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Evaluating travel distance provisions in the National Building Code of Canada

History, assumptions, current practices, and
recommendations for future directions

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Abbreviations and acronyms

AHJ	Authorities Having Jurisdiction
APEGA	Association of Professional Engineers and Geoscientists of Alberta
ASET	Available Safe Egress Time
BIM	Building Information Modelling
CFAST	Consolidated Model of Fire and Smoke Transport
CFD	Computational Fluid Dynamics
ESFR	Early Suppression Fast Response
FDS	Fire Dynamics Simulator
FPETOOL	Fire Protection Tools for Hazard Estimation
HRR	Heat Release Rate
HVAC	Heating, Ventilation And Air-Conditioning
IBC	International Building Code
IFEG	International Fire Engineering Guidelines
NBC	National Building Code of Canada
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NRC	National Research Council of Canada
RSET	Required Safe Egress Time
SCO	Safety Codes Officer
SFPE	Society of Fire Protection Engineers
UBC	Uniform Building Code

Executive summary

Commissioned under the National Research Council of Canada (NRC), this report reviews how the National Building Code of Canada (NBC) 2020 Part 3 travel distance provisions (Sentence 3.4.2.5.(1), maximum allowable distance to an exit in an emergency and related egress rules) are currently applied, what assumptions underlie them, and where clarifications would improve consistent use. The report does not evaluate enforcement or maintenance practices, expand definitions, or propose code text; priority is to clarify existing provisions and identify research needs to help inform potential future technical work by the relevant committees.

Canada's travel distance benchmarks, set in 1941–1965, remain virtually unchanged aside from minor updates. These limits were based on precedent and engineering judgment, not on empirical modelling, and reflect conditions from nearly a century ago (see Section 5). Given today's larger, more complex buildings and diverse occupants, these prescriptive limits may no longer consistently reflect safety needs.

The prescriptive travel-distance limits and related egress provisions are summarized in Section 4 of this report. It includes the objectives and functions; how distance interacts with endpoints, tenability, and vertical travel; and practical dependencies (sprinklers, smoke control/pressurization, emergency lighting, signage, wayfinding). Section 6 translates these themes into reviewable criteria, explicit tenability thresholds (see Table 3), declared system dependencies with degradation checks, visibility/wayfinding under smoke, and clear endpoints, used to demonstrate that Available Safe Egress Time (ASET) exceeds Required Safe Egress Time (RSET) to the declared endpoint.

Code users noted (Section 7) that prescriptive distances work in typical buildings but fail in large or complex layouts. Participants asked for a clearer performance pathway tied to explicit tenability benchmarks, RSET inputs that reflect occupant diversity, and declared/tested dependencies. A hybrid model, prescriptive baselines with a structured performance pathway, would improve clarity, consistency, and safety across Canada.

Note: This report focuses on Part 3 requirements, Part 9 is referenced only where needed for alignment.

Structured around five core research tasks, the study examines:

- **Task 1:** The current prescriptive requirements in Part 3 of the NBC 2020, including associated objectives, functional statements and dependent provisions such as fire separations, exit signage, smoke control and exit capacity.
- **Task 2:** The historical evolution of travel distance limits, tracing their roots to early 20th century insurance guidelines, fire tragedies and possible cross-industry influences such as mining, military and maritime standards.
- **Task 3:** The tools and methods used in performance-based design to justify travel distance exceedances in alternative solutions, including evacuation modelling approaches.
- **Task 4:** Insights from a national survey and workshop conducted with code users including designers, engineers and Authorities Having Jurisdiction (AHJs) to capture practical challenges, interpretations and needs in evaluating travel distance compliance.
- **Task 5:** Synthesize findings across all tasks to guide future research and recommendations.

Key gaps in performance-based design

- **Lack of standardization:** There is no nationally adopted methodology for evaluating alternative egress designs based on performance. Modelling inputs, safety margins, and tenability thresholds vary between jurisdictions and projects, leading to inconsistent levels of rigor and review.
- **Modelling misuse and oversimplification:** Fire and egress simulations are powerful but are sometimes used with overly optimistic inputs, such as immediate occupant movement, idealized travel paths, or uniform mobility. This can result in underestimating Required Safe Egress Time (RSET) or overestimating Available Safe Egress Time (ASET).
- **Absence of a national certification system:** Canada lacks a formal credentialing framework for professionals submitting or reviewing fire protection designs. As a result, performance-based strategies may be developed or approved by individuals without demonstrated fire modelling or egress expertise.
- **Reliance on legacy prescriptive benchmarks:** Performance-based modelling inputs are often anchored to existing prescriptive thresholds which may no longer reflect actual hazards or behavioural science.

The findings highlight gaps in both prescriptive and performance-based egress design. To ensure more reliable outcomes, this report recommends a hybrid approach that blends prescriptive clarity with performance-based flexibility, grounded in evidence and human behaviour.

Key recommendations

Clarifications of existing provisions

- **Definitions and metrics:** Define safe place, tenable conditions and timely movement. Set national benchmarks for visibility, temperature, and gas toxicity in both horizontal and vertical routes.
- **Minimum inputs and safety factors:** Publish default/allowed ranges and minimum RSET buffers (e.g., 20–30% or equivalent time) tailored by risk.
- **Equivalency benchmark (time-based):** Demonstrate $ASET > RSET$ to the declared endpoint using explicit tenability criteria and a minimum sensitivity set (pre-movement distributions; cohort-specific speeds; visibility degradation; credited systems timing/ performance).
- **Behaviour and wayfinding:** Document pre-movement delays, signage/visibility under smoke, route choice, and congestion/fatigue effects that influence RSET.
- **Endpoints and equity:** State the endpoint exit for Article 3.4.2.5 compliance; refuge only where the strategy explicitly allows and is fully supported. Reflect mixed-ability movement and assisted evacuation in RSET inputs where applicable.

Recommended research

- **Modernize travel distance benchmarks:** Reassess the prescriptive limits using current research, egress modelling and empirical evacuation data to ensure they reflect actual hazard timelines and occupant behaviour.
- **Standardize performance-based evaluation:** Develop national benchmarks and guidance for evaluating alternative egress designs, including clear benchmarks for evacuation modelling, including travel times, occupant behaviour, tenability thresholds and safety margins.
- **Address human behaviour and equity in egress:** Expand design expectations to reflect behavioural delays, varied cognition and the needs of vulnerable occupants. Prescriptive provisions should account for aging populations, persons with disabilities and non-fire emergencies.
- **Strengthen fire safety system integration:** Establish requirements for integrated smoke control testing, stair pressurization validation and long-term reliability of fire protection systems tied to extended egress paths.
- **Build capacity and accountability:** Introduce a national credentialing system for fire protection professionals and require third-party review of high-risk or complex alternative solutions to support consistent, qualified evaluation.
- **Verify performance-based designs after occupancy:** Implement post-occupancy inspections or audits for buildings relying on performance-based designs.

Programmatic enablers (outside code text)

- **Credentialing and training:** Define pathways for performance-based design practitioners and reviewers; provide AHJ training and worked examples.
- **Peer/third-party review:** Consideration of independent technical review for complex exceedances (magnitude/complexity) or when distance thresholds are significantly surpassed.
- **Guidance examples and templates:** Publish worked examples, default input libraries, and standardized documentation.
- **Post-occupancy verification:** Implement periodic checks for assumptions tied to credited systems (e.g., integration tests for alarms–smoke control–signage/communications) and re-assessment triggers after major renovations/system changes.

1.0 Introduction

1.1 Purpose and scope

This report evaluates the assumptions, gaps and limitations of the travel distance requirements outlined in Sentence 3.4.2.5.(1) of Division B of the NBC 2020. The primary focus is Part 3; Part 9 is noted only where explicitly referenced for alignment. The objectives are to clarify the rationale behind current distance requirements, assess their suitability in contemporary building contexts, and describe how tools and methodologies are used when proposing alternative solutions that credit extended travel distance. Although specific building types such as farm buildings, fixed seating assemblies and mezzanines are excluded, the findings are intended to inform code development and performance-based compliance pathways to improve the clarity, consistency and transparency of alternative solution evaluations. This will ultimately enable more evidence-based decision-making and greater confidence in the development and approval of alternative solutions (Bergeron, 2004; Meacham, 1998; Frye et al., 1998). Observations about operational/maintenance conditions (e.g., shutoffs, impaired systems) are included only as context and are not proposals to expand code scope.

1.2 Background

Travel distance is defined as the maximum distance an occupant must travel from any point in a floor area to an exit and has served as a proxy for ensuring timely evacuation during emergencies. These values were historically based on judgment and precedent, originating from early 20th century American fire codes and insurance guidelines rather than empirical evidence (National Board of Fire Underwriters, 1905; Ferguson, 1974a; Law & Beever, 1994). Despite advancements in fire modelling, human behaviour research and detection systems, core values like 30 metres and 45 metres have remained largely unchanged (Gwynne & Boyce, 2016; Kuligowski & Peacock, 2005). This continued reliance on legacy assumptions limits alignment with observed evacuation behaviour and raises important questions about their ongoing validity in today's diverse and complex building environments (Ronchi et al., 2013; Kuligowski, 2016).

Recent research and professional practice have highlighted that these fixed values often fail to reflect actual human behaviour during emergencies or account for diverse occupant needs, especially among vulnerable populations (Proulx, 1999; Fridolf, 2010; Bukvić et al., 2021; Smedberg et al., 2022). There is also a growing consensus that alternative solutions lack consistent evaluation frameworks and rely on inconsistent interpretations (Gwynne et al., 2017; Meacham, 2015; Purser & Bensilum, 2001).

2.0 Methodology

This report is based on and structured in alignment with the NRC's Statement of Work. Its goal is to clarify the rationale, assumptions and performance implications of travel distance requirements in the NBC 2020. Each task draws on a distinct methodological approach, combining document analysis, historical research, practitioner engagement and technical evaluation.

2.1 Categorization

The project was organized into the following five tasks:

Task 1: NBC 2020 code analysis

A detailed review of Part 3 of the NBC 2020, focusing on Sentence 3.4.2.5.(1), related objectives and functional statements in Division A and related provisions like fire separations, exit signage, exit capacity and smoke control. While no official user guide exists for the NBC 2020, interpretive insights were drawn from the NBC 1995 User's Guide – Part 3: Fire Protection, Occupant Safety and Accessibility, which remains a valuable legacy reference for understanding the rationale behind prescriptive egress requirements (National Research Council of Canada, 1995).

Task 2: Historical review

Historical context was established through a review of past NBC editions, archival records, technical literature and US and international codes, such as those from the National Fire Protection Association (NFPA) and the International Code Council (NFPA, 1924, 1942; International Code Council, 2024).

Key US developments such as New York City's 1901 Tenement House Act, the 1922 NYC Building Code and the 1905 guidelines from the National Board of Fire Underwriters (NBFU), as well as the 1913 formation of the NFPA's Committee on Fireproof Construction, are examined for their foundational influence on egress standards (National Board of Fire Underwriters, 1905, 1922; City of New York, 1922).

These efforts helped shape the NFPA's early Building Exits Codes (e.g., NFPA, 1924), which later evolved into today's NFPA 101: Life Safety Code (NFPA, 2006–2024). Relevant literature on cross-sector influences, such as mining and maritime safety, was reviewed to understand how early industrial hazards informed egress concepts (Archer, 2003; Allin et al., 2024). Critiques by Ferguson (1974, 1975) and Law, M., & Beever (1994), provided important context on the persistence of prescriptive "magic numbers" and the regulatory inertia surrounding travel distance limits.

Task 3: Methods and design tools - review of alternative solutions

This task involved the evaluation of modelling tools, performance-based design methods and the assumptions used in alternative solutions. Thirty alternative solutions approved by The City of Calgary were reviewed to understand how extended travel distances were justified in practice. This review includes analysis of submitted performance modelling, fire protection systems and ASET-RSET comparisons.

The primary references informing the analysis include the SFPE Handbook of Fire Protection Engineering (2016), which provides detailed guidance on tenability thresholds, fire modelling methods, and occupant behaviour; the NFPA 101: Life Safety Code, which outlines evacuation strategies and performance expectations (NFPA, 2006–2024); and the NBC 1995 User’s Guide – Part 3: Fire Protection, Occupant Safety and Accessibility, which remains a practical reference for understanding code rationale (NRC, 1995). NFPA 130 was also used as a benchmark to outline evacuation performance expectations for transit platforms (NFPA, 2003–2023).

Supporting references included tenability data from Purser (2016), movement speed data from Kuligowski et al. (2015), and fire growth characteristics described in Gann et al. (2007).

Task 4: Participant engagement

A national survey and professional workshop were designed and deployed to gather firsthand experiences from code users across Canada. Participants included architects, engineers, building officials, and fire safety professionals. The survey captured perceptions of prescriptive travel distance limits, challenges with compliance, and the processes used to evaluate or submit alternative solutions. The workshop provided a forum to discuss real-world design scenarios, explore regulatory friction points, and identify needs for improved guidance and greater consistency in application.

Task 5: Synthesis and reporting

Findings from all tasks were integrated into a single report that combines regulatory analysis, historical context, modelling evaluation, and stakeholder feedback. This task also drew on critiques and recommendations from performance-based design literature, including Meacham (2015), who advocates for risk-informed, transparent evaluation frameworks; Hurley and Kuligowski (2016), who emphasize conservative modelling assumptions and reproducibility in fire protection engineering; and Gwynne et al. (2017), who highlight process and skill gaps in evaluating complex fire protection strategies, particularly during egress drills and performance assessments.

2.2 Research limitations

As with any complex code study, this research was subject to a range of limitations related to scope, data access, and representativeness. These are summarized below to support transparency and contextualize the findings.

2.2.1 Scope and focus

- The analysis is limited to Part 3 of the NBC 2020. References to Part 9 are limited to explicit callouts for context; otherwise, “travel distance” denotes Part 3.
- It centers on NBC 2020, Sentence 3.4.2.5.(1). Other egress-related provisions are referenced only when directly relevant.

2.2.2 Out-of-scope

- Instances where buildings are temporarily non-compliant (e.g., disabled systems, blocked routes, poor maintenance) are beyond scope. They are identified to explain performance assumptions.
- Farm buildings, mezzanines, fixed seating assemblies, and other specialized occupancies are excluded.
- Related topics such as crossover floors may be noted but not assessed in depth.
- Integration & maintenance context (for clarity, not evaluation): Where systems interact (alarm/HVAC/power/doors), CAN/ULC-S1001 governs integrated system testing; maintenance is addressed in the National Fire Code. This report does not assess adequacy; it clarifies dependencies when crediting performance in alternative solutions.

2.2.3 Geographical and jurisdictional constraints

- The study does not analyze how provinces or municipalities adapt, adopt, or enforce NBC 2020 travel distance provisions.
- Local interpretation and enforcement by AHJs are acknowledged but not examined in detail.
- All reviewed case studies were submitted under the Alberta Building Code (ABC) or National Building Code-Alberta Edition. Minor provincial variations may limit direct national generalization.

2.2.4 Source material limitations

- The historical review of NBC 2020 travel distance values was based on manual document analysis; minor transcription or classification errors may exist.
- Original committee records and early code editions often lacked explanatory detail, limiting insight into the rationale behind prescriptive distances.
- Analysis was based on available and volunteered documentation. Some data gaps remain, and findings may not fully represent all jurisdictions or practices.

2.2.5 Comparative and performance-based analysis

- The study did not conduct original modelling or evaluate the real-world performance of travel distances in actual fire scenarios.
- While some international codes (e.g., IBC, Eurocodes) were referenced, they were not analyzed in depth due to the NBC-specific focus.
- Variability in performance-based design quality and modelling input rigor across jurisdictions could not be independently verified.
- The study did not conduct independent modelling or replicate the simulation inputs used in reviewed case studies. As such, conclusions about performance-based methods are based on secondary review and may reflect variation in modelling assumptions or tools.

2.2.6 Document access and sample size

- The review of alternative solutions was based on available case files from a single municipality (Calgary). Broader representativeness cannot be assumed.

2.2.7 Time constraints

- Time limitations inherent to the project may have constrained the depth of archival research.
- While efforts were made to capture representative materials, the review was not exhaustive, and some relevant sources may have been missed.

2.2.8 Engagement and participant input

- Survey and workshop participation was voluntary, and results may reflect response bias or overrepresentation of specific professions or regions.

2.3 Assumptions

This research was informed by the following assumptions, which shaped the scope, analysis and interpretation of findings:

- **Uniform interpretation of code intent:** It is assumed that objectives and functional statements associated with NBC 2020, Article 3.4.2.5, are interpreted consistently across jurisdictions and by code users.
- **Modelling rigor:** it is assumed that designers used defensible modelling inputs and methodologies in their submissions. Independent validation of modelling was not undertaken.
- **Transferability of evacuation data:** Modelling inputs and behavioural data derived from international literature are assumed to be applicable to Canadian contexts, though regional and demographic differences may limit accuracy.
- **Behavioural representativeness:** It is assumed that human behaviour during emergencies, as documented in literature, is broadly predictive of real-world response.

3.0 NBC 2020 structure and objective - based framework

The NBC 2020 uses an objective-based framework in which provisions in Division B (acceptable solutions) are attributed to Division A objectives and functional statements, with Division C setting administrative requirements. Figure 1 illustrates the hierarchy.



Figure 1. Structural hierarchy of the NBC

3.1 Compliance

Division A defines how compliance is achieved. NBC 2020, Article 1.2.1.1. specifies that compliance may be demonstrated either by adhering to Division B's acceptable solutions or by implementing alternative solutions that perform equally well in terms of the objectives and functional statements.

Two compliance pathways

Acceptable solutions

If a design meets all applicable acceptable solutions in Division B, it is deemed compliant with the NBC 2020. There is no need to reference the Division A objectives or functional statements in this case. The prescriptive and performance-based provisions in Division B are attributed to specific objectives and functional statements. This attribution helps clarify why a provision exists and what it is meant to achieve.

Alternative solutions

If a design differs from Division B, it is treated as an alternative solution. The designer must show it addresses the same objectives and functional statements as the acceptable solution it replaces and achieves equal to or greater performance. Since the objectives are qualitative, performance must be judged relative to the quantitative aspects of the NBC 2020, Division B.

3.2 Defining performance

Division B sets the minimum acceptable level of performance. It contains prescriptive requirements, which are deemed to meet the objectives and functional statements set out in Division A. Most of the requirements in Division B are linked to at least one objective and one functional statement. The Code's objectives, detailed in Division A, Part 2, reflect the intended outcomes that each requirement is designed to support. To help clarify how specific requirements meet these goals, functional statements are used.

3.3 Clarifying the relationship

Objectives(O): These define the intended societal outcomes of the Code — such as safety (OS), health (OH), fire and structural protection of buildings (OP), accessibility (OA) and environmental (OE).

Functional Statements (F): These describe the intended function or role of a building element or system in achieving an objective. For example, a functional statement might say that a fire separation must facilitate “the timely movement of persons to a safe place in an emergency.” (NBC 2020, 3-2 Division A)

Further to these, provisions in Division B have been reviewed to identify their intended purpose. These **intent statements** outline the specific risks or undesirable outcomes that each requirement is meant to prevent. While these statements are not legally binding parts of the Code, they serve as helpful guidance for users, particularly when developing performance targets for alternative solutions. They are available on the NRC’s website as a separate document.

3.4 Administrative provisions

Division C of the Code outlines the administrative provisions necessary for compliance defining the roles and responsibilities of building owners, designers and contractors and setting procedures for obtaining permits, undergoing inspections and fulfilling professional responsibilities. It also provides clear direction on the submission, review and documentation of alternative solutions.

3.5 Developing an alternative solution under NBC 2020

Developing an alternative solution under the NBC 2020 requires demonstrating that the proposed design meets or exceeds the level of performance established by the prescriptive provisions. The table below outlines a generalized process based on common industry practice and guidance from Division A. While individual jurisdictions may require additional documentation or review steps, this framework provides a reference point for structuring and justifying performance-based proposals related to travel distance exceedance. The following figure shows the process for developing an alternative solution under the NBC 2020.

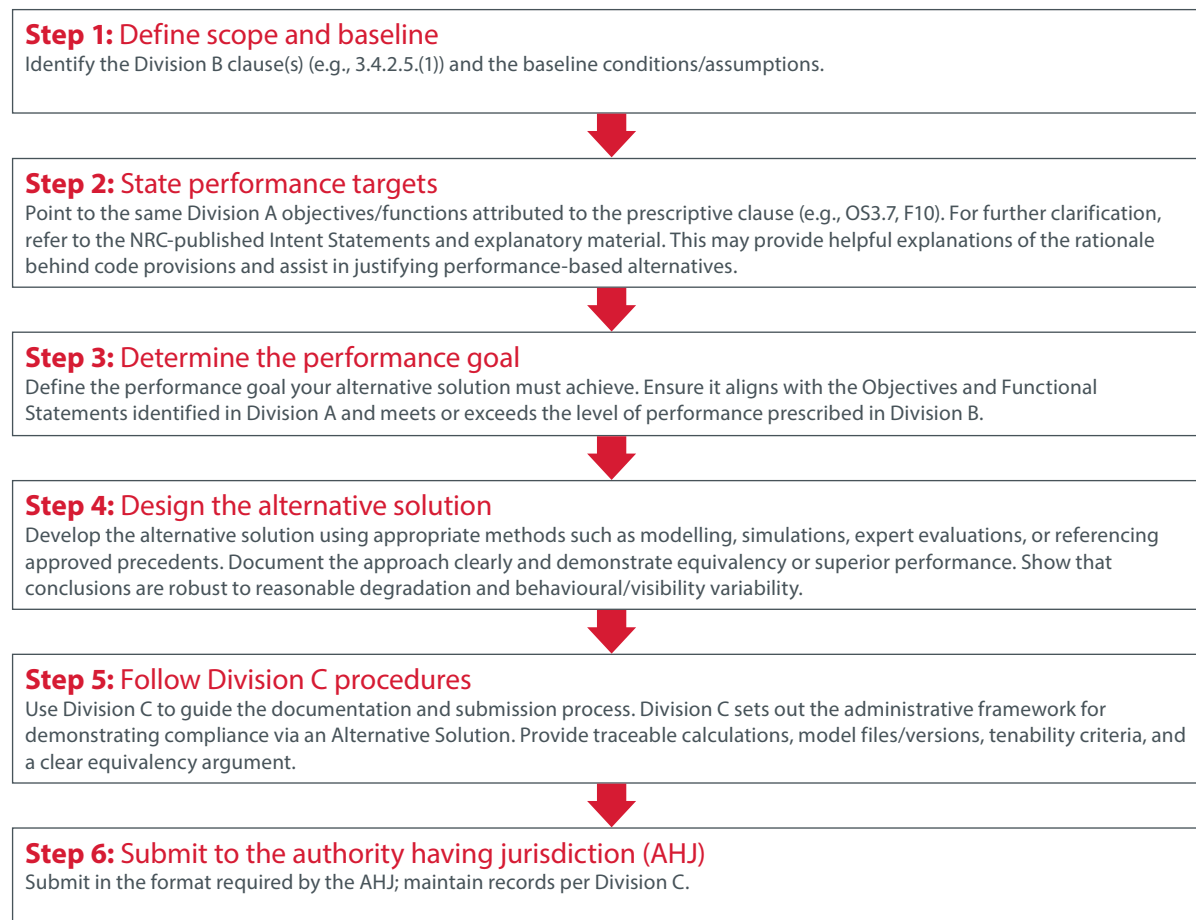


Figure 2. Process for developing an alternative solution under the NBC

3.6 Clarifying equivalency for travel distance alternatives

Division B provides clear prescriptive limits (e.g., maximum travel distance by occupancy type), but the Code does not specify a single quantitative metric (e.g., evacuation time or safety margin) that automatically defines “equivalent” performance. As Bergeron (2006) notes, “the acceptable solution remains the benchmark” (p.9), and equivalency must be demonstrated through reliable methods. However, because travel distance is not explicitly tied to evacuation time, life safety outcomes, or tenability criteria, the path to demonstrating compliance is not always well-defined. This can result in variability across jurisdictions and makes performance equivalency a negotiated outcome, rather than a clearly measurable one.

4.0 Prescriptive travel distance requirements

This section summarizes the NBC 2020 prescriptive travel distance requirements (Part 3 focus) and the assumptions that underlie their application. References to operational/maintenance conditions (e.g., impaired systems, temporary obstructions) are included only as context for performance-based submissions and are outside the scope of the analysis that is summarized in this report. Unless explicitly noted, “travel distance” refers to its use within the NBC 2020 Part 3, Part 9 is referenced only where stated.

4.1 NBC 2020, Division B, Article 3.4.2.5.

The NBC 2020, Division B, Article 3.4.2.5. sets out the maximum allowable travel distances that apply when more than one exit is required from a floor area and are based on the type of use, presence of sprinklers and other features. These prescriptive limits are intended to provide a minimum baseline of life safety by controlling how far building occupants may have to travel to reach an exit under emergency conditions. The table below summarizes the prescriptive travel distance limits:

Table 1. Prescriptive travel distance limits by occupancy type (NBC 2020, Division B, Sentence 3.4.2.5.)

Clause	Maximum travel distance to exit	Occupancy	Conditions
(1)(a)	25 m	High-hazard industrial occupancy	None
(1)(b)	40 m	Business and personal services occupancy	None
(1)(c)	45 m	Any occupancy other than high-hazard industrial	Sprinklered throughout
(1)(d)	105 m	Floor area served by a public corridor where rooms/suites are not separated by a fire separation,	Corridor \geq 9 m wide <ul style="list-style-type: none"> Ceiling height \geq 4 m Building is sprinklered throughout No more than half of required egress doors open into the corridor
(1)(e)	60 m	Storage garage	Must comply with Article 3.2.2.92. - Group F, Division 3, Storage Garages up to 22 m High <ol style="list-style-type: none"> A building used as a storage garage with all storeys constructed as open-air storeys and having no other occupancy above it is permitted to have its floor, wall, ceiling and roof assemblies constructed without a fire-resistance rating provided it is, <ol style="list-style-type: none"> of noncombustible construction, not more than 22 m high, measured between grade and the ceiling level of the top storey, not more than 10 000 m² in building area, and designed so that every portion of each floor area is within 60 m of an exterior wall opening.
(1)(f)	30 m	All other floor areas not covered by (a) to (e)	

Perimeter exits: Sentence 3.4.2.5.(2) exempts the limits in Sentence (1) if exits are placed along the perimeter not more than 60 m apart (measured along the perimeter) and each main aisle leads directly to an exit (not applicable to high-hazard industrial).

Visibility/indication of exits: Sentence 3.4.2.5.(3) requires that exits are always clearly visible or their locations clearly indicated and accessible.

Refer to Appendix 1 for a detailed code analysis and related provisions (e.g., signage, emergency lighting, exit continuity/enclosure).

4.2 Code intent: Objectives, functions and performance expectations

Article 3.4.2.5. aligns primarily with Objective OS3.7, which is “to limit the probability that, as a result of the design or construction of the building, a person in or adjacent to the building will be exposed to an unacceptable risk of injury due to hazards...caused by persons being delayed in or impeded from moving to a safe place during an emergency”—and with Functional Statement F10, “to facilitate the timely movement of persons to a safe place in an emergency” (NBC 2020, Division A).

Travel distance limits are not merely spatial measurements; they are a means to support timely, reliable egress consistent with OS3.7/F10. NRC intent/explanatory materials emphasize reducing delays in movement and ensuring that exits are visible/indicated and accessible so that occupants can progress to a safe place without undue disorientation or congestion.

These limits work in concert with related requirements (e.g., exit visibility/indication, signage, emergency lighting, and exit continuity/enclosure) to create a coherent egress strategy. The travel distance requirement itself sets the baseline path length; the related provisions influence whether that path can be found and used under emergency conditions. The items below are related provisions that interact with travel distance, they are not additional travel-distance requirements.

4.3 Safe egress beyond travel distance

Means of egress

Prescriptive travel distance limits are one element of a larger, interconnected egress strategy. Travel distance limits are meant to account for the time needed to detect an emergency, decide on a course of action and safely reach an exit before conditions become untenable. The NBC 2020, Division A, Article 1.4.1.2., defines the means of egress as the continuous path of travel from any point in a building to a safe place (Div. A 1.4.1.2.) Types of exits permitted (e.g., interior/exterior stairways, horizontal exits, exterior passageways) are listed in Div. B 3.4.1.4, and requirements governing access to exits appear in Section 3.3 (Safety within Floor Areas).

As set out in the NBC 2020, Div. B 3.4.2.4.(1), travel distance reflects the actual walking path, not a straight line. In specific cases permitted by the Code, distance may be measured from the egress doorway of a room or suite (rather than the most remote point) when conditions such as a fire-rated separation and direct access to a public corridor or exterior passageway are met.

Interrelated provisions

Travel distance sets a baseline path length consistent with OS3.7/F10 objectives, supporting timely movement to a safe place before conditions become untenable. Safe evacuation depends on many interrelated provisions such as exit signage, emergency lighting, exit continuity/enclosure and high-building measures to limit smoke movement. These related provisions interact with travel distance; they do not change the stated distance limits. To fully understand this, it must be examined in the context of the NBC 2020's complete egress framework.

The provisions below influence whether that path can be found, used, and kept tenable long enough for evacuation.

Note: All references below are to the NBC 2020, Division B.

- **Exit quantity and redundancy:** NBC 2020, Article 3.4.2.1. generally, mandates a minimum of two exits from each floor area to ensure redundancy in case one exit is compromised.
- **Distance between exits:** NBC 2020, Article 3.4.2.3. stipulates separation distances between exits, typically at least half the floor's diagonal length or a minimum of 9 metres, to prevent simultaneous compromise. This is meant to be “the shortest distance that smoke would travel between exits.
- **Exit separation:** Where required exits shall be separated from the remainder of the building by a fire separation (Subsection 3.4.4.).
- **Signage:** Every exit shall provide visual exit signage (NBC 2020, Subsection 3.4.5.).
- **Door and hardware requirements:** Generally, exit doors must swing in the direction of travel (NBC 2020, Article 3.4.6.12.), be self-closing (NBC 2020, Article 3.4.6.13.) and include hardware that meets usability standards (NBC 2020, Article 3.4.6.16.).
- **Unobstructed routes:** Exit routes must remain direct, unobstructed and free from temporary barriers such as furniture or displays (NBC 2020, Article 3.4.2.5).
- **Capacity and bottlenecks:** Corridors and stairwells must be sized according to occupant load to prevent bottlenecks, especially at floor convergence points (NBC 2020, Subsection 3.4.3).
- **Vertical protection:** In multi-storey buildings, stairways must be enclosed in fire rated shafts to limit smoke migration. Fire separations and closures (NBC 2020, Subsection 3.1.8.) further delay the spread of flame and smoke.
- **Horizontal evacuation:** Especially in care occupancies, horizontal evacuation using protected compartments is essential for those unable to use stairs.

Additional layout considerations. Complex plans (e.g., dead-end corridors, crossover floors, fixed seating) may require project-specific strategies within the Code framework to ensure that tenability and wayfinding remain adequate for the assumed evacuation timelines. Post-occupancy obstructions (e.g., furniture/displays placed in egress paths) and impaired systems are enforcement/maintenance matters outside the NBC's prescriptive scope; they are noted only to explain assumptions relevant to performance-based submissions.

4.4 Acceptable safety in travel distance limits

Fire incident investigations rarely isolate travel distance as the decisive variable for fatalities; outcomes typically co-vary with blocked/locked exits, crowding, missing suppression/detection, smoke migration, or management failures. Public reports also seldom include the granular, time-resolved data needed to recalibrate distance values (e.g., per-occupant pre-movement distributions, route choices, node-level visibility/CO/temperature histories, door/pressurization states, and reliable stair flows).

Accordingly, this report does not claim that current metre values are “unsafe”; it identifies assumption-sensitive areas where clarified performance criteria and targeted research would improve confidence in equivalency judgments. (See section 6.2; SFPE HB; NIST evacuation datasets; NFPA incident summaries.)

We assume travel distances are risk-informed baselines that, when applied with their dependent provisions (detection, suppression, visibility, enclosure, capacity), have produced broadly acceptable safety in typical conditions. “Safe” is not absolute; it’s acceptable risk under stated assumptions.

Section 4.4 shows where those assumptions may not hold uniformly (e.g., very tall buildings, highly complex layouts, diverse populations, or emerging hazards). That’s justification for clarifications now and research toward any future recalibration, not evidence that the prescriptive framework is categorically unsafe.

4.5 Assumptions, gaps and limitations in prescriptive travel distance requirements

This section outlines the key assumptions that underlie the NBC 2020 travel distance provisions and identifies limitations that can affect consistent application. Fixed travel distance limits are part of the prescriptive egress strategy; some assumptions are stated in Code text or explanatory materials, while others are implicit in the broader history and structure of prescriptive regulation. When examined against modern building configurations, diverse occupant profiles, and contemporary emergency scenarios, several assumptions may not hold uniformly.

Attribution and scope labels used in 4.4.

- Statements in this subsection are attributed to: (a) NBC 2020 clauses and explanatory/intent materials; (b) historical sources summarized elsewhere in this report; (c) Users’ input from the survey/workshop; and (d) where not directly cited, the author’s synthesis of these sources for clarity.
- Where sources are silent or ambiguous, statements marked as such reflect a consolidation of evidence from code text, commentary, historical references, and practitioner feedback (see Methodology and Bibliography).
- Examples of non-compliance (e.g., shutoff systems, blocked routes) are outside NBC scope; they appear only to explain assumptions relevant to performance-based submissions.

4.5.1 Methodology

A document-analysis approach was used to assess whether NBC 2020 prescriptive travel-distance provisions (with emphasis on Div. B Article 3.4.2.5) should be applied consistently given modern building types, diverse occupant characteristics, and contemporary emergency scenarios. The analysis combined regulatory review with assessment of academic, technical, and practice literature (Kuligowski et al., 2010; Ronchi & Nilsson, 2013; SFPE, 2016). Peer-reviewed studies covered evacuation dynamics, egress modelling, fire/smoke behaviour, and system reliability (Kuligowski et al., 2010; Gwynne & Boyce, 2016; Ronchi & Nilsson, 2013). Guidance from NFPA, NIST, SFPE, and ISO/BSI was used to compare assumptions and identify good practice (inputs, outputs, and sensitivity testing) (SFPE, 2016; ISO, 2012). Data was analyzed to identify assumptions and limitations, then grouped into themes used in 4.5.3–4.5.9.

Note: this section does not evaluate testing/maintenance or enforcement practices (NRC, 2020; SFPE, 2016).

Supplementary resources

- NRC commentary documents, explanatory notes and intent statements for NBC 2020, Article 3.4.2.5. were used to interpret the rationale behind each clause, including assumptions about occupant behaviour, system reliability and building conditions.
- Historical references such as the NBC 1995 User’s Guide and early editions of the NFPA Building Exits Code were reviewed to understand the origins and evolution of travel distance limits in North American codes.

4.5.2 Expanding the definition of risk beyond fire

While the NBC uses the term “emergency” broadly (e.g., structural, chemical, security), the Part 3 egress provisions and common evaluative frameworks (e.g., ASET/RSET using fire/smoke tenability) are historically fire-centred and calibrated to smoke development, heat, and typical alarm/notification cues.

Explanatory note A-2.2.1.1.(1) states that “emergency” is used broadly and that fire is the most common emergency addressed by the Code; other situations may be considered. In practice, however, travel distance and related Part 3 provisions are applied and reviewed against fire-based design scenarios unless another scenario set is explicitly declared.

4.5.3 Egress delays

A foundational premise of many building egress designs, including travel distance and exit capacity calculations, is that once notified of an emergency, occupants will begin moving toward exits without significant delay. This assumption is embedded in prescriptive code logic, such as that found in the NBC 2020 and NFPA 101: Life Safety Code.

Prescriptive egress requirements such as travel distance limits assume that occupants will follow a clear, unobstructed and optimally direct path to the nearest exit. The NBC 2020 explanatory note A-3.4.2.5. (1) supports this premise stating, “Travel distance is measured from the most remote point in a floor area to the nearest exit using the most direct route of travel...The path of travel must be clear and not obstructed by partitions, furnishings or other elements.”

This assumption, that occupants will respond promptly and predictably to alarms is not consistently supported by empirical studies. Research by Kuligowski et al. (2010) and Gwynne and Boyce (2016) demonstrate that individuals often delay evacuation due to cognitive overload, disbelief, confirmation-seeking behaviour or waiting for social cues.

These delays are exacerbated in unfamiliar environments or where emergency communication is unclear, undermining the premise that short travel distances alone ensure timely egress. Some of these delays include:

- **Alarm fatigue:** The NFPA 72: National fire alarm and signaling code handbook (NFPA, 2022) acknowledges that frequent nuisance alarms can lead to occupant desensitization or “alarm fatigue,” undermining the urgency to act.
- **Movement to the familiar:** Environmental psychology research by Jonathan Sime (1985) documents the phenomenon of “movement to the familiar,” where individuals tend to follow known paths and people they recognize, even when safer or more direct routes are available. This behaviour, driven by instinctual social cohesion and spatial memory, can lead occupants to bypass clearly marked exits.
- **Flow stability:** Prescriptive travel-distance limits do not address stewarding, queuing layout, barrier placement, or staff procedures that govern flow stability at exits.
- **Post-occupancy reconfigurations:** Kobes et al. (2010) and Bukowski (2009) (e.g., displays or partitions that screen signs).
- **Crowd dynamics:** Empirical research shows that crowd behaviour can create crush and queuing hazards independent of flame/smoke, particularly in high-density or complex environments (Kuligowski & Peacock, 2013; Ronchi & Nilsson, 2013).
- **Behavioural reliance:** The presence of suppression systems can influence occupant behaviour, for example, delaying evacuation because people perceive reduced risk (Purser & Bensilum, 2001; Kuligowski, Gwynne & Boyce, 2010; NFPA, 2022).

Shorter travel distance alone does not ensure timely egress if pre-movement and behaviour delay effects are significant.

Note: This subsection does not evaluate alarm system adequacy; it clarifies assumptions that matter when judging equivalency for Part 3 travel-distance alternatives. Temporary obstructions and post-occupancy changes are enforcement/maintenance concerns; they are beyond NBC scope but material to performance claims.

Considerations for performance submissions

When an alternative solution credits extended travel distance, documents should include: (a) the assumed pre-movement range/distribution (bounding values rather than point predictions) and its basis (occupant profile, communication strategy); (b) the emergency communication approach (e.g., voice/visual messaging) and how it supports prompt recognition and route selection; (c) sensitivity checks showing ASET > RSET remains acceptable under reasonable increases in pre-movement, misrouting, or local congestion; (d) any reliance on staff procedures/drills and how those assumptions are bounded; and (e) the wayfinding aids used in analysis (exit signage). Where large transient crowds are expected (assembly, concourse, event turnover), performance submissions should include a crowd-management plan and, where warranted, egress simulations calibrated for density-flow relationships and surge conditions.

Illustrative contemporary hazards

Recent literature, for example; lithium-ion battery events with rapid escalation (Underwriters Laboratories Fire Safety Research Institute [UL FSRI], 2021) or toxic gas releases that present without smoke cues (Environmental Protection Agency Risk Management Program [EPA RMP]) shows that some non-fire emergencies can unfold faster or differently than the assumptions embedded in fire-based egress models. These examples are provided only to explain why performance submissions should declare the scenario set.

4.5.4 Wayfinding, visibility and egress path selection

Exit signage (Subsection 3.4.5) and emergency lighting (Subsection 3.2.7) support visibility along the means of egress. The discussion below examines limitations not explicitly addressed by prescriptive text (e.g., smoke occlusion, layout changes, crowding).

These delays are exacerbated in unfamiliar environments or where emergency communication is unclear, undermining the premise that short travel distances alone ensure timely egress. In real events, visibility and route choice can be degraded by:

- **Smoke/occlusion** Ronchi and Nilsson (2013) found that ceiling-mounted exit signs quickly become ineffective in smoke due to stratification.
- **Local sprinkler discharge** near the fire seat (referenced here only for visibility effects, not to imply egress toward the fire),

Taken together, these effects can increase RSET despite compliant travel distances (see Table 3: Common tenability thresholds and section 4.5.3 on egress delays).

Current building codes do not address dynamic wayfinding, and evacuation signage remains static, assuming optimal conditions and fixed layouts. Updating code frameworks to account for adaptive, intelligent guidance systems could improve evacuation outcomes.

Considerations for performance submissions

When an alternative solution credits extended travel distance, documents should include: (a) the signage/emergency-lighting assumptions used (placement/height, photometrics where applicable, and visibility under smoke); (b) any expected occlusion sources (smoke layers, local spray near the fire seat, fit-outs/partitions) and sensitivity checks demonstrating that $ASET > RSET$ remains acceptable under reasonable obscuration; (c) assumptions for route choice and decision points (including potential misrouting) and the communication approach that supports prompt recognition (cross-ref section 4.4.3); and (d) any operational dependencies (e.g., staff direction in assembly uses) and how those are bounded in the analysis.

Cisek and Kapalka (2014) showed that adaptive signage, responsive to real-time hazard and occupant data, can significantly reduce evacuation times and casualties. Their multi-path simulation demonstrated that dynamic systems consistently outperformed static signage, even in moderately complex layouts with uneven crowd densities. Similarly, Filippidis et al. (2021) developed a real-time evacuation framework using dynamic signage to direct occupants based on evolving fire spread, congestion, and pedestrian flow.

Current building codes do not address dynamic wayfinding, and evacuation signage remains static, assuming optimal conditions and fixed layouts. Updating code frameworks to account for adaptive, intelligent guidance systems could improve real-world evacuation outcomes.

4.5.5 Equity in egress: Addressing diverse occupant needs

Unless specifically noted, such as in care occupancies or floor areas where persons are cared for, the NBC 2020 does not differentiate evacuation requirements by age, ability, or sensory/cognitive condition. This design default can exclude a significant portion of the population (e.g., older adults, children, persons with disabilities, users of mobility devices, or people with sensory/cognitive impairments), who may be unable to evacuate within the same timeframe, particularly where no designated refuge is provided or phased evacuation is used.

Empirical studies support this concern. Geoerg et al. (2022) demonstrated that the presence of individuals with disabilities significantly alters pedestrian dynamics, reducing flow efficiency and undermining assumptions about homogeneous movement. Smedberg et al. (2022) also emphasize that older adults and those with functional limitations face additional challenges during egress, requiring longer travel time and access to rest points or assistance.

Research by Purser and Bensilum (2001) similarly highlights the need for differentiated evacuation design. Vulnerable individuals are more likely to experience disorientation, fatigue, or alarm during emergencies, especially in buildings not equipped with horizontal exits, areas of refuge, or clear assistance protocols.

While Division B Subsection 3.3.3 prescribes egress features tailored to each occupancy, the travel-distance limit itself is generally uniform and does not explicitly vary by occupant capability (e.g., mobility, sensory or cognitive differences). As a result, buildings serving populations with slower movement or assisted evacuation may require additional measures (e.g., areas of refuge where permitted, assistance planning, enlarged queuing/turning space) to achieve equivalent safety even when the prescriptive distance is met. (Bukvić et al., 2021; Smedberg et al., 2022).

Uniform travel distance limits assume uniform occupant characteristics. Shorter travel distance alone does not ensure timely egress for diverse populations if the analysis does not account for mobility/sensory constraints and feasible endpoints.

Considerations for performance submissions

Documentation should include: (a) the anticipated occupant mix and any assisted movement assumptions; (b) the route strategy (horizontal relocation vs. full vertical egress) and endpoint definition; (c) time allowances for assistance/rest and how these are reflected in RSET; (d) sensitivity checks showing $ASET > RSET$ under reasonable variations in assistance timing, queueing, and mobility spreads; and (e) any wayfinding/accessibility features used in the analysis (e.g., signage/lighting, door hardware, clear widths).

4.5.6 Sprinkler system assumptions

Many allowances and alternative-solution arguments implicitly credit sprinkler presence when justifying travel-distance exceedances; this dependence is recognized in practice commentary and trade guidance. Although not articulated in a single clause, the NBC 2020 implicitly assumes that sprinkler systems will provide perfect performance and reliably (National Research Council of Canada, 2020). By “perfect performance,” I mean the implicit assumption that all dependent life-safety systems (e.g., sprinklers, detection/alarms, smoke control/pressurization, emergency power, egress lighting) operate as designed for the full duration of egress with no impairment or degradation.

Incident analyses and research reports consistently show that sprinklers are highly effective when available, but unavailability or impairment (e.g., closed valves, maintenance issues, manual overrides) accounts for a substantial share of failures to control fires. Studies also note that supervision/monitoring improves reliability by reducing latent faults. These findings support treating credited systems as declared dependencies in performance analyses, rather than assuming flawless operation by default.

Note: This subsection addresses how performance claims for extended travel distance credit sprinklers; it does not evaluate the adequacy of testing/maintenance regimes. Examples such as shut valves or poor maintenance are outside NBC prescriptive scope; they are mentioned only to explain assumptions relevant to performance-based submissions. See also the subsection on smoke control systems—assumptions, reliability & testing, Section 4.4.4 (wayfinding/visibility), and Table 3 (common tenability thresholds).

Considerations for performance submissions

When sprinklers are credited, submissions should (a) declare the dependency, (b) show that $ASET > RSET$ margins are robust to reasonable degradation, and (c) describe supervision/monitoring assumptions that affect availability. (Practice failures—e.g., shut valves—are outside NBC scope but materially affect credited performance.)

4.5.7 Smoke control systems

Smoke control (e.g., stair pressurization, exhaust, dampers/doors, controls and sequences) is assumed to maintain tenable conditions in egress routes for the time required to evacuate occupants.

High-building provisions are intended to limit smoke migration and protect exits. In application, smoke control is an interacting system (fire alarm, HVAC, doors/closures, power) whose overall performance governs tenability in stairs, lobbies, and corridors. This subsection clarifies how such dependence is handled when crediting smoke control to justify extended travel distance; it does not evaluate the adequacy of testing/maintenance or enforcement regimes.

While the intent of smoke control systems is to maintain tenability, failures are not uncommon. Literature and incident/drill reports show that tenability can be compromised by:

- Pressurization shortfalls or loss of margin (leakage, leeward winds, stack effects, fan curve limits),
- Smoke leakage from interior doors,
- Incorrect interlocking between control panel and HVAC equipment, and
- Post-occupancy alterations/maintenance issues that change leakage pathways or disable components.

These failures can expose occupants to untenable conditions even in protected egress paths. Gann et al. (2007) also note the importance of accurate smoke modelling and validation, underscoring that assumptions about system performance must be matched with ongoing maintenance and monitoring protocols. Deferred or poor maintenance can further exacerbate risk. Damaged dampers, disabled fans, or overridden control sequences can significantly reduce the effectiveness of smoke control systems over time. Building operators may lack the expertise, incentives, or resources to conduct routine, integrated testing, which is essential to preserve the integrity of the system as designed.

Investigation data

As demonstrated in the 1980 MGM Grand Hotel fire, smoke can travel far beyond the floor of fire origin, affecting upper levels through shafts and ducts. Of the 85 fatalities in the MGM fire, 67 occurred above the fire floor, illustrating that vertical smoke migration remains critical threat to life safety (Bukowski, 2008).

Crowd crush / blocked-exit: NIST Station Nightclub summary & NCSTAR 2 (placeholder for reference).

Smoke in stairs as dominant life-safety issue: CCFD MGM summary; Fire Engineering retrospective (placeholder for reference).

Data/uncertainty in human behaviour & modelling: SFPE Guide to Human Behaviour in Fire (2nd ed.); Kuligowski (NIST) on behaviour process & modelling needs; NIST review of evacuation models.

Smoke is more often the cause of death than flame or heat. Toxic gases and reduced visibility compromise occupant tenability, even in areas far from the origin of fire (Gann, Averill, Marsh, & Nyden, 2007). McGuire and Tamura (1979) emphasize that vertical shafts, such as stairwells, elevator shafts, and service chases, are key conduits for smoke due to stack effects, piston effects and HVAC pressurization failures.

Note: Examples such as disabled fans, damaged/overridden dampers, or uncoordinated control sequences are outside NBC prescriptive scope; they are mentioned only to explain assumptions relevant to performance-based submissions. Historical events cited in the literature (e.g., legacy high-rise incidents) are used here as timeline/conditions examples, not as NBC design scenarios.

Considerations for performance submissions

Documentation should include: (a) declare the dependence on pressurization/exhaust and specify performance criteria used in analysis (e.g., ΔP targets, make-up/relief strategy, visibility/temperature/CO criteria—see Table 3); (b) provide sensitivity checks for credible deviations (door held ajar, fan step loss, leakage increase, wind/stack variation) showing $ASET > RSET$ remains acceptable; (c) describe the control/sequence assumptions (fire alarm linkages, door hold-open releases, elevator/smoke control interactions) that affect system behaviour; (d) state the re-entry/transfer-floor assumptions used to manage flows and door operations; and (e) reference available design/verification guidance (e.g., documentation/commissioning concepts in widely used smoke-control guides) for context, without asserting code adequacy.

4.5.8 Stairwells and vertical egress

High-building provisions include measures to limit smoke migration and protect exits. The focus here is where travel-distance reliance intersects with stairwell tenability and evacuation timelines in practice.

Guidance has long framed the exit system (stair + doors to/from it) as a protected route to a safe place. In application, however, performance analyses that credit extended travel distance should make explicit how stairwell conditions and timelines are treated.

Incident reports, drills, and modelling show that vertical egress conditions can degrade due to a combination of smoke infiltration (e.g., pressurization shortfalls, door-open effects), congestion/queuing, and fatigue, particularly for older adults and persons with functional limitations. Documented evacuations in high-rise buildings have required tens of minutes to over an hour even under organized conditions, with observed walking speeds dropping markedly in dense stairwells. Illustration only. Historical cases cited in the literature (e.g., legacy high-rise incidents) are used here as timeline/conditions examples, not as NBC design scenarios.

During the 1993 World Trade Center bombing, some occupants took up to three hours to evacuate from upper levels due to smoke and stairwell conditions (Fahy, 1995). Illustration only. The 1993 WTC case is cited as a timeline/conditions example, not as an NBC design scenario.

In a 1997 Ottawa high-rise fire, only 54% of those attempting to evacuate succeeded; others had to shelter in place due to untenable conditions (Proulx, 1999). Illustration only, used here as timeline/conditions examples, not as NBC design scenarios.

Examples such as pressurization out of tolerance, interior doors held open, or post-occupancy alterations are outside NBC prescriptive scope; they are noted only to explain assumptions relevant to performance-based submissions. Occupants may still face smoke, congestion and exhaustion, especially in high-rise buildings or among vulnerable populations. For designs that rely on long vertical travel, treatment of stairwell tenability and timeline realism should be clarified (pressurization performance, door management, congestion/fatigue) when proposing alternative solutions.

Considerations for performance submissions

For designs that credit long vertical travel, documents should include: (a) declare dependencies that affect stair conditions (e.g., pressurization/smoke control) and the assumed re-entry/transfer-floor strategy; (b) provide sensitivity checks for credible degradations (e.g., reduced pressure, a door held ajar, localized smoke entry) demonstrating that $ASET > RSET$ remains acceptable; (c) model congestion/queuing and potential counter-flow at decision points, with walking speeds appropriate to dense stairs and mixed abilities; (d) bound fatigue/assistance effects (e.g., rest allowances, staff intervention where applicable); and (e) state the endpoint (exterior exit vs refuge/horizontal relocation) and demonstrate tenability to that endpoint.

4.5.9 Refuge areas

The NBC 2020's travel distance limits are based on reaching a designated exit along a prescribed path. With limited exceptions (e.g., designated areas of refuge in certain care occupancies), the prescriptive path assumes occupants can traverse the route unaided. While the NBC 2020 includes refuge provisions for specific care-occupancy cases, comparable requirements are generally not mandated in many other occupancies (subject to local amendments/other applicable provisions).

For some populations and building configurations, the practical interim point of safety may be a refuge or horizontal relocation point rather than immediate discharge to the exterior, especially where vertical evacuation is prolonged or assistance is required (e.g., Proulx, 1995; Bukvić et al., 2021; Smedberg et al., 2022). In these situations, the performance claim's endpoint should be carefully framed: a refuge is not necessarily the "final safe place," but rather a temporary safe location where occupants may await assisted rescue or staged evacuation.

The NBC 2020 is not clear on the practical implications of refuge areas, particularly regarding assumptions about assisted evacuation. Designers should be cautious in performance claims: if refuge areas are treated as part of the evacuation strategy, the endpoint of safety must be properly defined, and the assumptions regarding assistance from that point onward should be transparent.

Considerations for performance submissions

When populations cannot complete vertical travel unaided, documents should include: (a) state the endpoint (e.g., refuge / horizontal relocation compartment) and its acceptability for defended-in-place/assisted strategies; (b) show $ASET > RSET$ to that endpoint, including any assistance/rest allowances; (c) run sensitivity checks for queueing, door operations, and smoke migration affecting the refuge approach; and (d) describe wayfinding/accessibility elements to reach the refuge (signage/lighting, clear widths, hardware). (e) define the assumptions for the use of the refuge area (i.e., when used to wait for assistance to egress, or queuing at vertical egress, etc.); and (d) where assistance is assumed, define the assistance provided to the occupants of the refuge area to travel to a safe place.

4.6 Recommended research questions

1. Under what conditions (occupancy, geometry, detection/suppression assumptions) would [increase/decrease] to the current travel distance benchmarks maintain equivalent safety?
2. What tenability criteria and validation data are needed?
3. What pre-movement and misrouting distributions should bound RSET in [assembly/office/residential] occupancies, and how do those bounds interact with current travel distance values?
4. How do smoke occlusion and post-occupancy fit outs degrade sign visibility and route selection, and what visibility metrics should be used to judge equivalency when proposing extended travel distance?
5. For mixed-ability populations, what endpoint strategies (refuge/horizontal relocation) and time allowances preserve $ASET > RSET$, and do some occupancies warrant re-examining default distance values?
6. Under what stair pressurization and door management conditions do long vertical egress timelines remain tenable, and are there height/layout regimes where distance or endpoint assumptions should be adjusted?
7. What degradation cases (ΔP loss, door-open effects) should be standard for sensitivity analysis when smoke control is credited, and how should that feed any reconsideration of distance benchmarks?

4.7 Summary

Empirical evacuation research and practice literature indicate that fixed distance thresholds do not, by themselves, guarantee equivalent outcomes across all building types or populations, particularly in high-rise buildings, complex layouts, and content-rich environments where pre-movement delay, reduced visibility, mobility constraints, and stress-affected behaviour can lengthen RSET relative to available tenability time. Studies by Kuligowski et al. (2010, 2013), as well as Ronchi and Nilsson (2013), have shown that prescriptive distance thresholds may not ensure safe egress for all building types or occupant groups, especially in high-rise structures, complex layouts or content-rich environments.

The NBC 2020's prescriptive travel distance requirements serve as a foundational component of life safety strategies, offering measurable limits intended to guide occupants toward exits in a timely manner during emergencies. To support consistent application of Part 3 travel distance provisions, Section 4.5 identifies clarifications (not new prescriptive rules) needed in performance submissions:

- declare and test credited dependencies,
- document wayfinding/visibility assumptions and checks,
- address occupant-diversity effects on RSET and endpoints,
- clarify vertical-egress tenability/timelines where long travel is relied upon, and
- specify endpoints (including refuge where applicable) and show preserved $ASET > RSET$ to those endpoints.

Section 4 clarifies how fixed distances function only as baselines when the assumed conditions hold. Section 5 traces how these distances emerged historically as pragmatic proxies for time-to-safety and why modern evaluation increasingly pivots to explicit ASET–RSET benchmarks. Section 6 further details how to apply these principles in practice (see section 6.1–6.3), including explicit ASET–RSET benchmarks, tenability criteria, minimum input ranges, and required sensitivity checks for performance submissions.

5.0 From distance to time, the historic context of travel distance requirements

This section is based on a historical review of early building codes, technical literature, and archival documentation related to the evolution of egress and travel distance requirements. Supporting analysis draws from verified secondary sources on fire safety engineering, building code development, and performance-based design, including the SFPE Handbook (Hurley et al., 2016) and relevant publications by Bukowski (2009), Archer (2003), and McGuire & Tamura (1979). These sources were used to contextualize the origins of fixed travel distances and the eventual shift to ASET-RSET based thinking. Although prescriptive distance limits like 45 metres appear foundational in today's codes, historical analysis reveals that these values were not derived from science, but rather from practical judgment, precedent, and possibly influenced by other industries.

The emergence of travel distance limits

Historical efforts to mitigate fire risk in urban environments can be traced back to fires such as the 1133 Pentecost fire, which reportedly burned large parts of the city between London Bridge and St. Paul's, and the 1135 blaze, which damaged both the bridge and cathedral. These events illustrate London's early vulnerability to fire and its long-standing concern with urban fire containment (Historic UK, n.d.).

One notable medieval account describes how a single stone house played a pivotal role in halting the spread of a subsequent fire, providing early, practical evidence of the protective benefits of non-combustible construction. The house not only remained intact amid the surrounding destruction, but also acted as a physical barrier, stopping the fire's advance and protecting adjacent structures. This anecdote, cited in thirteenth and fourteenth century civic records, helped reinforce the emerging belief that material choice could directly influence fire containment (Ferguson, 1974a).

Subsequent reforms, such as the 1189 Assize of Building under Henry FitzAylwin (the first Lord Mayor of London), encouraged more durable materials by granting privileges to citizens who adopted fire-resistant construction methods (Salzman, 1952; Schofield, as cited in Ferguson, 1974b). It wasn't until after the Great Fire of London in 1666, which destroyed over 13,000 buildings, that the city enacted mandatory fire safety regulations. The Rebuilding Act of 1667 (18 & 19 Cha. 2 c. 8) formally banned timber-framed walls and required construction using brick or stone, while also regulating building heights and street widths to limit future fire spread (Friedman, 1995). While reform came swiftly after the 1666 disaster, the broader delay, from early awareness of fire hazards in the 12th century to enforceable regulation in the 17th century, illustrates how tradition and inertia often postponed meaningful safety reform, even when risks were long understood (Ferguson, 1974a).

Note: These references are provided for contextual colour on early fire-safety thinking. Details vary among sources and predate modern regulation; they are illustrative only and are not relied upon as technical evidence for any NBC 2020 travel-distance values.

5.1 Origins: Fixed distance as a practical proxy (early 1900s–1950s)

In the early 20th century, the United States began adopting specific egress-related fire safety standards. In New York City's 1901 Tenement House Act, insurance engineering proposed that occupants should not have to travel more than 100 ft to reach an exit. These early recommendations gained momentum with the 1913 NFPA Committee on Fireproof Construction, which echoed this 100 ft travel distance as a general guideline for safe egress. These informal standards were reflected in codes like the 1922 NBFU Recommended Building Code and later in the 1927 NFPA Building Exits Code, which codified the 100 ft limit as a rule for maximum allowable travel distance to an exit.

The rationale for these distances was heavily shaped by firefighting capabilities and limitations at the time. This is seen in the 5,000 ft² area cap, typically configured as a 50 ft × 100 ft rectangle and became the standard maximum undivided floor area for practical firefighting. These values were not grounded in science or controlled testing but in insurance risk assessments and engineering judgment.

5.2 Cross-industry influence on early building code travel distance requirements

Early travel distance requirements in building codes may have been influenced by safety principles developed in other industries, particularly mining, transit, maritime and military operations.

Mining

The mining industry was among the first to formalize redundant egress, following disasters such as the Wallsend Explosion in 1835, where survivors escaped through alternate shafts (Northern Mine Research Society, n.d.), and the Avondale mine disaster in 1869, which directly prompted new Pennsylvania legislation requiring mines to have more than one exit. (ExplorePAHistory.com, n.d.; People's Collection Wales, n.d.). These events led to legislation mandating dual escapeways, improved ventilation, and enhanced wayfinding in underground environments (U.S. Mine Safety and Health Administration, n.d.; O'Neal, 2021). These incidents emphasized that occupants must be able to reach safety within a survivable timeframe.

Transit

Similarly, the construction of the Thames Tunnel (completed in 1843) and the introduction of the Metropolitan Railway (opened in 1863) revealed the dangers of single-entry systems, inadequate ventilation, and poor visibility, raising awareness of the need for multiple access routes and safe egress from enclosed spaces. Early subway systems like the Paris Métro (1900) and New York City Subway (1904) faced similar challenges. Tunnel fires and air quality concerns led to the adoption of fire-resistant construction, emergency lighting, and standardized exit spacing (New York City Transit Authority Archives, 1989).

Maritime and military

Maritime and military sectors may have also influenced the evolution of egress planning. The 1912 Titanic disaster prompted international reforms through the International Convention for the Safety of Life at Sea (SOLAS), which introduced limits on travel distances to lifeboats and required compartmentalization to slow hazard spread (British Wreck Commissioner's Court, 1912; U.S. Senate, 1912). Around the same time, naval ships, bunkers and ammunition depots adopted principles of short, redundant and protected egress paths, ensuring personnel could evacuate quickly under combat or emergency conditions (U.S. Navy Department, 1905). These precedents may have established foundational egress principles for redundancy, spatial orientation and survivability that were later embedded into building codes and reflected in modern travel distance requirements.

5.3 Codification (1920s–1940s)

The 1927 NFPA Building Exits Code and the 1935 U.S. Department of Commerce publication “Design and Construction of Building Exits” introduced these distance limits more formally. The 1922 Bureau of Buildings standards expanded on this concept by requiring that no point in a floor area be more than 100 ft from an exit along the line of travel. Where floors were subdivided into smaller spaces, the maximum was relaxed slightly to 125 ft. That same year, the National Board of Fire Underwriters (NBFU) codified similar requirements in its recommended Building Code, mandating stair exits for upper floors and limiting horizontal travel distances to 100 ft or less (except in designated low-risk structures).

By 1927, the NFPA Building Exits Code had introduced differentiated travel distance limits based on occupancy hazard class:

- 75 feet for high hazard
- 100 feet for moderate hazard
- 150 feet for low hazard (sprinklered)

The 1935 Design and Construction of Building Exits reaffirmed the 100 ft rule while explicitly allowing sprinklered office buildings a maximum travel distance of 150 ft. This increase, mirrored insurance-backed data, which showed significantly reduced average fire loss in sprinkler-protected buildings. In essence, the code logic reflected insurer driven risk mitigation.

These values may have been grounded in rough approximations of how far people could walk under assumed conditions. In the early 20th century time-and-motion pioneers like Frank and Lillian Gilbreth (Gilbreth & Gilbreth, 1911) were measuring “normal” task times, laying a foundation for assuming walking speed baselines in safety codes. While no formal evacuation studies had yet been conducted, these speeds may have been used as baseline assumptions to estimate evacuation feasibility.

5.4 Canadian adoption (1940s–present)

When Canada published its first National Building Code in 1941, it leaned heavily from U.S. models. The NBC 2020's initial travel distance limits mirrored those of its southern neighbor: 75 feet for combustibile construction, up to 150 feet for fire resistive or sprinklered buildings.

The groundwork for a unified national building code in Canada began in the 1920s, but progress was slowed by limited federal capacity and jurisdictional complexities among provinces and municipalities. During this period, Canada relied heavily on American codes and standards for guidance. When the first edition of the National Building Code (NBC) was published in 1941, it drew extensively from U.S. model codes. Key provisions related to egress and life safety were particularly influenced by earlier American documents, including the 1927 NFPA Life Safety Code and the 1935 U.S. Department of Commerce publication, Design and Construction of Building Exits (Archer, 2003).

The following table shows the historical progression of maximum travel distances by occupancy and year, organized by NBC 2020 article reference and building type.

Table 2. Historical progression of maximum travel distances in the National Building Code of Canada

NBC	Group A (assembly) Excluding occupancies with Aisles		Group B (care) Excluding fire compartment		Group C (residential)		Group D (Office)		Group E (mercantile)		Group F (industrial)		
	S	US	S	US	S	US	S	US	S	US	1S	2 S/US	3 S/US
1941	(a) Distance to exits.-fits in buildings of Type 1A, 1B, or 1C (Fire-resistive) Construction, or Type 5 (Unprotected Metal or Fire retardant Treated Wood). Construction shall be so located that no point in any floor-area, room, or space served by them is more than 150 feet distant from an exit measured along the line of exit travel; exits in buildings of other types of construction shall be so located that no such point is more than 75 feet distant from an exit . When floor-areas are subdivided into smaller areas, served by corridors, such as rooms in hotels and office buildings, the distance to an exit shall be measured from the corridor entrance of such rooms to the nearest exit.												
1953	3.20.7.3. Number, Location and Width of Exits from floor areas. Every floor area shall be served by exits to the extent that no point on any floor is more than 75 feet distant from an exit measured along the line of exit travel except that: (i) in one-storey buildings this regulation need not apply if exits are placed along the perimeter of the floor area and are not more than 100 feet apart ; (ii) in non-combustible buildings of 1-hour fire resistance or more, the distance to an exit from any point on the floor may be 100 feet . When floor areas are subdivided into rooms and served by corridors the distance to an exit shall be measured from the corridor entrance of such rooms to the nearest exit.												
1960-1965	150 ft (45.8m)	100 ft (30.5m)	150 ft (45.8m)	100 ft (30.5m)	150 ft (45.8m)	100 ft (30.5m)	150 ft (45.8m)	100 ft (30.5m)	150 ft (45.8m)	100 ft (30.5m)	75ft (22.9m)	150 ft/100 ft (45.8m/30.5m)	150 ft/100 ft (45.8m/30.5m)
1970	150 ft (45.8m)	100 ft (30.5m)	150 ft (45.8m)	100 ft (30.5m)	150 ft (45.8m)	100 ft (30.5m)	150 ft (45.8m)	125 ft (38.1m)	150 ft (45.8m)	100ft (30.5m)	75ft (22.9m)	150 ft/100 ft (45.8m/30.5m)	150 ft/100 ft (45.8m/30.5 m)
1975-1977	150 ft (45.8m)	100 ft (30.5m)	150 ft (45.8m)	100 ft (30.5m)	150 ft (45.8m)	100 ft (30.5m)	150 ft (45.8m)	125 ft (38.1m)	150 ft (45.8m)	100 ft (30.5m)	75ft (22.9m)	150ft/100ft (45.8m/30.5m)	150 ft/100 ft (45.8 m/30.5 m)
1980-2020	45 m	30 m	45 m	30 m	45 m	30 m	45 m	40 m	45 m	30 m	25 m	45 m /30 m	45m/30 m

S- sprinklered

US - unsprinklered

Evolution of the NBC egress

- 1953–1960: Clarified measurements through corridors, differentiated by fire resistance.
- 1970–1978: Travel distances revised for offices, atriums and stadiums
- 1980–1985: Metrification of code
- 2005: Transition to objective based code, allowing for more flexible performance-based designs.

The core travel distance values such as 45 metres for most occupancies, have remained largely unchanged since mid-century. The notion that distance equates to survivable evacuation time was not explicitly defined in codes but became implied through accepted norms.

5.5 From distance to time

By the 1970s, researchers began questioning whether travel distance alone ensured timely evacuation. J.L. Pauls of the NRC led drills in Canadian cities that revealed discrepancies between assumed and actual occupant behaviour. These studies found that stairwell congestion significantly reduced descent speed, and door flow rates commonly fell below theoretical expectations, averaging around 40 persons per minute. Additionally, pre-movement delays of up to five minutes were frequently observed, influenced by alarm audibility and user familiarity with the building (Pauls, 1977).

Even earlier standards had hinted at the limits of rigid prescriptions. In 1922, an article by Heller in *NFPA Quarterly* (Vol. 16, No. 2) it was noted that evacuation times were based largely on engineering judgment rather than empirical analysis. A benchmark of three minutes was typically cited as sufficient to clear a building, although five to ten minutes was considered acceptable for low-risk, well-planned structures. Heller also noted that evacuation timing should vary based on the building's height, construction, internal hazards, and occupant characteristics—including children, the elderly, and people with disabilities (as cited in NIST, 2006).

More specific assumptions emerged in the 1926 Building Exits Code, which quantified stairwell flow at 45 persons per minute per unit of width (roughly 22 inches). The average capacity of stairs between floors was estimated at 15 persons per unit, based on typical floor-to-floor height and available landing space. These values, later echoed in a 1935 National Bureau of Standards report, reflected simplified physical models rather than actual human movement data.

By the 1990s and 2000s, the shift to performance-based methods accelerated with the introduction of advanced simulations. Work by Kuligowski and Peacock at NIST combined fire dynamics with occupant behaviour modelling, revealing that stairwell capacity declines non-linearly as crowding increases and that merging flows from multiple floors can significantly reduce throughput due to congestion effects. These simulations also showed how factors like age, physical ability, stair geometry, and group behaviour significantly affect travel speeds. (Averill et al. 2013),

Further contributions from Ng and Chow (2006) reinforced that crowding alone could cut walking speed nearly in half, from 1.19 to 0.63 meters per second, while group dynamics and social cohesion frequently led to pre-evacuation delays exceeding four minutes (Ng & Chow 2006). These studies underscored that human behaviour, not just building geometry, must be considered when designing egress systems.

Gwynne (2015), in the NRC's *Drilling for Safety* study, examined how high-rise evacuation drills are used to evaluate real-world occupant behaviour. The study which sought to broaden the empirical data beyond office buildings by including residential towers. Critical behavioural variables, such as pre-evacuation time, stairwell congestion, and decision-making under stress, are frequently unrecorded or under-analyzed. Drills often exclude vulnerable populations, such as people with limited mobility, reducing realism and representativeness. As Gwynne (2015) concludes, drills alone are insufficient; modelling and structured scenario variation are essential to capture realistic evacuation dynamics (Gwynne 2015).

5.6 The history and development of ASET-RSET

The concepts of ASET-RSET originated in the 1980s and 1990s as part of a shift toward performance-based fire safety engineering. These models recognized that successful evacuation depends not just on distance or building layout, but on interaction with fire dynamics, human behaviour, and system performance.

- RSET: represents the total time occupants require to evacuate, including detection, pre-movement (e.g., recognition, decision-making) and physical travel to an exit.
- ASET: represents the time available before conditions in the egress path become untenable (e.g., due to smoke, heat, or toxic gases).

The Empire Palace Theatre fire and the origins of time benchmarks

The Empire Palace Theatre fire in Edinburgh, Scotland which occurred on May 9, 1911, during a performance involving pyrotechnics, remains a frequently cited though often misinterpreted event in evacuation discourse. In that incident, ten performers died backstage, yet more than 3,000 audience members evacuated safely within approximately 2.5 minutes (International Master in Fire Safety Engineering, 2020). To help maintain order, the orchestra reportedly played "God Save the King," leading to the widely circulated, though unverified, belief that the time it takes to sing the anthem became a symbolic benchmark for evacuation. (Ronatlyer.2020)

While the anthem duration has no regulatory standing, the real impact of the Empire Theatre fire lies in its practical demonstration of effective life safety principles: well-distributed exits, direct outdoor egress and the decisive actions of trained staff. These factors contributed to an emerging belief, especially within British and Commonwealth safety circles, that evacuating large assembly occupancies in under three minutes was both achievable and desirable. Although prescriptive building codes do not explicitly define evacuation timeframes, traditional assumptions persist regarding how quickly occupants should be able to evacuate.

Caveat: Medieval/early modern accounts of fires are inconsistently documented and not independently verifiable to contemporary technical standards. They are included to illustrate historical attitudes, not to substantiate specific NBC 2020 requirements.

If RSET exceeds ASET, evacuation fails. This concept was formalized in the work of Bukowski (2008), Purser (2016), and Peacock et al. (2011), and is now embedded in standards like ISO 13571:2012 and key engineering references such as the SFPE Handbook of Fire Protection Engineering (Hurley et al., 2016).

The adoption of modelling tools such as CFAST and FDS in the 1990s enabled designers began to simulate both fire growth and occupant behaviour more accurately. By the 2000s, ASET- RSET analysis became central to performance-based fire protection design (Bukowski et al., 1987; Kuligowski et al., 2010).

Although prescriptive codes rarely define required evacuation times, modern frameworks such as BS PD 7974-7 (British Standards Institution, 2019), NFPA 101 (NFPA, 2018), and the International Building Code (ICC, 2024) emphasize ensuring ASET exceeds RSET. Designers often apply indicative benchmarks: 2–4 minutes for schools, 5–8 minutes for offices, and 15+ minutes for phased evacuations in high-rises (Nelson & Mowrer, 2016).

Researched such as J.L. Pauls (1987) and teams at NIST (Peacock et al., 2011; Kuligowski et al., 2015) showed that evacuation time is shaped more by alarm recognition, stairwell congestion and mobility constraints than by walking distance alone. In many documented cases, people spent more time deciding to evacuate than physically moving.

Yet distance-based rules persisted. Ferguson (1974b) described this as a “tradition trap”: legacy rules endure not because they reflect modern risks realities, but because they are easy to administer. Law and Beever (1994) referred to them as “magic numbers”, metrics that convey a sense of precision while concealing underlying uncertainty. This disconnect highlights a key regulatory mismatch: while codes continue to regulate distance, actual life safety depends on time.

5.7 The limits of the distance-time proxy

Although NBC 2020 does not explicitly define evacuation timeframes, many prescriptive code assumptions implicitly rely on time-based outcomes without quantifying them. Several concerns have been identified in the literature:

- Benchmarks are idealized, often based on optimal rather than observed conditions.
- ASET-RSET analysis is frequently decoupled from specific tenability thresholds, such as maximum allowable temperature, smoke obscuration, or toxic gas concentrations (Hurley et al, 2016; Purser, 2016).
- Vulnerable groups, such as older adults, people with disabilities, or those requiring assistance, are often underrepresented in modelling assumptions and performance tests (Bukvić et al., 2021; Gwynne, 2015).

Experts such as Bukowski et al. (2001) and the SFPE Handbook of Fire Protection Engineering (Hurley et al., 2016) advocate scenario-specific simulations that incorporate human behaviour, system failure modes and environmental variables to evaluate real-world viability. These approaches offer a more inclusive and evidence-based alternative to fixed-distance regulations.

5.8 Summary: Bridging history and evidence

Travel distance limits were originally introduced for administrative simplicity and consistency, not scientific accuracy. While they served a valid function in early code enforcement, modern evidence demonstrates that life safety is determined by total evacuation time, not just the linear distance to an exit.

They still exist today as they deliver consistency and enforceability across jurisdictions; they fit prescriptive plan-review; and, when combined with other provisions (signage/lighting, exit continuity/enclosure, capacities), they have been viewed as “good enough” for typical conditions (see section 4.3). Meanwhile, practice evolved: larger floorplates, taller/more complex buildings, synthetic contents (higher HRR/smoke), and more diverse populations. Performance-based methods arose to argue equivalency beyond fixed numbers (see section 6.2), revealing sensitivity to inputs and oversight variability.

Today, effective fire protection demands a performance-based, data-driven strategy, one that accounts for behavioural variability, environmental conditions, and system reliability. To move forward, building codes must integrate the lessons of history with the capabilities of modern simulation and risk-informed design.

6.0 Performance-based justification of extended travel distances

Life safety in fire scenarios remains a fundamental objective in building design. Among its prescriptive measures, the NBC 2020 sets maximum travel distance limits to help ensure occupants can reach a protected egress route before conditions become untenable. Where functional, spatial, or architectural constraints lead to exceedances, the Code allows alternative solutions provided equivalent or greater performance is demonstrated (see sections 3.1–3.6).

Reminder: In this section, “travel distance” refers to NBC 2020 Part 3 unless Part 9 is explicitly referenced.

6.1 Using ASET-RSET for travel distance justification

Where prescriptive limits are exceeded, design professionals may propose alternative solutions based on a performance-based evaluation of tenability and evacuation time. The most common approach involves a comparing RSET and ASET. This methodology assesses whether safe evacuate can occur under fire conditions, even when layout geometric exceeds code limits. (Ronchi & Nilsson 2013; Kuligowski, Peacock, & Hoskins 2011).

6.1.1 RSET

RSET represents the total time occupants require to reach a place of relative safety. It encompasses three key components:

- **Pre-travel time:** The delay between fire detection and occupant action. Influenced by alarm audibility, perceived risk and occupant awareness.
- **Travel time:** The time required to traverse the egress path. Affected by physical distance, layout and congestion.
- **Queueing or delay time:** Time lost at choke points such as stairwells, doorways or corridors during high-density evacuation.

Example: Alarm sounds (45 seconds) + travel time (50 seconds), and door congestion (15 seconds) = RSET: 110 seconds.

Industry guidance typically applies a safety factor or buffer to RSET. A common benchmark is a 100 per cent margin, meaning the ASET should be at least twice the RSET. Lower margins may be accepted depending on detection capability, system reliability and occupant vulnerability (Nelson & Mowrer, 2016; Hurley et al., 2016).

Example: if RSET is calculated at 120 seconds, and ASET is modeled at 390 seconds, the safety margin of 270 seconds would support a performance-based design, even if some prescriptive distance limits are exceeded, provided assumptions are defensible and models validated (ISO 13571:2012; Schröder et al., 2020).

To reduce RSET strategies may include occupant familiarity, staff training, enhancing alarm clarity and placement, reduced pre-travel delay through automated systems, widened exits paths, and improving wayfinding (Peacock et al., 2011; Kuligowski et al., 2015; Gwynne & Boyce, 2016).

6.1.2 ASET and tenability standards in design practice

In contrast to RSET, ASET refers to the time available before environmental conditions, such as excessive heat, toxic gases, or reduced visibility, render an egress route untenable. ASET is defined by the earliest moment at which any critical threshold is exceeded, based on physiological limits to human survivability or mobility.

These thresholds are established in internationally recognized fire safety engineering standards and literature. One of the most authoritative sources is the SFPE Handbook of Fire Protection Engineering (Hurley et al., 2016), which defines the tenability criteria used in most performance-based designs.

These include a heat exposure limit of approximately 60C (140F) for prolonged exposure and up to 120C (248F) for brief exposure with risk of pain or injury. For visibility, the handbook recommends a threshold of 10 to 20 metres in corridors (lower threshold in open rooms) with optical density (OD) typically $\leq 0.3 \text{ m}^{-1}$. The handbook also provides guidance on assessing the effects of toxic gases through the Fractional Effective Dose (FED) model, which accounts for the cumulative effects of carbon monoxide (CO), hydrogen cyanide (HCN) and oxygen depletion. Additionally, it suggests a minimum smoke layer height of 2 metres above the walking surface as a general benchmark for safe evacuation. These criteria, many developed or refined by D.A. Purser, are widely used for tenability analysis (Purser, 2016; Hurley et al., 2016).

In addition to SFPE benchmarks, the NIST incorporates tenability thresholds into computational tools such as CFAST and FDS, which model smoke, temperature, and gas development in dynamic fire scenarios. Bukowski (2009); Peacock et al., 2011) provide guidance on applying ASET limits within these tools.

Further technical direction comes from ISO 13571:2012, which defines analytical methods for estimating tenability times based on thermal dose and gas concentration. Similarly, NFPA 92 (Smoke Control Systems), NFPA 101 (Life Safety Code), and NFPA 130 (Transit Systems) provide both prescriptive and performance-based guidance on life safety and smoke control, referencing many of the same tenability thresholds as SFPE and NIST.

Table 3. Common tenability thresholds

Parameter	Typical threshold	Source(s)
Air temperature	60C sustained; 120C short-term pain limit	Hurley et al. (2016)
Visibility (corridor)	10–20 m (based on sign recognition)	Hurley et al. (2016)
CO (carbon monoxide)	1200 ppm (10minute exposure limit)	Hurley et al. (2016); Purser (2016)
HCN (hydrogen cyanide)	50–100 ppm (based on FED)	Purser (2016)
Smoke layer height	≥2 m above floor	Hurley et al. (2016); National Fire Protection Association (2023)
FED (Combined gases)	FED = 1 (threshold of incapacitation)	Hurley et al. (2016); Peacock et al. (2011)

The ASET-RSET method forms the foundation of most alternative solutions involving excessive travel distances. Instead of relying solely on fixed dimensional rules, this approach offers a quantitative, scenario-specific evaluation of life safety performance, tailored to building design, occupancy, and fire protection systems. Where designs credit life-safety systems (sprinklers, pressurization/smoke control, emergency power/lighting), submissions should: (a) declare dependencies, (b) document commissioning/maintenance/testing assumptions (e.g., NFPA 92 for smoke control), and (c) run sensitivity cases with degraded performance to show ASET > RSET is preserved (see sections 4.4.6, 4.4.9, and 4.5).

6.1.3 Academic foundations of ASET criteria

The academic basis for ASET analysis was established by fire safety researchers beginning in the late 20th century. Among the most influential is D.A. Purser, whose work in the 2000s formalized the FED model. This model accounts for the physiological impact of toxic gases during fires, including CO, HCN, and hypoxia, while adjusting for exertion and heat stress. A threshold of FED = 1 is generally accepted as the point at which 50% of individuals would become incapacitated (Purser, 2016).

Complementary research by Peacock et al. (2011) at NIST examined the relationship between smoke optical density and visibility. Their empirical studies established thresholds around 0.1 to 0.3 m⁻¹, identifying points where signage, exits, and pathways may become unreadable or disorienting during egress. These values now support visibility standards embedded in modelling tools and ISO guidance.

Academia has also contributed simplified correlation-based methods, such as Alpert’s ceiling jet and Zukoski’s plume equations, for estimating fire conditions without full simulations. While useful for quick assessments, these correlations are based on idealized experiments and should only be applied within their validated ranges. In complex or high-risk projects, computational models (e.g., FDS) are more appropriate for representing dynamic, real-world fire behaviour.

Table 4. Common analytical methods for fire safety evaluation

Method/Tool	Type	Purpose / use case	Strengths	Limitations	Primary sources
Alpert’s ceiling jet correlations	Empirical equations	Estimate temperature and velocity of ceiling jets to assess detector or sprinkler activation	Simple, fast; widely cited; good for open ceilings	Limited to flat ceilings and unobstructed compartments; not for complex layouts	Alpert (1972)
SFPE Handbook equations	Analytical methods	Broad range of fire dynamics and egress equations (e.g., HRR, smoke layer, egress time)	Peer-reviewed; comprehensive reference	Requires careful assumption selection; not validated for all real-world cases	Hurley et al. (2016)
t² fire growth model	Prescriptive input	Estimate HRR over time based on growth rate (slow, medium, fast)	Standardized fire scenario input for modelling or calculation	Not material-specific; simplified representation of complex fire dynamics	Hurley et al. (2016)
Tenability thresholds	Performance criteria	Identify critical limits for temperature, visibility, toxic gases for ASET analysis	Helps link fire dynamics to occupant impact	Thresholds vary across contexts; must be applied appropriately	ISO 13571:2012; Hurley et al. (2016)
ASET calculation (manual/ASETBX)	Analytical estimation	Estimate time before untenable conditions develop (e.g., smoke descent or heat exposure)	Quick estimation method for single zones	Limited to simple geometries and idealized conditions	NIST; Hurley et al. (2016)
RSET manual calculation	Time-based estimation	Estimate required safe egress time: pre-movement + travel time	Transparent and code-aligned for small buildings	Ignores human behaviour variability; travel path complexity not captured	Ronchi & Nilsson (2013); Peacock et al. (2011)
Smoke layer height formulae	Empirical equations	Estimate height of smoke layer over time from plume or smoke production data	Good for open spaces and warehouses	Sensitive to ventilation, geometry; less accurate for small or subdivided spaces	Hurley et al. (2016); NFPA 92 (2021)

Note: These methods are best suited for smaller or simpler buildings, retrofit assessments, or preliminary design analysis. They are often used by engineers to screen whether a full simulation is needed. Useful for evaluating exit strategies, detector placement, or travel distance exceedances in clear, low-complexity layouts.

6.2 Evaluation of performance-based design for travel distance

This subsection summarizes research and guidance on using performance-based methods to justify extended travel distances. It follows the same elements highlighted in Section 4’s “Considerations for performance submissions”: clear tenability criteria, RSET components and cohort diversity, declared system dependencies (and their degradation), visibility/wayfinding, vertical-egress tenability, and documentation standards. The aim is to turn the evidence into criteria that reviewers can check, supporting consistent ASET–RSET judgements and clear endpoints to a safe place (see Table 3 for common tenability thresholds).

Simulation outcomes are sensitive to user assumptions. Differences in boundary conditions, occupant profiles, and fire growth rates can yield large variances in ASET or RSET outputs (Peacock et al., 2011; Ronchi & Nilsson, 2013). This raises concerns about reproducibility and reliability, especially when it is used to justify longer travel distances without standard benchmarks or validation protocols.

Consistent with SFPE guidance for substantiating a model for a given application, performance submissions should: (1) define the problem and performance metrics (e.g., endpoint = exit or refuge; ASET > RSET to that point); (2) select models appropriate to scale/physics and coupling (e.g., FDS/zone + evacuation); (3) document verification/validation status and relevance to the case; (4) address user effects (mesh, timestep, solver options, occupant behaviour inputs); and (5) provide clear documentation.

Submissions should include sensitivity/uncertainty analysis on parameters that materially drive results (e.g., HRR growth, pre-movement, visibility/ Δp , queueing), demonstrating that conclusions are robust. See sections 6.1–6.3 for typical ASET/RSET components and inputs used in Canadian casework.

6.2.1 Tenability criteria and ASET definition

Studies and guidance converge on the need to specify tenability metrics (e.g., visibility, temperature, toxic gases) and to compute ASET to the declared endpoint, not just to the exit access. Literature also cautions that ASET is sometimes held constant or inferred rather than modeled explicitly, an approach associated with optimistic margins in later case reviews; this subsection therefore recommends explicit modelling or justified proxies with references. (See also section 6.3 limitations and Table 3 cross-reference.)

6.2.2 RSET composition: pre-movement, movement, congestion, and assistance

Kuligowski et al. (2011) show delays in recognition, social confirmation, and hesitation can increase RSET unpredictably, particularly when assumptions default to idealized occupant behaviour and has demonstrated that real-world evacuation behaviour is far more complex than modeled scenarios typically allow. Delayed recognition, mobility impairments, social influence, and non-optimal decision-making can all extend RSET, sometimes beyond the ASET estimated by simulation.

Realistic RSET requires distributions for pre-movement, route choice effects under reduced visibility, congestion at nodes, and allowances for assisted evacuation where applicable. Specific speeds and rest/transfer times should be included for mixed-ability populations, consistent with Section 4's equity/endpoint clarifications. This subsection recommends documenting the RSET breakdown (recognition→ response→ travel/queuing → transfer/assistance) and using ranges with sensitivity checks reflecting observed behaviour.

6.2.3 Visibility and wayfinding under smoke

Research on sign occlusion, lighting degradation, and smoke layer descent indicates that visibility materially alters route selection and egress time. Performance submissions should document the assumed visibility thresholds (see Table 3) and show that wayfinding measures (signage/lighting/communications) maintain effective guidance under modeled smoke conditions, with sensitivity around conservative thresholds. This operationalizes the section 4.6 direction to “document wayfinding/visibility assumptions and checks.”

Research has also shown that cold smoke tests can overestimate the effectiveness of smoke control systems under actual fire conditions. Warm smoke behaves differently, rising and stratifying due to buoyancy, leading to discrepancies between test and real-world performance (NFPA, 2021; Gann et al., 2007; Purser & McAllister, 2016). Despite this, Canadian regulations do not mandate periodic post-occupancy retesting of smoke control systems, which may impact long-term reliability. As noted by Gann et al. (2007), physical fire models used to assess smoke potency must account for thermal dynamics to ensure accurate safety assessments.

6.2.4 Declared dependencies and degradation scenarios

Empirical reviews and guidance underscore that credited systems (sprinklers, detection/alarms, smoke control/pressurization, emergency power/lighting) must be declared as dependencies and tested for reasonable degradation. Recommended minimum sensitivities include delayed sprinkler activation or local impairment; loss of pressurization (ΔP) and door open effects in stairs; reduced lighting/visibility; and detection/notification delays. Submissions should demonstrate preserved ASET > RSET margins under these variations, aligning with section 4.6 (“declare and test credited dependencies” and “clarify vertical-egress tenability/timelines”).

6.2.5 Vertical egress timelines and pressurization performance

Academic and practice literature identify vertical egress as a frequent bottleneck for long travel distances in high-rise contexts. Where designs rely on prolonged stair use, analyses should couple occupant movement with stair pressurization performance, accounting for door cycling and leakage. Required outputs should include time-series tenability conditions within stairs/lobbies and a sensitivity set for pressurization degradation.

6.2.6 Endpoints and equity of egress

Consistent with Section 4, endpoints must be explicit: to an exit for compliance with Sentence 3.4.2.5.(1), or to a refuge/horizontal relocation when the strategy allows and is fully supported. For mixed-ability populations, RSET must reflect assistance timing, transfer aids, and feasible endpoints; equivalency is shown by preserved ASET > RSET to that endpoint. This links section 4's “occupant-diversity effects on RSET and endpoints” to concrete, reviewable criteria in Section 6.

6.2.7 Documentation, transparency, and reproducibility

Literature repeatedly calls for transparent inputs, model versioning, and sensitivity reporting. This report therefore recommends a minimum documentation set in performance submissions (expanded in section 6.1): model files/versions, input libraries with ranges and sources, calibration/validation references, sensitivity outputs, and a traceable narrative connecting ASET–RSET evidence to the Code's objectives/functions. This aligns with the Division C process and the section 3.6 reminder that acceptable solutions set the performance benchmark against which equivalency must be shown.

6.2.8 Summary

Performance-based travel distance justification offers a viable path for equivalency, provided the methodology is rigorous, assumptions are conservative, and systems are maintained. While tools like Pathfinder, FDS and CFAST provide sophisticated simulation environments, their outputs must be interpreted with caution and subjected to rigorous review.

In addition, the absence of a certification system for fire protection engineers in Canada introduces further variability. Bukowski et al. (2007) emphasize the need for professional accountability in applying ASET-RSET methodologies. Without credentialing or peer review requirements, AHJs must evaluate complex submissions with uneven technical oversight.

Overall, academic evaluations reveal that performance-based solutions are a conditional pathway that depends heavily on the competence of practitioners and the scrutiny of regulators. Inconsistent application, idealized inputs and lack of follow-up all compromise the reliability.

The following elements create practical evaluation steps:

- state explicit tenability criteria
- model both ASET and a diversity-aware RSET
- declare dependencies and prove robustness under degradation
- demonstrate visibility aware route choice; and
- deliver reproducible documentation

6.3 Travel distance alternative solutions review

This section presents an analytical review of approximately twenty-five alternative solutions approved by the City of Calgary that exceed the maximum travel distances prescribed in the applicable building code. The review highlights performance-based design rationales, modelling approaches, safety margins and mitigation strategies used to justify these variances. It also examines trends across occupancy types, modelling practices, and benchmarks referenced in the analysis.

6.3.1 Summary of case studies

The twenty-five case studies analyzed include buildings across a wide range of occupancies: office towers, mechanical penthouses, warehouses, transit platforms, retail environments and mixed-use structures. Prescriptive travel distance limits in the NBC 2020, typically 30 metres or 45 metres under Article 3.4.2.5, were exceeded by up to 60 metres in some instances. Key reasons for seeking a variance included large or complex floorplates, rooftop mechanical zones, limited occupancy access and functional design constraints in high-rise construction.

Trends identified in the review include:

- A consistent reliance on early detection and notification systems
- The use of ASET-RSET comparison as the primary evaluation method
- Recurrent occupancy assumptions of trained, familiar, or low-density users
- Life safety enhancements such as increased exit widths, additional exits, illuminated signage and redundant egress routes

Table 5. Sample projects and building types reviewed

Occupancy group	Occupancy type	Project description	Tools/ and models used
Group F, Div 2	Industrial warehouse	High-bay warehouse with racking and large open areas, sprinkler protection, and smoke layer modelling	FDS, Pathfinder, sprinklers
Group A, Div 2	Transit station	Open-air LRT platform with limited combustibles and continuous surveillance	CFAST, ventilation modelling
Group E	Retail store	Big-box retail with mezzanine and stockroom; enhanced egress signage and increased exit widths	Pathfinder, exit visibility
Group B, Div 2	Healthcare facility	Hospital treatment area using staff-to-patient assisted evacuation modelling with mobility profiles	Pathfinder, FDS
Group F, Div 3	High-rise penthouse	Mechanical penthouse floor accessed only by trained personnel	Risk-based narrative, restricted access
Group F, Div 2	Parking garage	Non-combustible, open-air or ventilated parking garage with low fire load	FDS, smoke exhaust analysis
Group D/E (Mixed)	Mixed-use podium	Commercial and residential podium building with fire separation and horizontal egress pathways	Pathfinder
Group A, Div 2	Tunnel	Large assembly occupancy modeled with crowd flow; used performance-based justification in tunnel or hall space	Pathfinder, CFAST
Group F, Div 2	Distribution centre	Open-plan warehouse with phased sprinkler activation and delayed ignition scenarios	FDS, Pathfinder
Group D	Office tower renovation	Vertical mixed-use building with complex floor layouts; travel path exceeded 60 m in retrofit conditions	Pathfinder, smoke model integration

Note: Specific projects are anonymized but representative of common building types and risk-based justifications. Where ASET-RSET values were not explicitly stated, conservative or relative outcomes were inferred from narrative summaries. Table 5 was included to show the range of projects that were part of the review and the tools and models used.

Common enhancements in approved designs

Approved solutions typically integrated multiple enhancements to compensate for increased travel distances, including:

- Full sprinkler coverage (often ESFR-rated)
- Enhanced smoke and heat detection (e.g., closely spaced detectors, early response)
- Emergency lighting connected to backup power, including occupancy-sensor lighting in rarely occupied areas
- Illuminated or photo-luminescent signage
- Increased exit path width and/or redundant egress paths
- Access control limiting exposure to trained personnel
- Staff training, occupant drills and reduced alarm delay settings
- In some warehouse cases, floor-level path lighting and higher fire separations of up to two hours were proposed.
- Transit platform designs referenced NFPA 130 and used strategies tailored to public egress in large open areas.

Rationale for exceeding prescriptive travel distances

Exceeding the NBC 2020 travel distance limits was justified by the following:

- Functional requirements of large floor areas or tall buildings
- Low-risk occupancies with limited combustibles
- Use of active protection systems to offset egress time
- Restricted access such as mechanical levels, maintenance zones
- Enhanced notification systems that accelerate evacuation response

Case study data revealed that most proponents argued equivalency based on faster detection and shorter overall RSET despite longer travel paths. Many submissions included comparative models showing the proposed design yielded a net gain in safety performance relative to the prescriptive layout.

6.3.2 ASET-RSET modelling methods

All 30 reviewed projects employed ASET-RSET analysis or equivalent time-based evaluation.

RSET components included detection time, alarm delay, pre-movement and travel time, often broken into scenario-specific subcomponents such as slow versus fast growth fire. ASET values were either explicitly modeled or held constant for comparative analysis.

Use of analytical methods in case studies

While analytical methods such as Alpert’s correlations and SFPE Handbook equations are commonly used to support simplified fire safety assessments, a review of the submitted case studies revealed that none relied exclusively on hand calculations to justify extended travel distances. In all cases, analytical methods were either used for preliminary estimates or as supplementary inputs within a broader modelling framework.

Quantitative tools such as Fire Dynamics Simulator (FDS), Pathfinder, CFAST, BRANZFIRE, or ASETBX were consistently employed to provide dynamic modelling of smoke movement, evacuation timing, and system performance. The absence of cases relying solely on hand calculations highlights the increasing importance of modelling competency in the review and approval of performance-based fire safety designs in Canada.

However, a few cases made limited use of analytical or empirical methods, but none appeared to use them exclusively for fire safety evaluation, especially when travel distances exceeded prescriptive limits. In high-risk or complex scenarios, a combination of tools was typically applied.

Examples from the document where analytical methods were partially used:

- Retail or mezzanine cases sometimes applied ASETBX or Alpert’s correlations for ASET calculations in small compartments but still required evacuation modelling (Pathfinder).
- Mechanical penthouses and low-occupancy zones might have used simplified zone modelling, but again, these were combined with professional judgment or supplementary modelling tools.

Model tools referenced

The table below provides a summary of the tools and methodologies referenced in the alternative solutions reviewed during this research. This list is intended as a non-exhaustive summary and includes only those tools and references the report author became aware of during the research process. Additional tools, models, or approaches may exist that are not represented in this document.

For further information on fire modelling tools and current industry usage, readers are encouraged to consult resources such as FireModelSurvey.com, which provides detailed insights and user experiences across a wide range of modelling platforms.

Note: The inclusion of specific tools, methodologies, or references in this table does not constitute endorsement, approval, or recommendation. This list is not exhaustive and reflects only those tools referenced during the research process.

Table 6. Model tools referenced in alternative solutions

Model Tool	Type	Description	Strengths	Limitations	Primary sources
FPETOOL	Analytical model	NIST smoke layer and tenability tool for simple fire scenarios.	Simple interface; conservative outputs; low computational demands.	Limited to simple, single-zone fires; outdated assumptions.	NIST, FPETOOL User’s Guide; FireModelSurvey.com
ASETBX	Analytical model	ASET estimation tool for single-compartment fire analysis.	Quick ASET estimates; good for basic risk assessments.	Assumes idealized conditions; too simple for complex designs.	NIST, ASETBX User’s Manual; FireModelSurvey.com
Fire dynamics simulator (FDS)	CFD simulation	CFD model for fire-driven flows, smoke, and heat transfer.	Highly validated; supports complex geometries and coupled modelling.	Computationally intensive; requires advanced setup expertise.	McGrattan et al., FDS Guide; FireModelSurvey.com
Pathfinder	Evacuation modelling software	Agent-based evacuation simulation for movement and behaviour.	Customizable behaviours; strong 3D visualization; FDS integration.	Needs calibration for realistic occupant movement assumptions.	Thunderhead Engineering, Pathfinder User Guide; FireModelSurvey.com
CONTAM	Multizone airflow model	Airflow and contaminant transport simulation tool by NIST.	Models complex airflow; integrates with HVAC and smoke control.	Does not model fire heat sources; requires external coupling.	Walton and Dols, CONTAM User Guide; FireModelSurvey.com
BRANZFIRE	Zone fire model	Two-zone model for fire growth and smoke stratification.	Good for large open spaces; validated stratification modelling.	Less accurate for small or highly subdivided buildings.	BRANZ, BRANZFIRE User Guide; FireModelSurvey.com

Definitions of model type from FireModelSurvey.com,

- **Analytical model** - A simplified mathematical tool using predefined equations or relationships to approximate fire or smoke behaviour under idealized conditions; typically intended for quick assessments rather than detailed simulations.
- **CFD simulation** - Computational Fluid Dynamics (CFD) simulation tools numerically solve the complex physics of fluid flow, heat transfer, combustion and smoke movement during fires, providing detailed and high-fidelity predictions.
- **Evacuation modelling software** - Simulation platforms that model human movement, decision-making and congestion during emergency egress, often based on agent-based or flow-based approaches to predict evacuation times and behaviours.
- **Multizone airflow model** - Tools that simulate the movement of air, smoke and gases between multiple interconnected zones within a building based on pressure differences, without directly simulating combustion or fire-driven flows.
- **Zone fire model** - A two-zone or multi-zone model that simplifies fire dynamics by dividing a compartment into a hot upper layer and a cooler lower layer, estimating smoke spread, heat buildup and tenability over time.

6.3.3 Inputs used in case studies

Fire growth curves:

- T-squared fire growth profiles (slow, medium and fast) were consistently used for modelling, reflecting standard assumptions aligned with the SFPE Handbook of Fire Protection Engineering.
- Medium t^2 curves were typically applied for general office, retail, or healthcare occupancies, while fast t^2 curves were used in warehouse or atrium scenarios, consistent with engineering practice and SFPE guidance.

Heat release rates (HRR):

- Where specified, HRR inputs were based on furnishing loads and material classifications with parameters drawn from CAN/ULC-S135 and SFPE guidance on fire modelling.
- In some cases, prescribed fire loads were used in lieu of measured or inferred data, particularly when documentation was limited.

Detection and activation:

- Smoke detector response was modeled using CAN/ULC-S529, and in some cases, tools like FDS or ASETBX were applied to estimate detection delays
- Sprinkler activation assumptions referenced CAN/ULC-S524, with typical activation temperatures of 68°C to 74°C for standard-response heads. Earlier activation was modeled where fast-response devices were assumed.

Walking speeds:

Assumptions followed values from the SFPE Handbook (2016), generally:

- 0.8 to 1.2 m/s for standing adults in low-density occupancies.
- 0.5 m/s or less in healthcare settings.

PD 7974-6 was cited in several cases to support walking speed and pre-movement delays in healthcare scenarios.

Occupant categorization:

Occupants were commonly classified following the International Fire Engineering Guidelines (IFEG):

- Category A: Awake, alert and familiar with surroundings (e.g., staff or trained personnel in mechanical spaces).
- Category B: Awake but unfamiliar, general public, or mobility-challenged occupants.
- In hospitals or care settings, modelling accounted for staff-assisted evacuation, reduced movement speeds, and zoned egress.

Additional notes:

- Pre-movement delays of 15–30 seconds were commonly included to reflect delayed recognition or response to alarms.
- In some studies, behavioural assumptions were refined using drill-based data (e.g., hospital evacuation trials or station clearing drills) to better reflect actual conditions.

6.3.4 Benchmarks and guidance documents referenced

Key References Used in Case Studies (Ranked by Approximate Frequency)

- **SFPE Handbook of Fire Protection Engineering (about 70 per cent)**
The most referenced source across case studies. Used for tenability limits (e.g., FED thresholds), fire growth inputs (t-squared curves), occupant flow rates and calculation of ASET/RSET margins. Includes foundational research by J.L. Pauls on stair descent, crowd flow and emergency movement dynamics.
- **NIST publications and tools such as, FDS, CFAST (about 60 per cent)**
Widely used to model fire and smoke behaviour, ventilation and tenability. FDS was especially prevalent in transit, high-rise and healthcare projects requiring complex smoke flow analysis. Also provided validation references for model inputs.
- **International Fire Engineering Guidelines (IFEG) (about 40 per cent)**
Cited in performance-based submissions for methodology framing, risk categorization and ASET/RSET justification. Often used alongside SFPE and NIST to define fire scenarios and occupant assumptions.
- **NFPA 130: Standard for Fixed Guideway Transit and Passenger Rail Systems (about 35 per cent)**
Used in transit platform and tunnel projects to support extended travel distances, smoke control assumptions and emergency procedures. Provided occupancy-specific guidance aligned with actual facility use.
- **BS PD 7974-6:2004 (UK Guidance) (about 25 per cent)**
Referenced in several performance-based egress models for occupant categorization, pre-movement delay and behavioural inputs, especially when modelling vulnerable populations.
- **NFPA 101 (Life Safety Code) (about 20 per cent)**
Cited to support hybrid prescriptive-performance evaluations in assembly and residential occupancies. Informed assumptions on corridor width, exit access and egress route integrity.

6.3.5 Limitations and risks in performance-based evaluation

While the reviewed designs achieved equivalency through modelling, several limitations were noted:

- ASET values were often held constant or not modeled explicitly
- Behavioural assumptions (immediate response, optimal pathfinding) may not reflect real-world actions
- Some tools lacked sensitivity analysis or peer review
- Inputs for synthetic materials and modern contents were not always representative
- Mechanical systems such as pressurization, lighting assumed to function without degradation

Few designs included provisions for post-occupancy validation, maintenance oversight, or future layout changes. This creates long-term performance risks if the systems supporting equivalency are not sustained.

6.4 Summary

The review confirms that performance-based design, when executed rigorously, can support extended travel distances without compromising life safety. Common strategies include time-based evacuation modelling, layered system enhancements and conservative assumptions. However, inconsistent review standards, the absence of national peer-review mechanisms and lack of long-term oversight present ongoing challenges.

To ensure robust outcomes, future guidance should:

- Define minimum modelling requirements for equivalency
- Standardize ASET-RSET input assumptions
- Require sensitivity analysis and validation
- Promote third-party review and credentialing for fire modelling

It should be noted that the tools and methodologies referenced in this report represent only a subset of those available. The field of fire and evacuation modelling includes a wide variety of platforms, ranging from agent-based simulations to cellular automata and hybrid models such as, FDS+Evac. The inclusion of any specific tool or reference does not constitute endorsement, approval, or recommendation. Rather, they reflect examples encountered or cited during this research. Practitioners are advised to evaluate the suitability, assumptions and limitations of any modelling tool in the context of their specific application.

7.0 Perspective and experiences of code users

To complement the technical review (section 4) and the historical analysis (section 5), this study included engagement with code users' through a national survey and follow-up workshop. The objective was to capture practical experiences, interpretations, and challenges related to travel distance compliance, particularly Sentence 3.4.2.5.(1). Respondents included architects, fire protection engineers, municipal and provincial safety codes officers (SCOs), building officials, and other practitioners with direct experience in code application and alternative solution review. Findings here directly motivate the recommendations in section 8.

Note: 'travel distance' refers to NBC 2020 Part 3 unless Part 9 is explicitly referenced.

7.1 Survey

7.1.1 Engagement methods

As part of a broader research initiative, a national survey was conducted to better understand how users of the code, particularly Article 3.4.2.5. Location of Exits, experience its implementation in practice. The objective was to evaluate the effectiveness of current prescriptive requirements, identify practical limitations and uncover opportunities for future improvement. The survey targeted architects, fire protection engineers and AHJs.

Ninety-seven responses were received from professionals, primarily based in Alberta, British Columbia, Ontario and Saskatchewan. Most respondents reported having between two to over ten years of experience and indicated a high level of familiarity with the NBC 2020 and its travel distance provisions.

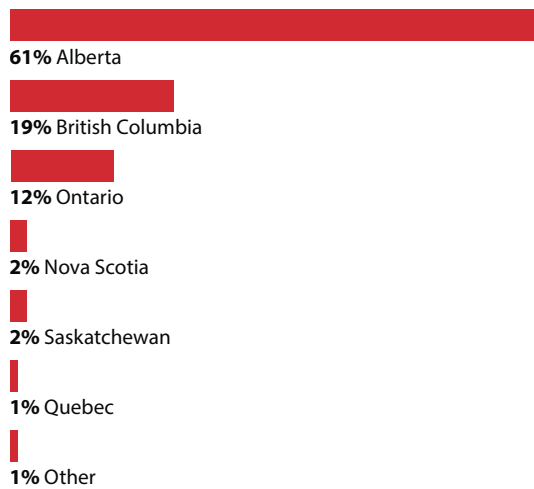


Figure 3. Survey responses received by province

The survey was part of a broader research initiative supported by the NRC to assess the strengths of the current NBC 2020 and to identify areas where it may fall short in today's evolving building landscape. Topics covered included the scientific basis for travel distance limits, the application of performance-based design methods, the effectiveness of supporting NBC 2020 statements and opportunities for prescriptive and policy reform. The full set of survey questions and responses can be found in Appendices 2, 3 and 4.



Figure 4. Survey respondent experience regarding travel distance requirements

Table 7. Survey respondent demographics

Fire protection engineer	21
Other engineer	4
Architect (or intern)	36
Interior designer (or intern)	1
Architectural Technologist	3
Authority having jurisdiction (AHJ) - Building	28
Authority having jurisdiction (AHJ) - Fire	9
Educator	1
Other	6

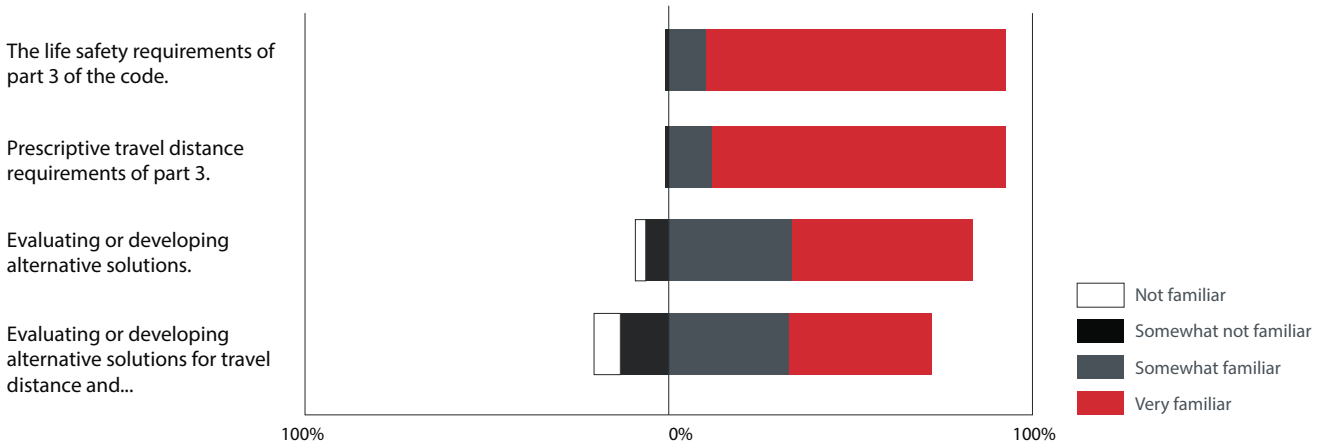


Figure 5. Survey respondents' familiarity

The survey consisted of 21 structured and open-ended questions, covering a broad spectrum of perspectives. Key questions included:

- How effective are the current travel distance requirements in promoting safe egress?
- What strategies could improve the flexibility of prescriptive travel distance limits?
- How clear and useful are the NBC 2020's objectives, functional statements and intent statements in supporting alternative solutions?
- What building design factors are most critical in determining safe travel distances?
- What tools and methods are currently used to evaluate or support travel distance alternatives?
- What emerging technologies or future trends could influence travel distance criteria?
- What gaps exist in the current Code or its application that should be addressed through future research or policy development?

These questions were grouped into thematic sections focusing on prescriptive code effectiveness, alternative compliance pathways, technical evaluation practices and suggestions for modernization. Each section yielded detailed qualitative feedback and useful comparative data.

For detailed information see Appendix 2 (Survey questions), Appendix 3 (Completed survey response dataset) and Appendix 4 (Survey response analytics).

7.1.2 Survey results: Code users' feedback

Prescriptive travel distance requirements

The survey responses showed consistent concern about the age and rigidity of the NBC 2020's current prescriptive travel distance requirements. Many respondents remarked that these values, notably the 30 metre and 45 metre limits, are no longer representative of contemporary design. As one respondent noted, "The current 30 to 45 metres travel distance is formulated based on City of New York lot sizes and open storeys in 'factory' buildings in the early 1900s." Another stated that "many of the current code provisions are based on archaic findings. Exit width, for example, is an area that needs to be revisited."

Table 8. Prescriptive travel distance requirements

	Inaccurate	Somewhat inaccurate	Unsure	Somewhat accurate	Accurate
Promotes safe egress for occupants.		7.2%	3.1%	30.9%	58.8%
Provides clear and consistent standards.	4.1%	8.2%	3.1%	43.4%	41.2%
Limits risks associated with high occupant or fuel loads.	4.1%	11.3%	8.2%	44.3%	32%
The research that guided the maximum travel distance is outdated.	6.2%	7.2%	37.1%	27.8%	21.6%

While many acknowledged the importance of prescriptive provisions for NBC 2020 compliance and enforcement simplicity, others emphasized that a one-size-fits-all approach fails to account for critical variables such as occupancy type, building use, building geometry and fire protection systems. Common limitations identified included:

- No credit given for enhanced fire suppression or smoke control systems.
- Assumed uniform occupant behaviour and mobility.
- Inflexibility for large or open-plan layouts, like warehouses or arenas.
- Difficulty applying static distances in complex, irregular floor plans.

Several suggested that prescriptive distances may be revisited in specific contexts. For example, one respondent noted, “There’s low-hanging fruit in low-hazard, sprinklered floor areas like parking garages and dead-end public corridors serving residential suites. Increasing travel distance here is reasonable and overdue.”

Alternative solutions

Alternative solutions are increasingly relied upon to bridge the gap between code prescriptions and modern building needs. However, survey feedback revealed broad frustration with the complexity, inconsistency and time-consuming nature of the alternative solution process. As one participant described, “A simple alternative solution for a few extra metres in travel distance often turns into a multi-week analysis with high approval risks, impacting project schedules.”

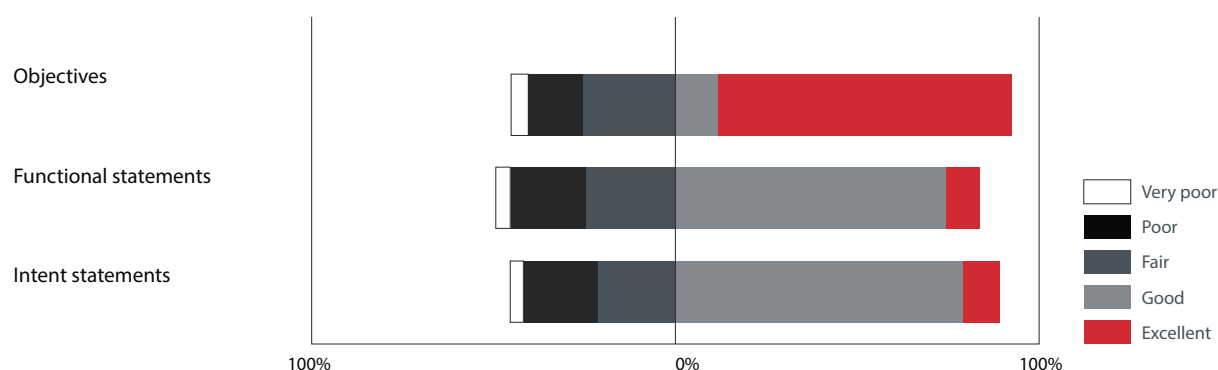


Figure 6. Survey feedback on guidance provided by the Code of alternative solution for travel distance

Respondents cited multiple barriers to efficient alternative solution development:

- High documentation burden and modelling complexity.
- Significant variation in how AHJs interpret submissions.
- Limited guidance or standardized performance benchmarks.
- Disparity between the professional qualifications of those preparing and those reviewing alternative solutions.

Despite these challenges, professionals emphasized the value of alternative solutions for introducing innovation and accommodating building-specific conditions. Several called for the development of national templates or case study repositories to guide practitioners and reviewers. One respondent recommended, “Introduce nationally consistent documentation standards for common alternative solutions, along with reviewer training to ensure balanced assessment.”

Methods and tools for evaluation

Participants were asked to rate the effectiveness of various evaluation tools used in the preparation of alternative solutions. The most widely supported tools included:

Fire and evacuation modelling (ASET/RSET analysis): Regarded as the gold standard for assessing tenability and evacuation performance, though its effectiveness is contingent on model inputs and practitioner expertise.

CFD (computational fluid dynamics): Valuable for smoke movement and temperature modelling, especially in complex or large-volume spaces. However, one respondent cautioned that “computer-generated results are only as good as the assumptions and inputs used.”

Evacuation simulation software: Recognized as useful for visualizing movement patterns, crowding and egress flow, particularly when integrated with fire scenarios.

Engineering calculations: These methods remain popular for clearly defined scenarios and are often used to validate more complex simulations.

Other methods, like historical fire data, expert judgment and comparative risk assessments, were viewed as supportive but secondary. Concerns were expressed over the inconsistent application of these methods and the absence of shared performance thresholds.

A particularly noteworthy comment stressed the need for standardization, “Without quantitative acceptance criteria, it’s hard to prove ‘equivalent performance’ even with sound modelling.”

Design factors influencing travel distance

Respondents were asked to identify the most critical design features that should influence allowable travel distance. The top factors included:

- Presence of sprinkler systems and fire detection systems.
- Occupancy type and occupant familiarity with the space.
- Fire separations and construction type.
- Ceiling height and compartment geometry.
- Crowd density, queuing and behavioural patterns.

Multiple respondents emphasized that different occupancies require different assumptions. One noted, “The hazards in a sole-proprietor massage facility are much less than in a small retail space, yet both are treated the same.”

Others stressed that existing language within the NBC 2020 fails to reflect accessibility considerations or aging demographics. As one participant summarized, “Accessibility isn’t just about getting into a building, it’s about getting out during an emergency.”

Table 9. Methods and tools for evaluation

	Very ineffective	Somewhat ineffective	Not sure if effective	Somewhat effective	Very effective
Fire Modelling Software/Computational Fluid Dynamics (CFD)(to demonstrate time to untenable conditions, used to validate smoke control systems or fire separations)	4.1%	3.1%	25.8%	37.1%	29.9%
Evacuation simulation models (to evaluate egress times, potential congestion points and occupant behaviour)	3.1%	2.1%	20.6%	41.2%	33%
	Somewhat important	Neutral	Important	Critical	
Presence of sprinklers and fire detection.	3.1%	4.1%	34%	58.8%	
Occupancy type (assembly, care, residential, office, retail, high-hazard, etc.)	1%	11.3%	43.3%	44.3%	
	Unimportant	Neutral	Important	Critical	
Presence of fire separations (Fire separation means a construction assembly that acts as a barrier against the spread of fire. NBC 2020 definition)	1%	7.2%	56.7%	35.1%	

Future research and development needs

There was a strong call across the survey for more contemporary and inclusive research to inform travel distance criteria. Suggested areas of research included:

- Human behaviour studies, including delay times, queuing, cultural and linguistic barriers.
- Data from real world evacuation drills and randomized fire tests.
- The impact of new fire hazards such as electric vehicle batteries, lithium-ion storage and combustible furniture.
- Updated tenability criteria and engineering benchmarks.
- International best practices and performance-based design standards.

Some respondents expressed frustration that existing research is not being adequately applied. One stated, “There are a few excellent studies that are out there that should be revised with newer information.”

Final reflections and critiques

Final reflections were wide ranging and candid. Many respondents reiterated the importance of keeping occupant safety paramount, regardless of economic or development pressures. “Allowing people to leave a building in a timely manner, in any emergency, is the only way to provide a means of self-rescue,” one wrote.

Several participants critiqued the survey itself for being too leading, voicing concern that the intent was to favour industry over safety.

Themes in the final remarks included:

- Support for expanding prescriptive options in low-risk buildings with advanced fire protection.
- The need for performance-based criteria that align with tenability and not just geometry.
- The value of consistency and clarity in the review process.
- The critical importance of reviewer competence and training.

One participant put it concisely, “The NBC 2020 does a good job of protecting people, but it hasn’t kept pace with changes in building design, technology, or population. It’s time to modernize.”

7.2 Workshop

7.2.1 Engagement methods

As part of a broader research initiative exploring egress system performance and code modernization, three two-hour virtual workshops were held on March 27 and 28, 2025. Approximately 45 participants including Architects, Fire Engineers and AHJ’s engaged in activities that evaluated the underlying assumptions and practical implications of Article 3.4.2.5. of NBC 2020. This Article prescribes the maximum travel distance to an exit based on occupancy type and fire protection features.

The workshops focused on discussions related to the effectiveness of the current requirements and explored potential pathways for performance-based alternatives.

Each workshop opened with a presentation that provided important context and framing that traced the historical evolution of travel distance requirements from early twentieth-century fire codes to their current form in NBC 2020. The presentation emphasized that today’s prescriptive limits remain largely unchanged since the early twentieth century, despite major shifts in building materials, layouts, fire behaviour and occupant dynamics. It raised questions about whether the assumptions behind these limits still hold and challenged attendees to consider:

- How do current travel distances relate to the functional objective of “timely movement of persons to a safe place”?
- What constitutes a “safe” evacuation in modern buildings?
- Have advances in fire modelling, detection, suppression and human behaviour research been meaningfully incorporated into the code?
- Are emerging risks such as open-concept layouts, synthetic materials, energy storage systems and climate-related threats being accounted for?

The presentation also highlighted discrepancies in how time and distance are treated in egress planning, the need for performance-based flexibility and the lack of clear benchmarks for evaluating what constitutes a “safe” travel time.

Current travel distance requirements in NBC 2020 are rooted in historical precedents, with core values largely unchanged since the early twentieth century. These values were originally derived from engineering judgment, early fire incidents and limited empirical studies. While the NBC 2020 has evolved in other areas, its travel distance provisions remain mainly prescriptive, relying on fixed maximums regardless of building complexity, occupancy diversity or modern fire protection technologies. Although the current NBC 2020 is objective-based, it does not provide much guidance to support the use of alternative solutions. This approach has raised questions regarding its continued appropriateness in contemporary design and enforcement contexts.

The workshop had four activities for participants:

- Prescriptive travel distance large group discussion.
- Alternative solutions small group discussions.
- Debate on prescriptive vs performance-based design.
- Identify gaps and priorities in travel distance requirements and alternative solutions.

Responses to each activity were documented using the online collaboration tool Mural. A copy of the Mural board activities can be found in Appendix 5.

7.2.2 Workshop results: Code users' feedback

Prescriptive travel distance requirements

The following questions were asked during this activity:

- Are the current code requirements too stringent or too relaxed? Explain your answer.
- In what types of building designs or occupancy types do current travel distance requirements most often fall short and why?

Participant feedback suggests that while current travel distance requirements work reasonably well for standard building types, they often fall short in complex, large-scale or specialized scenarios. High hazard industrial occupancies, large warehouses, assembly spaces and healthcare facilities are frequently cited as problematic due to their unique layouts, equipment and evacuation strategies. The NBC 2020's one-size-fits-all approach does not account for the diversity in design, risk or functional use. For instance, sprinklered buildings are held to overly conservative standards despite their reduced fire risk. Several respondents noted that travel distance is often treated as a proxy for evacuation time, but this oversimplifies real-world safety conditions and can misrepresent actual risk.

Concerns were shared about how "emergency" is defined in the context of evacuation. Most code provisions assume fire as the primary hazard, but participants noted that travel distance should be tied to the time it takes to move occupants away from any hazardous condition, including smoke, chemical exposure, power failure or violence. A broader and clearer definition of emergency conditions may support more appropriate design targets.

Design challenges like open layouts, high ceilings, racking systems, mezzanines, manufacturing processes and non-traditional exit configurations further complicate compliance, particularly in renovated or repurposed buildings. Some participants highlighted the disconnect between how buildings are permitted versus how they are eventually used, leading to unintentional non-compliance. Others raised concerns around limited clarity in the NBC 2020 terms like "dead-end corridor" are inconsistently interpreted and differing enforcement standards across municipalities exacerbate the issue. Functional use factors, like the presence of people with limited mobility or staff-led evacuations in healthcare settings, are also not adequately reflected in the current code.

Although some participants believed the rules are broadly sufficient, most called for a shift toward more context-based and flexible approaches, including greater support for performance-based design alternatives.

In summary, participants suggested:

- Tailoring travel distance requirements by occupancy type, risk level, geometry of space and building function.
- Allowing more flexibility for complex or large-scale buildings.
- Addressing limitations in code definitions and interpretation.
- Recognizing design realities like equipment, racking and internal zones of refuge.
- Conducting further research on evacuation time vs. distance assumptions.
- Defining what qualifies as an "emergency" for egress design and measurement.

Alternative solutions

The following questions were asked during this activity:

- What design tools or methods have you used (or seen used) to justify longer travel distances. Which are most effective in supporting travel distance assessments and which ones fall short?
- What barriers or challenges do designers and AHJs face when evaluating alternative solutions involving extended travel distances and how can those barriers be reduced?
- What data or evidence would make you more confident in assessing or auditing a performance-based travel distance solution?
- Would having a national guideline or decision framework for performance-based travel distances be helpful? Why or why not?

Participants provided insights on the tools, challenges and future needs related to performance-based design travel distance assessments. While there is strong technical knowledge and a variety of methodologies in use, gaps remain in clarity, consistency and practical application, especially when deviating from prescriptive code requirements.

For tools and methods, many respondents referenced established resources like the SFPE Handbook, NFPA 101, Pathfinder, MassMotion, REST/ASET analysis and CFD modelling tools like FDS and Consolidated Model of Fire and Smoke Transport (CFAST). Hand calculations remain common, especially for simpler designs, while complex buildings often require simulations. However, the effectiveness of these tools is mixed, depending on input quality, designer expertise and AHJ familiarity.

Some participants voiced concern over inconsistent acceptance criteria and the lack of shared standards for tool selection or methodology. Several warned that performance tools can be manipulated or misunderstood if not used carefully.

One issue raised was the unclear definition of what qualifies as “safe” in a performance-based design. Without clearly defined thresholds in terms of evacuation time, tenability or risk equivalency, designers and AHJs are left to interpret safety outcomes subjectively. Participants emphasized the need to shift from comparing to prescriptive numbers to assessing whether an alternative solution achieves the intended objective-level outcome of safety, with a transparent risk basis.

Barriers to implementing alternative solutions are widespread.

Key challenges identified include:

- Inconsistent interpretation and comfort levels across jurisdictions.
- Lack of clear performance metrics or acceptable egress time benchmarks.
- High costs, time and perceived risk associated with alternatives.
- Limited technical capacity among both designers and AHJs.
- Uncertainty over how to compare modeled solutions to prescriptive code.

These difficulties often discourage designers and clients from pursuing alternative solutions, especially in smaller or resource-constrained municipalities.

There was strong support from participants for a national guideline or decision framework, though with important caveats. Many emphasized that it should not become overly prescriptive, but instead act as a flexible, risk-based structure to promote consistency while preserving design freedom. This could help reduce disputes between designers and AHJs, standardize assumptions and improve the quality and confidence in performance-based designs. Despite some skepticism about whether a single guide can cover all building types, the consensus was that a national framework will help streamline evaluations, encourage innovation and close current gaps in interpretation and application.

Participants were aligned on the need for better data and evidence to support performance-based approaches. Suggestions included:

- Real-world fire incident data.
- Clear assumptions on occupant mobility, exit times and tenability thresholds.
- Standardized modelling protocols and reference case databases.
- Integration of fire and egress modelling tools to reduce disjointed results.
- Defined guidance on acceptable inputs and performance expectations.
- National guideline or decision framework that supports consistency without rigidity.

Debate

The workshop debate explored whether travel distance requirements in the NBC 2020 should be expanded to address emerging fire risks, human behaviour and technological change. While there was broad agreement on the need to modernize the approach, participants were divided on how best to do it as a prescriptive, performance-based or hybrid model.

Participants were divided into two rooms where they discussed their assigned argument.

Room 1 debated maintaining a **prescriptive foundation** due to its simplicity, consistency and ease of enforcement. Many noted that prescriptive rules provide a clear baseline, are cost-effective and reduce the need for specialized consultants or complex modelling - especially in standard buildings. However, they acknowledged limitations in addressing atypical buildings, evolving hazards and occupant variability. A hybrid solution was widely favoured: keep prescriptive rules for baseline compliance but allow clearly defined performance pathways for more complex scenarios.

Room 2 debated on the value of **performance-based decisions** for customized, innovative and risk-responsive solutions. Participants stressed that performance-based decisions offer greater flexibility, better alignment with real-world behaviour and building geometry for more adaptability over a building’s lifecycle. Yet, they also cautioned that performance-based decisions can introduce costs, modelling inconsistencies and challenges for AHJs without engineering expertise. Some advocated for clearer national frameworks, peer reviews and more robust data to support and standardize performance-based decisions.

Across both groups, key themes emerged:

- Prescriptive codes are easy to apply, enforceable and provide a minimum safety standard.
- Performance-based methods allow nuanced, tailored solutions but require careful validation and experienced practitioners.
- A hybrid approach prescriptive for common cases, performance-based for complex or high-risk buildings is widely supported.
- Modelling tools (e.g., egress and fire simulations) must be used with consistent assumptions and better oversight.
- Future guidance should include clear benchmarks, support tools for AHJs and risk-based evaluation methods.

Overall, the debate reinforced that while prescriptive requirements remain essential for clarity and consistency, the future of travel distance regulation must include structured flexibility, robust performance metrics and a national framework to ensure safe, adaptable and cost-effective outcomes.

Gaps and limitations in travel distance requirements and alternative solutions

The last activity invited the participants to reflect on the following two questions:

- What are the most critical gaps and limitations in the current prescriptive requirements and alternative solution process related to travel distance?
- If you had unlimited resources, what research or policy changes would you prioritize to improve the requirements and improve confidence in evaluating alternative solutions?

The reflections shared by the participants revealed broad agreement that current travel distance requirements in the NBC 2020 are too rigid in some cases, outdated and not well-supported by transparent or scientific foundations. Many participants noted that prescriptive limits lack clarity about how they were developed, particularly when it comes to assumptions about human behaviour, fire dynamics and acceptable levels of risk. This makes it difficult to create credible alternative solutions that meet or exceed the intended safety outcomes.

There was strong support for the role of performance-based design, especially in complex or non-standard buildings. However, participants pointed out several barriers that limit its effectiveness or widespread adoption. These included:

- A lack of formal recognition of performance-based design in NBC 2020.
- Requirement to benchmark against unclear prescriptive values.
- Inconsistent review processes by AHJs.
- Over reliance on “mitigating features” without standardized criteria.

Administrative and regulatory challenges were also a consistent theme. Many AHJs lack the internal expertise or tools to evaluate complex alternatives, especially in smaller jurisdictions. Without standardized review frameworks or national guidance, alternative solutions are often judged inconsistently adding cost, time and uncertainty for designers and building owners.

Participants called for greater investment in education and training to improve competency across the board. Key suggestions included:

- Structured fire engineering education pathways (degree or licensing).
- National training programs for AHJs on modelling, fire dynamics and performance metrics.
- Better documentation practices for submitting and reviewing alternative solutions.

Research emerged as a high priority to modernize code assumptions and support evidence-based design. Specific areas identified included:

- Human behaviour studies (e.g., pre-movement, walking speeds, mobility factors).
- Real world egress testing to validate simulation tools.
- Risk-based thresholds for different occupancy types and design contexts.
- Evaluation of older buildings to understand existing risk exposure.
- Participants also identified a need for better technical tools and frameworks.

Proposals included:

- Standardizing modelling assumptions and acceptable software.
- Introducing AI-guided flowchart tools for documenting complex solutions.
- Establishing peer review processes to ensure consistency and quality control.

Finally, there was a call for more collaboration and transparency across the industry. Many stressed the importance of involving architects, building owners, insurers and regulators in shaping future policy. This includes building a shared understanding of performance expectations, liability and risk tolerance.

In summary:

- Prescriptive rules are too rigid for some buildings and lack transparency.
- Performance-based design is promising but under supported and inconsistently applied.
- There is a clear need for research, education and national frameworks.
- Tools and peer review processes can help bridge the gap between intent and application.

Further discussions

A range of practical, policy and cultural issues emerged through workshop discussions but may not have been fully captured in the formal questions. These insights reinforced earlier findings while highlighting real world barriers and opportunities in the implementation of prescriptive and performance-based fire safety strategies.

One recurring theme was the timing and involvement of fire protection engineers. Multiple participants noted that these professionals are often brought into projects too late, typically only to validate designs rather than shape them. Early engagement was seen as critical, especially in innovative or complex builds where performance-based paths are likely. This issue connects directly with a broader concern about communication and coordination among project participants.

Jurisdictional differences especially between large centers and smaller municipalities were another major concern. Smaller AHJs may lack the capacity or mandate to assess complex alternative solutions, leading to uneven application of performance-based methods.

Participants also flagged building lifecycle changes as a common challenge. When occupancy or layout evolves, like warehouses being divided into smaller units, a previously approved alternative solution can become problematic. This reveals a gap in how ongoing compliance and performance over time are addressed.

Several other points emerged around standards, culture and professional accountability:

- There is no formal designation for “fire protection engineers” in Alberta, leading to variability in qualifications and some people self-designating as a fire protection engineer.
- Some engineers reportedly design to meet AHJ expectations rather than the NBC 2020.
- NBC 2020 compliance and innovation are not mutually exclusive but require better coordination and shared understanding.
- A consistent, national-level dataset on fire incidents will strengthen risk-based design and policy.

There was also interest in looking internationally for best practices. New Zealand’s four-step peer review system for alternative solutions was cited as a model that ensures more comprehensive evaluation and accountability.

7.3 Summary: Perspectives and experiences of code users

The survey and workshop findings reflect a readiness within industry to embrace a more flexible, performance-driven approach to travel distance and egress design. Respondents emphasized the importance of updating the NBC 2020 to reflect current building practices, occupant needs and fire protection technologies.

The survey provided insight into how prescriptive travel distance provisions are interpreted and applied across Canada. Many respondents expressed concern that the current limits do not reflect modern building complexity, occupant diversity, or evolving fire protection strategies. While some users felt the existing limits were appropriate for typical buildings, a significant portion identified situations, particularly in large, complex, or sprinklered buildings, where they act as a barrier to effective design.

The workshop offered an opportunity to validate and explore the gaps and limitations identified in earlier research. Participants confirmed many of the same issues raised in the survey, including:

- Overly optimistic behavioural assumptions.
- Lack of national guidance on modelling inputs and tenability thresholds.
- Underrepresentation of vulnerable populations in evacuation analysis.

AHJs highlighted discomfort in evaluating technically complex alternative solutions without modelling expertise or third-party support. Several participants emphasized the need for post-occupancy validation, standard benchmarks for safety margins, and clearer expectations for documentation and review.

Together, these engagements reinforced that while the NBC 2020 provides a functional baseline, both the prescriptive and performance-based pathways have gaps that require greater consistency, transparency, and scientific alignment. The findings from code users directly support and validate the gaps and limitations outlined earlier in the report, as summarized in Table 10. Comparison of gaps: Prescriptive vs. performance-based travel distance approaches.

8.0 Recommendations and future directions

The following recommendations are drawn from:

- A review of the historical and technical basis for prescriptive travel distance requirements in the NBC 2020, including analysis of their underlying assumptions and limitations.
- An evaluation of 30 approved alternative solutions submitted in the City of Calgary, focusing on modelling approaches, assumptions and outcomes related to extended travel distances.
- Insights from stakeholder workshops and a national survey of fire safety professionals, regulators, and Authorities Having Jurisdiction (AHJs), which validated and expanded upon the issues identified in document reviews.

The table below summarizes key differences between prescriptive and performance-based approaches, highlighting gaps identified through this research.

Table 10. Comparison of gaps: prescriptive vs. performance-based travel distance approaches

Topic	Prescriptive approach	Performance-based design (as practiced)
Origin of values	Legacy benchmarks; simple geometry proxies	Case-specific modelling; variable benchmarks/inputs
Behavioural assumptions	Assumes average adult speed, immediate response and independence	Often idealized; delays/impairments under-modelled
System performance assumptions	Assumes availability	Credited dependencies; sensitivity rarely standardized
Evaluation consistency	Uniform text; variable interpretation	Methodology, input quality and review process vary widely across jurisdictions
Safety margins	Conservative distances with built-in margin	Margins not standardized; sensitivity uneven
Reviewer capacity	Code literacy	Requires technical understanding of modelling and fire dynamics; uneven across jurisdictions
Professional credentials	Any qualified designer can follow code	No regulated fire protection engineering certification in Canada; performance-based designers may lack specialized training

8.1 Key recommendations to clarify existing provisions (Part 3 and Part 9)

- **Definitions and metrics:** Codify safe place, tenable conditions and timely movement. Set national benchmarks for visibility, temperature, and gas toxicity in both horizontal and vertical routes.
- **Minimum inputs and safety factors:** Publish default/allowed ranges and minimum RSET buffers (e.g., 20–30% or equivalent time) tailored by risk.
- **Equivalency benchmark (time-based):** Demonstrate $ASET > RSET$ to the declared endpoint using explicit tenability criteria and a minimum sensitivity set (pre-movement distributions; ability-based speeds; visibility degradation; credited systems timing/performance).
- **Declared dependencies:** Where performance claims credit sprinklers, pressurization/smoke control, emergency lighting/communications, signage, submissions must declare those dependencies and examine reasonable degradations.
- **Behaviour and wayfinding:** Document pre-movement delays, signage/visibility under smoke, route choice, and congestion/fatigue effects that influence RSET.
- **Endpoints and equity:** State the endpoint (exit for 3.4.2.5 compliance; refuge only where the strategy explicitly allows and is fully supported). Reflect mixed-ability movement and assisted evacuation in RSET inputs where applicable.
- **Model QA and transparency:** Disclose model/tool versions, meshes/zone checks, files sufficient for replication; include uncertainty/sensitivity analysis for key dependencies.
- **Templates and checklists:** Use submission/review checklists mirroring the above to raise inter-reviewer agreement.

8.2 Key recommendations to address limitations (research)

- **Modernize fixed distances by context:** Evaluate where distances could increase/decrease (e.g., low-hazard, sprinklered, large-volume spaces vs. tall, mixed-ability occupancies) using time-based criteria and practice data.
- **Equity in egress:** Develop evidence for mixed-ability timelines/endpoints and clearer refuge provisions beyond care facilities.
- **Vertical-egress tenability:** Establish validation criteria for stair conditions under pressurization ΔP targets, door-open effects, leakage/stack/wind, and congestion/fatigue.
- **System integration and reliability:** Quantify reliability/maintenance impacts of credited systems (sprinklers, smoke control, communications) and robustness of designs under degraded performance.
- **Data and validation:** Design drills/experiments to obtain time-resolved behavioural/tenability data (visibility, gas/temperature, messaging efficacy) suitable for calibrating RSET/ASET inputs and safety margins.

8.3 Programmatic enablers (outside code text)

- **Credentialing and training:** Define pathways for performance-based design practitioners and reviewers; provide AHJ training and worked examples.
- **Peer/third-party review:** Require independent technical review for complex exceedances (magnitude/complexity) or when distance thresholds are significantly surpassed.
- **Guidance exemplars and templates:** Publish worked examples, default input libraries, and standardized documentation.
- **Post-occupancy verification:** Implement periodic checks for assumptions tied to credited systems (e.g., integration tests for alarms–smoke control–signage/communications) and re-assessment triggers after major renovations/system changes.

9.0 Conclusion

Based on section 4.0 and 6.2, the existing Part 3 travel-distance limits function as risk-informed baselines when underlying assumptions are made explicit in performance submissions, specifically visibility/wayfinding, occupant response, system availability (sprinklers/pressurization), vertical-egress tenability, and defined endpoints (exit vs refuge).

Fire incident literature and national datasets seldom isolate travel distance as the decisive factor in fatalities. Outcomes typically hinge on blocked/locked exits, smoke migration, overcrowding, and missing/impacted systems. Likewise, many public reports lack the granular, time-resolved data needed to recalibrate specific metre values independently. Any reconsideration of numeric limits should therefore be informed by targeted studies/drills rather than incident narratives alone (see section 7.0).

Performance tools can support equivalency when inputs are transparent and bounded, dependencies are declared, sensitivity demonstrates $ASET > RSET$ under reasonable degradations, and reviews are competent and consistent (e.g., peer/third-party review for higher-risk proposals).

Recommended actions

- **Adopt now (clarifications for application):** Declare credited dependencies; document wayfinding/visibility assumptions; account for mixed-ability timelines; clarify vertical-egress tenability; and state the performance endpoint (exit vs. refuge) and show $ASET > RSET$ to that point.
- **Commission research (future technical work):** Develop evidence on (i) behavioural bounds by occupancy, (ii) visibility under smoke/occlusion, (iii) mixed-ability timelines/endpoints, (iv) vertical-egress conditions under pressurization/door effects, and (v) robustness of credited systems—to inform any future reconsideration of distance values (e.g., low-occupancy warehouses vs. tall, mixed-ability occupancies).
- **Build capacity/consistency (programmatic):** Consider national guidance for default modelling inputs, tenability criteria/safety margins, and documentation standards; promote peer/third-party review for complex alternatives; and consider periodic post-occupancy verification protocols for credited systems.

Egress safety is not merely geometric; it is time and system dependent and sensitive to human behaviour. Prescriptive distances remain useful baselines, but consistent application and targeted research will keep them aligned with modern buildings, occupants, and hazards.

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Appendices

Appendix 1: Detailed review of the NBC 2020 travel distance requirements and related clauses

This appendix summarizes the key prescriptive travel distance limits outlined in Article 3.4.2.5. of Division B of the NBC 2020, and identifies related provisions, objectives, and assumptions relevant to egress design and performance-based evaluation.

Appendix 2: Survey questions

This appendix includes the full set of structured and open-ended questions used in the national survey of code users.

Appendix 3: Complete survey response dataset

This appendix includes the raw survey data of individual survey responses.

Note: Responses are grouped by question and presented verbatim. Identifying information has been removed for confidentiality.

Appendix 4: Survey response analytics

This appendix presents graphical summaries and response breakdowns as exported from Microsoft Forms. Results include aggregated percentages, charts, and response patterns for both multiple choice and Likert scale questions. These visuals support the analysis presented in Section 7.0 of this report.

Appendix 5: Workshop insights – virtual board responses

This appendix includes screenshots of participant responses gathered during the national stakeholder workshop. Comments were submitted using virtual post-it notes on a shared digital board. Responses are presented thematically as contributed by participants and represent unedited feedback on the interpretation, challenges, and reform needs associated with travel distance provisions in the building code.

Appendix 1 - Code review - National Building Code of Canada 2020

Article 3.4.2.4. Travel Distance

1. Except as permitted by Sentence (2), for the purposes of this Subsection, travel distance means the distance from any point in the floor area to an exit measured along the path of travel to the exit.
2. The travel distance from a suite or a room not within a suite is permitted to be measured from an egress door of the suite or room to the nearest exit, provided
 - a. the suite or room is separated from the remainder of the floor area by a fire separation
 - i. having a fire-resistance rating not less than 45 min in a floor area that is not sprinklered throughout, or
 - ii. which is not required to have a fire-resistance rating, in a floor area that is sprinklered throughout, and
 - b. the egress door opens onto
 - i. an exterior passageway,
 - ii. a corridor used by the public that is separated from the remainder of the floor area in conformance with the requirements in Article 3.3.1.4. for the separation of public corridors, or
 - iii. a public corridor that is separated from the remainder of the floor area in conformance with Article 3.3.1.4. (see Note A-3.1.8.1.(1)(b)).
3. Travel distance to an exit shall be not more than 50 m from any point in a service space referred to in Sentence 3.2.1.1.(8).

Attributes and Intent

Sentence 3.4.2.4.(1)

- Intent: To define the means of measuring travel distance within a floor area.

Sentence 3.4.2.4.(2)

- **Intent:** To exempt travel distance measurements involving a suite or room from the application of Sentence 3.4.2.2.(1), which would otherwise require the measurement from the furthest point in the suite or room, and permit measurement from the egress door of the suite or room, if certain conditions are met. This is on the basis that the portion of the travel route outside the room or suite is protected from a fire in the rooms or suites leading onto the protected egress route and thus would not be rendered untenable within the time required to achieve occupant safety.

Sentence 3.4.2.4.(3)

- Attribution [F10-OS3.7]*
- **Intent:** To limit the probability of excessive travel distances to an exit in emergency situation, which could lead to delays in the evacuation or movement of persons to a safe place, which could lead to harm to persons.

Article 3.4.2.5. Location of Exits

1. Except as permitted by Sentences (2) and 3.3.2.5.(6), if more than one exit is required from a floor area, the exits shall be located so that the travel distance to at least one exit shall be not more than
 - a. 25 m in a high-hazard industrial occupancy,
 - b. 40 m in a business and personal services occupancy,
 - c. 45 m in a floor area that contains an occupancy other than a high-hazard industrial occupancy, provided it is sprinklered throughout,
 - d. 105 m in any floor area, served by a public corridor, in which rooms and suites are not separated from the remainder of the floor area by a fire separation, provided
 - i. the public corridor is not less than 9 m wide,
 - ii. the ceiling height in the public corridor is not less than 4 m above all floor surfaces,
 - iii. the building is sprinklered throughout, and
 - iv. not more than one half of the required egress doorways from a room or suite open into the public corridor if the room or suite is required to have more than one egress doorway,
 - e. 60m in any storage garage that conforms to the requirements of Article 3.2.2.92., and
 - f. 30 m in any floor area other than those referred to in Clauses (a) to (e).

- | | |
|--|---|
| <p>2. Except for a high-hazard industrial occupancy, Sentence (1) need not apply if exits are placed along the perimeter of the floor area and are not more than 60 m apart, measured along the perimeter, provided each main aisle in the floor area leads directly to an exit.</p> | <p>3. Exits shall be located and arranged so that they are clearly visible or their locations are clearly indicated and they are accessible at all times.</p> |
|--|---|

Attributes and Intent

Sentence 3.4.2.5.(1)

- Attribution [F10-OS3.7]*
- **Intent:** To limit the probability of excessive travel distance to an exit in an emergency situation, which could lead to delays in the evacuation or movement of persons to safe place, which could lead to harm to persons.

Sentence 3.4.2.5.(2)

- **Intent 1 :** To exempt floor areas used for high hazard industrial occupancies from the permission in the latter part of Sentence 3.4.2.5.(2) to space exits around the perimeter of a large building instead of the travel distance limits of Sentence 3.4.2.5.(1), on the basis that the growth of the fire will be so rapid that delays in evacuating are not acceptable, and the 25 m travel distance limit of Clause 3.4.2.5.(1)(a) is necessary.
- **Intent 2:** To exempt exits located around the perimeter of floor areas from the travel distance limits of Sentence 3.4.2.5.(1), on the basis that the exit spacing is limited and each main aisle leads directly to an exit.

This is allowed on the basis that:

- Occupants will be able to leave before the space becomes untenable in a fire, and
- Emergency responders will be able to enter the building at the exit location and proceed expeditiously by means of the main aisles to problem areas in the building.

Sentence 3.4.2.5.(3)

- Attribution [F10-OS3.7]*
- **Intent 1:** To limit the probability that persons will not be familiar with the location of exits, which could lead to delays in evacuation or movement of persons to a safe place in emergency situation, which could lead to harm to persons.
- **Intent 2:** To limit the probability that exits will not be readily accessible, which could lead to delays in evacuation or movement of persons to a safe place in an emergency situation, which could lead to harm to persons.

Objective statement OS3 Safety in Use - An objective of this Code is to limit the probability that, as a result of the design or construction of the building, a person in or adjacent to the building will be exposed to an unacceptable risk of injury due to hazards. The risks of injury due to hazards addressed in this Code are those caused by (OS3.7) persons being delayed in or impeded from moving to a safe place during an emergency (see Note A-2.2.1.1.(1))

***Functional Statement F10** To facilitate the timely movement of persons to a safe place in an emergency.

National Building Code of Canada 2020 - National Research Council Canada,

<https://codes-guides.nrc.ca/IA/15NBC/intentframe.html>

Related articles from Part 3 of the National Building Code 2020

3.3.1.3. Means of Egress

1. Access to exit within floor areas shall conform to Subsections 3.3.2. to 3.3.5., in addition to the requirements of this Subsection.
2. If a podium, terrace, platform or contained open space is provided, egress requirements shall conform to the appropriate requirements of Sentence 3.3.1.5.(1) for rooms and suites.
3. Means of egress shall be provided from every roof which is intended for occupancy, and from every podium, terrace, platform or contained open space.
4. At least two separate means of egress shall be provided from a roof, used or intended for an occupant load more than 60, to stairs designed in conformance with the requirements regarding exit stairs stated in Section 3.4.

5. A rooftop enclosure shall be provided with an access to exit that leads to an exit
 - a. at the roof level, or
 - b. on the storey immediately below the roof.
6. A rooftop enclosure which is more than 200 m² in area shall be provided with at least 2 means of egress.
7. Two points of egress shall be provided for a service space referred to in Sentence 3.2.1.1.(8) if
 - a. the area is more than 200m², or
 - b. the travel distance measured from any point in the service space to a point of egress is more than 25 m.
8. Except as permitted by Sentences 3.3.4.4.(5) and (6), each suite in a floor area that contains more than one suite shall have
 - a. an exterior exit doorway, or
 - b. a doorway
 - i. into a public corridor, or
 - ii. to an exterior passageway.
9. Except as permitted by this Section and by Sentence 3.4.2.1.(2), at the point where a doorway referred to in Sentence (8) opens onto a public corridor or exterior passageway, it shall be possible to go in opposite directions to each of 2 separate exits.

3.3.1.4. Public Corridor Separations

1. Except as otherwise required by this Part or as permitted by Sentence (4), a public corridor shall be separated from the remainder of the storey by a fire separation.
2. Except as permitted by Sentence (3) and Clauses (4)(a) and (b), the fire separation between a public corridor and the remainder of the storey shall have a fire-resistance rating not less than 45 min.
3. If a storey is sprinklered throughout, no fire-resistance rating is required for a fire separation between a public corridor and the remainder of the storey, provided the corridor does not serve a care, treatment or detention occupancy or a residential occupancy. (See Note A-3.1.8.1.(1)(b).)
4. No fire separation is required in a sprinklered floor area between a public corridor and,
 - a. except as required by Sentences 3.3.3.5.(8) and 3.3.4.2.(1), and notwithstanding Sentence 3.4.2.4.(2), the remainder of a storey, provided the travel distance from any part of the floor area to an exit is not more than 45 m,
 - b. a room or a suite, provided the public corridor complies with Sentence 3.3.1.9.(4) and Clause 3.4.2.5.(1)(d), or
 - c. a space containing plumbing fixtures required by Subsection 3.7.2., provided the space and the public corridor are separated from the remainder of the storey by a fire separation having a fire-resistance rating not less than that required between the public corridor and the remainder of the storey.

3.3.1.5. Egress Doorways

1. Except for dwelling units, a minimum of 2 egress doorways located so that one doorway could provide egress from the room or suite as required by Article 3.3.1.3. if the other doorway becomes inaccessible to the occupants due to a fire which originates in the room or suite, shall be provided for every room and every suite
 - a. that is used for a high-hazard industrial occupancy and whose area is more than 15 m²,
 - b. intended for an occupant load more than 60,
 - c. in a floor area that is not sprinklered throughout, and
 - i. the area of a room or suite is more than the value in Table 3.3.1.5.-A, or
 - ii. the travel distance within the room or suite to the nearest egress doorway is more than the value in Table 3.3.1.5.-A, or
 - d. in a floor area that is sprinklered throughout and does not contain a high-hazard industrial occupancy and
 - i. the travel distance to an egress doorway is more than 25 m, or
 - ii. the area of the room or suite is more than the value in Table 3.3.1.5.-B.
2. Where 2 egress doorways are required by Sentence (1), they shall be placed at a distance from one another equal to or greater than one third of the maximum overall diagonal dimension of the area to be served, measured as the shortest distance that smoke would have to travel between the nearest required egress doors.

Table 3.3.1.5.-A
Egress in Floor Area not Sprinklered Throughout
 Forming Part of Sentence 3.3.1.5.(1)

Occupancy of Room or Suite	Maximum Area of Room or Suite, m ²	Maximum Distance to Egress Doorway, m
Group A	150	15
Group C	100 ⁽¹⁾	15 ⁽¹⁾
Group D	200	25
Group E	150	15
Group F, Division 2	150	10
Group F, Division 3	200	15

Notes to Table 3.3.1.5.-A:

⁽¹⁾ See Article 3.3.4.4. for *dwelling units*.

Table 3.3.1.5.-B
Egress in Floor Area Sprinklered Throughout
 Forming Part of Sentence 3.3.1.5.(1)

Occupancy of Room or Suite	Maximum Area of Room or Suite, m ²
Group A	200
Group B, Division 1	100
Group B, Division 2	
sleeping rooms	100
other than sleeping rooms	200
Group B, Division 3	
sleeping rooms not in suites	100
individual suites	150
other than sleeping rooms	200
Group C	150 ⁽¹⁾
Group D	300
Group E	200
Group F, Division 2	200
Group F, Division 3	300

Notes to Table 3.3.1.5.-B:

⁽¹⁾ See Article 3.3.4.4. for *dwelling units*.

3.3.1.6. Travel Distance

1. If more than one egress doorway is required from a room or suite referred to in Article 3.3.1.5., the travel distance within the room or suite to the nearest egress doorway shall not exceed the maximum travel distances specified in Clauses 3.4.2.5.(1)(a), (b), (c) and (f) for exits.

3.3.1.7. Protection on Floor Areas with a Barrier-Free Path of Travel

1. Every floor area above or below the first storey that is not sprinklered throughout and that has a barrier-free path of travel shall
 - a. be served by an elevator
 - i. conforming to Sentences 3.2.6.5.(4) to (6),
 - ii. protected against fire in conformance with Clause 3.2.6.5.(3)(b) or (c), and
 - iii. in a building over 3 storeys in building height, protected against smoke movement so that the hoistway will not contain more than 1% by volume of contaminated air from a fire floor during a period of 2 h after the start of a fire, assuming an outdoor temperature equal to the January design temperature on a 2.5% basis determined in conformance with Subsection 1.1.3.,
 - b. be divided into at least 2 zones by fire separations conforming to Sentences (2), (3) and 3.1.8.5.(6) so that (see Note A-3.3.1.7.(1)(b))
 - i. persons with physical disabilities can be accommodated in each zone, and
 - ii. the travel distance from any point in one zone to a doorway leading to another zone shall be not more than the value for travel distance permitted by Sentence 3.4.2.5.(1) for the occupancy classification of the zone,
 - c. in the case of residential occupancies, be provided with balconies conforming to Sentence (4), except on the storey containing the barrier-free entrance required by Article 3.8.2.2.,

- d. have an exterior exit at ground level, or
 - e. have a ramp leading to ground level. (See Note A-3.3.1.7.(1).)
2. Except as permitted by Sentence (3), the fire separations referred to in Clause (1)(b) shall have a fire-resistance rating not less than 1 h.
 3. The fire-resistance rating of the fire separations referred to in Clause (1)(b) is permitted to be less than 1 h but not less than 45 min provided the fire-resistance rating required by Subsection 3.2.2. is permitted to be less than 1 h for
 - a. the floor assembly above the floor area, or
 - b. the floor assembly below the floor area, if there is no floor assembly above.
 4. A balcony required by Clause (1)(c) shall
 - a. have direct barrier-free access from the suite or floor area
 - b. be not less than 1.5 m deep from the outside face of the exterior wall to the inside edge of the balcony, and
 - c. provide not less than 1.5 m² of balcony space for each non-ambulatory occupant and 0.5 m² for each ambulatory occupant.

3.3.2.6. Corridors

1. Except as permitted by Sentences (2) to (4), a corridor used by the public in an assembly occupancy as an access to exit shall be separated from the remainder of the floor area by a fire separation having a fire-resistance rating not less than 1 h.
2. The fire-resistance rating of the fire separation required by Sentence (1) is permitted to be less than 1 h but not less than 45 min provided the fire-resistance rating required by Subsection 3.2.2. is permitted to be less than 1 h for
 - a. the floor assembly above the floor area, or
 - b. the floor assembly below the floor area, if there is no floor assembly above.
3. The fire-resistance rating required by Sentence (1) is permitted to be waived if the floor area in which the corridor is located is sprinklered throughout.
4. The requirement for a fire separation stated in Sentence (1) is permitted to be waived if the distance from any point in the floor area to an exit measured along the path of travel to the exit does not exceed the travel distance permitted by Article 3.4.2.5.

3.3.3.5. Compartments and Fire Separations

1. Floor areas containing patients' or residents' sleeping rooms in a care or treatment occupancy where overnight sleeping accommodation is provided for more than a total of 10 patients or residents shall conform to Sentences (2) to (13).
2. Except as permitted by Sentence (3), a floor area described in Sentence (1) shall be divided into not less than 2 fire compartments, each not more than 1 000 m² in area.
3. The floor area on either side of a horizontal exit conforming to Article 3.4.6.10. is permitted to be considered as a fire compartment in applying the requirements of this Article.
4. Except as permitted by Sentence (5), fire separations separating fire compartments required by Sentence (2) shall have a fire-resistance rating not less than 1 h.
5. The fire-resistance rating of a fire separation referred to in Sentence (4) is permitted to be less than 1 h but not less than 45 min provided the fire-resistance rating required by Subsection 3.2.2. is permitted to be less than 1 h for
 - a. the floor assembly above the floor area, or
 - b. the floor assembly below the floor area, if there is no floor assembly above.
6. The travel distance from any point within each fire compartment referred to in Sentence (2) to a door to an adjoining fire compartment shall be not more than 45 m.
7. Each fire compartment referred to in Sentence (2) shall be capable of accommodating, in addition to its own occupants, the occupants of the largest adjacent fire compartment based on a clear floor space of 2.5 m² per patient in the adjacent fire compartment.
8. Except as provided in Sentences (9) to (13), walls between patients' or residents' sleeping rooms and the remainder of the floor area shall be constructed as fire separations but are not required to have a fire-resistance rating unless one is required by other provisions in this Part. (See Note A-3.1.8.1.(1)(b).)
9. The fire separation requirements of Sentence (8) do not apply to walls within a group of intercommunicating patients' or residents' sleeping rooms, provided the group of rooms does not

- a. contain more than 5 patients or residents, or
 - b. include storage, bathing or toilet facilities serving persons not occupying the group of rooms. (See Note A-3.3.3.5.(9).)
10. The fire separation requirements of Sentence (8) do not apply to walls within individual suites of care occupancy.
11. A door in a fire separation required by Sentence (8) is permitted to be equipped with a roller latch.
12. Except as permitted by Sentence (13), a fire separation required by Sentence (8) shall not have any grilles, louvres or other openings.
13. A door or wall separating a patient's or resident's sleeping room from an ensuite toilet room, shower room or similar ancillary space is permitted to incorporate grilles and louvres, provided
- a. the adjacent rooms are not used to store flammable or combustible materials, and
 - b. the openings are located so that smoke cannot pass through these rooms to other parts of the building. (See Note A-3.3.3.5.(13).)
14. Walls between individual suites of care occupancy and the remainder of the floor area in buildings of care occupancy shall be constructed as fire separations with a fire-resistance rating not less than that specified for residential occupancies in Sentences 3.3.4.2.(1) and (2).
15. Floor assemblies within individual suites of care occupancy need not be constructed as fire separations, provided the suites meet the conditions described in Clauses 3.3.4.2.(3)(a) and (b).
16. The fire-resistance rating of the fire separation required by Sentence 3.3.5.6.(1) is permitted to be waived if the fire separation is located between individual suites of care occupancy and an attached storage garage containing not more than 5 vehicles, provided the conditions described in Sentence 3.3.4.2.(4) are met.

3.4.2.1. Minimum Number of Exits

1. Except as permitted by Sentences (2) to (4), every floor area intended for occupancy shall be served by at least 2 exits.
2. A floor area in a building not more than 2 storeys in building height, is permitted to be served by one exit provided the total occupant load served by the exit is not more than 60, and
 - a. in a floor area that is not sprinklered throughout, the floor area and the travel distance are not more than the values in Table 3.4.2.1.-A, or
 - b. in a floor area that is sprinklered throughout
 - i. the travel distance is not more than 25 m, and
 - ii. the floor area is not more than the value in Table 3.4.2.1.-B.

Table 3.4.2.1.-A
Criteria for One Exit (Floor Area Not Sprinklered Throughout)
 Forming Part of Sentence 3.4.2.1.(2)

<i>Occupancy of Floor Area</i>	<i>Maximum Floor Area, m²</i>	<i>Maximum Travel Distance, m</i>
Group A	150	15
Group B	75	10
Group C	100	15
Group D	200	25
Group E	150	15
Group F, Division 2	150	10
Group F, Division 3	200	15

3.4.2.3. Distance between Exits

1. Except as provided in Sentence (2), the least distance between 2 exits from a floor area shall be
 - a. one half the maximum diagonal dimension of the floor area, but need not be more than 9 m for a floor area having a public corridor, or
 - b. one half the maximum diagonal dimension of the floor area, but not less than 9 m for all other floor areas. (See Note A-3.4.2.3.(1).)
2. Exits need not comply with Sentence (1) where
 - a. the floor area is divided so that not less than one third of the floor area is on each side of a fire separation, and
 - b. it is necessary to pass through the fire separation to travel from one exit to another exit.
3. The minimum distance between exits referred to in Sentence (1) shall be the shortest distance that smoke would have to travel between the exits, assuming that the smoke will not penetrate an intervening fire separation.

4. The distance between 2 exterior discharges of exit stairs serving the same floor area shall be
 - a. not less than 9 m, or
 - b. not less than 6 m, where
 - i. the building is sprinklered throughout, and
 - ii. the 2 exterior discharges are located within 15 m of a street.

3.4.6.18. Emergency Crossover Access to Floor Areas

1. Except as permitted in Sentence (2), doors providing access to floor areas from exit stairs shall not have locking devices to prevent entry into any floor area from which the travel distance up or down to an unlocked door is more than 2 storeys.
2. Doors referred to in Sentence (1) are permitted to be equipped with electromagnetic locks, provided they comply with Sentences 3.4.6.16.(5) and (6).
3. Doors referred to in Sentence (1) shall be identified by visual and tactile information signs complying with Subsection 3.8.3. mounted on the stairway side to indicate that they are openable from that side.
4. Locked doors intended to prevent entry into a floor area from an exit stair shall
 - a. be identified by visual and tactile information signs complying with Subsection 3.8.3. mounted on the stairway side to indicate the location of the nearest unlocked door in each direction of travel, and
 - b. be openable with a master key that fits all locking devices and is kept in a designated location accessible to firefighters or be provided with a wired glass panel not less than 0.0645 m² in area and located not more than 300 mm from the door opening hardware.
5. Where access to floor areas through unlocked doors is required by Sentence (1), it shall be possible for a person entering the floor area to have access through unlocked doors within the floor area to at least one other exit.

User's Guide – NBC 1995 Fire Protection, Occupant Safety and Accessibility (Part 3)

Safety within Floor Areas [NBC Section 3.3.]

Section 3.3. applies to safety within individual storeys (floor areas), including all rooms and spaces other than service rooms and service spaces covered by Section 3.6. This contrasts with Section 3.2., whose requirements affect the entire building. The requirements are grouped according to the occupancy of the floor area, room or space. This occupancy is not necessarily the principal occupancy for which the rest of the building or storey is classified.

For example, the principal occupancy of a building having most of its storeys used for offices would be classified as business and personal services. The provisions in Section 3.2. for structural fire protection and fire protection equipment for a business and personal services major occupancy building (Group D) would apply to the whole building. Within a specific storey, a room or a part of the floor area could be considered as a subsidiary occupancy to the office function and might be used for an assembly, institutional, residential, mercantile or industrial function. In this case, the special rules of Section 3.3. apply to that room or space. A small boardroom used as an assembly room must therefore comply with the requirements for assembly occupancy in Section 3.3., even if it is contained in an office building, hospital, hotel, industrial building or any other building that would be classified as a major occupancy other than assembly (Group A). However, a group of rooms used for meetings in a hotel would be considered as an assembly major occupancy, even though the principal use of the hotel would be considered as residential major occupancy.

In the NBC 1995, life safety for the occupants of any room, space or floor area depends on the use or occupancy of that space. The risk to these occupants occurs in the early stages of a fire. It is not the same for all occupancies, so each one must be regulated separately. Section 3.3. contains requirements for access to exit, both from open floor areas and from floor areas divided into rooms and suites. Access to exit includes all portions of the floor area, up to the entry to the exit. This Section also regulates the size of access to exits, limits the travel distance to exits from within a floor area, and addresses the design of guards around openings and in stairways and the use of glass in doors or windows that may be mistaken for doors.

Exits [NBC Section 3.4.]

The requirements for exits are separate from the requirements of Section 3.2., which affect the building as a whole, and from the requirements of Section 3.3., which affect the floor area. An exit is that part of the evacuation route that leads from the floor area it serves to another building, a public thoroughfare, or a safe open space outside the building. In a typical building with exit stairs, an exit includes the stairway itself and the doors leading into and out of the stairway. Once in the exit system, a person is considered to be in a relatively safe place, thus the exiting should be completed without re-entering another floor area in the same building. One exception involves the use of a lobby as a part of an exit facility. Some building designs provide for areas of refuge that act as intermediate holding areas between the occupied floor spaces and the exit facilities. Although these are intended for temporary use until an exit is available, they may be in use for extended periods of time where it is not practicable to evacuate the occupants directly from the floor areas in care or detention occupancies or in high buildings.

Section 3.4. defines what may be used as part of an exit system and the requirements for these facilities, their number and location, fire separation from the rest of the building, as well as exit signs and lighting.

Chapter 5, Safety within Floor Area, General [NBC 3.3.]

The requirements in Section 3.3. apply to a specific occupancy within a floor area or part of a floor area, regardless of the major occupancy category of the floor area or the building. The hazards to which occupants are initially exposed are local and may have no immediate impact on persons on other storeys of the building. General items that apply in all categories of building are placed in the first Subsection, followed by other Subsections with requirements for specific occupancies. Section 3.3. provides safety for occupants within floor areas. Even though the term "floor area" is written in terms of the superficial area of a floor, a "floor area" in its broadest sense, as used in Part 3, applies to all of the space on the storey, bounded by exterior walls and firewalls, from the top of the floor to the top of the floor of the next storey, but does not include space occupied by exit stair shafts, elevator hoistways, or other vertical service spaces. It includes all the space within a storey, including that occupied by interior walls, less the area occupied by vertical shafts that extend through the storey. Although floor areas include service rooms, the requirements for these rooms are covered in Section 3.6. and not in Section 3.3. The hazard associated with a service room is specific to that space and does not relate to the occupancy of the remainder of the storey.

Access to Exit within a Floor Area [NBC 3.3.1.3. and 3.3.1.4.]

Access to exit in a building is a principal feature that ensures the safety of the occupants. Although commonly misunderstood to relate only to corridors, it is that part of a means of egress within a floor area that provides access to exit serving the floor area. Means of egress is a continuous path of travel provided by a doorway, corridor, exterior passageway, balcony, lobby, stair, ramp or other egress facility from any point in a building, floor area or contained open space to an adjoining building, a public thoroughfare, or other safe open space. The question of what constitutes a safe open space is often asked. Typically, this would be specific to the design being considered and is based on an evaluation of egress from the space, the construction of an adjacent building, the separation of the building from the space, and the presence of other hazards. For example, the roof of an adjacent open-air storage garage might be considered a safe open space for egress from the second storey of a building, provided it is protected from fire exposure from the building and has access to a public thoroughfare. Access to exit is the path taken from any point where a person might be when evacuation starts, to an exit facility (Figures A-48 and A-49). In most buildings, the path is not a straight line but passes around furniture, fixtures, products and merchandise, and through internal corridors and doorways.

Many of these obstructions to egress change periodically and there is no guarantee that the same access to exit will be available at all times. Persons who are familiar with the building normally follow the access to the exit without difficulty, but those who are not regular users of the building will need help; this is usually provided by directional signs if an exit sign is not clearly visible. Mezzanines and raised platforms must be carefully considered in determining egress routes. The access to exit can start from any point on the raised platform or the mezzanine and includes any stair that might be used in moving from one level to another. Even with an additional exit on the mezzanine level, persons on stairs connecting the mezzanine to a lower or higher level have to be considered, because their access to exit would start on the stair.

Public corridors provide access to exit from suites in a floor area that is divided into a number of suites. The term "public corridor" does not refer to any specific category of persons who use the corridor. Compared to corridors within suites, a higher standard of protection is expected of public corridors because of their importance in evacuating persons who may receive a delayed warning of a hazardous situation in another suite.

Sufficient clear space must be provided for pedestrian movement adjacent to the walls of a wide public corridor in a shopping centre by ensuring that displays, kiosks and other obstructions within the public corridor do not block means of egress for the occupants of the building (Figure A-50). To control the fire load and the obstruction to pedestrian movement in an emergency, no more than 15% of the total area of the public corridor may be used for displays, kiosks or other obstructions.

Transparent doors and panels in and adjacent to means of egress within a floor area can cause injury to persons who may accidentally break them, and so are required to be marked or made inaccessible. The primary safety measure is clear identification by decals, etching or other means, supplemented, if needed, by bars or barricades to keep persons away.

Glazing in doors and sidelights must be safety glass.

Travel distance to an exit [NBC 3.3.1.6. and 3.4.2.4.]

The travel distance in an access to exit governs the time necessary for a person to evacuate the space. There is no clear method of measuring travel distance. When a building is first designed and the floor area is open, without partitions and furniture, the travel distance could be measured in a straight line from the most remote point to the nearest exit.

As partitions and furniture are installed, the routes become more complex and the travel distance increases. If the distance becomes excessive, alternate means of travelling to the exit should be provided. If a room or suite adjoining a corridor is separated from the corridor by a fire separation with a fire-resistance rating of at least 45 minutes, the travel distance to the exit is measured from the doorway of the room or suite. The travel distance within the room or suite under these circumstances is based on the requirements of Article 3.3.1.5. and the corridor has to be separated from the rest of the floor area by a fire separation conforming to the requirements for public corridors, whether or not the corridor is a public corridor. A similar relaxation in the measurement of travel distance is applied in a sprinklered building, provided there is a fire separation between the corridor and the rooms or suites, even though the fire separation is not required to have a fire-resistance rating.

Chapter 6 Exits General [NBC 3.4.]

Egress from a building is divided into two components: the path of travel to reach an exit (access to exit), and the path of travel within the exit. Chapter 5 of this Commentary, "Safety within Floor Areas," covers the components involved in travelling to an exit. This Chapter considers the design of the exit itself.

An exit is defined as that part of a means of egress that leads from the floor area it serves to a safe location. Obviously, a door opening directly outside to a public thoroughfare at ground level fulfills this requirement. The NBC 1995 recognizes a number of other exit components: interior and exterior passageways and ramps, fire escapes and horizontal exits. The exact location where an exit starts and finishes is usually easy to determine. However, in grandstands, arenas, industrial process buildings and similar places, these locations may not be easy to discern, and judgment must be exercised in applying the requirements of the NBC 1995.

The portion of a means of egress that is designated as the exit starts at the boundary of a floor area and is expected to provide a substantial protection from exposure to a fire within the floor area and from lower floor areas that would have to be passed while using the exit stair. In a single storey building, the exit is usually an exterior door leading directly to the outside. In multi-storey buildings, the exits from the upper floors usually consist of interior stairs that are enclosed within protective shafts.

Although not frequently used on buildings more than three storeys in building height, the exit stairs from upper floors can be outside the building and unenclosed, subject to protection from fire in the building.

The difference between an interior exit passageway and a public corridor is often questioned. An exit passageway must be designed as an exit for occupant flow in one direction. This applies both to interior and exterior passageways. The fire separation between a passageway and a floor area must be rated as an exit fire separation. No openings are permitted in this fire separation except for exit doors, and openings for standpipes, sprinkler system piping, and smoke control system ducts serving the exit. Certain rooms are not permitted to open directly into an exit. Doors opening into an exit passageway must open in the direction of the passageway and thus, for the most part, be recessed to avoid encroaching on the width of the exit. An exit passageway is subject to substantially more restrictive requirements than a public corridor, due to its role as an exit. An exit passageway would normally be designed for unidirectional flow of the occupants, whereas most public corridors must allow for movement in two directions to two different exits.

An exit passageway may not contain an occupancy, whereas a public corridor may contain an occupancy. Flame-spread ratings are more restrictive for exit passageways than for public corridors. A public corridor is part of the floor area, whereas an interior exit passageway is located outside the floor area.

An example of an exterior passageway for which special provisions apply is the passageway serving suites on upper storeys of a motel. The egress door from each suite is an exit door onto the passageway; from the suite exit door a person would proceed along the passageway to an exit stair at each end; then using the exit stair the person would proceed to a place of safety. Sentence 3.4.4.3.(1) waives the normal fire separation requirements between this exterior passageway and the floor area it serves, provided there is direct connection to the outdoors (at least 50% of the exterior side is open) and the exit stairs are located at each end of the passageway.

If the passageway were to be enclosed (to prevent it being blocked by snow or becoming difficult to traverse if freezing rain fell on the floor), it would be necessary to consider it as an interior passageway with adequate fire separations between it and the adjacent floor area. Subject to other requirements of the NBC 1995, an enclosed space leading from the suites to the exit stairs could also be designed as a public corridor.

The NBC 1995 limits the use of transparent panels and mirrors in or adjacent to exits. The restriction on transparent panels is intended to reduce the possibility of injuries arising from breakage of the panels during crowding in an emergency and the confusion that can arise if the presence of the panel is not obvious and intervenes between the person and the exit. Mirrors are restricted to reduce the possibility that the real exit location is reflected in the mirror and could cause evacuating persons to collide with the mirror or head in the wrong direction. In most buildings, at least two separate exits are required. This provides redundancy, in case one exit is blocked, and a route for fire fighters to reach a fire floor, while allowing one exit to be used for the continuing evacuation of occupants. If more than two exits are provided from a floor area, the NBC 1995 permits convergence of some of the exit routes, provided not more than 50% of the required egress capacity of the building is provided by any one converged exit facility.

Number of Exits and Travel Distance [NBC 3.4.2.]

With few exceptions, every floor area must be served by at least two exits. One exception allows single exits for small suites in one and two-storey buildings in which the occupant load does not exceed 60 persons, the travel distance is minimal, and the floor area does not contain a high hazard industrial occupancy. Dwelling units are the other major exception.

The time it takes to move from any point in a building to an area of safety is determined primarily by the distance that has to be travelled. The physical state of the persons using the egress route will also influence the time of travel. This is recognized by stipulating different travel distances for different occupancies. The presence of an automatic fire suppression system will reduce the threat to the occupants of the building from a fire, thereby allowing more time for the evacuation to take place. In a sprinklered building, the permitted travel distance is usually greater than in a building without an automatic sprinkler system.

Travel distance is defined as the distance from any point in a floor area to an exit measured along the path of travel to the exit. Many buildings do not have developed interiors when they are initially constructed and approximate travel distances are based upon experience of similar existing buildings. During the process of occupying the building, walls and partitions will be installed or relocated and can easily produce extended travel distances that greatly exceed permitted values. Whenever a floor plan layout is designed or altered in a manner that would affect travel distances, the layout should be reviewed with the authority having jurisdiction to ensure compliance with the intent of the NBC 1995. The NBC 1995 permits variations in the method of measuring travel distance in large shopping complexes, in sprinklered floor areas and in open-air parking structures.

One criterion for determining the number of exits is the travel distance to an exit. Limits on the travel distance to the nearest exit are governed by occupancy.

The maximum travel distances permitted by the NBC 1995 are:

- 25 m within a high hazard industrial occupancy,
- 40 m within a business and personal services occupancy,
- 45 m within a sprinklered floor area, other than one used for a high hazard industrial occupancy,
- 60 m within an open-air storage garage complying with Article 3.2.2.83.,
- 105 m within a floor area served by a public corridor complying with Clause 3.4.2.5.(1)(d),
- 30 m for any other case.

Limiting travel distance to an exit is one way to reduce the hazard to the occupant. The measurement of travel distance is, therefore, important in the NBC 1995 context. For an open floor area that serves a single tenant, the travel distance is measured from any point in the floor area to the nearest exit door (Figure A-67). If, however, the room or suite is separated from the remainder of a floor area by fire separations having at least 45 minute fire resistance rating, or is located in a sprinklered floor area and surrounded by fire separations that are not required to have a fire-resistance rating, the travel distance can be measured from the suite door to the exit (Figure A-68). Thus, the total distance a person would have to travel from any point in a room to an exit would be the value TD-1 plus TD-2, each of these values being the maximum permitted for the type of occupancy involved. If the corridor in a floor area without a sprinkler system does not have at least a 45 minute fire separation between it and the adjacent spaces, the travel distance is measured from the most remote point in the adjacent space through the corridor to the exit and the sum of TD-1 and TD-2 is not permitted to exceed the maximum value for the specific occupancy (Figure A-69).

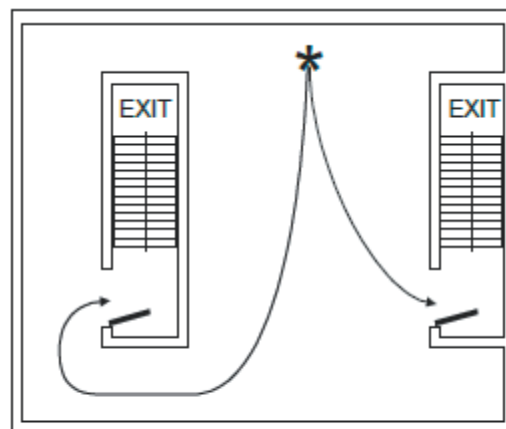


Figure A-67
Travel distance to exits in open floor areas

Supplement to the NBC 1990

The objectives of the measures for fire safety in high buildings are (a) to provide for the safety of the occupants of a building, either by maintaining the tenability of the occupied floor spaces during the period of a fire emergency or by making it possible for occupants to move to a place of safety, (b) to maintain tenable conditions in which occupants may remain in exit stairs leading from floor spaces to the outdoors, and (c) to maintain tenable conditions in elevators that can be used to transport fire fighters and their equipment from the street floor to the floor immediately below the fire floor.

It is assumed that the fire fighters will use one of the protected stairshafts referred to in (b) to walk up to the fire floor from the floor below.

The first of these objectives may be met by the evacuation of all occupants to the outdoors in from seven to ten minutes, by the movement of occupants to safe areas within the building in from three to five minutes (as in Measures C, E, G,, K, Land M) or by maintaining the tenability of all floor areas except those on the fire floor and the floor above the fire floor (as in Measures A, B, O, F, H and I). The requirements in the National Building Code covering widths of exits and travel distances to exits make it possible for occupants of a floor on which a fire occurs to leave that floor within one or two minutes provided their escape route is not cut off by the fire.

The objectives of the measures are to maintain certain spaces substantially smoke free for a significant period of time during a fire emergency, and hence some criterion of tenability is called for. The criterion for long term tenability is that a space shall not include more than one per cent by volume of the contaminated atmosphere from the fire region. The criterion of tenability is based on visibility and carbon monoxide concentration.

Appendix 2 - Survey questions

Travel distance requirements and perspectives on alternative solutions

The goal of this survey is to gather perspectives on the current prescriptive requirements for travel distance in the National Building Code 2020 (Code) and the evaluation or development of alternative solutions related to these. The responses gathered will help identify opportunities for improvement and potential gaps to direct future research. *“Travel distance means the distance from any point in the floor area to an exit measured along the path of travel to the exit.”* (NBC 2020, Division B,3.4.2.4) Functional Statement – To facilitate the timely movement of persons to a safe place in an emergency.

Please take a few minutes to familiarize yourself with the requirements in the Code on travel distances. This information can be found in the email with the link to this survey.

Your personal information is being collected for the purpose of supporting future research on prescriptive requirements for travel distance in the building code. This information is collected under the authority of the Freedom of Information and Protection of Privacy (FOIP) Act, Section 33(c). If you have any questions about this survey, please contact Senior Safety Codes Officer Jennifer Rodger via email at Jennifer.Rodger@calgary.ca or by phone at (403) 801-2839.

Respondent background

1. What is your primary role in relation to building design and code compliance? Check all that apply.

- Fire Protection Engineer
- Other Engineer
- Architect (or Intern)
- Interior Designer (or Intern)
- Architectural Technologist
- Authority Having Jurisdiction (AHJ) - Building
- Authority Having Jurisdiction (AHJ) - Fire
- Educator
- Other

2. Where are you located?

- Alberta
- British Columbia
- Manitoba
- New Brunswick
- Newfoundland and Labrador
- Nova Scotia
- Ontario
- Prince Edward Island
- Quebec
- Saskatchewan
- Northwest Territories
- Nunavut
- United States
- Other

3. How familiar are you with the following?

	Not familiar	Somewhat not familiar	Somewhat familiar	Very familiar
The life safety requirements of part 3 of the code	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prescriptive travel distance requirements of part 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evaluating or developing alternative solutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evaluating or developing alternative for travel distance and egress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. How many years of experience do you have working with the Code, particularly regarding the egress and travel distance requirements.

- 0-2 years
- 2-5 years
- 5-10 years
- over 10 years

5. How many years of experience do you have evaluating or developing alternative solutions?

- 0-2
- 2-5 years
- 5-10 years
- over 10 years

Application of Travel Distance Requirements

6. In your opinion, are the following statements accurate regarding of the current prescriptive requirements for maximum travel distance found in Division B, Part 3 of the Code?

	Inaccurate	Somewhat Inaccurate	Unsure	Somewhat accurate	Accurate
Promotes safe egress for occupants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provides clear and consistent standards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Limits risks associated with high occupant or fuel loads	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The research that guided the maximum travel distance is outdated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Caters to all abilities and behavioural situations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provides safe egress for all occupancy types and uses residential, office, retail, high hazard, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Please share additional comments or feedback for question 6.

8. Which of the following would you prioritize to improve flexibility to prescriptive travel distance requirements in future codes? Put in order of importance.

Longer permissible travel distances in low-risk occupancies.

Exceptions for buildings with enhanced emergency technologies.

More emphasis on exit distribution over strict distance limits.

Improved exit signage and wayfinding systems with additional early warnings.

Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.

Increased maximum travel distance for buildings with enhanced fire detection.

Code based on time to egress rather than a set travel distance.

9. Rate the current prescriptive requirements for travel distance with respect to the following.

	Very poor	Poor	Fair	Good	Excellent
Clarity: Are the requirements easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Usability: Do the requirements support efficient application in real world scenarios?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flexibility: Do they allow for reasonable design variation while maintaining safety?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consistency: Are they aligned with other related provisions in the Code?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness: Do they achieve the intended safety objectives without unnecessary complexity?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Please share any additional comments or feedback on the current prescriptive travel distance requirements in the Code. In your opinion, what is the most important change or improvement that should be made to the travel distance requirements in the Code, if any?

Alternative solutions

11. How well do the current Code objectives, functional statements and intent statements support or guide the evaluation and development of alternative solutions for travel distance?

“The objectives, functional statements and intent statements linked to a Code requirement clarify the reasoning behind that requirement and facilitate understanding of what must be done to satisfy that requirement. A person seeking to propose a new method or material not described or covered in the Code will be able to use the added information to understand the expected level of performance that their alternative solution must achieve to satisfy the Code.” (NBC 2020 Volume 1 page viii)

	Very poor	Poor	Fair	Good	Excellent
Objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Functional statements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intent statements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Please share any additional comments or feedback for question 11. What aspects are most effective, and what challenges or areas for improvements do you see?

13. What building design factors do you consider most critical for determining the appropriate safe travel distance?

	Unimportant	Somewhat important	Neutral	Important	Critical
Presence of sprinklers and fire detection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Occupancy type(assembly, care, residential, office, retail, high-hazard,etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presence of fire separations (<i>Fire separation means a construction assembly that acts as a barrier against the spread of fire. NBC 2020 definition</i>)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Building area or suite area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Type of construction (combustible versus non-combustible)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Occupant load (maximum occupants at one time)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Building height and number of stories	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Please share any additional comments or feedback for question 13.

15. The following methods are used to evaluate or develop travel distance and egress alternative solutions. How effective are they for assessing safe travel distances in emergencies?

	Very ineffective	Somewhat ineffective	Not sure if effective	Somewhat effective	Very effective
Fire Modelling Software/ Computational Fluid Dynamics (CFD) (to demonstrate time to untenable conditions, used to validate smoke control systems or fire separations)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evacuation simulation models (to evaluate egress times, potential congestion points and occupant behaviour)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comparative analysis (demonstrating equivalency, using precedents or case studies)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Historical data analysis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expert judgment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Performance-based engineering calculations (such as egress time calculations, heat and smoke transfer, smoke movement and fire growth calculations.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk assessments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fire testing and experimental data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhanced fire protection systems (like Early Suppression Fast Response (ESFR) sprinklers and enhanced detection systems)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Systems integration studies (assessing how fire safety systems work together)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Please share any additional comments or feedback for question 15.

17. Of the following advancements, which do you think will have the greatest impact on travel distance requirements? Put in order of importance.

18. Please share any additional comments or feedback for question 17. What other innovative solutions or technologies do you believe could safely extend travel distances beyond current prescriptive limits?

Gaps and areas for improvement

19. Listed below are a variety of occupant demographics, unforeseen events and human errors that can occur. Which of the items listed do you think additional research should be conducted and changes incorporated into future revisions to the Code.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Vulnerable populations not already considered in occupancy type	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Occupants' ability to respond/evacuate in an emergency	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Human behaviour in emergencies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improper use of building or suite (being over max.occupant load, obstruction of exits, using an office space for a party etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Failure of smoke control and HVAC systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Failure of building emergency systems(sprinklers, fire alarm, emergency power, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of municipal firefighting services (fire services unable to attend call)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Failure of infrastructure, like inadequate water supply for sprinkler systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Please share any additional comments or feedback on alternative solutions for travel distance. What are potential areas for future research or future developments in the Code that may improve the confidence in evaluating and developing alternative solutions related to maximum allowable travel distance in the Code?

Closing thoughts

21. Please share any additional comments or feedback.

22. Please indicate if you would like to be part of further discussions on this topic. You may be asked to be part of a discussion group in the upcoming weeks if you answer yes.

Yes

No

23. If you want to participate in the discussion group, please provide your name and contact information. You may also email Jennifer Rodger at jennifer.rodger@calgary.ca for further information and to be added to the list.

Appendix 3 - Complete survey response dataset

Section 1: Respondent Background

Responses to questions 1 thru 5

Respondent number	What is your primary role in relation to building design and code compliance? Check all that apply.	Where are you located?	How familiar are you with the life safety requirements of part 3 of the code?	How familiar are you with the prescriptive travel distance requirements of part 3?	How familiar are you with evaluating or developing alternative solutions	How familiar are you with the evaluating or developing alternative solutions for travel distance and egress?	How many years of experience do you have working with the Code, particularly regarding the egress and travel distance requirements?	How many years of experience do you have evaluating or developing alternative solutions?
1	AHJ-Building	Alberta	Somewhat Familiar	Somewhat Familiar	Somewhat Not Familiar	Somewhat Not Familiar	5-10 years	2-5 years
2	AHJ-Building	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
3	Fire Protection Engineer ;	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	5-10 years	5-10 years
4	Fire Protection Engineer ;	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	2-5 years	2-5 years
5	AHJ-Fire	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
6	AHJ-Building	Alberta	Very Familiar	Very Familiar	Very Familiar	Somewhat Familiar	over 10 years	over 10 years
7	AHJ-Building	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	5-10 years
8	Fire Protection Engineer ;Other Engineer ;	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
9	AHJ-Fire	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
10	Fire Protection Engineer ;	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
11	Fire Protection Engineer ;AHJ-Building	Alberta	Very Familiar	Very Familiar	Very Familiar	Somewhat Familiar	5-10 years	5-10 years
12	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Very Familiar	Somewhat Familiar	over 10 years	over 10 years
13	AHJ-Building	Alberta	Very Familiar	Very Familiar	Very Familiar	Somewhat Familiar	over 10 years	over 10 years
14	AHJ-Building	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	5-10 years	5-10 years
15	Fire Protection Engineer ;	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
16	Fire Protection Engineer ;	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
17	AHJ-Building	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Not Familiar	2-5 years	0-2
18	Architect (or Intern);	Yukon	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Not Familiar	over 10 years	2-5 years
19	AHJ-Building	Saskatchewan	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	5-10 years	5-10 years
20	AHJ-Fire	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Not Familiar	5-10 years	5-10 years
21	Fire Protection Engineer ;	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
22	AHJ-Building	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
23	AHJ-Fire	Alberta	Very Familiar	Somewhat Familiar	Somewhat Not Familiar	Not Familiar	0-2 years	0-2
24	AHJ-Fire	Alberta	Very Familiar	Somewhat Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	0-2
25	AHJ-Building	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years

Respondent number	What is your primary role in relation to building design and code compliance? Check all that apply.	Where are you located?	How familiar are you with the life safety requirements of part 3 of the code?	How familiar are you with the prescriptive travel distance requirements of part 3?	How familiar are you with evaluating or developing alternative solutions	How familiar are you with the evaluating or developing alternative solutions for travel distance and egress?	How many years of experience do you have working with the Code, particularly regarding the egress and travel distance requirements?	How many years of experience do you have evaluating or developing alternative solutions?
26	Fire Protection Engineer ;	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	2-5 years	2-5 years
27	AHJ-Building	Saskatchewan	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
28	Fire Protection Engineer ;	Alberta	Very Familiar	Very Familiar	Very Familiar	Somewhat Familiar	over 10 years	over 10 years
29	Fire Protection Engineer ;	BC	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	5-10 years
30	Fire Protection Engineer ;	Ontario	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
31	Fire Protection Engineer ;	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	5-10 years
32	Fire Protection Engineer ;	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
33	Building Code Consultant and P.L.Eng.;Other Engineer ;	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	5-10 years	5-10 years
34	AHJ-Building	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	5-10 years	5-10 years
35	Fire Protection Engineer ;	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	5-10 years	5-10 years
36	AHJ-Building	Ontario	Somewhat Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	5-10 years
37	AHJ-Building	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years
38	AHJ-Fire	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	2-5 years	2-5 years
39	Building Code Consultant;	BC	Very Familiar	Very Familiar	Very Familiar	Somewhat Familiar	over 10 years	5-10 years
40	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Not Familiar	over 10 years	5-10 years
41	Architectural Technologist ;	Alberta	Very Familiar	Very Familiar	Very Familiar	Somewhat Familiar	over 10 years	5-10 years
42	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
43	Fire Protection Engineer ;	Quebec	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
44	Architect (or Intern);	Ontario	Very Familiar	Very Familiar	Somewhat Familiar	Not Familiar	over 10 years	0-2
45	Architect (or Intern);	Alberta	Very Familiar	Somewhat Familiar	Very Familiar	Somewhat Not Familiar	over 10 years	over 10 years
46	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years
47	Architect (or Intern);	BC	Somewhat Familiar	Very Familiar	Somewhat Not Familiar	Somewhat Not Familiar	over 10 years	over 10 years
48	Interior Designer (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years
49	Architect (or Intern);	Alberta	Somewhat Familiar	Somewhat Familiar	Somewhat Not Familiar	Somewhat Not Familiar	over 10 years	0-2
50	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Not Familiar	over 10 years	5-10 years
51	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
52	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
53	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
54	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Not Familiar	over 10 years	over 10 years

Respondent number	What is your primary role in relation to building design and code compliance? Check all that apply.	Where are you located?	How familiar are you with the life safety requirements of part 3 of the code?	How familiar are you with the prescriptive travel distance requirements of part 3?	How familiar are you with evaluating or developing alternative solutions	How familiar are you with the evaluating or developing alternative solutions for travel distance and egress?	How many years of experience do you have working with the Code, particularly regarding the egress and travel distance requirements?	How many years of experience do you have evaluating or developing alternative solutions?
55	Architect (or Intern);Client GoA representative;	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
56	Architect (or Intern);	Alberta	Somewhat Familiar	Somewhat Familiar	Not Familiar	Not Familiar	2-5 years	0-2
57	Architect (or Intern);	Nova Scotia	Somewhat Familiar	Somewhat Familiar	Somewhat Not Familiar	Not Familiar	over 10 years	5-10 years
58	Architect (or Intern);Architectural Technologist ;Principal Architect;	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years
59	Architect (or Intern);Building Code Specialist;	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years
60	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Not Familiar	over 10 years	0-2
61	AHJ-Building	Alberta	Somewhat Familiar	Somewhat Familiar	Somewhat Familiar	Somewhat Familiar	0-2 years	0-2
62	Fire Protection Engineer ;AHJ-Building	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
63	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Not Familiar	Not Familiar	over 10 years	2-5 years
64	Architect (or Intern);	Alberta	Very Familiar	Somewhat Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	5-10 years
65	Architect (or Intern);	Ontario	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years
66	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Not Familiar	Not Familiar	over 10 years	0-2
67	AHJ-Building	Ontario	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	5-10 years
68	AHJ-Building	Ontario	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	2-5 years
69	AHJ-BuildingAHJ-Fire	Ontario	Somewhat Familiar	Somewhat Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years
70	AHJ-Building	Ontario	Very Familiar	Very Familiar	Very Familiar	Somewhat Familiar	over 10 years	5-10 years
71	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	5-10 years
72	Other Engineer ;	Nova Scotia	Not Familiar	Not Familiar	Not Familiar	Not Familiar	over 10 years	over 10 years
73	Fire Protection Engineer ;	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	5-10 years	5-10 years
74	Fire Protection Engineer ;	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
75	Other Engineer ;P. Eng., Code Expert;AHJ-BuildingEducator;	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	5-10 years	5-10 years
76	AHJ-Building	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	2-5 years
77	Fire Protection Engineer ;	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
78	Architect (or Intern);	BC	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	0-2
79	Architect (or Intern);	Ontario	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years
80	AHJ-Building	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
81	AHJ-Building	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	5-10 years

Respondent number	What is your primary role in relation to building design and code compliance? Check all that apply.	Where are you located?	How familiar are you with the life safety requirements of part 3 of the code?	How familiar are you with the prescriptive travel distance requirements of part 3?	How familiar are you with evaluating or developing alternative solutions	How familiar are you with the evaluating or developing alternative solutions for travel distance and egress?	How many years of experience do you have working with the Code, particularly regarding the egress and travel distance requirements?	How many years of experience do you have evaluating or developing alternative solutions?
82	AHJ-Building	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	2-5 years	2-5 years
83	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Very Familiar	Somewhat Familiar	2-5 years	2-5 years
84	AHJ-Fire	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	2-5 years
85	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years
86	AHJ-Fire	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	5-10 years
87	Architect (or Intern);	BC	Somewhat Familiar	Somewhat Familiar	Somewhat Familiar	Somewhat Not Familiar	over 10 years	2-5 years
88	AHJ-Building	Ontario	Very Familiar	Very Familiar	Very Familiar	Somewhat Familiar	over 10 years	5-10 years
89	Architectural Technologist ;	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Not Familiar	over 10 years	0-2
90	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Not Familiar	over 10 years	2-5 years
91	AHJ-Building	Alberta	Somewhat Familiar	Somewhat Familiar	Somewhat Not Familiar	Somewhat Not Familiar	0-2 years	0-2
92	Fire Protection Engineer ;	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	5-10 years	5-10 years
93	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	0-2
94	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Very Familiar	Very Familiar	over 10 years	over 10 years
95	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	over 10 years
96	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	2-5 years
97	Architect (or Intern);	Alberta	Very Familiar	Very Familiar	Somewhat Familiar	Somewhat Familiar	over 10 years	2-5 years

Travel Distance Requirements and Perspectives on alternative solutions. Data collected January 30, 2025 to February 13, 2025.

Section 2: Application of Travel Distance Requirements

Responses to questions 6 and 7

Respondent number	Promotes safe egress for occupants.	Provides clear and consistent standards.	Limits risks associated with high occupant or fuel loads.	Division B, Part 3 of the research that guided the maximum travel distance is outdated.	Caters to all abilities and behavioural situations.	Provides safe egress for all occupancy types and Uses (assembly, care, residenti	Please share additional comments or feedback for question 6.
1	Somewhat Accurate	Somewhat Accurate	Somewhat Inaccurate	Unsure	Inaccurate	Somewhat Accurate	
2	Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	
3	Unsure	Somewhat Inaccurate	Somewhat Inaccurate	Accurate	Somewhat Inaccurate	Somewhat Inaccurate	The information has been outdated and require additional research to catch up with the modern technology
4	Accurate	Accurate	Accurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	The research that guided travel distance limits is outdated; other standards and building codes, including the International Building Code and NFPA standards permit extended travel distance relative to the limits in the National Building Code of Canada. Often, these extended travel distance limits are based on the specific occupancies or hazards.
5	Accurate	Accurate	Accurate	Inaccurate	Unsure	Somewhat Accurate	I believe there has been aggressive push to adjust exiting to serve industry and not public safety. I have seen alternative solutions to increase travel distance and occupant loads that do not meet current code only for the benefit of the industry and not the public. Same as question 7 below. What you have done is have a survey question with only one outcome which I am in disagreement with. The exiting requirements already has minimum standards to reduce risk. You want to increase that.
6	Somewhat Inaccurate	Accurate	Unsure	Somewhat Inaccurate	Inaccurate	Somewhat Inaccurate	I am unfamiliar with the historic research that has guided the establishing of current travel distance provisions. Perhaps that information could be provided?
7	Accurate	Accurate	Accurate	Unsure	Somewhat Inaccurate	Somewhat Accurate	it falls under NBC 2023(AE) Means of Egress 3.3.1.3. 10) No access to exit for patrons in an assembly shall pass through a kitchen, service space and storage. kitchen is not a defined terms and this article always bring up issue especially with how a narrow suite with front and rear doors in place and the challenge of design of limited space and somehow fitting a corridor to the rear exit and accommodate a kitchen
8	Somewhat Accurate	Accurate	Accurate	Accurate	Somewhat Inaccurate	Unsure	Travel distance requirements provide clarity and set an expectation easily evaluated but fundamentally are overly simplistic and do not recognize inherent features of the design (e.g., high ceiling height, low fuel load, etc.).
9	Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Inaccurate	Inaccurate	Somewhat Inaccurate	I have often seen variances based on smoke control but when tested after the construction is completed the system fails to actually move smoke the way it was designed.

Respondent number	Promotes safe egress for occupants.	Provides clear and consistent standards.	Limits risks associated with high occupant or fuel loads.	Division B, Part 3 of the research that guided the maximum travel distance is outdated.	Caters to all abilities and behavioural situations.	Provides safe egress for all occupancy types and Uses (assembly, care, residenti	Please share additional comments or feedback for question 6.
10	Accurate	Inaccurate	Somewhat Accurate	Accurate	Unsure	Unsure	<p>The 'maximum travel distance' to exit in the code varies significant - starts at 15m for most single egress, 25m for single egress in sprinklered spaces. For places with two exits, then 30m for unsprinklered spaces; 45m for sprinklered spaces... but then those distances can be extended if there's a public corridor (45M in the corridor + either 25m or 45m in the room/suite), and up to 105m in mall corridor with certain characteristics (higher ceiling, width etc).</p> <p>It's evident the code , while prescriptive, is trying to limit travel distances on a risk-adjusted basis. Nonetheless, this still doesn't capture a lot of real world situation -</p> <p>Instead of modifying the code, it'd be more helpful to provide performance guidelines using generally accepted fire engineering principles such as regulating ASET/RSET ratio (either in the code or in the appendix).</p> <p>On rapid transit projects, most transit authorities use codes that follow NFPA 130 and that is a good model for the NBC - if that's the direction Canada is moving towards.</p>
11	Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Somewhat Accurate	Somewhat Accurate	
12	Somewhat Inaccurate	Somewhat Inaccurate	Somewhat Inaccurate	Accurate	Somewhat Inaccurate	Somewhat Inaccurate	
13	Accurate	Accurate	Somewhat Accurate	Inaccurate	Inaccurate	Somewhat Accurate	no comment
14	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Somewhat Inaccurate	Unsure	I think there should be some more clarity around sprinklered buildings with occupant loads on the roof for a patio or such. As the building is sprinklered but the space is not sprinklered it creates a little grey area.
15	Accurate	Accurate	Accurate	Accurate	Accurate	Accurate	no further comments
16	Somewhat Accurate	Somewhat Inaccurate	Somewhat Inaccurate	Accurate	Inaccurate	Somewhat Accurate	Travel distance requirements were founded in the code a century ago and aren't scientifically established based on the risks associated with building geometry, proximity to fire, compartmentalization, and presence of fire suppression systems.
17	Accurate	Somewhat Accurate	Unsure	Somewhat Accurate	Inaccurate	Unsure	N/A
18	Accurate	Accurate	Somewhat Accurate	Unsure	Inaccurate	Somewhat Accurate	
19	Accurate	Somewhat Accurate	Accurate	Unsure	Unsure	Accurate	
20	Somewhat Accurate	Accurate	Somewhat Accurate	Unsure	Unsure	Somewhat Accurate	It would be nice to have historical context compiled into a "handbook" to the code for how the prescriptive requirements came to be and what research articles/case studies were referenced to derive the numerical values of any provisions in the code. Aside from the maximum travel distance to an exit being unchanged for several decades, we do not know how the numerical values were first determined (without doing extensive research for historical context); therefore it is hard to say if the methodologies are outdated.

Respondent number	Promotes safe egress for occupants.	Provides clear and consistent standards.	Limits risks associated with high occupant or fuel loads.	Division B, Part 3 of the research that guided the maximum travel distance is outdated.	Caters to all abilities and behavioural situations.	Provides safe egress for all occupancy types and Uses (assembly, care, residenti	Please share additional comments or feedback for question 6.
21	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	Accurate	Inaccurate	Somewhat Inaccurate	The current prescriptive maximum travel distance is significantly outdated (i.e., by approx. 123 years) and is based on conditions resulting from limited fire compartmentation from storey to storey. The prescriptive value is overly conservative in some cases and can result in risk greater than intended in other cases.
22	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Accurate	Somewhat Accurate	Somewhat Accurate	
23	Accurate	Accurate	Accurate	Unsure	Unsure	Somewhat Accurate	
24	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Somewhat Accurate	
25	Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Somewhat Accurate	Somewhat Accurate	The prescriptive requirements should be easy to follow, however designers like to push the envelope (measure as radius or diagonal rather than a normal path of travel, etc) and if they are over the maximum distances specified in the Code they would need to propose an alternative solution of equal safety.
26	Somewhat Inaccurate	Inaccurate	Somewhat Accurate	Accurate	Inaccurate	Somewhat Inaccurate	It is evident in how frequent alternative solutions are developed to address extended travel distance that our national codes do not encompass consistent requirements for maximum travel distance. 45m is limited compared to international codes and standards; this is evident.
27	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Accurate	Somewhat Inaccurate	Somewhat Accurate	I am guessing the wording for question 7 should say "share additional comments or feedback for question "6".. so I am seeing there needs to be more research and data incorporated into queuing and behavioral situations with all abilities within a space by incorporating statistics Canada values.
28	Somewhat Accurate	Somewhat Accurate	Inaccurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	Insofar as prescriptive measures can, the travel distance requirements in the NBC provide an essential proxy for some aspects of egress safety, however they do nothing whatsoever to address crowd behaviour (high occupant loads), and over-generalize egress and escape time compared to the tools and resources available to professionals.
29	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	Accurate	Somewhat Inaccurate	Somewhat Inaccurate	

Respondent number	Promotes safe egress for occupants.	Provides clear and consistent standards.	Limits risks associated with high occupant or fuel loads.	Division B, Part 3 of the research that guided the maximum travel distance is outdated.	Caters to all abilities and behavioural situations.	Provides safe egress for all occupancy types and Uses (assembly, care, residenti	Please share additional comments or feedback for question 6.
30	Accurate	Inaccurate	Somewhat Accurate	Accurate	Inaccurate	Somewhat Accurate	While the acceptable solutions are generally a solid and safe framework, they often are not backed by science or real world experiences and not customisable to different situations. For example the tenability conditions and often the occupant load in a 40 ft high F2 sprinklered warehouse are significantly different to that of an office or a lab sprinklered with an 8-10 ft ceiling, yet the maximum travel distance is 45 m for both. The requirement for 25 m travel distance to apply throughout an F1 is extremely onerous as there are often areas in the building that are not high hazard. Furthermore, high hazard from a firefighting perspective does not always translate to a greater threat to life in terms of the time it takes to exit a building. It is next to impossible for most buildings to meet this requirement. Travel distance at least should align somewhat with the International Building Code or NFPA 101 and encourage an ASET versus RSET approach and the use of performance-based solutions.
31	Somewhat Inaccurate	Accurate	Somewhat Inaccurate	Accurate	Somewhat Inaccurate	Somewhat Accurate	
32	Somewhat Accurate	Inaccurate	Inaccurate	Somewhat Inaccurate	Inaccurate	Inaccurate	I assume this means for question 6. Travel distance forms part of an exiting strategy that relies upon fire alarm, occupant load density, exit capacity, exit diversity etc. in order to demonstrate safety. A piece meal appraisal of travel distance may potentially give skewed results if not considered as part of an egress system. For example, travel is of primary concern for low density environments where queuing at exits is low or non-existent. Where significant queuing occurs (high occupant load density) then travel distance becomes less relevant with very high travel distances justifiable with exit time governed by exit flow.
33	Accurate	Somewhat Accurate	Accurate	Unsure	Somewhat Accurate	Accurate	The requirements are consistent but perhaps over-applied or too conservative in some situations. For example, a maximum 6 m dead-end corridor in a residential public corridor seems overly conservative because occupants are very familiar with the layout. Also, NFPA 101 has less restrictive requirements to consider.
34	Somewhat Accurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Inaccurate	Comments for question 6 - I would argue that travel distance limits are too generalized and do not appreciate the varying complexities of a part 3 building.

Respondent number	Promotes safe egress for occupants.	Provides clear and consistent standards.	Limits risks associated with high occupant or fuel loads.	Division B, Part 3 of the research that guided the maximum travel distance is outdated.	Caters to all abilities and behavioural situations.	Provides safe egress for all occupancy types and Uses (assembly, care, residenti	Please share additional comments or feedback for question 6.
35	Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Inaccurate	Somewhat Accurate	Sharing comments for question 6, not question 5. - Uncertain about history of travel distances and why the specific values were selected to egress, and reasoning for distances not discussed in NBC User's Guide 1995 edition. - There is a difference between "corridor used by the public" vs. a "public corridor" that can be lost in translation in Sentence 3.4.2.4.(2) and for other applications. - Time-egress analysis for action and alert of persons within a building, i.e. RSET / ASET analysis, compares the time for persons to egress safely vs the unsafe time in which a fire develops. - Persons working / alert of fire conditions are likely to have a much higher response to evacuate vs. persons sleeping / in residential areas. Group C provided with a longer travel distance than Group D occupancies (45m vs 40m) and without reasoning for distance values, values may be questioned (i.e. is fuel load that much more of a concern and fire separations between the suites and the corridors vs human awareness from Group D vs Group C occupancies, even if a fire develops with sprinkler protection?).
36	Accurate	Somewhat Accurate	Unsure	Accurate	Unsure	Accurate	
37	Accurate	Accurate	Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Not sure there is enough information about current tenability for the various occupancies
38	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Somewhat Accurate	Somewhat Accurate	none
39	Accurate	Accurate	Accurate	Unsure	Unsure	Somewhat Accurate	
40	Accurate	Somewhat Accurate	Unsure	Unsure	Unsure	Unsure	
41	Accurate	Accurate	Accurate	Inaccurate	Accurate	Accurate	
42	Accurate	Accurate	Somewhat Accurate	Inaccurate	Unsure	Somewhat Accurate	
43	Accurate	Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Accurate	1- The distances are consistent with international norms and are conservative enough to address the variability (or lack of resources) of fire code enforcement across Canadian provinces territories and cities. 2- Not sure what risks are being alluded. The TD does not reduce, limit the risk of the occupancy high occupant load or fuel load, however the max TD are provided to cover all occupancies with high occupant load and areas with various fuel loads and therefore reduce risk of injury or death by having egress facilities.. 3- not sure what is meant by caters to all abilities. It is impossible for the code to cater to all abilities and behavioural situations, the max travel distances are generic enough to cater to generic population including hospital patients.
44	Accurate	Somewhat Accurate	Accurate	Somewhat Inaccurate	Unsure	Somewhat Accurate	
45	Accurate	Accurate	Unsure	Unsure	Somewhat Inaccurate	Somewhat Accurate	-
46	Accurate	Accurate	Accurate	Unsure	Unsure	Somewhat Accurate	

Respondent number	Promotes safe egress for occupants.	Provides clear and consistent standards.	Limits risks associated with high occupant or fuel loads.	Division B, Part 3 of the research that guided the maximum travel distance is outdated.	Caters to all abilities and behavioural situations.	Provides safe egress for all occupancy types and Uses (assembly, care, residenti	Please share additional comments or feedback for question 6.
47	Accurate	Accurate	Accurate	Somewhat Inaccurate	Accurate	Accurate	
48	Accurate	Accurate	Accurate	Unsure	Unsure	Unsure	Our work for the most part is limited to Class D so we are not overly familiar with other classifications
49	Accurate	Accurate	Somewhat Accurate	Somewhat Accurate	Inaccurate	Somewhat Inaccurate	I'm not sure what this survey is driving at but my experience with regards to exiting in shopping malls, is that the basic assumptions do not coincide with likely behaviour of the population. Also furniture and equipment impacts exiting, and can change from occupant to occupant. This is not always well accommodated.
50	Somewhat Accurate	Somewhat Accurate	Accurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	requirements for some occupancy types seems to be outdated, as fire loads may not be as high for some space types as when the travel distances were first set, such as in mercantile spaces. Perhaps there needs to be clearer or better defined space types and align travel distances accordingly.
51	Accurate	Somewhat Accurate	Accurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	
52	Accurate	Accurate	Accurate	Accurate	Somewhat Inaccurate	Somewhat Inaccurate	
53	Somewhat Inaccurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	Inaccurate	Somewhat Inaccurate	
54	Unsure	Unsure	Inaccurate	Accurate	Inaccurate	Unsure	
55	Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Somewhat Inaccurate	Somewhat Accurate	There are many design variables, (mobile furniture and fixed built in post construction), as well as difference of interpretations influencing accuracy and safety intentions
56	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Accurate	Somewhat Inaccurate	Unsure	
57	Accurate	Somewhat Accurate	Accurate	Unsure	Inaccurate	Accurate	
58	Accurate	Accurate	Accurate	Unsure	Unsure	Somewhat Accurate	Uncertain about the historic basis of research that was used to develop these long standing standards. Have noted the travel distances by occupancy type vary quite drastically from NFPA. Would be able to provide better feedback on the matter if the background research that was used to develop the NBC standard was better known. Agree strongly that cultural and behavior of occupants can have a substantial impact on a travel distance standard. The familiarity with a building (office working in same space versus one-time visitor to a hotel for example) can have a huge impact to these standards. May not be able to respond knowledgably to some of the questions in this survey without understanding the scientific and research basis for the standard first nor do I think it is appropriate for myself or anyone else to provide opinions on how the standard might change until the scientific basis for the standards is disclosed. I have therefore not responded to any questions that propose to alter the current standard in any way. My response to #8 was completed purely for allowing the survey to be completed and I honestly have no basis for providing opinions on such matters. In my opinion, the entire basis for this survey needs to be better explained before relying upon any information generated by it.

Respondent number	Promotes safe egress for occupants.	Provides clear and consistent standards.	Limits risks associated with high occupant or fuel loads.	Division B, Part 3 of the research that guided the maximum travel distance is outdated.	Caters to all abilities and behavioural situations.	Provides safe egress for all occupancy types and Uses (assembly, care, residenti	Please share additional comments or feedback for question 6.
59	Somewhat Accurate	Somewhat Inaccurate	Inaccurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Inaccurate	More clarity required related to travel distance, public corridors and horizontal exits, and what uses or occupancies may be able to occupy each space. Alternative solutions may be problematic here, due to changing uses and occupancies within many building types.
60	Somewhat Accurate	Accurate	Somewhat Accurate	Accurate	Somewhat Inaccurate	Somewhat Inaccurate	
61	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Inaccurate	
62	Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Inaccurate	These additional comments questions are meant to reflect the most recent earlier question (in this case Question 6). I would like to see an increase in associated travel distances in keeping with those permitted in the US. Many travel distance alternative solutions make reference to these increased travel distances within US standards (e.g., NFPA 101 as a supporting document). Typically referenced in support of increased travel distances within parking garages, dead-end corridors in residential public corridors, etc. applications which are commonly addressed on a alternative solution basis, also the type of application where the OL is low and with limited if any queuing at the exit entry).
63	Somewhat Accurate	Accurate	Accurate	Unsure	Somewhat Inaccurate	Somewhat Inaccurate	
64	Unsure	Unsure	Unsure	Unsure	Unsure	Unsure	In my experience, interpretation of the Building Code is done relative to each individual project. For typical scenarios, this is relatively straight forward and leads to the creation of safe solutions. In atypical, and more complex projects, especially renovations and additions I have typically used a collaborative approach to interpret the code involving the Client, colleagues within our firm, the authority having jurisdiction and increasingly third part Building Code Consulting firms. The AHJ are increasingly inconsistent with interpretations and less willing to review project scenarios and interpretations prior to the actual submission of a Building Permit Application.
65	Accurate	Accurate	Accurate	Somewhat Accurate	Accurate	Accurate	No comments
66	Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Unsure	Somewhat Accurate	
67	Accurate	Accurate	Somewhat Accurate	Unsure	Unsure	Somewhat Accurate	
68	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Inaccurate	NA
69	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	
70	Accurate	Accurate	Accurate	Unsure	Somewhat Accurate	Somewhat Accurate	
71	Accurate	Accurate	Accurate	Unsure	Unsure	Somewhat Accurate	
72	Somewhat Inaccurate	Somewhat Inaccurate	Somewhat Inaccurate	Somewhat Inaccurate	Somewhat Inaccurate	Somewhat Inaccurate	FDF
73	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Accurate	Inaccurate	Somewhat Inaccurate	

Respondent number	Promotes safe egress for occupants.	Provides clear and consistent standards.	Limits risks associated with high occupant or fuel loads.	Division B, Part 3 of the research that guided the maximum travel distance is outdated.	Caters to all abilities and behavioural situations.	Provides safe egress for all occupancy types and Uses (assembly, care, residenti	Please share additional comments or feedback for question 6.
74	Somewhat Inaccurate	Unsure	Somewhat Inaccurate	Somewhat Accurate	Inaccurate	Inaccurate	
75	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Somewhat Accurate	
76	Accurate	Accurate	Accurate	Unsure	Somewhat Accurate	Somewhat Accurate	
77	Accurate	Accurate	Somewhat Accurate	Accurate	Inaccurate	Accurate	Although the Code does not specifically address safety for all occupancy types or abilities to egress, the current requirements for travel distance are restrictive enough that they do seem to allow for safe egress for all abilities and behavioral situations.
78	Accurate	Accurate	Accurate	Somewhat Accurate	Unsure	Somewhat Accurate	
79	Somewhat Accurate	Somewhat Accurate	Unsure	Somewhat Accurate	Somewhat Inaccurate	Somewhat Inaccurate	Most of the fire and life safety standards in the code have not yet been adapted for people with reduced mobility.
80	Accurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Inaccurate	Some higher risk occupancies may require further consideration.
81	Somewhat Accurate	Accurate	Somewhat Accurate	Unsure	Inaccurate	Somewhat Accurate	
82	Accurate	Somewhat Accurate	Accurate	Unsure	Somewhat Accurate	Somewhat Accurate	
83	Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Somewhat Accurate	Accurate	We have experienced some conflicting interpretations of travel distance. Specifically, the understanding that it should be measured "orthogonally." Notes should be added to the code to provide clarity regarding how distances are measured. The understanding at our firm is that it is measured as the shortest distance across the floor area (measured around permanent objects and built forms) - that someone would run in an emergency - which is never at a right angle. This makes sense to us, as humans do not run at right angles, so some additional notes will help to streamline understanding of this part of the code.
84	Accurate	Accurate	Somewhat Accurate	Inaccurate	Somewhat Accurate	Somewhat Accurate	The risk associated with travel distances are already calculated into the codes and standards. The continued reliance on alternative solutions to accept materials and processes that are less than the code simply based on ASET and RSET fails to consider an all-hazard approach to life safety. Smoke or fire is only one consideration.
85	Accurate	Accurate	Somewhat Accurate	Unsure	Somewhat Accurate	Accurate	
86	Accurate	Accurate	Somewhat Accurate	Inaccurate	Somewhat Inaccurate	Somewhat Accurate	Accessible and limited mobility persons are not specifically addressed in travel distances even when accessibility features are required for a facility.
87	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Unsure	Unsure	Somewhat Accurate	
88	Accurate	Accurate	Somewhat Accurate	Somewhat Accurate	Inaccurate	Somewhat Accurate	the increase of obesity and elderly population not taken into consideration
89	Accurate	Somewhat Accurate	Accurate	Somewhat Accurate	Somewhat Inaccurate	Unsure	
90	Accurate	Accurate	Accurate	Unsure	Unsure	Somewhat Accurate	
91	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Nothing at this time

Respondent number	Promotes safe egress for occupants.	Provides clear and consistent standards.	Limits risks associated with high occupant or fuel loads.	Division B, Part 3 of the research that guided the maximum travel distance is outdated.	Caters to all abilities and behavioural situations.	Provides safe egress for all occupancy types and Uses (assembly, care, residenti	Please share additional comments or feedback for question 6.
92	Accurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Accurate	Somewhat Inaccurate	Somewhat Inaccurate	I assume this is for question 6. The current allowances don't necessarily consider all abilities or conditions (both faster or slower), and don't necessarily capture varying risks in occupancies such as parkades, warehouses (depending on the applicability of 60 m perimeter exiting to the layout, certain large volume spaces that might not align with 3.4.2.5.(1)(d), and don't necessarily align well in occupancies where queuing dominates an egress analysis. Barrier-free egress is also not considered (but may not be in the scope of this research).
93	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Somewhat Inaccurate	Unsure	Somewhat Accurate	Thankfully, in all the buildings I have designed, lived in, or worked in, I have not encountered fire or safety evacuation situations that would challenge my perspective on code requirements.
94	Accurate	Accurate	Accurate	Unsure	Unsure	Somewhat Accurate	
95	Somewhat Accurate	Somewhat Accurate	Somewhat Accurate	Accurate	Somewhat Accurate	Somewhat Accurate	
96	Accurate	Accurate	Accurate	Unsure	Unsure	Somewhat Accurate	
97	Accurate	Somewhat Accurate	Unsure	Unsure	Somewhat Accurate	Accurate	

Travel Distance Requirements and Perspectives on alternative solutions. Data collected January 30, 2025 to February 13, 2025.

Responses to question 8 (listed in order of importance)

Respondent Number	Which of the following would you prioritize to improve flexibility to prescriptive travel distance requirements in future codes? Put in order of importance.
1	Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;
2	More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Code based on time to egress rather than a set travel distance. ;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
3	Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;
4	Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;
5	More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;
6	Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;
7	More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;
8	Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
9	More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Longer permissible travel distances in low-risk occupancies.;Improved exit signage and wayfinding systems with additional early warnings.;
10	Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;
11	Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
12	Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;

Respondent Number **Which of the following would you prioritize to improve flexibility to prescriptive travel distance requirements in future codes? Put in order of importance.**

- 13 More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Code based on time to egress rather than a set travel distance. ;
- 14 Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Code based on time to egress rather than a set travel distance. ;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;
- 15 Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
- 16 Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
- 17 Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;
- 18 Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Improved exit signage and wayfinding systems with additional early warnings.;Exceptions for buildings with enhanced emergency technologies.;
- 19 Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;
- 20 Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Code based on time to egress rather than a set travel distance. ;
- 21 More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Improved exit signage and wayfinding systems with additional early warnings.;
- 22 Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;
- 23 Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;
- 24 Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Longer permissible travel distances in low-risk occupancies.;
- 25 Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Code based on time to egress rather than a set travel distance. ;

Respondent Number **Which of the following would you prioritize to improve flexibility to prescriptive travel distance requirements in future codes? Put in order of importance.**

26	Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;
27	Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;
28	Code based on time to egress rather than a set travel distance. ;Improved exit signage and wayfinding systems with additional early warnings.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;
29	Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
30	Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
31	Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
32	Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;
33	Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;
34	Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Longer permissible travel distances in low-risk occupancies.;Improved exit signage and wayfinding systems with additional early warnings.;
35	Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;
36	Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;
37	Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
38	More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;

Respondent Number **Which of the following would you prioritize to improve flexibility to prescriptive travel distance requirements in future codes? Put in order of importance.**

39	Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Code based on time to egress rather than a set travel distance. ;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;
40	Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Longer permissible travel distances in low-risk occupancies.;Improved exit signage and wayfinding systems with additional early warnings.;
41	Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;Improved exit signage and wayfinding systems with additional early warnings.;
42	Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
43	Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Code based on time to egress rather than a set travel distance. ;
44	Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;
45	Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Code based on time to egress rather than a set travel distance. ;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;
46	Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;
47	Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;
48	Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;
49	Exceptions for buildings with enhanced emergency technologies.;Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;
50	Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;
51	Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Exceptions for buildings with enhanced emergency technologies.;

Respondent Number **Which of the following would you prioritize to improve flexibility to prescriptive travel distance requirements in future codes? Put in order of importance.**

52	Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;
53	Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;
54	Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;
55	Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Code based on time to egress rather than a set travel distance. ;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;
56	More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;
57	Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
58	More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;
59	Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;
60	Improved exit signage and wayfinding systems with additional early warnings.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;
61	Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;
62	Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;
63	Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;Improved exit signage and wayfinding systems with additional early warnings.;
64	Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;Improved exit signage and wayfinding systems with additional early warnings.;

Respondent Number **Which of the following would you prioritize to improve flexibility to prescriptive travel distance requirements in future codes? Put in order of importance.**

65	Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;
66	Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Code based on time to egress rather than a set travel distance. ;
67	Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;
68	Exceptions for buildings with enhanced emergency technologies.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;
69	Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;
70	Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;
71	Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;
72	Exceptions for buildings with enhanced emergency technologies.;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;
73	Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;
74	Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Longer permissible travel distances in low-risk occupancies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
75	Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;
76	Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;
77	Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;

Respondent Number **Which of the following would you prioritize to improve flexibility to prescriptive travel distance requirements in future codes? Put in order of importance.**

78	Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;
79	Code based on time to egress rather than a set travel distance. ;More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;
80	Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;
81	Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Code based on time to egress rather than a set travel distance. ;
82	More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
83	Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;
84	More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;
85	Longer permissible travel distances in low-risk occupancies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Code based on time to egress rather than a set travel distance. ;
86	More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;
87	Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;
88	Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Improved exit signage and wayfinding systems with additional early warnings.;Longer permissible travel distances in low-risk occupancies.;
89	Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Code based on time to egress rather than a set travel distance. ;
90	More emphasis on exit distribution over strict distance limits.;Longer permissible travel distances in low-risk occupancies.;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;

Respondent Number **Which of the following would you prioritize to improve flexibility to prescriptive travel distance requirements in future codes? Put in order of importance.**

91	Code based on time to egress rather than a set travel distance. ;Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Longer permissible travel distances in low-risk occupancies.;Increased maximum travel distance for buildings with enhanced fire detection. ;
92	Code based on time to egress rather than a set travel distance. ;Exceptions for buildings with enhanced emergency technologies.;Longer permissible travel distances in low-risk occupancies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;
93	Improved exit signage and wayfinding systems with additional early warnings.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with enhanced fire detection. ;Longer permissible travel distances in low-risk occupancies.;Code based on time to egress rather than a set travel distance. ;
94	Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Exceptions for buildings with enhanced emergency technologies.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;
95	Longer permissible travel distances in low-risk occupancies.;Exceptions for buildings with enhanced emergency technologies.;More emphasis on exit distribution over strict distance limits.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Increased maximum travel distance for buildings with enhanced fire detection. ;Improved exit signage and wayfinding systems with additional early warnings.;Code based on time to egress rather than a set travel distance. ;
96	Increased maximum travel distance for buildings with enhanced fire detection. ;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;Longer permissible travel distances in low-risk occupancies.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Exceptions for buildings with enhanced emergency technologies.;Code based on time to egress rather than a set travel distance. ;
97	Exceptions for buildings with enhanced emergency technologies.;Increased maximum travel distance for buildings with Early Suppression Fast Response (ESFR) Sprinklers.;More emphasis on exit distribution over strict distance limits.;Improved exit signage and wayfinding systems with additional early warnings.;Increased maximum travel distance for buildings with enhanced fire detection. ;Code based on time to egress rather than a set travel distance. ;Longer permissible travel distances in low-risk occupancies.;

Travel Distance Requirements and Perspectives on alternative solutions. Data collected January 30, 2025 to February 13, 2025.

Responses to questions 9 and 10

Rate the current prescriptive requirements for travel distance with respect to the following.

Respondent number	Clarity	Usability	Flexibility	Consistency	Effectiveness	Please share any additional comments or feedback on the current prescriptive travel distance requirements in the Code. In your opinion, what is the most important change or improvement that should be made to the travel distance requirements in the Code, if
1	Good	Good	Good	Good	Good	Travel distances may be lengthened, if there are significantly more means of egress pathways than the minimum required, and/or if the building is equipped with fire detection and suppression technology that is regularly maintained and upgraded.
2	Good	Fair	Good	Good	Good	Egress and exiting requirements in code are dated, and additional testing on ASET v RSET should be done given the use and occupancy currently seen in buildings
3	Good	Poor	Poor	Poor	Poor	it should be more performance based to look at the overall performance of the building rather than single point of design.
4	Excellent	Fair	Fair	Fair	Good	Additional permissions for extended travel distance based on low risk occupancies; for example, in storage occupancies with multiple exits, limited number of occupants, and low probability of ignition.
5	Excellent	Good	Good	Good	Excellent	This whole survey is to achieve an outcome only to increase travel distance and occupant loads to the benefit of industry and not public safety.
6	Fair	Fair	Poor	Fair	Good	I think that the current provisions are acceptable but restrictive. Perhaps Tables 3.3.1.5.-A & B and Tables 3.4.2.1.-A & B could also be looked at.
7	Good	Fair	Poor	Fair	Good	maximum travel distance is measured to the nearest exit and if 2 exits are required, the other exit is not regulated. Excessive travel distance can be hazardous and there should be at least some maximum measurement
8	Excellent	Poor	Poor	Good	Excellent	Providing performance metric such as time to exit will aid in the development of alternative solutions, to evaluated consistently.
9	Excellent	Excellent	Good	Good	Excellent	I do not believe that a change is necessary - what needs to change is the desire to save money (or make more money) at the safety of the people who work, visit or live in the buildings we build. Any changes we consider is not for the betterment of society at large just a small number who benefit monetarily.
10	Good	Poor	Poor	Poor	Poor	Have performance guidance. There are now so many fire engineering practitioners - many out of UWaterloo's fire program, Carleton U, and there's established standards in NFPA 92, 130, etc - it's a matured practice and the code should give that flexibility, so developers / owners can utilize that as an option.
11	Poor	Fair	Fair	Good	Fair	Currently, the language for travel distance can be very confusing. I.e., not many know how to apply the "notwithstanding" Clause or excessive cross-references for dwelling unit egress. Perhaps we should explore having a performance-based egress option (i.e., ASET > RSET) in Division B, without requiring an alternative solution.
12	Fair	Poor	Poor	Poor	Poor	Increase travel distances related to updated fire protection.
13	Good	Good	Good	Good	Good	No comment

Respondent number	Clarity	Usability	Flexibility	Consistency	Effectiveness	Please share any additional comments or feedback on the current prescriptive travel distance requirements in the Code. In your opinion, what is the most important change or improvement that should be made to the travel distance requirements in the Code, if
14	Fair	Good	Poor	Good	Good	If the code had a way to demonstrate timed egress when exits are further than required in low occupancy buildings
15	Good	Fair	Poor	Good	Fair	The early detection and risk based consideration
16	Good	Fair	Poor	Poor	Fair	Responses are situation dependent. Current travel distances are not adequate for modern complex assembly occupancies such as transit, airports, large assembly. Likely adequate for residential apartments.
17	Good	Fair	Fair	Good	Fair	N/A
18	Excellent	Fair	Poor	Fair	Good	Allowing time to egress solutions, particularly for low occupant loads without requiring an alternative solution.
19	Good	Good	Good	Good	Excellent	- Sentence 3.4.2.4.(2) uses the phrase "... room not within a suite...". Yet, I find that designers try to use this Sentence for rooms that ARE within a suite when they have travel distances that are too long. I believe part of the confusion is that in other portions of Sentence (2), they simply use the word "room" (for example, in Clause (a)), and they also talk about a "corridor used by the public" (Subclause (2)(b)(ii)). So it appears that designers get the impression that this rule can be applied to rooms that ARE within suites, when it appears that they should not be. This could be clarified with consistent wording. Also, the wording in Subclauses 3.4.2.4.(2)(a)(i) & (ii) cause some confusion: what about locations where the building is sprinklered AND the wall separation IS required to have a FRR? (For example, in a sprinklered apartment building, are you allowed to measure exit travel distance from a suite door? This would not fit into Subclause 3.4.2.4.(2)(a)(ii) because the suite IS required to be separated from the remainder of the floor by a rated fire separation). And yet, there would be some non-sprinklered apartment buildings that would 'fit' into Subclause 3.4.2.4.(2)(a)(i). THEREFORE, it seems unfair that a non-sprinklered apartment can measure exit travel distance from the suite door, BUT in a sprinklered apartment it cannot (by the actual wording provided in these Clauses). This wording should be fixed to correct this unfair discrepancy.
20	Excellent	Good	Good	Good	Excellent	No additional comments at this point in time.
21	Poor	Poor	Very Poor	Poor	Very Poor	Enhanced basis information is necessary to appropriately apply the existing prescriptive limit, and for the development of alternative approaches.
22	Excellent	Fair	Fair	Good	Good	Include options to allow compliance with other standards such as NFPA or ICC
23	Good	Fair	Fair	Good	Fair	Take into consideration current technologies and advancements in life protection systems.
24	Fair	Poor	Fair	Fair	Fair	Ensure that all protection systems are in place before any changes can be made.
25	Good	Good	Good	Good	Good	With maximum travel distances in meters it is easy enough to check on the drawings or pace out in the field, if it changes to timed egress, we can't check it, and the applicant will have to provide modeling every time they renovate.

Respondent number	Clarity	Usability	Flexibility	Consistency	Effectiveness	Please share any additional comments or feedback on the current prescriptive travel distance requirements in the Code. In your opinion, what is the most important change or improvement that should be made to the travel distance requirements in the Code, if
26	Good	Very Poor	Very Poor	Very Poor	Poor	Longer TD for low occupant loads. Prescription options for timed-egress analysis. Alternative options for extended TD where there are high ceilings, and enhanced fire/smoke detection. - To name a few.
27	Excellent	Excellent	Good	Good	Good	More inclusion or emphasis on time to egress should be incorporated into the NBC
28	Good	Fair	Good	Good	Fair	As I suggested in question 8, I think the greatest improvement which could be made to address the effectiveness of travel distance requirements in the NBC would be an increase in the competence of the professionals applying these provisions, specifically an ability to consider occupant behaviour. Although the code does not address this competency, explanatory material could be added to encourage skilled professionals to approach egress design more consistently.
29	Good	Poor	Poor	Fair	Poor	More alignment with other codes/standards especially for industrial occupancies and low hazard/occupant load occupancies.
30	Fair	Very Poor	Poor	Fair	Fair	Calgary should encourage time based and performance based solutions to travel distance. The 60 m rule is also loosely interpreted and facilitates a building of any size to have limitless travel distance. There are differing interpretation on what the 60 m rule means when it says that aisles need to lead directly to an exit. Some people interpret that as a straight line aisle with no turns which is very onerous and doesn't make sense if the exit is still generally visible. Some interpret it as not needing to line up directly and facilitating a limited number of turns provide aisles are designated for egress and provided with exit signage, wayfinding, and emergency lighting all along the aisle.
31	Excellent	Very Poor	Very Poor	Fair	Excellent	travel distances are general across the board. there is no additional benefit for lower risk occupancies. further the building code does not place high emphasis on advanced notification measures such as smoke detection or heat detection ($RTI \leq 35 (m*s)^{1/2}$). benefits should be provided for these means. lastly, a combination of sprinklers and, say, smoke detection should allow for maximum travel distance, especially, since a smoke detector typically responds at least a minute earlier than sprinklers, providing the opportunity to an increase in travel distance.
32	Poor	Poor	Poor	Very Poor	Poor	To identify and communicate an explicit escape time. The purpose of travel distance is to maintain a tolerable level of escape time with all the assumptions implicit within the code. By benchmarking a time, a level of safety can be maintained easier by practitioners.
33	Excellent	Excellent	Good	Excellent	Excellent	In sprinklered buildings, there seems to be a weird gap between when max 45 m is applied versus 45 m + 45 m such as when you can have 45 m from edge of a room to the egress door and then 45 m from that door to an exit. Perhaps new scenarios can be introduced to permit the 45 + 45 or something in between.

Respondent number	Clarity	Usability	Flexibility	Consistency	Effectiveness	Please share any additional comments or feedback on the current prescriptive travel distance requirements in the Code. In your opinion, what is the most important change or improvement that should be made to the travel distance requirements in the Code, if
34	Good	Fair	Poor	Good	Fair	There could be more distance permitted for increased fire safety systems, written directly into 3.4.2.5
35	Good	Fair	Fair	Good	Excellent	Review of travel distance values with proper research in coordination with exit capacity.
36	Good	Fair	Fair	Fair	Good	time travel study
37	Good	Good	Good	Good	Good	make them more transferable to fire code as many of the building code distances are not interpreted the same in by fire personnel under the fire code
38	Good	Good	Fair	Good	Fair	Promotes safer egress for occupants
39	Fair	Poor	Poor	Fair	Good	Travel distances are outdated. They do not take into account the type of construction and do not allow for much additional length in a sprinklered building in comparison to an unsprinklered building. Parkades can be very large, have a low occupant load, but still require a maximum 45m travel distance which can constrain the design.
40	Good	Fair	Fair	Fair	Good	The main inconsistency I see in regards to dead end corridors is surrounding an elevator lobby. Sometimes we have jurisdictions ask for these lobbies to be closed off with fire separations. A double set of elevators facing perpendicular to the main corridor of a residential occupancy means this lobby is most often over 6m in depth. There is no code language that dictates the width (or width to length ratio) of this space, so it is sometimes interpreted as a dead end corridor, and this the request to separate the space with a fire separation, and doors on automatic closures tied into the fire alarm
41	Excellent	Excellent	Good	Excellent	Excellent	One inconsistency we've encountered is that some jurisdictions require routes of travel with 90° turns. This seems odd as it does not reflect how people move through a space. If the AHJ are making this requirement to reduce actual travel distances within a space, their argument should be with the actual allowable distances.
42	Good	Good	Good	Fair	Good	Current limits work, though a few building habitants are still at risk in a fire with longer dead end corridors. Please do not allow variances based on tech. Assume that the majority of fires in the future will be entire neighbourhoods where water for sprinklers or firefighting is simply not available - where power is out as well. We need to design codes for our future climate not current. Resiliency will be key to maintaining civil society.
43	Excellent	Good	Good	Excellent	Excellent	Address areas such roof, balconies and open areas within buildings and adjacent to buildings that are open air.
44	Good	Good	Good	Good	Good	I cannot think of a change to the Code which I think is necessary
45	Fair	Fair	Very Poor	Fair	Poor	/
46	Excellent	Excellent	Fair	Good	Good	Use of a matrix evaluation to identify permissible travel distances may offer more flexibility

Respondent number	Clarity	Usability	Flexibility	Consistency	Effectiveness	Please share any additional comments or feedback on the current prescriptive travel distance requirements in the Code. In your opinion, what is the most important change or improvement that should be made to the travel distance requirements in the Code, if
47	Good	Good	Good	Good	Fair	Keep it simple. Additional options are likely responding to special cases that can be handled with an engineered solution. Otherwise, they will just start to increase costs to Owners and unnecessary time spent by consultants to achieve limited if any improvement
48	Good	Good	Good	Good	Good	don't feel any change is required
49	Good	Good	Good	Good	Good	I'm confused by this survey. I don't have any issues per se regarding exiting. I would like to point out that as much as we may want to increase exit limits, they should not only respond to fire safety. General security and the ability for exiting regardless of the "emergency" presented are important.
50	Fair	Fair	Poor	Good	Fair	More flexibility in determining travel distances.
51	Good	Fair	Fair	Fair	Good	Question 8 is challenging as multiple lines are very similar. Reliance on technology is problematic and the simplest (often analog) solutions are usually the best. Power outages can render a building numb to respond properly.
52	Good	Fair	Poor	Good	Fair	Strict travel distances are too prescriptive, and as noted by your options above: there should be some consideration of mitigation wired into the code that doesn't require a full-blown alternate solution. For example, a project that is exceeding the strict travel distance limits by say 10%, but offers up ESFR sprinklers as an offset should not require the AS submittal.
53	Fair	Fair	Very Poor	Poor	Fair	Modify code travel distance to reflect lower risk and improved Fire detection/suppression
54	Fair	Poor	Fair	Fair	Poor	more illustrations to explain intents
55	Good	Fair	Good	Good	Fair	Need to be more specific/strategic to diverse scenarios for real improvement. Avoid increase of exits as this is less supportive of thermal performance and low carbon strategies. Stick to distances over time as too difficult to assess. Make distinctions per types of assemblies and occ load. Schools (various corridors to exits) versus theaters (large assemble in one spot to exit) In non emergency times - leaving a concert hall? leaving the school? leaving an office tower at the EOD? what are crowds like, then filter with a Fire emergency or gunman?
56	Fair	Fair	Poor	Fair	Fair	Look at number of pathways to exits from a certain point, rather than purely distances
57	Poor	Fair	Fair	Good	Good	Provide a user guide to Part 3
58	Excellent	Excellent	Excellent	Excellent	Excellent	None
59	Fair	Poor	Fair	Fair	Very Poor	What may occupied spaces, public corridors and horizontal exits be used for? Often public corridors and horizontal exits are used for uses other than exiting, which creates hazards limiting exit widths and adding fire load.
60	Excellent	Fair	Poor	Excellent	Excellent	Accessibility considerations for exiting need to be reflected in any review of the maximum exit distances in most occupancies. As the population increases in complex needs and especially for eldercare situations, increasing the maximum allowable exit distances increases risk for vulnerable populations. We can't assume occupants with complex needs are limited to B occupancies, or are only wheelchair-bound.

Respondent number	Clarity	Usability	Flexibility	Consistency	Effectiveness	Please share any additional comments or feedback on the current prescriptive travel distance requirements in the Code. In your opinion, what is the most important change or improvement that should be made to the travel distance requirements in the Code, if
61	Good	Good	Poor	Good	Fair	incorporating various mobility needs of the population.
62	Fair	Poor	Poor	Fair	Fair	Increase in travel distance for low hazard/exposure conditions whether that be in open floor areas (e.g., sprinklered parkade with low occupant loads or dead-end travel distances in protected public corridors). This would immediately lead to a measurable improvement in design efficiency, lower build costs and without the need for alternative solutions.
63	Good	Good	Good	Good	Good	recognition of advancing technology specifically for buildings where staff/users are very familiar with navigation within the building.
64	Fair	Fair	Fair	Fair	Fair	No particular suggestion
65	Excellent	Excellent	Excellent	Excellent	Excellent	No Changes
66	Good	Good	Poor	Excellent	Good	none
67	Excellent	Good	Fair	Good	Excellent	Two points. One; time-based egress must be linked / supported by a fire dynamics study to ensure there is enough time for safe egress. In my jurisdiction, we have very large industrial buildings that because of their size are designed based on the 60m perimeter exit door rule. The 60m perimeter exit door scenario only works for single tenant buildings. If the building is divided to allow for additional tenant spaces, there currently is no prescriptive exiting requirement that can be applied. Some evidence-based research in this area or guidelines would be beneficial to code users.
68	Fair	Fair	Poor	Fair	Very Poor	NA
69	Fair	Fair	Fair	Fair	Fair	Clear requirement for large, multi-tenant building using 3.4.2.5.(2).
70	Good	Good	Good	Good	Good	When an addition is proposed to existing non-sprinklered building, and where the addition triggers sprinkler, the requirement for travel distance is mixed up between sprinklered to non-sprinklered building, this has to be more clear in the code.
71	Good	Fair	Fair	Good	Good	travel distance from service spaces, which are typically never occupied by the public, should be greatly increased, especially since building service personnel are typically very familiar with building egress
72	Very Poor	Fair	Poor	Good	Good	ASAS
73	Fair	Poor	Very Poor	Fair	Fair	One potential improvement to the prescriptive travel distance requirements in the Code could be greater flexibility based on risk assessment and occupancy type.
74	Good	Poor	Fair	Poor	Excellent	Without going too deep, our code does not deal with dead-end open path conditions, this should be considered.
75	Good	Fair	Fair	Good	Fair	Provide timed egress table (the maximum evacuation time) and equations for certain occupancy types and the occupancy number.

Respondent number	Clarity	Usability	Flexibility	Consistency	Effectiveness	Please share any additional comments or feedback on the current prescriptive travel distance requirements in the Code. In your opinion, what is the most important change or improvement that should be made to the travel distance requirements in the Code, if
76	Fair	Fair	Fair	Good	Good	The Code is not clear how to treat dead-end areas within a suite where the suite meets the Code requirements having 2 egress doorways but the design of the suite creates a dead-end portion of the suite that has only a single means of egress from that portion of floor area. If the dead-end portion is greater than the area and the travel distance exceeds what is permitted to be served by a single egress doorway, then the area should have an additional egress door. Based on how the Code is worded it is not able to enforce an additional egress door.
77	Fair	Good	Fair	Good	Excellent	Since the Code relies on absolute numbers for maximum travel distance, it can be incredibly challenging to justify that an area of extended travel distance has an equivalent level of performance to that mandated by the Code in real terms (i.e., 50 m performs as well as 45 m). Additional context in the body or Notes to the Code that support the use of time-based egress allowances would significantly improve the ability to develop alternative solutions and reduce costs associated with unnecessary analysis or coordination with the AHJ.
78	Good	Fair	Good	Good	Good	The Code is a standard, it should apply to most cases; for specific project that could provide safety measures at least at or above code requirement, relaxation consideration should be given to these projects..
79	Good	Fair	Good	Good	Fair	Considerations for rehabilitation of existing (historic) buildings where adding exits are not always feasible and considerations for people with varying levels of disabilities.
80	Excellent	Good	Good	Fair	Excellent	Alternative solutions are always welcome but I don't feel making prescriptive compliance more complicated will help
81	Good	Good	Good	Good	Good	Not sure if any changes are required, where is the science to show that extending travel distance does not affect life safety.
82	Good	Fair	Good	Good	Good	Provisions for time to egress and exit distribution, as opposed to strictly max TD, could be beneficial without reducing occupant safety
83	Good	Good	Fair	Good	Good	Our biggest hurdle has been the lack of a common understanding of how travel distance can be measured to reflect real-world applications, and where the route can be taken from (a human will most likely not be pressed in to the corner of the room, against the wall, rather they will be set off from the wall by a few feet). The other point of confusion we have come across is regarding exit distances under canopies and covered passageways. Some interpretations favour carrying the travel distance to the edge of the canopy over, open to the sky, while other interpretations favour terminating the distance as soon as the occupant is outside the building/ door, regardless of whether the canopy is over or not. The term "open area" can be understood as either open air, or open to sky, and a clear direction is not available in the code.
84	Good	Good	Good	Good	Good	The focus is always on fire as the only consideration and the use of ASET or RSET, a snapshot in time, once again does not consider an all-hazards approach to occupant safety.

Respondent number	Clarity	Usability	Flexibility	Consistency	Effectiveness	Please share any additional comments or feedback on the current prescriptive travel distance requirements in the Code. In your opinion, what is the most important change or improvement that should be made to the travel distance requirements in the Code, if
85	Excellent	Excellent	Good	Good	Good	measuring travel from egress doors only off public corridors is too limiting. distance from a parkade drive aisle should be considered.
86	Excellent	Good	Good	Good	Excellent	Often times smoke modelling or timed exiting is used to increase travel distances through alternative solution however, smoke is not the only risk to address in exit considerations. NFPA 1 and NFPA 101 provide a number of credible scenarios that should be evaluated and not just smoke or tenable atmosphere times. Mass crowd movement can occur for a variety of reasons and timely movement to a safe space must be consistent and measurable.
87	Good	Good	Fair	Good	Good	none
88	Good	Fair	Excellent	Excellent	Excellent	The biggest issues ive had with exiting is 3.4.2.5.(2) this could be clearer or rephrased. Most people that cannot meet the travel distance requirement will create an internal exit corridor.
89	Good	Fair	Poor	Fair	Fair	"Dead end Corridor" Should be a defined term. There should be an allowance in the code for 2 Storey low risk occupancies, that would allow people to leave the floor area at an open stairway without having to enter into an EXIT shaft as long as they met the travel distance requirements.
90	Good	Good	Good	Good	Good	not sure
91	Fair	Good	Good	Good	Good	Nothing to add at this time
92	Good	Fair	Fair	Fair	Fair	Re-evaluation or update in a modern context what an expected time to reach a point of safety should be.
93	Good	Good	Good	Good	Good	Using real-world evacuation data to refine travel distance limits, ensuring they align with how people actually move in emergencies.
94	Good	Good	Good	Fair	Good	none
95	Fair	Fair	Fair	Fair	Good	Greater respect for actual behavior of occupants in emergency situations.
96	Fair	Good	Good	Fair	Fair	Allow increased travel distances for buildings with enhanced fire detection and/or ESFR
97	Good	Good	Fair	Good	Fair	Article 3.4.2.6(1) needs further elaboration; for example, does the principal entrance for fire fighting also require to be barrier free?

Travel Distance Requirements and Perspectives on alternative solutions. Data collected January 30, 2025 to February 13, 2025.

Section 3: Alternative solutions

Responses to questions 11 and 12

Respondent Number	Objectives	Functional Statements	Intent Statements	Please share any additional comments or feedback for question 11. What aspects are most effective, and what challenges or areas for improvements do you see?
1	Poor	Poor	Poor	Statements are vague (probably intended to be) giving rise to subjective interpretation of what solution can achieve the objectives/intent. Room for variation across AHJs.
2	Good	Good	Good	Determining what a new 'safe' exiting criteria should be can be challenging given our current prescriptive requirements work, and any change could introduce unintended risk for future fire/emergency events
3	Very poor	Very poor	Fair	They do provide the intent but only qualitative. It needs to provide more guidance on how to meet the intent.
4	Excellent	Excellent	Excellent	N/A
5	Good	Good	Good	Current code is descriptive enough
6	Poor	Poor	Poor	The Code measures travel distance by meters however the Intent Statement for 3.4.2.4.(2) speaks about "time required to achieve occupant safety. It is difficult to compare an empirical distance to time. Further, the Intent Statements for 3.4.2.4. & 5. speak about delays. Delays are measured by time not distance.
7	Excellent	Excellent	Excellent	the objective , functional statements, intent statement are quite clear, the challenge is how to and what basis to determine and accept alternative solution to determine the safe travel distance. There are always variables and other contributing factors
8	Good	Good	Good	Intent statement provide useful information to demonstrate equivalent performance, objectives & functional statements are vague.
9	Good	Good	Good	Again, I find the requirement extremely straight forward. There is no guessing needed.
10	Good	Good	Good	It's not always 100% clear evacuation analysis must also consider non-fire scenarios - we are now seeing more and more of those public emergencies involving shooting or assault in malls / schools, etc.
11	Good	Good	Good	We haven't been focusing enough on the human behavior side of exiting, especially for assembly occupancies. I.e., large number of occupants exiting via the principal entrance they entered from / familiarity.
12	Poor	Poor	Poor	Current interpretations are not applicable to current construction, protections and functional application
13	Good	Good	Good	no comment
14	Good	Good	Good	Lots of applicants that apply for alternative solutions are using this to fix a design error and do not even think about the functional, objective and intent statements.
15	Good	Good	Good	Current objectives and functional statements and intent are good.
16	Poor	Poor	Poor	Since the original foundation of travel distance requirements is not technically based, The objectives and functional statements and intents are too general to specifically address complex situations.
17	Good	Good	Good	N/A
18	Good	Good	Good	None
19	Good	Good	Good	Just cleaning up some of the wording (as I already discussed) will provide clarity.
20	Excellent	Fair	Good	None.
21	Very poor	Very poor	Very poor	See previous comment.
22	Good	Good	Good	na
23	Fair	Poor	Poor	The more info or real life scenarios the better.
24	Fair	Fair	Fair	Non at this time
25	Good	Good	Good	question 10 was clear, but I disagree with question 8. It is not up to Code Officers opinions to dictate Code requirements, NRC should be doing unbiased research based on real emergency scenarios and making Code requirements based on that.
26	Fair	Fair	Fair	The Code requirements need to be updated to be more consistent with international research. Canada is lacking in this field.
27	Fair	Good	Good	I'm thinking this question is to elaborate on question 11 and I think there could be more objectives considered/incorporated to facilitate alternative solution reports.

Respondent Number	Objectives	Functional Statements	Intent Statements	Please share any additional comments or feedback for question 11. What aspects are most effective, and what challenges or areas for improvements do you see?
28	Good	Fair	Excellent	The main challenges I see when using alternative solutions to address travel distance is the baseline performance implied by the prescriptive measures in the code. Generally speaking, most alternative solutions I have seen with respect to travel distance (aside from the very small variations) are performance-based, i.e. they consider both Available Safe Egress Time (of which travel distance is a component and is partially addressed by these articles) and Required Safe Egress Time (meaning analysis/alternatives are evaluated based on expected tenability performance, rather than just travel time). This means that the performance of the acceptable solution is assumed to be the more general threshold "tenability", rather than a strict "do occupants get out at least as fast as with the acceptable solution". I think updating the intent statements and perhaps explanatory material highlighting what "tenability" means would be somewhat useful to ensure there is consistency in how practitioners and AHJ's evaluate the performance of an alternative solution to travel distance. While "good engineering practice" should be sufficient, I think a more explicit stating of tenability thresholds, or perhaps direct reference to engineering resources which provide means for determining tenability (such as the SFPE Handbook) would be helpful.
29	Fair	Fair	Fair	no comment
30	Good	Fair	Good	Question 10 or Question 11? I think the objectives and functional statements are reasonably well worded.
31	Fair	Fair	Fair	Assuming this is for Q11, not Q10. The functional statement should include a performance aspect that the intent and objectives are trying to address. ISO 13571 provides great detail on performance criteria for exiting and tenability. Good engineering practice performance criteria are FED (CO), FED (thermal) and Visibility. A good example of how these requirements are implemented in a building code can see here in Clause C4: https://www.building.govt.nz/assets/Uploads/building-code-compliance/c-protection-from-fire/asvm/c1-c6-protection-from-fire-a3.pdf
32	Very poor	Very poor	Very poor	Unhelpful qualitative statements that do not allow tolerable risk to be expressed or benchmarked
33	Excellent	Excellent	Excellent	I find that Intent Statements are most effective for understanding why a requirement is written the way it is.
34	Good	Good	Fair	The intent statements can sometimes be too vague, and require another level of interpretation.
35	Fair	Fair	Fair	Describes timely movement of persons to a safe place in an emergency for delays in evacuation of movement to prevent harm to persons. Question is what is considered an excessive travel distance? Why the ones stated at 45m, 40m, etc...
36	Fair	Fair	Fair	no comments
37	Good	Good	Good	code objectives should be reevaluated periodically to ensure still relevant in today's technology, materials and building types
38	Good	Good	Good	--
39	Fair	Fair	Poor	Additional information/benchmarks should be provided in the intent statements to provide an effective performance based design.
40	Good	Good	Good	unsure
41	Good	Good	Good	It is unclear why some code articles do not have these references. When any of these articles has been part of an AS application, we have prescribed what we believe the intent of the article to be and addressed those issues with follow-up info and scenarios.
42	Good	Good	Good	Alternative solutions are effective
43	Excellent	Excellent	Excellent	no additional comment
44	Good	Good	Good	I don't see any need for this part of the code to change substantially
45	Good	Good	Good	-
46	Fair	Fair	Fair	
47	Fair	Fair	Fair	The code keeps adding things and getting more and more extensive without substantially improving constructed results. The people who write the background sometimes don't seem to understand how things actually get built.
48	Poor	Poor	Poor	hard to find information that is 'open to interpretation' by the AHJ plus their inability to contribute to the discussion or accept precedence makes presenting alternatives challenging or costly or both
49	Fair	Fair	Fair	-
50	Fair	Fair	Fair	no comment
51	Good	Good	Good	The challenge is interpretation and often subjective stances from the AHJ CO. If the architects are truly the ones liable and responsible, the proposed solutions based on O & FS should be evaluated based on their expertise unless a complete misinterpretation is found.
52	Good	Fair	Good	In my mind, the objectives and the intent statements should trump the functional statements.
53	Fair	Poor	Fair	Alternative solutions need to be clear and easily predictable, without significant modelling and additional studies
54	Fair	Fair	Fair	illustrations instead of words, I know your lawyers don't like it.

Respondent Number	Objectives	Functional Statements	Intent Statements	Please share any additional comments or feedback for question 11. What aspects are most effective, and what challenges or areas for improvements do you see?
55	Good	Good	Good	Too many are focused on the “cheaper” or easier solution and “creatively” argue using the functional statements, many are reasonable, others less so. Consider requiring augmented safety features to offset any risks
56	Poor	Poor	Poor	N/A
57	Good	Poor	Poor	No comment
58	Poor	Poor	Poor	The objectives, functional statements and intent statements would need to be substantially updated if the alternatives described in question #8 were to be considered. They are currently simply a way of stating the prescriptive, restrictive standard in a positive way. They provide no indication about the potential alternative approach that may be available or that have been applied effectively in the past. In general a database of accepted alternative solutions should be made broadly available to SCOs and design professionals.
59	Fair	Fair	Good	Building uses tend to change over time, making alternative solutions often unrealistic. Alternative solutions may be onerous to adjust to meet changing building uses.
60	Excellent	Good	Good	Functional and intent statements accommodate for broader interpretations, however, the AHJ should have additional guidance on how to evaluate these when reviewing alternative solutions
61	Fair	Fair	Fair	More elaboration of the objective/function/intent statements may be helpful in evaluating the effectiveness of the alternative solution.
62	Fair	Fair	Fair	These statements are general/qualitative and by nature may be subject to interpretation which on the positive side allows flexibility in the features which are proposed to support an alternative solution approach. If the code instead moved to include definitive quantitative performance, flexibility and innovation could in turn be restricted.
63	Good	Good	Good	if all read together (as they should) the objectives and statements provide enough guidance while allowing flexibility in my limited experience with alternative solutions. The biggest challenge is getting AHJs to accept alternative solutions. There seems to be a resistance to do so even though these are prepared and assessed by qualified professionals.
64	Fair	Fair	Fair	No additional comments
65	Excellent	Excellent	Excellent	No comments
66	Fair	Fair	Fair	NA
67	Fair	Fair	Fair	Additional guidelines on how these travel distances were determined.
68	Fair	Poor	Poor	NA
69	Fair	Fair	Fair	1. 3.4.2.5.(2) 2. Dead end corridor for elevator lobby between exits. 3. exit discharge protection
70	Good	Good	Good	The goal is to do better assessment of the exit time from the floor area and the Objective and Function statement require to be more specific when it comes to exit time.
71	Fair	Fair	Fair	unclear, as we have always contracted a Code expert when an Alternative Solution was required.
72	Poor	Fair	Poor	ASDSD
73	Fair	Fair	Fair	one challenge is the lack of flexibility for buildings with enhanced fire protection measures, such as advanced detection, suppression systems, or smoke control strategies. Allowing alternative solutions based on performance-based design could improve efficiency while maintaining safety.
74	Fair	Fair	Fair	Understanding the basis on how travel distance from an historical context is being applied to modern day design techniques.
75	Fair	Fair	Fair	More specific intent statements based on occupancy types and update the https://codes-guides.nrc.ca/IA/15NBC/intentframe.html to count for specific occupancy types related egress/travel distances
76	Fair	Fair	Fair	Installation of sprinkler system and fire separations.
77	Poor	Poor	Good	At a high level, the objectives and functional statements are beneficial for establishing the specific concerns addressed by the Code requirements; however, these are not particularly beneficial for preparing alternative solutions. For example, AHJs often evaluate alternative solutions for concerns well beyond those quantified by the objectives and functional statements. The intent statements are more helpful to establish the exact concerns, though could be still be more specific in many cases.
78	Fair	Fair	Fair	let's make some examples for industrial practices to follow.
79	Fair	Fair	Fair	no additional comment
80	Fair	Fair	Fair	Enhance NBC requirements for aisles for better way finding and more obvious travel routes as in AFC Division B 2.7.1.2.(2) & (3)
81	Fair	Fair	Good	N/A
82	Good	Good	Good	Quality of requests for alternative solutions differ considerably between professionals
83	Good	Good	Good	The objectives and statements are effective and help the reader to understand what the sentences are aiming for. They just need to be accompanied by more notes to better contextualize their aims. The lack of a definition of or context regarding “open area,” and the inference of orthogonal paths by some has created issues in the past for us.

Respondent Number	Objectives	Functional Statements	Intent Statements	Please share any additional comments or feedback for question 11. What aspects are most effective, and what challenges or areas for improvements do you see?
84	Fair	Good	Good	Once again, go back to sentence 3.4.2.5.(1), "To limit the probability of excessive travel distance to an exit in an emergency situation, which could lead to delays in the evacuation or movement of persons to safe place, which could lead to harm to persons." increases travel distances impacts more than just smoke and fire.
85	Good	Good	Good	-
86	Excellent	Excellent	Good	Although the codes use "fire" in the intent statements, the objectives and the Preface both clearly indicate that the code is referring to all hazards and not just smoke or fire. See OS3. Travel distance and crowd movement dynamics confirm that both density and distance are factors in evacuation along with familiarity.
87	Good	Good	Good	,
88	Excellent	Excellent	Excellent	.
89	Poor	Poor	Poor	Alternative solutions based on the functional statements are very difficult to get approved in most municipalities and most Architect are too risk adverse to use an alternative solution.
90	Good	Good	Good	not sure
91	Fair	Fair	Fair	Nothing at this time
92	Fair	Fair	Fair	The statements all help from the perspective of aligning with other relevant code provisions that relate to evacuations, however they blend "emergency" with elements that are largely related to "fire emergencies" and are sometimes challenging to establish credible evacuation times, and what other emergencies might require from an evacuation standpoint.
93	Good	Good	Good	Incorporating human behaviour study in emergency and complexity of building layout.
94	Good	Good	Good	none
95	Fair	Poor	Poor	Big challenge is to allow for the furnished condition of the majority of space types/occupancies and address the travel/exiting realistically.
96	Poor	Poor	Poor	The organization / layout of the Code points users to apply prescriptive requirements almost exclusively, the option to develop alternative solutions is almost forgotten.
97	Fair	Fair	Fair	none

Travel Distance Requirements and Perspectives on alternative solutions. Data collected January 30, 2025 to February 13, 2025.

Responses to questions 13 and 14

What building design factors do you consider most critical for determining the appropriate safe travel distance?

Respondent number	Presence of sprinklers and fire detection	Occupancy type (assembly, care, residential, office, retail, high-hazard, etc.)	Presence of fire separations	Building area or suite area	Type of construction (combustible versus non-combustible)	Occupant load (maximum occupants at one time)	Building height and number of stories	Please share any additional comments or feedback for question 13.
1	Important	Critical	Important	Critical	Critical	Important	Critical	
2	Critical	Neutral	Important	Important	Neutral	Important	Important	exiting has a significant human response element that can affect individuals differently given the above parameters
3	Important	Important	Important	Neutral	Neutral	Important	Important	
4	Important	Critical	Important	Neutral	Unimportant	Critical	Important	N/A
5	Important	Important	Important	Important	Important	Critical	Important	The industry is pushing further exiting distance and greater Occ loads which is only putting public at a greater risk.
6	Critical	Important	Critical	Somewhat Important	Somewhat Important	Neutral	Important	
7	Critical	Critical	Critical	Critical	Critical	Critical	Critical	floor layout, ceiling height and location of exits and exit capacity . some of the security items can be a hindrance and interconnected floor can be confusing during emergency
8	Critical	Neutral	Important	Unimportant	Somewhat Important	Important	Important	
9	Critical	Critical	Important	Neutral	Neutral	Important	Important	
10	Important	Critical	Neutral	Unimportant	Unimportant	Critical	Neutral	For fire emergencies - the current code does not give enough credit for sprinklers. For non-fire emergencies - the current code simply does not recognize evacuation though convenience stairs that are often seen in malls and schools that have interconnected floors (transit stations recognize these, including use of escalators). All studies point to occupants using the path they are familiar with to exit, the code's strict use of 'exits' as defined , lacks that flexibility.
11	Critical	Neutral	Important	Neutral	Important	Critical	Important	
12	Critical	Somewhat Important	Important	Unimportant	Somewhat Important	Important	Somewhat Important	
13	Neutral	Important	Unimportant	Somewhat Important	Important	Critical	Important	no comment
14	Critical	Important	Important	Neutral	Neutral	Important	Neutral	
15	Critical	Important	Important	Important	Neutral	Neutral	Neutral	No further comments.
16	Important	Critical	Important	Important	Somewhat Important	Critical	Somewhat Important	Ceiling height and smoke reservoir are not included on the list of parameters, however the volume of the space and ceiling height are critical factors in smoke layer development and degradation of paths of egress, as is ventilation and risk of ventilation limited fires.
17	Critical	Critical	Critical	Important	Important	Important	Critical	
18	Critical	Critical	Critical	Important	Neutral	Critical	Important	

Respondent number	Presence of sprinklers and fire detection	Occupancy type (assembly, care, residential, office, retail, high-hazard, etc.)	Presence of fire separations	Building area or suite area	Type of construction (combustible versus non-combustible)	Occupant load (maximum occupants at one time)	Building height and number of stories	Please share any additional comments or feedback for question 13.
19	Important	Important	Critical	Neutral	Neutral	Somewhat Important	Somewhat Important	
20	Critical	Critical	Critical	Critical	Critical	Critical	Important	None.
21	Important	Important	Critical	Unimportant	Unimportant	Important	Somewhat Important	Type of construction has limited impact on life safety, given other features such as sprinklers and fire compartmentation. See "Fire Severity Outcome Comparison of Apartment Buildings Constructed from Combustible and Non-combustible Construction Materials."
22	Important	Important	Important	Neutral	Neutral	Important	Critical	na
23	Important	Critical	Important	Neutral	Important	Critical	Critical	
24	Critical	Critical	Critical	Important	Important	Important	Important	
25	Important	Important	Important	Important	Important	Important	Important	There are too many variables in emergency scenarios and we should not rely on a single safety system (as it may not work as intended).
26	Important	Critical	Important	Critical	Neutral	Critical	Neutral	
27	Important	Neutral	Important	Important	Neutral	Critical	Neutral	Safe travel distance needs to incorporate queuing when queuing and tenability when queuing could occur within the space.
28	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	I disagree with the premise of Question 13, because I think it is imprecise to use such broad factors subjectively to be proxies for "tenability" - the honest answer to any of these is, "it depends on a lot of other, often interdependent, stuff". I recognize there is a big jump between using just "travel distance" as with the acceptable solutions, and using ASET/REST analysis, however I don't think further/additional modification to the acceptable solutions is practical or desired as it would both create far more regulation in terms of how travel distance applies based on these factors, and it is likely to improperly estimate the performance (if prescriptive travel distance was extended for "shorter" building, how much would that be by? I think this subjective assessment of "good travel distance" also ignores the concepts of tenability, which are so vital. For example, if it could be shown through fire modelling that an acceptable solution travel distance corresponded to a loss of tenable conditions for occupants, would that imply that the acceptable performance is a loss of tenability? If we are careless about setting travel distances based on subjective factors, we might end up in this exact situation, all the while making the regulations themselves more complex (more rules).

Respondent number	Presence of sprinklers and fire detection	Occupancy type (assembly, care, residential, office, retail, high-hazard, etc.)	Presence of fire separations	Building area or suite area	Type of construction (combustible versus non-combustible)	Occupant load (maximum occupants at one time)	Building height and number of stories	Please share any additional comments or feedback for question 13.
29	Somewhat Important	Important	Neutral	Important	Important	Important	Important	
30	Critical	Critical	Important	Neutral	Neutral	Critical	Critical	Ceiling height is not factored in anywhere. Building height is defined but you can have varying ceiling heights within a building that significantly impacts tenability. An example would be that the IBC permits an extended travel distance to 400 ft in a S1 storage building providing it is sprinklered and has a clear height of 24 ft. There are other exemptions permitted by the IBC which should be considered. Of course building height is also important in terms of exit capacity, stair locations, merging occupants, and number of storeys. Other factors that should be considered are whether or not the building is publicly accessible or is secured. This speaks to occupant familiarity and perhaps level of training. This is not addressed anywhere in the codes.
31	Critical	Critical	Neutral	Unimportant	Unimportant	Unimportant	Neutral	The type of occupancy and the presence of automatic warnings systems is the most critical aspect for determining a prescriptive travel distance, with the most emphasis placed on the automatic warning. The building code already provides a small range for this. However, greater weight can be placed on the addition of smoke detection in conjunction with sprinklers to exceed travel distances beyond 45 m. Similarly, additional distance categories could be provided for buildings with heat detectors provided throughout or smoke detectors provided throughout. Further NFPA 101 provides greater than 45 m travel distances for buildings based on occupancy.
32	Important	Critical	Important	Somewhat Important	Unimportant	Critical	Important	There are many layers to the above questions. Building height does not create a more severe level of calculation however the consequence of exit failure is higher due to more people being present in the building and relying on places of relative safety (exit stairs). Occupancy type speaks to predicted human behavior that is generalized within the building code. Accurate portrayals of occupant movement is critical to safe exit design of which travel distance is a component.

Respondent number	Presence of sprinklers and fire detection	Occupancy type (assembly, care, residential, office, retail, high-hazard, etc.)	Presence of fire separations	Building area or suite area	Type of construction (combustible versus non-combustible)	Occupant load (maximum occupants at one time)	Building height and number of stories	Please share any additional comments or feedback for question 13.
33	Critical	Critical	Important	Important	Critical	Important	Neutral	It seems unusual that the same max 45 m travel distance requirement is applied for combustible buildings and noncombustible buildings. There are huge differences in requirements between sprinklered vs unsprinklered but not for combustible vs noncombustible which is strange to me.
34	Critical	Important	Important	Critical	Important	Important	Important	
35	Critical	Important	Important	Somewhat Important	Neutral	Important	Unimportant	
36	Critical	Critical	Critical	Important	Critical	Critical	Important	
37	Critical	Important	Critical	Important	Important	Critical	Important	
38	Neutral	Important	Important	Important	Important	Important	Important	--
39	Critical	Important	Important	Neutral	Neutral	Critical	Neutral	
40	Critical	Critical	Important	Important	Critical	Neutral	Neutral	
41	Critical	Critical	Critical	Critical	Important	Important	Important	As a firm, we don't deal with many high occupancy projects so the cumulative effect of exit width is not something we have had to address. One issue that came up recently was the issue of exiting through a lobby. It was not allowed as both one main floor space and one exit from the mezzanine over lead through the lobby (church). This is a cumulative situation, but the numbers were low and both were considered exits from the same floor space so changes had to be made. A very reasonable situation was deemed unworkable due to code wording.
42	Somewhat Important	Important	Critical	Important	Critical	Critical	Neutral	
43	Critical	Important	Neutral	Neutral	Neutral	Neutral	Somewhat Important	no additional comment
44	Important	Important	Important	Important	Critical	Critical	Critical	I think that the code is quite well balanced already
45	Critical	Important	Critical	Important	Critical	Important	Important	-
46	Important	Critical	Important	Critical	Critical	Critical	Critical	
47	Critical	Important	Important	Neutral	Important	Important	Neutral	The amount of potentially toxic content in modern materials; i.e. even if they don't "burn", the fumes will kill you before the fire does.
48	Important	Critical	Important	Important	Important	Unimportant	Unimportant	the same travel distances and fire code requirements should apply regardless of occupant load or building height
49	Critical	Neutral	Important	Somewhat Important	Important	Neutral	Important	
50	Important	Important	Important	Neutral	Important	Important	Important	no comment
51	Critical	Critical	Critical	Critical	Critical	Critical	Critical	

Respondent number	Presence of sprinklers and fire detection	Occupancy type (assembly, care, residential, office, retail, high-hazard, etc.)	Presence of fire separations	Building area or suite area	Type of construction (combustible versus non-combustible)	Occupant load (maximum occupants at one time)	Building height and number of stories	Please share any additional comments or feedback for question 13.
52	Critical	Important	Critical	Important	Critical	Important	Important	Honestly, all of these are important. None of them are of lesser influence over the safety of occupants.
53	Critical	Important	Important	Neutral	Important	Somewhat Important	Somewhat Important	
54	Important	Important	Important	Somewhat Important	Critical	Critical	Critical	Disable person?? There must be real fires that you can draw experience from!!! MGM Grand been used for years, how about UK apartment fire??
55	Critical	Critical	Critical	Important	Critical	Critical	Important	Type of occupancy should/could have sub categories - assemblies Schools young and higher mobility and internal groupings per exits. Arenas or concert halls - challenging to exit quickly with many diverse ages/mobility abilities and all from 1 space Maybe need more strategies? more exits? Similar in the B1 -B2 B3 all with unique criteria and occupant needs; again F1 F2 & F3 maybe distinguish differently?
56	Important	Neutral	Neutral	Somewhat Important	Somewhat Important	Neutral	Neutral	
57	Critical	Critical	Critical	Neutral	Important	Important	Neutral	
58	Important	Critical	Critical	Critical	Important	Critical	Critical	As noted before, the familiarity with the building is an important factor that is not currently considered by the prescriptive code. Unfortunately, this may come down to an operational solution that does not equate well with the building code. Must always consider the worst case occupant use to be safe. If this whole effort is a method for "red tape" reduction, I would suggest this is not a good idea. Red Tape reduction would be better focused on administrative processes and a heavier reliance on legitimate design professionals rather than many other advisors not authorized to provide design advice.
59	Important	Important	Important	Neutral	Critical	Important	Neutral	More stipulations and enforcement on what public corridors and horizontal exits may be used for is important. Building owners often do not understand requirements, creating unintended hazards,
60	Critical	Critical	Critical	Neutral	Important	Important	Neutral	
61	Important	Important	Important	Critical	Critical	Critical	Important	

Respondent number	Presence of sprinklers and fire detection	Occupancy type (assembly, care, residential, office, retail, high-hazard, etc.)	Presence of fire separations	Building area or suite area	Type of construction (combustible versus non-combustible)	Occupant load (maximum occupants at one time)	Building height and number of stories	Please share any additional comments or feedback for question 13.
62	Critical	Important	Important	Important	Important	Important	Important	Queuing at an exit while awaiting entry into the exit is a key consideration in determining travel distance. Little or no queuing limits the potential for exposure prior to entering the exit. And in a fully sprinklered application, this exposure concern is further limited. This is often the basis for less complicated alternative solutions and seems could be a basis to support an increased travel distance. Parking storage garages being a typical example.
63	Critical	Critical	Critical	Important	Important	Important	Important	The biggest challenge is getting AHJs to accept alternative solutions. There seems to be a resistance to do so even though these are prepared and assessed by qualified professionals.
64	Critical	Critical	Critical	Critical	Critical	Critical	Important	No additional comments
65	Critical	Critical	Critical	Critical	Critical	Critical	Critical	No comments.
66	Critical	Neutral	Important	Important	Neutral	Critical	Critical	
67	Critical	Critical	Neutral	Critical	Important	Critical	Important	The risk is that the use may change and therefore the basis of an alternative solution approval may no longer be applicable to the new use. There should be a change of use permit requirement for these scenarios added to the building code.
68	Critical	Critical	Important	Neutral	Neutral	Important	Important	
69	Important	Important	Important	Important	Important	Important	Important	
70	Critical	Important	Important	Neutral	Neutral	Important	Neutral	
71	Important	Important	Important	Important	Critical	Critical	Important	
72	Somewhat Important	Neutral	Important	Neutral	Somewhat Important	Neutral	Important	DFEDF
73	Critical	Critical	Important	Important	Important	Critical	Neutral	
74	Important	Critical	Important	Neutral	Important	Critical	Neutral	
75	Critical	Important	Important	Important	Critical	Critical	Important	Firefighting emergency response time is also a factor. Specially for outside 10 minutes response area. The current code looks into it only for spatial, but I will prefer to incorporate Firefighting operations into some Alternative solutions. Also, the vertical travel distance. And the density factor of units on the same lot.
76	Critical	Critical	Critical	Important	Important	Important	Critical	It is all subjective and is based on the opinion of the person evaluating the alternative solution.
77	Critical	Neutral	Important	Unimportant	Unimportant	Unimportant	Unimportant	
78	Critical	Critical	Critical	Important	Important	Important	Important	
79	Important	Critical	Important	Neutral	Critical	Critical	Critical	
80	Neutral	Critical	Critical	Important	Important	Critical	Important	
81	Critical	Important	Critical	Important	Important	Important	Important	

Respondent number	Presence of sprinklers and fire detection	Occupancy type (assembly, care, residential, office, retail, high-hazard, etc.)	Presence of fire separations	Building area or suite area	Type of construction (combustible versus non-combustible)	Occupant load (maximum occupants at one time)	Building height and number of stories	Please share any additional comments or feedback for question 13.
82	Critical	Important	Important	Important	Somewhat Important	Important	Important	
83	Critical	Important	Critical	Neutral	Important	Critical	Neutral	
84	Critical	Important	Critical	Important	Critical	Critical	Critical	Early detection and confinement are key aspects to allow for early detection and confinement of the fire. However, everything is open concept these days and built with combustible materials. if it is the smoke that kills people why do we only focus on fire spread? Occupant load is critical as studies show that rate of forward movement decreases based on the number of people and the amount of circulation space available in a building or space, therefore cannot be discounted
85	Important	Important	Critical	Important	Important	Important	Neutral	
86	Important	Critical	Critical	Important	Important	Critical	Neutral	Availability of exits and travel distance can be of the greatest concern. Multiple paths of travel are required as an incident can impede egress to one or more exits and choke points along the exit route need to be considered through to the final exit.
87	Critical	Critical	Critical	Neutral	Critical	Important	Neutral	
88	Important	Critical	Important	Important	Important	Important	Neutral	
89	Critical	Important	Important	Important	Neutral	Somewhat Important	Neutral	
90	Important	Critical	Important	Important	Important	Critical	Neutral	
91	Important	Critical	Critical	Important	Critical	Critical	Critical	Nothing at this time
92	Critical	Critical	Important	Neutral	Somewhat Important	Important	Somewhat Important	Building height and number of storeys might influence the safety of a design more than "somewhat important", depending on the other factors, exit strategies, and fire alarm sequence of operation.
93	Important	Important	Important	Important	Important	Important	Important	No additional comments
94	Critical	Important	Important	Important	Critical	Critical	Critical	
95	Critical	Neutral	Important	Neutral	Important	Important	Neutral	
96	Critical	Important	Critical	Important	Somewhat Important	Somewhat Important	Somewhat Important	
97	Critical	Important	Critical	Important	Critical	Neutral	Important	

Travel Distance Requirements and Perspectives on alternative solutions. Data collected January 30, 2025 to February 13, 2025.

Responses to questions 15 and 16

The following methods are used to evaluate or develop travel distance and egress alternative solutions. How effective are they for assessing safe travel distances in emergencies?

Respondent number	Fire Modelling Software/ Computational Fluid Dynamics (CFD)	Evacuation Simulation Models	Comparative analysis	Historical Data Analysis	Expert Judgment	Performance-Based Engineering Calculations	Risk Assessments	Fire Testing and Experimental Data	Enhanced Fire Protection Systems	Systems Integration Studies	Please share any additional comments or feedback for question 15.
1	Somewhat effective	Very effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Somewhat effective	
2	Very effective	Not sure if effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	
3	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	
4	Very effective	Very effective	Very effective	Somewhat ineffective	Somewhat ineffective	Very effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	
5	Somewhat ineffective	Very ineffective	Somewhat ineffective	Somewhat ineffective	Not sure if effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Not sure if effective	No comment
6	Somewhat effective	Not sure if effective	Somewhat effective	Not sure if effective	Somewhat ineffective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Computer generated results are only as good as the inputs. There is too much room for error. No one can predict occupant behavior accurately.
7	Very effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Very effective	Not sure if effective	Somewhat effective	Very effective	Somewhat effective	
8	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat ineffective	Not sure if effective	Somewhat effective	Very effective	Somewhat ineffective	Somewhat ineffective	Not sure if effective	
9	Very ineffective	Somewhat ineffective	Very ineffective	Very ineffective	Very ineffective	Very ineffective	Very ineffective	Somewhat ineffective	Somewhat ineffective	Very ineffective	I have yet to see a variance for travel distance actually pass testing when the building has been completed. The only thing accomplished was the saving of money as being built and allowing more space for commercial businesses.
10	Somewhat effective	Very effective	Very effective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Somewhat ineffective	Somewhat ineffective	Somewhat ineffective	

Respondent number	Fire Modelling Software/ Computational Fluid Dynamics (CFD)	Evacuation Simulation Models	Comparative analysis	Historical Data Analysis	Expert Judgment	Performance-Based Engineering Calculations	Risk Assessments	Fire Testing and Experimental Data	Enhanced Fire Protection Systems	Systems Integration Studies	Please share any additional comments or feedback for question 15.
11	Somewhat effective	Very effective	Somewhat effective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Somewhat effective	Somewhat ineffective	Somewhat effective	ESFR sprinklers are more commonly used in warehouse facilities. I don't think ESFR sprinklers will be very practical as they demand a lot of water and pressure, and building occupants may have water damage concerns. In order to provide proper modelling and software analysis, the proponent and authority should discuss and agree upon a set of parameters / criteria to establish tenability and safe conditions. Another point of consideration is that authorities across the Province or Canada may not have consistent capabilities to review performance-based design solutions, which could lead to a disparity of "conservativeness" between municipalities.
12	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Somewhat effective	Very effective	Very effective	
13	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	All of these methods would need to be assessed and against many real-world conditions and similar situations to see what went wrong when injuries or fatalities occurred.
14	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat ineffective	Very effective	Somewhat ineffective	Somewhat effective	Not sure if effective	Not sure if effective	Risk assessments can be challenging, as expertise in conducting them varies among professionals.
15	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Not sure if effective	The fire and egress models can only be on basis of adequate data input and parameter setup.
16	Very effective	Very effective	Somewhat ineffective	Somewhat effective	Not sure if effective	Very effective	Somewhat effective	Not sure if effective	Somewhat ineffective	Not sure if effective	
17	Somewhat effective	Somewhat effective	Somewhat ineffective	Somewhat ineffective	Not sure if effective	Somewhat effective	Somewhat effective	Not sure if effective	Very effective	Somewhat effective	

Respondent number	Fire Modelling Software/ Computational Fluid Dynamics (CFD)	Evacuation Simulation Models	Comparative analysis	Historical Data Analysis	Expert Judgment	Performance-Based Engineering Calculations	Risk Assessments	Fire Testing and Experimental Data	Enhanced Fire Protection Systems	Systems Integration Studies	Please share any additional comments or feedback for question 15.
18	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	
19	Very effective	Somewhat effective	Not sure if effective	Somewhat ineffective	Somewhat ineffective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	
20	Somewhat effective	Somewhat effective	Very effective	Very effective	Very effective	Very effective	Very effective	Very effective	Somewhat effective	Somewhat effective	None.
21	Very effective	Very effective	Somewhat ineffective	Very effective	Not sure if effective	Somewhat effective	Very effective	Somewhat effective	Somewhat ineffective	Somewhat effective	Most critical: Historical data analysis.
22	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	na
23	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Very effective	Very effective	Very effective	
24	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat ineffective	Very effective	Not sure if effective	Very effective	Very effective	Very effective	Not sure if effective	Nothing at this time
25	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	We see detailed reports with alternative solution requests however are not able to verify if they have been done correctly.
26	Not sure if effective	Very effective	Somewhat effective	Not sure if effective	Not sure if effective	Very effective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	
27	Somewhat effective	Very effective	Somewhat effective	Somewhat ineffective	Somewhat effective	Very effective	Somewhat ineffective	Somewhat effective	Somewhat effective	Very effective	More of these topics that can be included in any single alternative solution, the better the argument/justification for a performance based solution.
28	Very effective	Very effective	Somewhat ineffective	Somewhat effective	Not sure if effective	Very effective	Very effective	Very effective	Not sure if effective	Not sure if effective	I struggled with Question 15 as it seems many of the methods are restatements of each other (I do not differentiate ASET/ RSET from expert judgement, fire modelling, egress modelling, risk assessments, and performance-based calculations - they are all really the same thing).
29	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat ineffective	Not sure if effective	Somewhat effective	Somewhat ineffective	Somewhat ineffective	Somewhat ineffective	Somewhat ineffective	People (AHJs) are wanting tools (modelling) to demonstrate compliance because they generate pretty pictures rather than tools that provide useful and accurate data.

Respondent number	Fire Modelling Software/ Computational Fluid Dynamics (CFD)	Evacuation Simulation Models	Comparative analysis	Historical Data Analysis	Expert Judgment	Performance-Based Engineering Calculations	Risk Assessments	Fire Testing and Experimental Data	Enhanced Fire Protection Systems	Systems Integration Studies	Please share any additional comments or feedback for question 15.
30	Very effective	Very effective	Not sure if effective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Very effective	Not sure if effective	Somewhat effective	I understand sprinklers play an important role in preventing fire spread and the structure but they are not necessarily a life safety system. That said sprinkler operation can significantly impact on model assumptions and results. As state previously solutions should strike a balance between what is know from the real world, performance based analyses, and minimum safe limitations.
31	Very effective	Very effective	Somewhat ineffective	Not sure if effective	Very ineffective	Very effective	Somewhat effective	Somewhat effective	Very ineffective	Very ineffective	The use of deterministic methods utilizing modeling to develop ASET v RSET assessments is extremely powerful in determining travel distances. Functionally, when conducting these types of analysis, travel distance is generally irrelevant, as the ASET is actually a function of tenability within the fire compartment. As such, travel distance will be limited to what ever the ASET is. This type of approach is the general basis for assessing occupant egress safety in all performance based codes and applications thoroughout the world. Risk assessment can be a useful tool as well, however, there still needs to be a specific acceptance criteria to base the risk assessment on, i.e. a qualitative acceptable level of risk for the loss of life or damage to property. As such, risk assessment can be used for to determine the probability of a potential hazard and then mitigating features can be applied to aid in reduction of the probability of that hazard occurring.

Respondent number	Fire Modelling Software/ Computational Fluid Dynamics (CFD)	Evacuation Simulation Models	Comparative analysis	Historical Data Analysis	Expert Judgment	Performance-Based Engineering Calculations	Risk Assessments	Fire Testing and Experimental Data	Enhanced Fire Protection Systems	Systems Integration Studies	Please share any additional comments or feedback for question 15.
32	Very effective	Very effective	Somewhat ineffective	Somewhat effective	Not sure if effective	Very effective	Somewhat effective	Somewhat effective	Somewhat ineffective	Somewhat ineffective	All of the above responses to question 15 are contingent on competence of the practitioner. The method is only as good as the user which is a big problem faced within Canada.
33	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Very effective	Very effective	
34	Not sure if effective	Very effective	Somewhat effective	Somewhat effective	Very effective	Very effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	
35	Very effective	Very effective	Not sure if effective	Not sure if effective	Not sure if effective	Very effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Unknown historical data analysis.
36	Somewhat effective	Somewhat effective	Somewhat ineffective	Not sure if effective	Somewhat ineffective	Somewhat effective	Somewhat ineffective	Not sure if effective	Somewhat effective	Somewhat effective	no comments
37	Somewhat effective	Very effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	need to be an acceptable timeline for acceptance of the methods, ie. maximum age before needs to be reviewed. For example, should not use a test or research more than 10 years old unless reevaluated.
38	Not sure if effective	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat effective	
39	Very effective	Very effective	Somewhat effective	Somewhat effective	Somewhat ineffective	Very effective	Somewhat effective	Somewhat ineffective	Somewhat effective	Not sure if effective	
40	Not sure if effective	Somewhat effective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	
41	Somewhat effective	Very effective	Somewhat effective	Very effective	Very effective	Somewhat effective	Somewhat effective	Very effective	Very effective	Somewhat effective	
42	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat ineffective	Not sure if effective	
43	Somewhat effective	Somewhat effective	Not sure if effective	Very effective	Very ineffective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Somewhat effective	Evacuation simulation models are useful but heavily based on assumptions related to behavior of the crowd - the availability of exits should be based on the individual having access to exits within a max distance and not only on time for crowd to get through an exit.
44	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	I have no real opinion as we do not tend to seek alternative solutions - merely comply with the code
45	Not sure if effective	Somewhat effective	Very effective	Somewhat effective	Very effective	Not sure if effective	Not sure if effective	Very effective	Very effective	Not sure if effective	-
46	Not sure if effective	Somewhat effective	Somewhat effective	Very effective	Not sure if effective	Not sure if effective	Not sure if effective	Very effective	Not sure if effective	Somewhat effective	

Respondent number	Fire Modelling Software/ Computational Fluid Dynamics (CFD)	Evacuation Simulation Models	Comparative analysis	Historical Data Analysis	Expert Judgment	Performance-Based Engineering Calculations	Risk Assessments	Fire Testing and Experimental Data	Enhanced Fire Protection Systems	Systems Integration Studies	Please share any additional comments or feedback for question 15.
47	Very effective	Very effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat ineffective	Not sure if effective	Not sure if effective	Not sure if effective	
48	Not sure if effective	Not sure if effective	Very effective	Somewhat effective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	Very ineffective	Not sure if effective	most projects do not have the budget to support many of the alternative solutions suggested above which makes proposing them not work the time or budget. Accepting precedence and case studies of other similar projects would help immensely with the process
49	Somewhat effective	Somewhat effective	Somewhat ineffective	Somewhat ineffective	Not sure if effective	Somewhat effective	Somewhat ineffective	Somewhat ineffective	Not sure if effective	Somewhat effective	
50	Very effective	Very effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	no comment
51	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	
52	Very effective	Very effective	Very effective	Not sure if effective	Not sure if effective	Very effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	For more major projects, the simulation models will become more and more important over the coming years. I'd trust these more than an "expert opinion."
53	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat ineffective	Somewhat ineffective	Somewhat effective	
54	Very ineffective	Very ineffective	Very ineffective	Somewhat effective	Very ineffective	Very ineffective	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Do't think an alternative solution should be considered at all. Citizens are expecting the same facilities that they are accustom to in case of emergency.
55	Very effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Fire is not the only reason for evacuation; but also, hard to predict human behaviour (lots of mental health issues out there waiting to crack?) in a fire smoke situation, or tornado, or gun man emergency
56	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	
57	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	

Respondent number	Fire Modelling Software/ Computational Fluid Dynamics (CFD)	Evacuation Simulation Models	Comparative analysis	Historical Data Analysis	Expert Judgment	Performance-Based Engineering Calculations	Risk Assessments	Fire Testing and Experimental Data	Enhanced Fire Protection Systems	Systems Integration Studies	Please share any additional comments or feedback for question 15.
58	Very ineffective	Very ineffective	Very ineffective	Somewhat effective	Somewhat effective	Very ineffective	Very ineffective	Very ineffective	Very ineffective	Very ineffective	I do not believe that any method that relies upon a highly-sophisticated building operator should be considered as part of any proposed revision to a standard. It is administratively difficult enough for AHJs such as a fire marshal to properly monitor and administer simple items such as fire load. I have interpreted expert judgement as that of a duly registered and licensed design professional operating in good faith with knowledgeable and experienced SCOs.
59	Somewhat ineffective	Somewhat effective	Somewhat effective	Somewhat ineffective	Somewhat ineffective	Somewhat ineffective	Somewhat ineffective	Not sure if effective	Not sure if effective	Somewhat effective	
60	Somewhat effective	Very effective	Not sure if effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat ineffective	Somewhat effective	Somewhat effective	Very effective	
61	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Very effective	Very effective	Very effective	Very effective	
62	Very effective	Very effective	Somewhat effective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Not sure if effective	Somewhat effective	Very effective	Quantitative assessments using fire/egress modelling has proven a very effective means of supporting increase travel distances on an alternative solution basis. Unfortunately, it does require expertise in its application which can be a challenge for lesser sophisticated applicants.
63	Very effective	Very effective	Not sure if effective	Not sure if effective	Not sure if effective	Very effective	Not sure if effective	Not sure if effective	Very effective	Very effective	
64	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	No additional comments
65	Very effective	Very effective	Very effective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Very effective	Very effective	Very effective	No comments
66	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	

Respondent number	Fire Modelling Software/ Computational Fluid Dynamics (CFD)	Evacuation Simulation Models	Comparative analysis	Historical Data Analysis	Expert Judgment	Performance-Based Engineering Calculations	Risk Assessments	Fire Testing and Experimental Data	Enhanced Fire Protection Systems	Systems Integration Studies	Please share any additional comments or feedback for question 15.
67	Very effective	Not sure if effective	Somewhat ineffective	Not sure if effective	Very ineffective	Very effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat ineffective	The risk is that the use may change and therefore the basis of an alternative solution approval may no longer be applicable to the new use. There should be a change of use permit requirement for these scenarios added to the building code.
68	Somewhat effective	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat ineffective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Not sure if effective	NA
69	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	
70	Somewhat effective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	
71	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	
72	Very ineffective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	DFDF
73	Very effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Very effective	Very effective	Somewhat effective	Somewhat effective	Not sure if effective	
74	Very effective	Very effective	Somewhat ineffective	Somewhat ineffective	Somewhat ineffective	Very effective	Not sure if effective	Very effective	Not sure if effective	Somewhat effective	
75	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Not sure if effective	Somewhat effective	Very effective	Very effective	Very effective	Somewhat effective	The competency of the fire modeling/ fire projection engineer, the designer are very important factors.
76	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Not sure if effective	Very effective	Somewhat effective	

Respondent number	Fire Modelling Software/ Computational Fluid Dynamics (CFD)	Evacuation Simulation Models	Comparative analysis	Historical Data Analysis	Expert Judgment	Performance-Based Engineering Calculations	Risk Assessments	Fire Testing and Experimental Data	Enhanced Fire Protection Systems	Systems Integration Studies	Please share any additional comments or feedback for question 15.
77	Somewhat ineffective	Very effective	Very effective	Somewhat effective	Very ineffective	Very effective	Very ineffective	Very ineffective	Somewhat ineffective	Somewhat ineffective	Because alternative solutions must demonstrate equivalent level of performance to the Code, it is nearly impossible to develop alternative solutions that rely on risk assessments, professional judgement, emerging technologies, or similar since the performance of these are not quantified in the Code. Even when there is an indisputably appropriate level of safety being maintained, it is not possible to quantify that an equivalent level of safety is provided. Additionally, in many cases, an alternative solution is likely to be hampered by the knowledge of the AHJ; risk assessments in particular are not well understood or accepted by many AHJs.
78	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Very effective	Very effective	Somewhat effective	
79	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	
80	Very effective	Very effective	Somewhat effective	Not sure if effective	Somewhat effective	Very effective	Somewhat effective	Somewhat effective	Somewhat effective	Very effective	
81	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	Not sure if effective	Not sure about modelling, only as good as the info that is put in.
82	Somewhat effective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	
83	Very effective	Very effective	Somewhat effective	Somewhat ineffective	Somewhat effective	Somewhat effective	Not sure if effective	Somewhat effective	Very effective	Somewhat effective	
84	Somewhat effective	Somewhat effective	Somewhat ineffective	Somewhat ineffective	Somewhat ineffective	Somewhat effective	Somewhat ineffective	Somewhat effective	Very effective	Very effective	The use of many of the above mentioned models only consider smoke and heat movement, mostly relying on active systems to manage hazards where a combination of passive and active measures would likely provide better overall performance.

Respondent number	Fire Modelling Software/ Computational Fluid Dynamics (CFD)	Evacuation Simulation Models	Comparative analysis	Historical Data Analysis	Expert Judgment	Performance-Based Engineering Calculations	Risk Assessments	Fire Testing and Experimental Data	Enhanced Fire Protection Systems	Systems Integration Studies	Please share any additional comments or feedback for question 15.
85	Not sure if effective	Somewhat effective	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	
86	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Very effective	Not sure if effective	Not sure if effective	Somewhat effective	Not sure if effective	Standardized evacuation model parameters are required. The model settings can significantly change the outcomes. Crowd dynamics based upon use and occupancy should also be considered, residential vs. assembly etc. as well as crowd demographics. CFD and Crowd modelling software are only as good as the inputs and should be used to measure "Equivalent or greater" compliance with the code not 'expert guided relaxations'
87	Very effective	Somewhat ineffective	Not sure if effective	Not sure if effective	Not sure if effective	Very effective	Not sure if effective	Not sure if effective	Very effective	Very effective	
88	Very effective	Very effective	Somewhat ineffective	Somewhat ineffective	Somewhat ineffective	Very effective	Very ineffective	Very ineffective	Somewhat effective	Not sure if effective	.
89	Very effective	Very effective	Very effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	
90	Not sure if effective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Not sure if effective	Somewhat effective	Not sure if effective	Somewhat effective	
91	Somewhat effective	Somewhat effective	Very effective	Very effective	Very effective	Very effective	Somewhat effective	Somewhat effective	Very effective	Somewhat effective	Nothing at this time
92	Very effective	Very effective	Somewhat effective	Somewhat ineffective	Somewhat ineffective	Somewhat effective	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Comparative analysis can be effective, but is probably sensitive to the relevancy of the comparison and complexity of the problem.
93	Somewhat effective	Somewhat effective	Very effective	Very effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	No additional comments
94	Very effective	Very effective	Very effective	Somewhat effective	Somewhat effective	Very effective	Very effective	Somewhat effective	Somewhat effective	Somewhat effective	
95	Not sure if effective	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	
96	Somewhat effective	Somewhat effective	Somewhat effective	Not sure if effective	Not sure if effective	Somewhat effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	
97	Not sure if effective	Not sure if effective	Not sure if effective	Somewhat effective	Somewhat effective	Somewhat effective	Somewhat effective	Very effective	Very effective	Somewhat effective	

Travel Distance Requirements and Perspectives on alternative solutions. Data collected January 30, 2025 to February 13, 2025.

Responses to questions 17 and 18

Respondent number	17. Of the following advancements, which do you think will have the greatest impact on travel distance requirements? (in order of importance)	18. Please share any additional comments or feedback for question 17. What other innovative solutions or technologies do you believe could safely extend travel distances beyond current prescriptive limits.
1	Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	VR / AR review and simulations for testing and evaluation.
2	Advanced fire suppression systems;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Enhanced detection systems ;Advances in AI technology;	new systems need to be evaluated against a risk management basis, for the life of the structure/occupancy, as these assumptions can change over time (maintenance, durability, failure rate, etc)
3	Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	EM lighting and directional signage. paging system on the cell phone to broadcasting alarm
4	Advanced fire suppression systems;Enhanced detection systems ;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advances in AI technology;	N/A
5	Advanced fire suppression systems;Enhanced detection systems ;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	Again, all these questions surround greater travel distance. It appears from this survey, that it already has a perceived outcome.
6	Advanced fire suppression systems;Enhanced detection systems ;Improved fire-resistant materials;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	AI technology cannot be relied on (in my opinion). Signage is not effective enough to rely on it.
7	Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	By design - creating more safe refuge area
8	Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Improved fire-resistant materials;Advanced fire suppression systems;Advances in AI technology;	Diversity of exit and combustible fuel load assessment, design of means of egress (height & width).
9	Advanced fire suppression systems;Improved fire-resistant materials;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	I believe that there is an underlining assumption that should be challenged in the way travel distance is approached. The need to evacuate a building is not always based on an emergency fire situation. To develop our buildings with only the emergency of fire in mind is too restrictive and places those individuals within a building with travel distances that have been extended due to enhanced life safety systems.
10	Enhanced detection systems ;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Advances in AI technology;Improved fire-resistant materials;	Exit signs near the floor , Public Address system , greater allowance for use of glazing protected by sprinklers - 'seeing' is everything; solid concrete walls / corridors do not invite people to use them as an exit path.
11	Advanced fire suppression systems;Improved fire-resistant materials;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Advances in AI technology;	Guidance for Mass Notification System (MNS) is available in NFPA standards, but not common in Canada. MNS could be something worth exploring to provide building occupants with intelligible instructions. Also, I am aware that smoke alarms are in development that can avoid nuisance alarms, to prevent occupants from being desensitized from smoke alarms.
12	Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	No additional comments
13	Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Improved fire-resistant materials;Advanced fire suppression systems;Advances in AI technology;	The problem with longer travel distances is that rapid spread of smoke and fire is more often related to combustible building contents and processes (i.e. occupancy type), changing travel distances due to egress routes being blocked by unanticipated obstacles like racking, shelving and furniture not on plans at the time of approval or may change later and lastly human behavior, all of which are variable and which will never be stated or considered as a negative on a variance application.
14	Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advanced fire suppression systems;Improved fire-resistant materials;Advances in AI technology;	When systems are designed to NFPA 92 and NFPA 101 then the systems have requirements for maintenance and testing.
15	Smoke control and HVAC systems;Enhanced detection systems ;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advances in AI technology;	I'm not sure how AI can help...

Respondent number	17. Of the following advancements, which do you think will have the greatest impact on travel distance requirements? (in order of importance)	18. Please share any additional comments or feedback for question 17. What other innovative solutions or technologies do you believe could safely extend travel distances beyond current prescriptive limits.
16	Smoke control and HVAC systems;Enhanced detection systems ;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advances in AI technology;	this question is more system specific, but is missing compartmentalization and geometrical design and passive measures such as baffles, smoke curtains, etc.
17	Advanced fire suppression systems;Smoke control and HVAC systems;Enhanced detection systems ;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	N/A
18	Advanced fire suppression systems;Enhanced detection systems ;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Advances in AI technology;	Unsure
19	Improved fire-resistant materials;Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	Nothing to add
20	Enhanced detection systems ;Smoke control and HVAC systems;Advanced fire suppression systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	Additional requirements for smoke detection/detectors in storage rooms and service rooms regardless of there being fire sprinklers (fire detectors) in those rooms; likewise, increased smoke detector requirements in principal routes to an exit (corridors).
21	Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	I have not ranked the advancements from the previous question as they will likely all have the same, "limited" impact. The only exception in this case is AI technology, which will likely obfuscate appropriate analysis.
22	Enhanced detection systems ;Smoke control and HVAC systems;Advanced fire suppression systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	"na "
23	Enhanced detection systems ;Advances in AI technology;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advanced fire suppression systems;Improved fire-resistant materials;	na
24	Advanced fire suppression systems;Enhanced detection systems ;Advances in AI technology;Improved fire-resistant materials;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;	Unsure
25	Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	Compartmentalization would be the best bet for most buildings as not all have fire detection and/or suppression.
26	Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Advanced fire suppression systems;Improved fire-resistant materials;Advances in AI technology;	Higher ceilings was missed in the list above, and is arguably more important that most of those suggestions - this was a miss. The idea is to address the time needed for an untenable smoke layer to develop. The NBC does not attribute safety to ceiling heights, so a 3m ceiling versus a 2.05m ceiling is a significant difference and provides additional time to egress.
27	Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Advanced fire suppression systems;Improved fire-resistant materials;Advances in AI technology;	Any factor that can buy the occupant safe/tenable time in the building could be considered to increase travel distance.
28	Smoke control and HVAC systems;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Improved fire-resistant materials;Advances in AI technology;	I think any solutions or technologies listed above need to be put in context of many other factors to be able to evaluate their impact on travel distance - the impact they have likely varies greatly from application to application. I would also have loved to see crowd management as one of the advancements; we do not recognize (nor account for) human behaviour in the current acceptable solutions, but it is clear that the behavioural aspects of pre-movement time (what/how quickly people decide to do something) is a huge component to egress/escape time. These concepts are well understood and well regulated in other jurisdictions both in terms of management of large crowds (like in NFPA 101 Life Safety Evaluations) and intelligibility of mass notification systems.
29	Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	determination of hazard and fuel load
30	Enhanced detection systems ;Smoke control and HVAC systems;Advances in AI technology;Dynamic wayfinding and emergency signage systems;Advanced fire suppression systems;Improved fire-resistant materials;	Training and implementation of a fire evacuation strategy.

Respondent number	17. Of the following advancements, which do you think will have the greatest impact on travel distance requirements? (in order of importance)	18. Please share any additional comments or feedback for question 17. What other innovative solutions or technologies do you believe could safely extend travel distances beyond current prescriptive limits.
31	Enhanced detection systems ;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advanced fire suppression systems;Improved fire-resistant materials;Advances in AI technology;	n/a
32	Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Smoke control and HVAC systems;Advances in AI technology;Improved fire-resistant materials;Advanced fire suppression systems;	How people consume information has changed thus alerting and notifying people could include messaging via devices, directional sound, etc. Not innovation but ceiling height is a significant factor in allowing extended travel distances that is overlooked by the building code. Further reference can be found in BS 9999 on modifiers to allow extended travel distance.
33	Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	Passive design solutions. For example a higher ceiling height should promote increased travel distance because it means it would take much longer for smoke to build up and create an untenuous environment.
34	Advanced fire suppression systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Enhanced detection systems ;Advances in AI technology;	No further comment
35	Advanced fire suppression systems;Enhanced detection systems ;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advances in AI technology;	For question 17, under enhanced detection systems include beam detection. AI unknown, available video shows sprinkler targeting garbage can fire and extinguishing fire. Not certain of applicability in buildings.
36	Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Advances in AI technology;Dynamic wayfinding and emergency signage systems;	none
37	Smoke control and HVAC systems;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Improved fire-resistant materials;Advances in AI technology;	smoke control and HVAC support tenability
38	Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Advances in AI technology;Dynamic wayfinding and emergency signage systems;	--
39	Advanced fire suppression systems;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Improved fire-resistant materials;Advances in AI technology;	Items such as dynamic wayfinding can be helpful in floor areas where occupants may not be familiar with the layout such as arenas.
40	Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	unsure
41	Improved fire-resistant materials;Advanced fire suppression systems;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	No response.
42	Improved fire-resistant materials;Advanced fire suppression systems;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	None, tech is useless when power is out. We need latent solutions.
43	Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;Improved fire-resistant materials;Advanced fire suppression systems;Smoke control and HVAC systems;	There are assumptions that the availability and distance to exit are evaluated based on occupant loads and risks associated with the occupancy only. Exits within safe max travel distance also provided for individuals, of generic or limited abilities, in all types of incidents including security incidents and other types of emergencies other than fire incidents.
44	Improved fire-resistant materials;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Enhanced detection systems ;Advances in AI technology;	Travel distances could be increased with decreased combustible materials, accelerated detection, more potent suppression systems and breaking spaces into separate fire zones.
45	Enhanced detection systems ;Advanced fire suppression systems;Improved fire-resistant materials;Smoke control and HVAC systems;Advances in AI technology;Dynamic wayfinding and emergency signage systems;	-
46	Enhanced detection systems ;Advanced fire suppression systems;Improved fire-resistant materials;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	"

Respondent number	17. Of the following advancements, which do you think will have the greatest impact on travel distance requirements? (in order of importance)	18. Please share any additional comments or feedback for question 17. What other innovative solutions or technologies do you believe could safely extend travel distances beyond current prescriptive limits.
47	Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	In a fire, people don't necessarily think and evaluate their choices effectively. So additional signage isn't likely to help. The most important part is to prevent or damp down the fire in the first place. AI Tech in the event of a fire won't help much - you don't have time to ask you phone what to do.
48	Smoke control and HVAC systems;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Improved fire-resistant materials;Advances in AI technology;	no comment
49	Smoke control and HVAC systems;Advanced fire suppression systems;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advances in AI technology;	-
50	Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Advances in AI technology;	no comment
51	Improved fire-resistant materials;Smoke control and HVAC systems;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	if for question 17, see comments on question 12 feedback.
52	Advanced fire suppression systems;Smoke control and HVAC systems;Enhanced detection systems ;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	I likely will come down to the coordination of some of these systems together. Perhaps it is indeed AI, but a "smart" fire suppression system that would assess what levels of sprinkler deployment, HVAC and smoke control is required in real-time would be very helpful.
53	Advanced fire suppression systems;Enhanced detection systems ;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	Additional Fire suppression coverage/detection for any distance beyond current prescriptive dimension
54	Improved fire-resistant materials;Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	"There should be only 1 standard for Canada everywhere so citizens can be accustom to in case of emergency. Alternative method will just confuse people. Alternative method should NOT be permitted. Exit doors should open out in the direction of travel, NO discussion is necessary or alternative allowed. Just like stairs, why there are so many different standards for home, part 9 than part 3. There should be 1 standard that citizens can be accustom to it, even it is wrong. Stop trying to make a perfect system that don't existed in the real world. Everyone is somewhat different and you can not please everyone."
55	Advanced fire suppression systems;Enhanced detection systems ;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	Smart fire detection/suppression systems focus on the specific area could be very effective. Maybe case studies or drills to assess behaviors and proper routes. Areas of refuge to shorten the distances to safety/separated, could offer solutions coupled with smart closing/signaling if not safe?
56	Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Smoke control and HVAC systems;Advanced fire suppression systems;Advances in AI technology;Improved fire-resistant materials;	N/a
57	Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Advanced fire suppression systems;Improved fire-resistant materials;Advances in AI technology;	No comment
58	Enhanced detection systems ;Smoke control and HVAC systems;Improved fire-resistant materials;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	I have answered question 17 above. Smoke kills. Products that have higher potential to generated smoke are therefore an important consideration. Priorities have been generated based on this main concept.
59	Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Advanced fire suppression systems;Enhanced detection systems ;Advances in AI technology;Improved fire-resistant materials;	It is possible to improve building safety through design and technology. Many problems however I have found are related to operational issues, where ownership is either not aware of consequences or is ignoring design intent.
60	Dynamic wayfinding and emergency signage systems;Advanced fire suppression systems;Enhanced detection systems ;Improved fire-resistant materials;Smoke control and HVAC systems;Advances in AI technology;	n/a
61	Enhanced detection systems ;Advanced fire suppression systems;Improved fire-resistant materials;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	Alternative means of egress that can be deployable, protected egress suitable for individuals with limited mobility, etc...

Respondent number	17. Of the following advancements, which do you think will have the greatest impact on travel distance requirements? (in order of importance)	18. Please share any additional comments or feedback for question 17. What other innovative solutions or technologies do you believe could safely extend travel distances beyond current prescriptive limits.
62	Advanced fire suppression systems;Smoke control and HVAC systems;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advances in AI technology;	Risk with increases in travel distance is reduced via effective and reliable fire suppression to extinguish a fire condition in its incipient stages (statement of the obvious I realize). Faster activating/enhanced sprinkler suppression capability (with a simultaneous increase in reliability though reliability is already statistically quite good with sprinkler systems in Canada) seems a reasonable basis from which to extend travel distance to an exit.
63	Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	not familiar with another tech not mentioned above
64	Smoke control and HVAC systems;Advanced fire suppression systems;Improved fire-resistant materials;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	No additional comments
65	Advanced fire suppression systems;Improved fire-resistant materials;Enhanced detection systems ;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	No comments
66	Advanced fire suppression systems;Enhanced detection systems ;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advances in AI technology;	NA
67	Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	The risk is that the use may change and therefore the basis of an alternative solution approval may no longer be applicable to the new use. There should be a change of use permit requirement for these scenarios added to the building code.
68	Advanced fire suppression systems;Enhanced detection systems ;Advances in AI technology;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;	NA
69	Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	no answer
70	Advanced fire suppression systems;Smoke control and HVAC systems;Enhanced detection systems ;Advances in AI technology;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;	Use of Wifi technology to send messages or alerts to all building occupants in case of fire.
71	Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	-
72	Smoke control and HVAC systems;Advanced fire suppression systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	DFDF
73	Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advanced fire suppression systems;Enhanced detection systems ;Improved fire-resistant materials;Advances in AI technology;	no comment
74	Smoke control and HVAC systems;Enhanced detection systems ;Advanced fire suppression systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	Quantitative approaches that could require an all-round approach dependant upon the problem.
75	Smoke control and HVAC systems;Advanced fire suppression systems;Enhanced detection systems ;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	It is kind of all of all the above. Also, the AI technology still in early stages in my opinion.
76	Advanced fire suppression systems;Advances in AI technology;Smoke control and HVAC systems;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;	No comment.

Respondent number	17. Of the following advancements, which do you think will have the greatest impact on travel distance requirements? (in order of importance)	18. Please share any additional comments or feedback for question 17. What other innovative solutions or technologies do you believe could safely extend travel distances beyond current prescriptive limits.
77	Improved fire-resistant materials;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Smoke control and HVAC systems;Advances in AI technology;	A review of the historical survivability in fire under the travel distance limits in Canada and elsewhere in the world. For example, are our current limitations on travel distance supported by significantly lower injuries/deaths compared to jurisdictions with more generous limits? Would a contemporary review of human behaviour, fire dynamics, smoke movement, and construction technologies justify the current travel distance limits?
78	Dynamic wayfinding and emergency signage systems;Advanced fire suppression systems;Smoke control and HVAC systems;Improved fire-resistant materials;Enhanced detection systems ;Advances in AI technology;	No system is perfect, consideration should be given to reasonable measures that could facilitate the evacuation of occupants.
79	Enhanced detection systems ;Smoke control and HVAC systems;Advanced fire suppression systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	No additional comment
80	Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advanced fire suppression systems;Enhanced detection systems ;Advances in AI technology;	Require operational fire safety plans with building permits to outline conditions such as aisles, egress routes, signage, combustible content etc. for use by the fire department after occupancy.
81	Enhanced detection systems ;Smoke control and HVAC systems;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advances in AI technology;	You mean question 17?
82	Enhanced detection systems ;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Improved fire-resistant materials;Advances in AI technology;	Unsure
83	Smoke control and HVAC systems;Improved fire-resistant materials;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	The above are a pretty comprehensive list.
84	Improved fire-resistant materials;Advanced fire suppression systems;Smoke control and HVAC systems;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	As mentioned above, we cannot rely on any one active measure to determine if we can extend travel distances. There needs to be a combination of both passive (confinement, non-combustible construction, no obstructions) and active (smoke control, sprinkler density, ceiling heights) measures to ensure occupants can safely exit the building regardless of the emergency.
85	Dynamic wayfinding and emergency signage systems;Smoke control and HVAC systems;Advanced fire suppression systems;Enhanced detection systems ;Improved fire-resistant materials;Advances in AI technology;	-
86	Improved fire-resistant materials;Advanced fire suppression systems;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advances in AI technology;	Movement from one 'space' to another although it may not be truly an exit may provide greater travel distance and protection in an all hazards design. Smoke/fire is not the only risk to measure against. How do you safety get people away from the immediate hazard quickly is what travel distance is intended to address.
87	Advanced fire suppression systems;Improved fire-resistant materials;Enhanced detection systems ;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	.
88	Enhanced detection systems ;Improved fire-resistant materials;Smoke control and HVAC systems;Advanced fire suppression systems;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	.
89	Advanced fire suppression systems;Enhanced detection systems ;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advances in AI technology;	Enhanced Security system, Enhanced Safety procedures by user groups. Enhanced Areas of Refuge.
90	Advanced fire suppression systems;Improved fire-resistant materials;Smoke control and HVAC systems;Enhanced detection systems ;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	not sure
91	Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advanced fire suppression systems;Advances in AI technology;	Nothing at this time

Respondent number	17. Of the following advancements, which do you think will have the greatest impact on travel distance requirements? (in order of importance)	18. Please share any additional comments or feedback for question 17. What other innovative solutions or technologies do you believe could safely extend travel distances beyond current prescriptive limits.
92	Advanced fire suppression systems;Enhanced detection systems ;Smoke control and HVAC systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	Improvements to smoke control and smoke management technologies, including the ability to use non-emergency equipment to improve tenability would help increase options available that should improve safety even with longer travel time. Occupant evacuation elevators and other barrier-free egress technologies may also facilitate faster or improved exiting.
93	Dynamic wayfinding and emergency signage systems;Enhanced detection systems ;Advanced fire suppression systems;Improved fire-resistant materials;Smoke control and HVAC systems;Advances in AI technology;	The most important improvement to travel distance requirements in the building code would be to ensure they reflect real-world evacuation scenarios, not just theoretical calculations.
94	Smoke control and HVAC systems;Enhanced detection systems ;Advanced fire suppression systems;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	none
95	Advanced fire suppression systems;Smoke control and HVAC systems;Enhanced detection systems ;Improved fire-resistant materials;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	More development of non-water based fire suppression systems that are environment friendly.
96	Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Improved fire-resistant materials;Advances in AI technology;	not sure
97	Improved fire-resistant materials;Enhanced detection systems ;Advanced fire suppression systems;Smoke control and HVAC systems;Dynamic wayfinding and emergency signage systems;Advances in AI technology;	none

Travel Distance Requirements and Perspectives on alternative solutions. Data collected January 30, 2025 to February 13, 2025.

Section 4: Gaps and Areas for Improvement

Responses to questions 19 and 20

Respondent Number	Vulnerable populations not already considered in occupancy type	Occupants' ability to respond/ evacuate in an emergency	Human behaviour in emergencies	Improper use of building or suite	Failure of smoke control and HVAC systems	Failure of building emergency systems	Availability of municipal firefighting services	Failure of infrastructure	Please share any additional comments or feedback on alternative solutions for travel distance. What are potential areas for future research or future developments in the Code that may improve the confidence in evaluating and developing Alternative Solution
1	Agree	Agree	Strongly agree	Strongly agree	Agree	Agree	Strongly agree	Agree	investigation and testing of different fire types and emerging fuel sources, i.e. do fires burn hotter and faster based on the types of fuel load typically found in the current social climate, i.e. storage garage with 40% EV and 60% ICE vehicles, OR office occupancies with the presence of batteries from power assisted bicycles/ scooters, electronic devices, etc...OR include research data from randomized fire evacuation testing and drills of various building/occupancy types in real life scenarios.
2	Agree	Agree	Strongly agree	Neutral	Agree	Agree	Neutral	Neutral	Single exit stairs
3	Neutral	Neutral	Agree	Agree	Agree	Agree	Neutral	Agree	reliability of the overall building system
4	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Disagree	Disagree	Experimental data related to human behavior in fire, including effects of untenable conditions on walking speeds or Code prescribed thresholds for tenability depending on the occupancy type.
5	Agree	Agree	Strongly agree	Strongly agree	Agree	Neutral	Disagree	Neutral	I have seen in my time as a SCO where the alternative solution does not meet or exceed current code. It was only added after construction to the benefit of the contractor/ industry. Most decisions today are made of a political nature and not for public safety.
6	Agree	Neutral	Agree	Agree	Agree	Neutral	Neutral	Neutral	Different Occupancies have different hazards. If there were some guidance on how to factor that in, it would be helpful. Also, small spaces with small occupant loads (max 10 persons) need to be looked at differently. The hazards in a sole proprietor massage facility are much less than a small retail space.
7	Agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Agree	Strongly agree	operation is a large issue as time goes by, owners / operators will let their guards off and through non permitted/ inspected alterations that may compromise the life safety system of the original design.... like blocking exits, replacing non rated doors for rated closures etc. , increasing occupant loads
8	Strongly agree	Agree	Agree	Agree	Neutral	Strongly agree	Disagree	Disagree	Quantification of tolerable risk for the purpose of exiting should be pursued.
9	Strongly agree	Agree	Strongly agree	Agree	Strongly agree	Neutral	Disagree	Disagree	The availability of fire department services should not be considered when setting travel distances. In an emergency, it is the desire that most buildings (with the exception of high buildings) the space should be evacuated before fire crews show up.
10	Neutral	Neutral	Neutral	Neutral	Agree	Neutral	Neutral	Agree	Use of convenience stairways.
11	Agree	Agree	Strongly agree	Strongly agree	Neutral	Neutral	Neutral	Neutral	The smoke control requirements in Canada are nowhere sophisticated as European smoke control systems. The smoke control systems in Canadian Building Codes are only intended to limit the migration of "cold smoke" (i.e., from sprinkler suppressing fire).
12	Disagree	Agree	Agree	Neutral	Neutral	Neutral	Neutral	Agree	No further comments

Respondent Number	Vulnerable populations not already considered in occupancy type	Occupants' ability to respond/ evacuate in an emergency	Human behaviour in emergencies	Improper use of building or suite	Failure of smoke control and HVAC systems	Failure of building emergency systems	Availability of municipal firefighting services	Failure of infrastructure	Please share any additional comments or feedback on alternative solutions for travel distance. What are potential areas for future research or future developments in the Code that may improve the confidence in evaluating and developing Alternative Solution
13	Neutral	Agree	Agree	Strongly agree	Strongly agree	Agree	Neutral	Neutral	no comment
14	Agree	Strongly agree	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	There are a few excellent studies that are out there that should be revised with newer information.
15	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	No further comments
16	Agree	Strongly agree	Neutral	Neutral	Agree	Neutral	Neutral	Neutral	A greater understanding of large crowd movement through larger buildings in emergency situations would be helpful, along with the impact operational interventions (recorded and live messages). The impact of different demographics in evacuation that may be cultural or language related and their response from alarms, signage cues and announcements would be informative to understand whether the underlying assumptions of the systems that are in the code are effective.
17	Agree	Agree	Strongly agree	Agree	Agree	Strongly agree	Agree	Agree	N/A
18	Strongly agree	Strongly agree	Agree	Disagree	Neutral	Neutral	Agree	Neutral	No additional comments
19	Strongly disagree	Agree	Agree	Disagree	Disagree	Disagree	Disagree	Disagree	Some topics are better meant for specialized fire safety plans for the specific building on a case-by-case basis, rather than a Code item. For example, trying to design for even more vulnerable populations beyond what has already been considered. If a building meets Codes, but there are still concerns to vulnerable populations in a certain building, then a fire safety plan for that building needs to address it so that the building occupants are ready for proper action when the time comes. Failure of systems can be a concern, but with regular inspections of systems and integrated systems testing (all of which is required to be provided as ongoing/regular testing), failures should be less frequent.
20	Agree	Agree	Agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	None.
21	Strongly agree	Agree	Agree	Agree	Neutral	Agree	Strongly agree	Agree	Fire compartmentation and exterior fire spread.
22	Neutral	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	na
23	Neutral	Neutral	Agree	Agree	Neutral	Agree	Agree	Neutral	na
24	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Non at this time
25	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	We have found issues with the complex modeling done for some alternative solutions. It provided sufficient information to issue the original building permit, but now every time they renovate they have to re-do the modelling. Not very cost effective and it delays permit issuance.
26	Disagree	Agree	Agree	Disagree	Disagree	Disagree	Disagree	Disagree	The NBC does not account for double jeopardy situations, this should not be a focus of research. Focus should be placed on the human factors and build on the existing plethora of research already completed by other countries around the world.

Respondent Number	Vulnerable populations not already considered in occupancy type	Occupants' ability to respond/ evacuate in an emergency	Human behaviour in emergencies	Improper use of building or suite	Failure of smoke control and HVAC systems	Failure of building emergency systems	Availability of municipal firefighting services	Failure of infrastructure	Please share any additional comments or feedback on alternative solutions for travel distance. What are potential areas for future research or future developments in the Code that may improve the confidence in evaluating and developing Alternative Solution
27	Agree	Agree	Agree	Strongly disagree	Strongly disagree	Strongly disagree	Disagree	Disagree	Familiarity of occupants to an individual space. Time to an exit will be greater for those that are unfamiliar with a space/building than those that are familiar with the space such as employees.
28	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	I disagree with the premise of Question 19 as it implies that research has not been performed in these areas, and that each aspect might "in the future" be inherent in the code, because I think it disregards the *existing* research and current application of each of these factors in professional design of buildings. I don't think it is practical or desired to have prescriptive acceptable solutions with respect to these factors added to the code simply because they are already there in the context of professional performance-based design. That's not to say these factors couldn't be included in the code as performance requirements (for example, consideration of municipal fire services is already inherent in the Notes to Part 3, perhaps formalizing this consideration on a performance basis within Division B would be useful), but I think each of those listed above would always fall in the scope of professional design.
29	Agree	Strongly agree	Agree	Neutral	Disagree	Disagree	Disagree	Disagree	failure of building components is a red herring. how is that different than failure of a sprinkler system in a travel distance compliant system? That if there is an earthquake and a truck runs into the FDC. Alternative solutions should be based systems working correctly with the maintenance requirements of all of those necessary subsystems being testing and maintained per their individual requirements.
30	Agree	Agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Neutral	Strongly agree	Reviewers need to be trained and educated in analysing alternative solutions. There's a requirement in most cases for a P.Eng. to develop the solution and may go into complex analysis but no requirement for the reviewer to have equal or better credentials or experience. Peer review is encouraged but many municipalities ignore this and it becomes one person's opinion. Areas of research should look at young kids and their behaviour in fires. Significant work is required in developing a solid reference for pre-movement times. Research should also look at safety margins and limits of tenability. Many people will move through smoke or through limited visibility however many models are overly conservative. Research is needed in modelling to assess the impact of sprinklers on fires.
31	Neutral	Agree	Agree	Disagree	Disagree	Agree	Disagree	Agree	n/a
32	Agree	Agree	Agree	Disagree	Neutral	Neutral	Disagree	Disagree	Greater research in respect to realistic evacuation testing or data capture from real world events. Premovement is highly subjective and divisive which can be improved. Cultural differences and language barriers in relation to exiting. Canada is very diverse environment with exiting assumptions based on western behavioral types. Affects of alcohol on exiting. BS 9999 promotes a reduction of 10% on travel distances where alcohol is consumed. Anthropometric research to inform travel speeds.
33	Agree	Strongly agree	Strongly agree	Neutral	Strongly agree	Strongly agree	Agree	Agree	Enhanced detection and sprinkler systems

Respondent Number	Vulnerable populations not already considered in occupancy type	Occupants' ability to respond/ evacuate in an emergency	Human behaviour in emergencies	Improper use of building or suite	Failure of smoke control and HVAC systems	Failure of building emergency systems	Availability of municipal firefighting services	Failure of infrastructure	Please share any additional comments or feedback on alternative solutions for travel distance. What are potential areas for future research or future developments in the Code that may improve the confidence in evaluating and developing Alternative Solution
34	Agree	Agree	Agree	Strongly agree	Agree	Strongly agree	Agree	Agree	More detailed function and intent statements, easier access to timed egress analysis or fire protection engineering.
35	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Strongly agree	Sprinklers are meant as a measure for maintaining the fire as well as smoke control. If a sprinkler activates to "maintain" the fire rather than extinguish, how much additional time is given to the occupants, given the success rate of sprinklers is >90%? Is additional credit received?
36	Agree	Agree	Agree	Neutral	Strongly agree	Strongly agree	Agree	Neutral	time travel study for different occupancies
37	Neutral	Strongly agree	Strongly agree	Neutral	Strongly agree	Neutral	Neutral	Neutral	human behavior and changes in demographics/ abilities of occupants have changed and will continue to change. The alternative solutions should be able to address how they can also change over time
38	Agree	Agree	Agree	Strongly agree	Strongly agree	Strongly agree	Agree	Agree	--
39	Neutral	Agree	Agree	Disagree	Disagree	Disagree	Neutral	Disagree	
40	Agree	Neutral	Neutral	Disagree	Agree	Agree	Neutral	Agree	unsure. I have limited experience with alternative solutions
41	Neutral	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Neutral	I don't see an issue for occasional use of space for other uses (eg: office party in office space) as staff members are familiar with exit locations and their actions will act a guide for strangers in the space. The demographics of the population are leaning more heavily toward older persons, so that likely has an effect on exit times, but except for actual care occupancies, it is difficult to address this without affecting the design for all age groups.
42	Agree	Agree	Strongly agree	Neutral	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Time is up, thanks
43	Agree	Agree	Disagree	Disagree	Disagree	Disagree	Disagree	Disagree	All these systems have been deeply researched but their effectiveness and reliability /
44	Neutral	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	I suppose that a review of historical fire data related to major loss of life events might shed some light on ways to improve.
45	Agree	Strongly agree	Agree	Neutral	Agree	Strongly agree	Strongly agree	Strongly agree	-
46	Agree	Agree	Strongly agree	Agree	Agree	Strongly agree	Neutral	Agree	
47	Strongly disagree	Neutral	Strongly agree	Strongly disagree	Strongly agree	Strongly agree	Agree	Neutral	none
48	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	no comment
49	Strongly agree	Agree	Strongly agree	Neutral	Neutral	Neutral	Disagree	Disagree	Please consider more than just fire when assessing exiting. Unfortunately there are more risks these days to consider.
50	Neutral	Agree	Agree	Agree	Agree	Strongly agree	Strongly agree	Strongly agree	no comment
51	Agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	With Calgary as a multicultural city with many cultural backgrounds, understanding how they respond to emergencies is important. Some have trauma that prevent them from responding as those without. Language and understanding of culturally normative directives vs what their culture understands (ie. red exit vs green exit, pictograms vs words, etc).

Respondent Number	Vulnerable populations not already considered in occupancy type	Occupants' ability to respond/ evacuate in an emergency	Human behaviour in emergencies	Improper use of building or suite	Failure of smoke control and HVAC systems	Failure of building emergency systems	Availability of municipal firefighting services	Failure of infrastructure	Please share any additional comments or feedback on alternative solutions for travel distance. What are potential areas for future research or future developments in the Code that may improve the confidence in evaluating and developing Alternative Solution
52	Neutral	Agree	Agree	Strongly agree	Neutral	Neutral	Neutral	Neutral	Honestly, I don't think we can consider macro level factors beyond the building and its occupants. For example, the failure of municipal firefighting services to attend the building is just such an unknown, I don't know how that would work.
53	Disagree	Neutral	Neutral	Disagree	Agree	Agree	Neutral	Neutral	Site/Building specific solutions are difficult to incorporate, predict and enforce
54	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Agree	Agree	Agree	Agree	You are getting into an area what is beyond the code's control. Each situation may varies depend on the circumstance. There is NO perfect system but code's assumptions are often not disclosed. The human behaviour is way beyond the code's control. Are you going to limit a specific type of population to enter a building??? May be a subject matter to think about!!!!
55	Agree	Strongly agree	Strongly agree	Strongly agree	Agree	Agree	Neutral	Strongly agree	It can be very complicated, so always supported the prescriptive distances even in the face of "highly unlikely" we'll see a fire in this non combustable material facility?
56	Agree	Neutral	Agree	Neutral	Agree	Agree	Neutral	Neutral	Na
57	Agree	Agree	Agree	Neutral	Agree	Agree	Neutral	Agree	No comment
58	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	I am not sure what current research exists that has been used to generate the current standards and am therefore unable to comment on what additional research might be required to be conduct to serve as the basis for a propose revision to the standards. I believe if there is any such information that exists, it should have been made available prior to conducting this survey. I am firmly against the idea of altering the code or considering a variety of different opinions about how the code might be changed unless the opinions are based upon scientific research and the opinions are informed by that research. This is too serious of a matter to consider changing based upon how someone just "feels" about the matter.
59	Agree	Disagree	Strongly agree	Strongly agree	Agree	Agree	Neutral	Neutral	Some building types are more likely to be in non-compliance of code or safety provisions due to changes in use, without addressing risks, or simply not addressing fire risks in management plans.
60	Strongly agree	Strongly agree	Strongly agree	Agree	Agree	Strongly agree	Agree	Agree	Impact of emergency response times (not just availability); impact of weather (i.e. winter or extreme conditions)
61	Strongly agree	Strongly agree	Strongly agree	Agree	Agree	Agree	Strongly agree	Agree	n/a
62	Neutral	Neutral	Agree	Neutral	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Emphasis on the last four failure mechanisms and what could improve redundancy (if needed) in combination with inclusion in S1001 ensuring ongoing maintenance and testing.
63	Strongly agree	Strongly agree	Agree	Strongly agree	Agree	Agree	Neutral	Neutral	The ability to exit (human factor) and support to do so is the most important aspect in my view.
64	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly agree	Agree	Is it possible to further clarify the relationship of the AHJ in assessing especially atypical design scenarios, in particular, prior to BP submissions and in cases of partial building permits.
65	Agree	Strongly agree	Agree	Strongly agree	Strongly agree	Strongly agree	Agree	Strongly agree	No comments

Respondent Number	Vulnerable populations not already considered in occupancy type	Occupants' ability to respond/ evacuate in an emergency	Human behaviour in emergencies	Improper use of building or suite	Failure of smoke control and HVAC systems	Failure of building emergency systems	Availability of municipal firefighting services	Failure of infrastructure	Please share any additional comments or feedback on alternative solutions for travel distance. What are potential areas for future research or future developments in the Code that may improve the confidence in evaluating and developing Alternative Solution
66	Disagree	Agree	Neutral	Neutral	Agree	Agree	Neutral	Neutral	NA
67	Strongly agree	Strongly agree	Strongly agree	Agree	Agree	Agree	Agree	Agree	The risk is that the use may change and therefore the basis of an alternative solution approval may no longer be applicable to the new use. There should be a change of use permit requirement for these scenarios added to the building code.
68	Disagree	Neutral	Disagree	Disagree	Neutral	Neutral	Agree	Neutral	NA
69	Neutral	Neutral	Neutral	Agree	Strongly agree	Strongly agree	Strongly agree	Agree	Smoke control at high rising building and big warehouse
70	Agree	Agree	Neutral	Agree	Agree	Strongly agree	Agree	Agree	Door release hardware is a potential area for future research related to evaluation of alternative solutions for travel distance.
71	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	my immediate interest is in the use of single stair residential buildings, which typically have much shorter travel distances than traditional double-loaded corridor buildings
72	Disagree	Neutral	Disagree	Disagree	Neutral	Neutral	Neutral	Neutral	zz
73	Strongly agree	Agree	Strongly agree	Neutral	Neutral	Neutral	Neutral	Neutral	Future research and Code developments could focus on performance-based fire modeling to better evaluate alternative solutions for travel distance. Establishing clearer guidelines on how factors such as fire suppression systems, smoke control measures, and occupant egress behavior impact travel distances would improve confidence in their evaluation. Additionally, standardized methodologies for risk assessment and validation of alternative designs—potentially through real-world case studies or computational simulations—could help ensure consistency and reliability in their application.
74	Agree	Agree	Neutral	Neutral	Agree	Agree	Neutral	Disagree	I would suggest looking internationally on various methods on how this is conducted.
75	Agree	Strongly agree	Strongly agree	Agree	Strongly agree	Strongly agree	Agree	Agree	These risks factors should be counted toward the reduction of the travel distances in my opinion.
76	Agree	Neutral	Agree	Strongly agree	Strongly agree	Strongly agree	Neutral	Agree	No comment.
77	Agree	Agree	Neutral	Disagree	Strongly disagree	Strongly disagree	Disagree	Strongly disagree	<ul style="list-style-type: none"> - Historical information on why these specific travel distance limits have been adopted - Historical information on what is considered to be a safe egress time from floor areas - Additional information in the code or Notes to justify time-based evacuation analysis - Supporting information on whether the Code anticipates persons with disabilities egressing through exits if those should be considered in egress analysis WRT to body radius, walking speeds, delay times, etc. - Recognition in the code or Notes that a 'code compliant' space with compliant travel distances would likely not achieve acceptable results when evaluated through fire and evacuation models with the type of fire assumptions mandated by many authorities.
78	Agree	Agree	Strongly agree	Agree	Agree	Agree	Neutral	Agree	As long as the alternative solutions could facilitate the evacuation at least meet minimum Code requirements, consideration should be given to these projects.
79	Strongly agree	Strongly agree	Agree	Neutral	Strongly agree	Strongly agree	Agree	Agree	no additional comment

Respondent Number	Vulnerable populations not already considered in occupancy type	Occupants' ability to respond/ evacuate in an emergency	Human behaviour in emergencies	Improper use of building or suite	Failure of smoke control and HVAC systems	Failure of building emergency systems	Availability of municipal firefighting services	Failure of infrastructure	Please share any additional comments or feedback on alternative solutions for travel distance. What are potential areas for future research or future developments in the Code that may improve the confidence in evaluating and developing Alternative Solution
80	Agree	Agree	Neutral	Strongly agree	Agree	Strongly agree	Agree	Neutral	Alternative solutions need to include a direct comparison to prescriptive code solutions. Many are just RSET and ASET without a comparison to code.
81	Strongly agree	Strongly agree	Agree	Neutral	Agree	Agree	Agree	Agree	N/A
82	Agree	Agree	Strongly agree	Agree	Agree	Strongly agree	Strongly agree	Strongly agree	More specific code provisions requirements for alternative solution requests relating to an increased travel distance
83	Strongly agree	Strongly agree	Strongly agree	Neutral	Agree	Agree	Neutral	Neutral	Barrier-free sections of the code have a lot to do with access to the building the effort to ensure people of all abilities can use the building in the same way - this is great and should continue. However, accessibility should be included in the context of emergencies as well. Visual or hearing impairment, as well as lower mobility, can greatly affect someone's ability to escape in an emergency. Also, age demographic may be an important factor - in terms of how both fast they can mobilize and their maturity/calmness in an emergency, which can affect efficiency of egress. It might already be considered and I am just unaware at this time.
84	Agree	Strongly agree	Strongly agree	Agree	Agree	Strongly agree	Agree	Agree	Human error is the most common cause of fires. more importantly, is the paradigm shift that occurred where people no longer consider risks and think that nothing will ever happen to them, until it does. We cannot rely on the fire service to manage all the hazards posed by new construction and changes to building designs. We need to rely on the construction of the building and the systems that are put in place to mitigate hazards. We do not need to find ways to reduce the effectiveness of codes based on one or two active measures. Once again, the approaches need to be all encompassing and contain both active and passive measures.
85	Disagree	Agree	Agree	Disagree	Neutral	Neutral	Disagree	Neutral	-
86	Strongly agree	Strongly agree	Strongly agree	Agree	Agree	Agree	Disagree	Neutral	Fire response should not be a strong factor in egress design. The building should be able to egress all occupants safely and in most cases prior to the arrival of the fire service even in a full time career department. Fire response is a last line of defence and is a reactionary measure. Building systems and features should be designed to provide a safe environment and adequate means of egress for any incident without the need for manual intervention by building staff or the Fire Department.
87	Neutral	Disagree	Disagree	Disagree	Neutral	Agree	Agree	Neutral	.
88	Agree	Agree	Agree	Agree	Neutral	Neutral	Disagree	Disagree	.
89	Agree	Agree	Strongly agree	Disagree	Disagree	Disagree	Agree	Disagree	It is not fair, to include the possibility of systems failures in risk assessment. Because it becomes an impossible task to account for all possible failures.
90	Agree	Agree	Agree	Disagree	Neutral	Neutral	Neutral	Neutral	not sure
91	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Strongly agree	Nothing at this time.

Respondent Number	Vulnerable populations not already considered in occupancy type	Occupants' ability to respond/ evacuate in an emergency	Human behaviour in emergencies	Improper use of building or suite	Failure of smoke control and HVAC systems	Failure of building emergency systems	Availability of municipal firefighting services	Failure of infrastructure	Please share any additional comments or feedback on alternative solutions for travel distance. What are potential areas for future research or future developments in the Code that may improve the confidence in evaluating and developing Alternative Solution
92	Agree	Agree	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Finding ways to shift towards a more time-based egress method with consensus-drive inputs and/or methods would facilitate more creative designs while simplifying certain analysis types. A possible example could be a more generalized way of how OBC 3.16.1.7 works for shelf and rack storage systems but for other occupancy types.
93	Strongly agree	Strongly agree	Strongly agree	Neutral	Agree	Agree	Neutral	Neutral	Some of the above-mentioned considerations may be more appropriately addressed through local bylaws rather than the national building code."
94	Strongly agree	Strongly agree	Strongly agree	Neutral	Agree	Agree	Agree	Agree	none
95	Disagree	Agree	Agree	Strongly agree	Strongly agree	Strongly agree	Agree	Strongly agree	Development of non-water based fire suppression systems.
96	Neutral	Agree	Agree	Agree	Agree	Strongly agree	Strongly agree	Strongly agree	Build into the Code the analytical methods listed in Q.15 to allow users to perform their own alternative solutions analyses.
97	Agree	Neutral	Agree	Neutral	Neutral	Agree	Neutral	Strongly agree	none

Travel Distance Requirements and Perspectives on alternative solutions. Data collected January 30, 2025 to February 13, 2025.

Section 5: Closing Thoughts

Responses to question 21

Respondent Number	Please share any additional comments or feedback.
1	
2	Risk profiles differ between designers and AHJ's, municipalities take on more risk given that a decision on code can have impacts on existing infrastructure (ie.. Grenfell)
3	
4	
5	This survey is very one sided for an outcome someone is looking for. What was the motivation behind such a survey? Public safety should always come first, and I have seen a push to increase travel distance and increase Occupant loads only to the benefit the industry. Do not agree with that.
6	Many of the current Code provisions are based off of archaic findings. Exit width for example. It is a huge task, but the entire Code needs to be looked at and brought into at least the 2010's.
7	Education is important -Designers, building officials, building owners and business operators.
8	
9	Please keep the safety of those people working and living in the buildings we build as the primary consideration for travel distances rather than the money that could be saved or made by reducing exiting or gaining more space for business. Allowing people to leave a building in a timely manner, in any emergency, is the only way to provide a means of self rescue where they are not relying on a mechanical system, emergency services, or some other means.
10	
11	
12	No further comments
13	no comment
14	
15	Good discussion.
16	This is an area that warrants more in depth review. The current methodology is overly simplified and does not address moderate to complex egressing scenarios.
17	
18	
19	None to add.
20	None.
21	Suggested starting point: 1. Understand the basis of the requirements were currently have. i.e., hazard, exposed and relationship between. This will relate in large part to tenability as a result of smoke spread. 2. Review the historical basis in a current context to establish where updating is warranted. For example, the current 30/45 m travel distance is formulated based on City of New York lot sizes and open storeys in "factory" buildings in early 1900s. Tenability considerations were much different at that time. 3. Develop a risk assessment gradient from objectives to prescriptive requirements with increasing quantum toward the prescriptive values that allow for the development of a parallel performance requirement. See New Zealand C/VM2 as a method that is moving in this direction.
22	na
23	
24	
25	Any Code changes (or alternative solution requests) must be data driven not opinion based.
26	I hope there will be prescriptive options developed to extend travel distance beyond 45m in a sprinklered building, based on specific criteria or requirements. This is highly needed in modern buildings where the level of safety has exponentially increased since the original 45m TD requirement was initially instituted.
27	
28	
29	
30	No additional.

Respondent Number	Please share any additional comments or feedback.
31	<p>From a practical point of view, the current minimum requirements in the Acceptable Solutions are onerous and conservative, and yet when generally measured against a performance basis such as tenability, would likely fail to be considered as suitable. For example, assuming a 10 m square room with 2.4 m high ceiling (slightly higher than minimum ceiling height by Code). A fire in this room could result in loss of visibility in 58 seconds and occupants would likely succumb to hyperthermia in 155 seconds; and the sprinkler system would likely activate the in 110 s. Depending on the occupancy and the considering standard SFPE criteria for determining RSET, people would not be fully evacuated from the room for at least 200 seconds. Thus, failing the ASET v RSET assessment prior to the sprinkler system activating, if visibility is considered a tenable criteria, or during the pre-movement stage as a result of hyperthermia.</p> <p>The point is practical consideration is needed for any future code changes. Or at least a solid reasoning for prescribed travel distances. Better yet, travel distance should almost entirely be based on engineering assessment in lieu of prescribed means, as this will allow for more flexible design and less overall interpretation by both designers and regulatory authorities, especially if the underlying assumptions for a specific travel distance are not clear or well understood, by either party.</p>
32	The means at which risk is expressed can be reviewed also. Comparative evaluation of travel distance does not equate to a safe design with deterministic expression potentially more appropriate (circumstance specific though). Competence of practitioners for alternative solutions needs to be addressed in conjunction with the provisions themselves.
33	
34	
35	
36	no comments
37	the ability to transfer the building code travel distance requirements to fire code is critical to ensure consistent interpretation and application of the building code after the building is occupied.
38	--
39	
40	
41	Thank you for allowing input on this topic, although it has not been a hot button issue for our projects to date. I would participate in further surveys as we do run into rouge SCO's that have the oddest take on some code articles, and we are forced to change projects to align as the AHJ has control.
42	Time is up
43	no additional comment
44	
45	-
46	
47	NA
48	no comment
49	
50	no comment
51	
52	I've designed a few buildings in rural areas to Firesmart standards. As fire risk is seen to be more prevalent, it may be worthwhile to consider these standards going forward.
53	Code requirements need to continue to be prescriptive (and predictable), but provide some level of relaxation in some cases being granted based on added levels of life safety/fire suppression to warrant additional/lengthened travel distance request being granted
54	There is NO perfect system. 1 standard good or bad for all.
55	Thanks for reaching out on this. Can be complex and many projects are getting larger and more complicated - tough task!
56	Na
57	
58	Nuf said.
59	
60	
61	
62	Low hanging fruit within low hazard sprinklered floor areas with limited occupant loads and little if any queuing (e.g., parking garages, dead-end public corridors serving residential suites) with reference to US standards. Increasing travel distance for applications like these seem reasonable and over due and will have an immediately impact on effective/efficient use of space and associated costs.
63	
64	I am pleased to see City of Calgary and AAA supporting this initiative
65	No comments
66	
67	

Respondent Number	Please share any additional comments or feedback.
68	
69	
70	
71	
72	zSS
73	
74	
75	Thank you, Jen! You did a great job :)
76	
77	Thanks for performing this study; travel distance is an area of the Code that could be greatly improved through additional information and options for compliance with no decrease to occupant safety. Something that should be a simple alternative solution to justify a couple metres of extended travel distance quite often becomes a multi-week analysis with significant AHJ approvals risk resulting in cascading impacts on project schedule and costs.
78	
79	
80	
81	How many fatalities occur in Commercial buildings that are constructed to newer codes? Are they related to human action such as blocking an exit? If the numbers are low, maybe the travel distances are correct now. Any changes have to be based in science and research. Not for the convenience of designers which is what this survey appears to be for.
82	
83	
84	There is too much emphasis put on modeling and active systems to address all of the hazards that may be associated with an event of a building. Modeling is a tool but not the only tool and should not be used as the sole indicator when making performance-based decisions. Getting out or moving to safe place is the only way to ensure the safety of the occupants.
85	
86	The ranking questions did not provide the opportunity to indicate that some of those items are not considered beneficial but still needed to be ranked. therefore this may lead to false positives that indicate that an option is desirable only because it was not able to be excluded.
87	
88	
89	
90	
91	Nothing at this time
92	
93	No additional comments
94	
95	
96	
97	

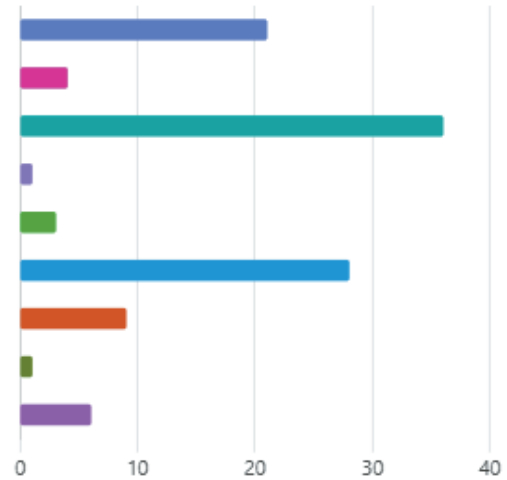
Travel Distance Requirements and Perspectives on alternative solutions. Data collected January 30, 2025 to February 13, 2025.

Appendix 4 - Survey response analytics

Screen Shots of Survey Data

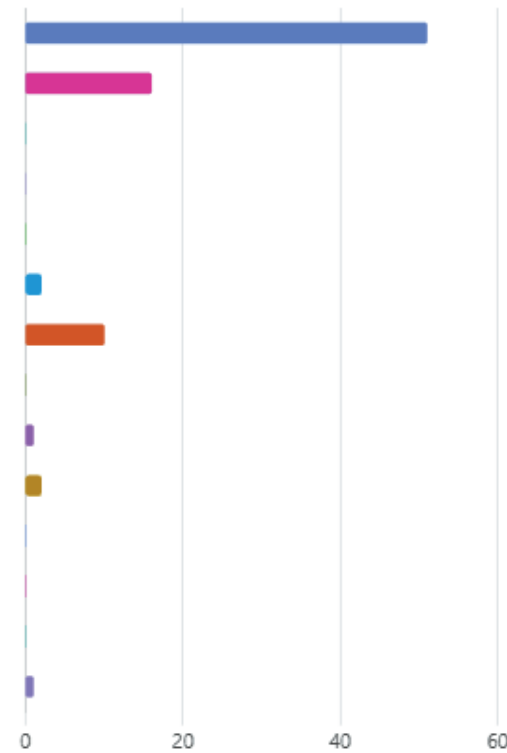
1. What is your primary role in relation to building design and code compliance? Check all that apply.

● Fire Protection Engineer	21
● Other Engineer	4
● Architect (or Intern)	36
● Interior Designer (or Intern)	1
● Architectural Technologist	3
● Authority Having Jurisdiction (AHJ) - Building	28
● Authority Having Jurisdiction (AHJ) - Fire	9
● Educator	1
● Other	6



2. Where are you located?

● Alberta	51
● British Columbia	16
● Manitoba	0
● New Brunswick	0
● Newfoundland and Labrador	0
● Nova Scotia	2
● Ontario	10
● Prince Edward Island	0
● Quebec	1
● Saskatchewan	2
● Northwest Territories	0
● Nunavut	0
● United States	0
● Other	1



3. How familiar are you with the following?

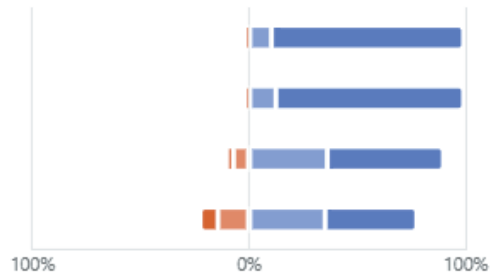
● Not Familiar ● Somewhat Not Familiar ● Somewhat Familiar ● Very Familiar

The life safety requirements of part 3 of the code

Prescriptive travel distance requirements of part 3

Evaluating or developing alternative solutions

Evaluating or developing alternative solutions for travel distance and egress



The life safety requirements of part 3 of the code	
● Not Familiar	1%
● Somewhat Familiar	10.3%
● Very Familiar	88.7%

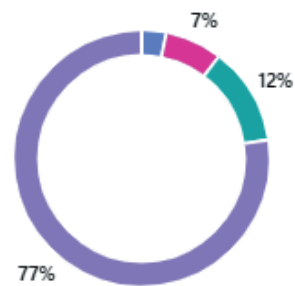
Evaluating or developing alternative solutions	
● Not Familiar	3.1%
● Somewhat Not Familiar	7.2%
● Somewhat Familiar	36.1%
● Very Familiar	53.6%

Evaluating or developing alternative solutions for travel distance and...	
● Not Familiar	8.2%
● Somewhat Not Familiar	14.4%
● Somewhat Familiar	35.1%
● Very Familiar	42.3%

Prescriptive travel distance requirements of part 3	
● Not Familiar	1%
● Somewhat Familiar	12.4%
● Very Familiar	86.6%

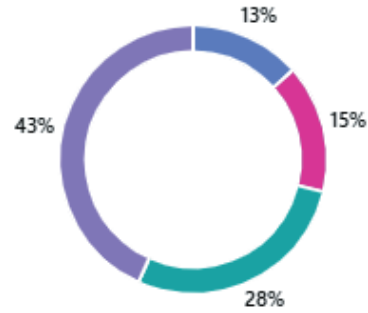
4. How many years of experience do you have working with the Code, particularly regarding the egress and travel distance requirements.

- 0-2 years 3
- 2-5 years 7
- 5-10 years 12
- over 10 years 75



5. How many years of experience do you have evaluating or developing Alternative Solutions?

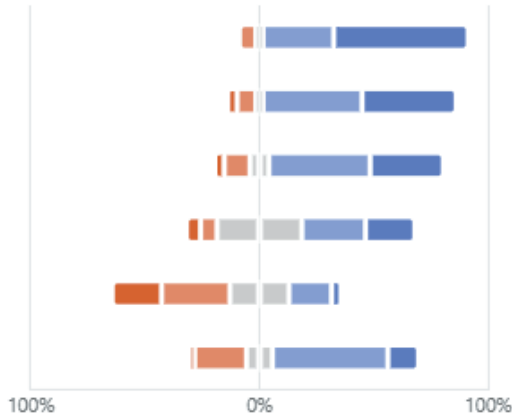
● 0-2	13
● 2-5 years	15
● 5-10 years	27
● over 10 years	42



6. In your opinion, are the following statements accurate regarding of the current prescriptive requirements for maximum travel distance found in Division B, Part 3 of the Code?

● Inaccurate ● Somewhat Inaccurate ● Unsure ● Somewhat Accurate ● Accurate

- Promotes safe egress for occupants.
- Provides clear and consistent standards.
- Limits risks associated with high occupant or fuel loads.
- The research that guided the maximum travel distance is outdated.
- Caters to all abilities and behavioral situations.
- Provides safe egress for all occupancy types and Uses (assembly, care, residential, office, retail, high hazard, etc.).



Provides clear and consistent standards.

● Inaccurate	4.1%
● Somewhat Inaccurate	8.2%
● Unsure	3.1%
● Somewhat Accurate	43.3%
● Accurate	41.2%

The research that guided the maximum travel distance is outdated.

● Inaccurate	6.2%
● Somewhat Inaccurate	7.2%
● Unsure	37.1%
● Somewhat Accurate	27.8%
● Accurate	21.6%

Provides safe egress for all occupancy types and Uses (assembly, care,...

● Inaccurate	2.1%
● Somewhat Inaccurate	22.7%
● Unsure	11.3%
● Somewhat Accurate	50.5%
● Accurate	13.4%

Limits risks associated with high occupant or fuel loads.

● Inaccurate	4.1%
● Somewhat Inaccurate	11.3%
● Unsure	8.2%
● Somewhat Accurate	44.3%
● Accurate	32%

Caters to all abilities and behavioral situations.

● Inaccurate	21.6%
● Somewhat Inaccurate	29.9%
● Unsure	25.8%
● Somewhat Accurate	18.6%
● Accurate	4.1%

8. Which of the following would you prioritize to improve flexibility to prescriptive travel distance requirements in future codes? Put in order of importance.



9. Rate the current prescriptive requirements for travel distance with respect to the following.

Very Poor Poor Fair Good Excellent

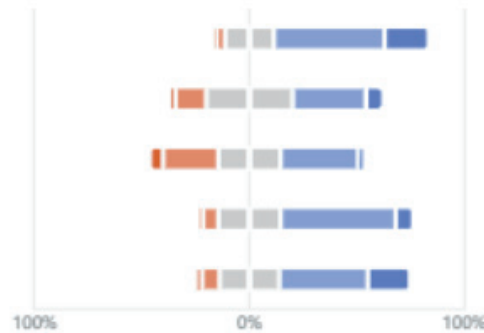
Clarity: Are the requirements easy to understand?

Usability: Do the requirements support efficient application in real world scenarios?

Flexibility: Do they allow for reasonable design variation while maintaining safety?

Consistency: Are they aligned with other related provisions in the Code?

Effectiveness: Do they achieve the intended safety objectives without unnecessary complexity?



Clarity: Are the requirements easy to understand?

Very Poor	1%
Poor	4.1%
Fair	22.7%
Good	51.5%
Excellent	20.6%

Flexibility: Do they allow for reasonable design variation while...

Very Poor	6.2%
Poor	25.8%
Fair	28.9%
Good	36.1%
Excellent	3.1%

Effectiveness: Do they achieve the intended safety objectives without...

Very Poor	3.1%
Poor	8.2%
Fair	27.8%
Good	41.2%
Excellent	19.6%

Usability: Do the requirements support efficient application in real...

Very Poor	3.1%
Poor	14.4%
Fair	40.2%
Good	34%
Excellent	8.2%

Consistency: Are they aligned with other related provisions in the Code?

Very Poor	2.1%
Poor	7.2%
Fair	28.9%
Good	53.6%
Excellent	8.2%

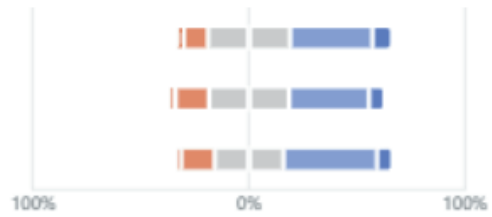
11. How well do the current Code objectives, functional statements and intent statements support or guide the evaluation and development of alternative solutions for travel distance?

● Very poor ● Poor ● Fair ● Good ● Excellent

Objectives

Functional Statements

Intent Statements



Objectives	
● Very poor	3.1%
● Poor	11.3%
● Fair	38.1%
● Good	38.1%
● Excellent	9.3%

Functional Statements	
● Very poor	3.1%
● Poor	15.5%
● Fair	37.1%
● Good	37.1%
● Excellent	7.2%

Intent Statements	
● Very poor	2.1%
● Poor	15.5%
● Fair	32%
● Good	43.3%
● Excellent	7.2%

13. What building design factors do you consider most critical for determining the appropriate safe travel distance?

● Unimportant ● Somewhat Important ● Neutral ● Important ● Critical

Presence of sprinklers and fire detection

Occupancy type (assembly, care, residential, office, retail, high-hazard, etc.)

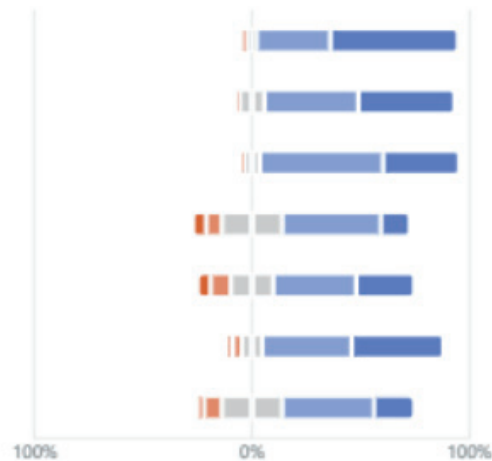
Presence of fire separations (Fire separation means a construction assembly that acts as a barrier against the spread of fire. NBC 202...

Building area or suite area

Type of construction (combustible versus non-combustible)

Occupant load (maximum occupants at one time)

Building height and number of stories



Presence of sprinklers and fire detection	
● Somewhat Important	3.1%
● Neutral	4.1%
● Important	34%
● Critical	58.8%

Occupancy type (assembly, care, residential, office, retail, high-hazar...	
● Somewhat Important	1%
● Neutral	11.3%
● Important	43.3%
● Critical	44.3%

Presence of fire separations (Fire separation means a construction...	
● Unimportant	1%
● Neutral	7.2%
● Important	56.7%
● Critical	35.1%

Building area or suite area	
● Unimportant	6.2%
● Somewhat Important	7.2%
● Neutral	27.8%
● Important	45.4%
● Critical	13.4%

Type of construction (combustible versus non-combustible)	
● Unimportant	6.2%
● Somewhat Important	9.3%
● Neutral	19.6%
● Important	38.1%
● Critical	26.8%

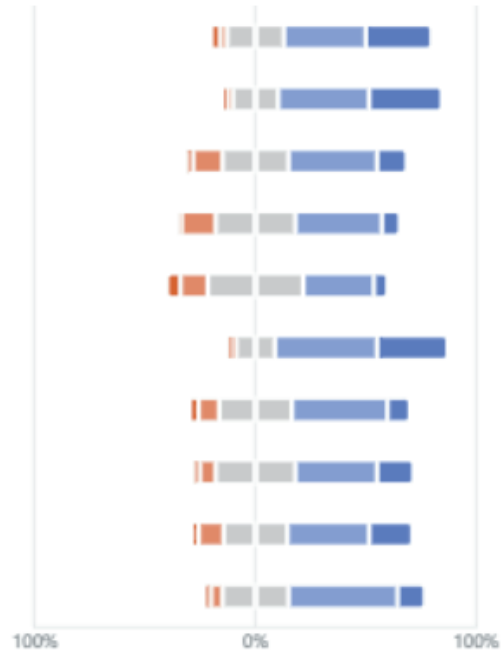
Occupant load (maximum occupants at one time)	
● Unimportant	3.1%
● Somewhat Important	4.1%
● Neutral	9.3%
● Important	41.2%
● Critical	42.3%

Building height and number of stories	
● Unimportant	3.1%
● Somewhat Important	8.2%
● Neutral	27.8%
● Important	42.3%
● Critical	18.6%

15. The following methods are used to evaluate or develop travel distance and egress Alternative Solutions. How effective are they for assessing safe travel distances in emergencies?

Very ineffective Somewhat ineffective Not sure if effective Somewhat effective Very effective

- Fire Modelling Software/Computational Fluid Dynamics (CFD) (to demonstrate time to untenable conditions, used to validate smo...
- Evacuation Simulation Models (to evaluate egress times, potential congestion points and occupant behavior)
- Comparative analysis (demonstrating equivalency, using precedents or case studies)
- Historical Data Analysis
- Expert Judgment
- Performance-Based Engineering Calculations (such as egress time calculations ASET and REST. Heat transfer, smoke movement an...
- Risk Assessments
- Fire Testing and Experimental Data
- Enhanced Fire Protection Systems (like Early Suppression Fast Response (ESFR) sprinklers and enhanced detections systems)
- Systems Integration Studies (assessing how fire safety systems work together)



Fire Modelling Software/Computational Fluid... <ul style="list-style-type: none"> Very ineffective 4.1% Somewhat ineffective 3.1% Not sure if effective 25.8% Somewhat effective 37.1% Very effective 29.9% 	Evacuation Simulation Models (to evaluate egress times, potential... <ul style="list-style-type: none"> Very ineffective 3.1% Somewhat ineffective 2.1% Not sure if effective 20.6% Somewhat effective 41.2% Very effective 33% 	Comparative analysis (demonstrating equivalency, using precedents or... <ul style="list-style-type: none"> Very ineffective 3.1% Somewhat ineffective 13.4% Not sure if effective 29.9% Somewhat effective 40.2% Very effective 13.4%
Historical Data Analysis <ul style="list-style-type: none"> Very ineffective 1% Somewhat ineffective 15.5% Not sure if effective 36.1% Somewhat effective 39.2% Very effective 8.2% 	Expert Judgment <ul style="list-style-type: none"> Very ineffective 6.2% Somewhat ineffective 12.4% Not sure if effective 43.3% Somewhat effective 32% Very effective 6.2% 	Performance-Based Engineering Calculations (such as egress time... <ul style="list-style-type: none"> Very ineffective 3.1% Somewhat ineffective 1% Not sure if effective 17.5% Somewhat effective 46.4% Very effective 32%
Risk Assessments <ul style="list-style-type: none"> Very ineffective 4.1% Somewhat ineffective 9.3% Not sure if effective 33% Somewhat effective 43.3% Very effective 10.3% 	Fire Testing and Experimental Data <ul style="list-style-type: none"> Very ineffective 3.1% Somewhat ineffective 7.2% Not sure if effective 36.1% Somewhat effective 37.1% Very effective 16.5% 	Enhanced Fire Protection Systems (like Early Suppression Fast Respons... <ul style="list-style-type: none"> Very ineffective 3.1% Somewhat ineffective 11.3% Not sure if effective 28.9% Somewhat effective 37.1% Very effective 19.6%

Systems Integration Studies
(assessing how fire safety systems...)

- Very ineffective 3.1%
- Somewhat ineffective 5.2%
- Not sure if effective 29.9%
- Somewhat effective 49.5%
- Very effective 12.4%

17. Of the following advancements, which do you think will have the **greatest** impact on travel distance requirements? Put in order of importance.



Advanced fire suppression systems

1st choice:	35 (36%)
2nd choice:	28 (29%)
3rd choice:	18 (19%)
4th choice:	9 (9%)
5th choice:	6 (6%)
6th choice:	1 (1%)

Smoke control and HVAC systems

1st choice:	17 (18%)
2nd choice:	25 (26%)
3rd choice:	32 (33%)
4th choice:	16 (16%)
5th choice:	6 (6%)
6th choice:	1 (1%)

Enhanced detection systems

1st choice:	26 (27%)
2nd choice:	25 (26%)
3rd choice:	13 (13%)
4th choice:	17 (18%)
5th choice:	16 (16%)

Improved fire-resistant materials

1st choice:	10 (10%)
2nd choice:	9 (9%)
3rd choice:	18 (19%)
4th choice:	28 (29%)
5th choice:	26 (27%)
6th choice:	6 (6%)

Dynamic wayfinding and emergency signage systems

1st choice:	9 (9%)
2nd choice:	8 (8%)
3rd choice:	12 (12%)
4th choice:	25 (26%)
5th choice:	37 (38%)
6th choice:	6 (6%)

Advances in AI technology

2nd choice:	2 (2%)
3rd choice:	4 (4%)
4th choice:	2 (2%)
5th choice:	6 (6%)
6th choice:	83 (86%)

19. Listed below are a variety of occupant demographics, unforeseen events and human errors that can occur. Which of the items listed do you think additional research should be conducted and changes incorporated into future revisions to the Code.

● Strongly disagree ● Disagree ● Neutral ● Agree ● Strongly agree

Vulnerable populations not already considered in occupancy type

Occupants' ability to respond/evacuate in an emergency

Human behaviour in emergencies

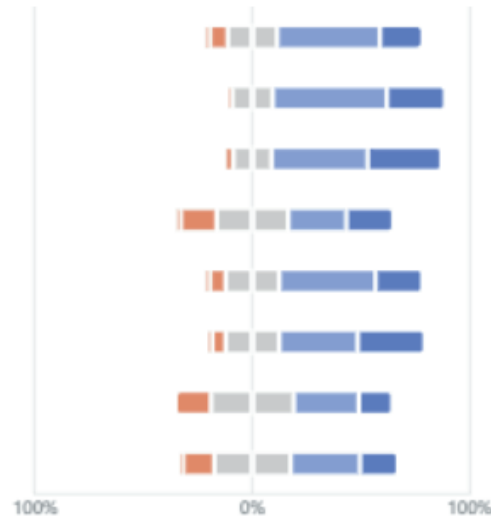
Improper use of building or suite (being over max. occupant load, obstruction of exits, using an office space for a party etc.)

Failure of smoke control and HVAC systems

Failure of building emergency systems (sprinklers, fire alarm, emergency power, etc.)

Availability of municipal firefighting services (fire services unable to attend call)

Failure of infrastructure, like inadequate water supply for sprinkler systems



Vulnerable populations not already considered in occupancy type

● Strongly disagree	2.1%
● Disagree	8.2%
● Neutral	22.7%
● Agree	47.4%
● Strongly agree	19.6%

Improper use of building or suite (being over max. occupant load, ...)

● Strongly disagree	2.1%
● Disagree	16.5%
● Neutral	33%
● Agree	26.8%
● Strongly agree	21.6%

Availability of municipal firefighting services (fire services unable to atte...)

● Disagree	16.5%
● Neutral	38.1%
● Agree	29.9%
● Strongly agree	15.5%

Occupants' ability to respond/evacuate in an emergency

● Disagree	2.1%
● Neutral	18.6%
● Agree	52.6%
● Strongly agree	26.8%

Failure of smoke control and HVAC systems

● Strongly disagree	2.1%
● Disagree	7.2%
● Neutral	24.7%
● Agree	44.3%
● Strongly agree	21.6%

Failure of infrastructure, like inadequate water supply for sprinkl...

● Strongly disagree	1%
● Disagree	14.4%
● Neutral	35.1%
● Agree	32%
● Strongly agree	17.5%

Human behaviour in emergencies

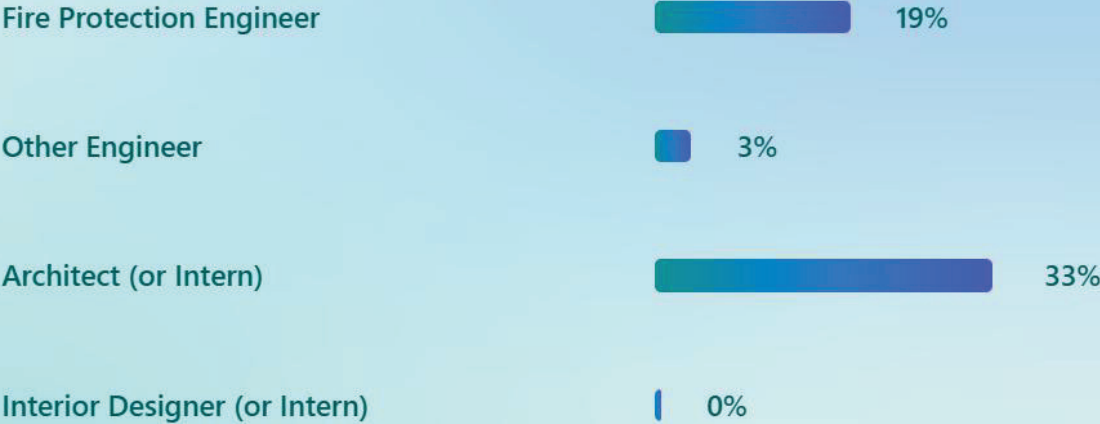
● Disagree	4.1%
● Neutral	17.5%
● Agree	44.3%
● Strongly agree	34%

Failure of building emergency systems (sprinklers, fire alarm, ...)

● Strongly disagree	2.1%
● Disagree	6.2%
● Neutral	24.7%
● Agree	36.1%
● Strongly agree	30.9%

Survey data presentation Form

What is your primary role in relation to building design and code compliance? Check all that apply.

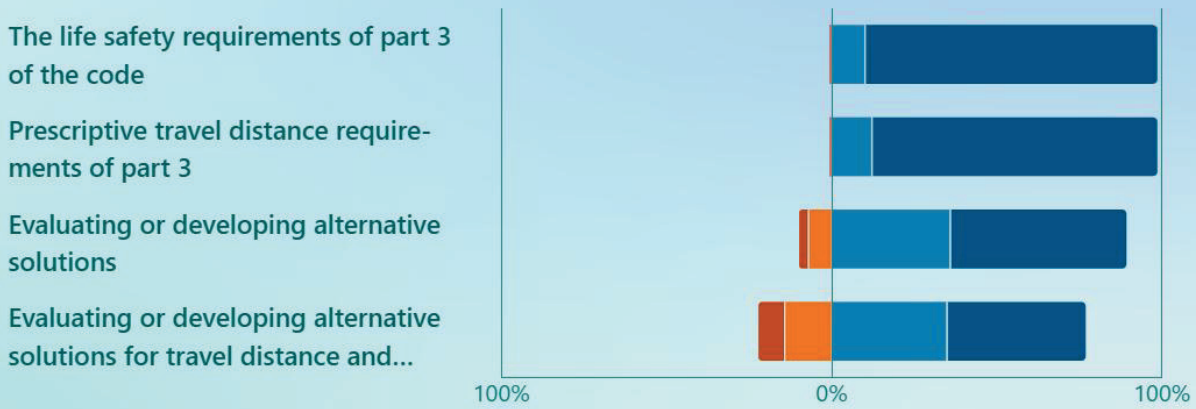


Where are you located?



How familiar are you with the following?

■ Not Familiar
 ■ Somewhat Not Familiar
 ■ Somewhat Familiar
 ■ Very Familiar



How many years of experience do you have working with the Code, particularly regarding the egress and travel distance requirements.



How many years of experience do you have evaluating or developing Alternative Solutions?



In your opinion, are the following statements accurate regarding of the current prescriptive requirements for maximum travel distance found...

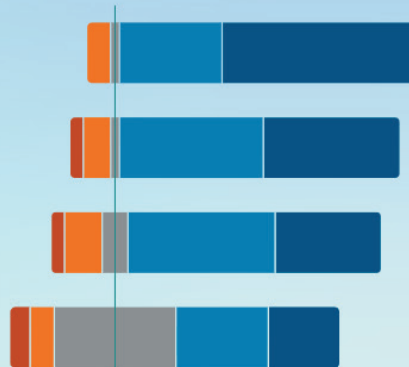
■ Inaccurate
 ■ Somewhat Inaccurate
 ■ Unsure
 ■ Somewhat Accurate
 ■ Accurate

Promotes safe egress for occupants.

Provides clear and consistent standards.

Limits risks associated with high occupant or fuel loads.

The research that guided the maximum travel distance is outdated.



In your opinion, are the following statements accurate regarding of the current prescriptive requirements for maximum travel distance found...

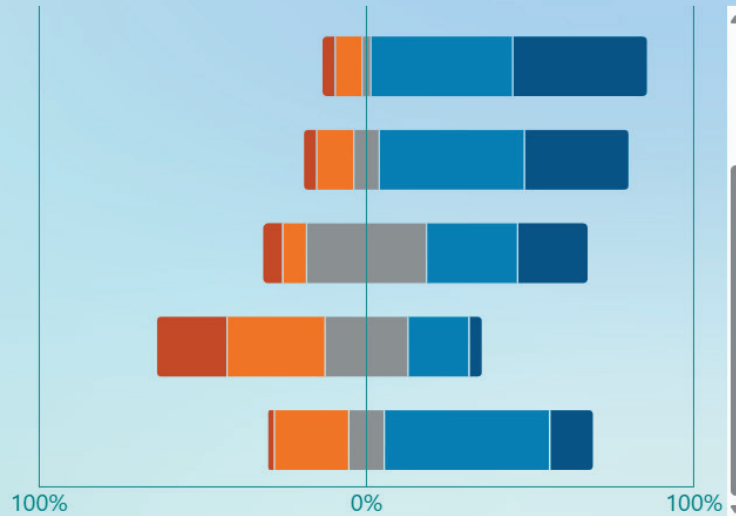
Provides clear and consistent standards.

Limits risks associated with high occupant or fuel loads.

The research that guided the maximum travel distance is outdated.

Caters to all abilities and behavioral situations.

Provides safe egress for all occupancy types and Uses (assembly,...



Rate the current prescriptive requirements for travel distance with respect to the following.

Very Poor Poor Fair Good Excellent

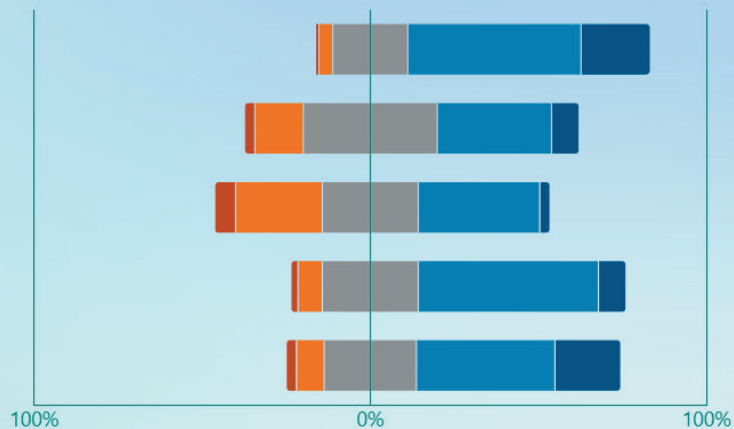
Clarity: Are the requirements easy to understand?

Usability: Do the requirements support efficient application in real world scenarios?

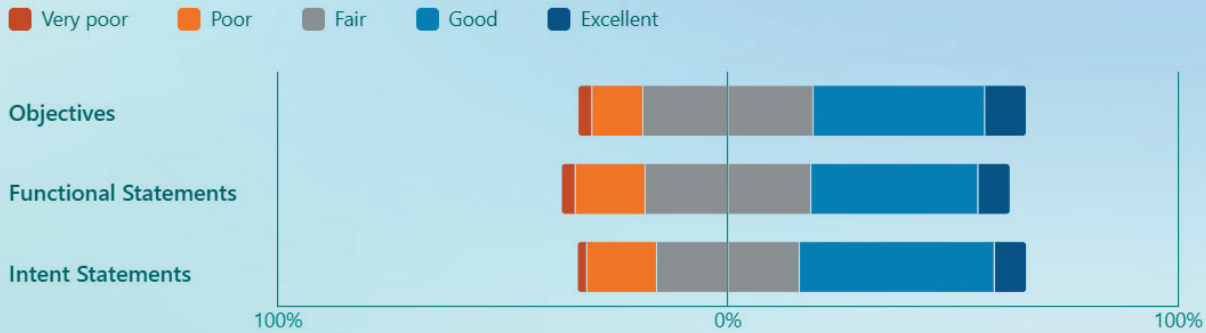
Flexibility: Do they allow for reasonable design variation while maintaining safety?

Consistency: Are they aligned with other related provisions in the Code?

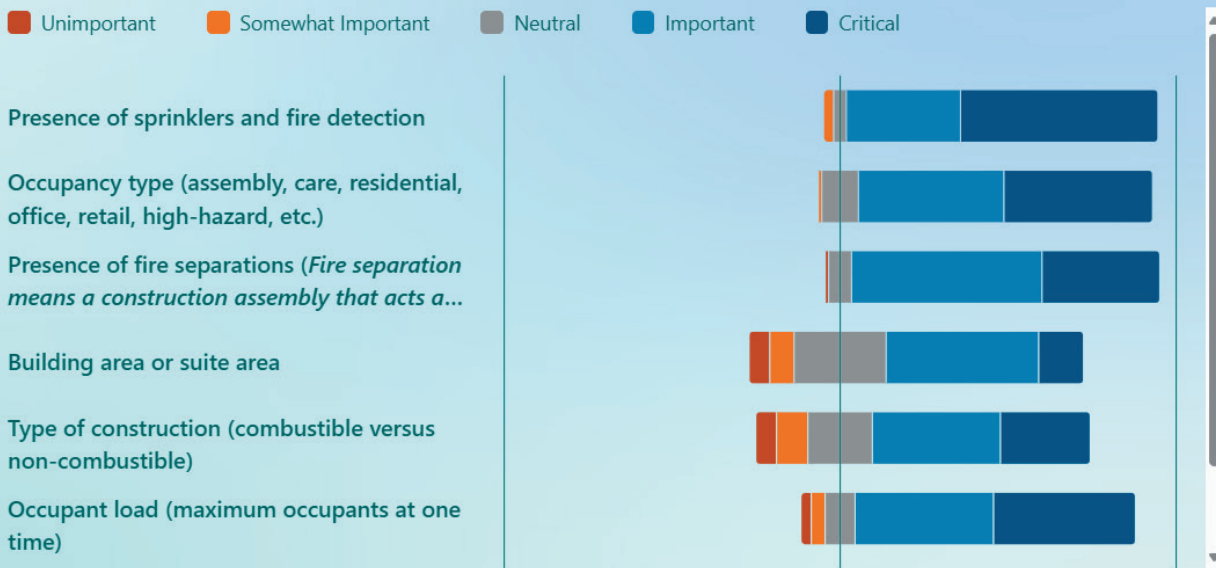
Effectiveness: Do they achieve the intended safety objectives without unnecessary...



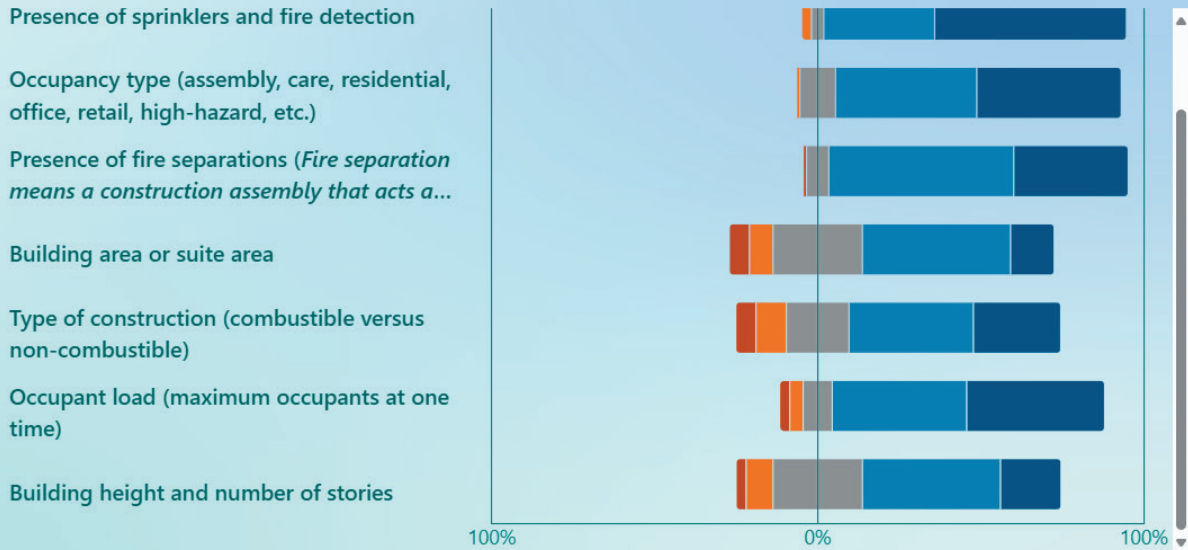
How well do the current Code objectives, functional statements and intent statements support or guide the evaluation and development of alternative solutions for travel...



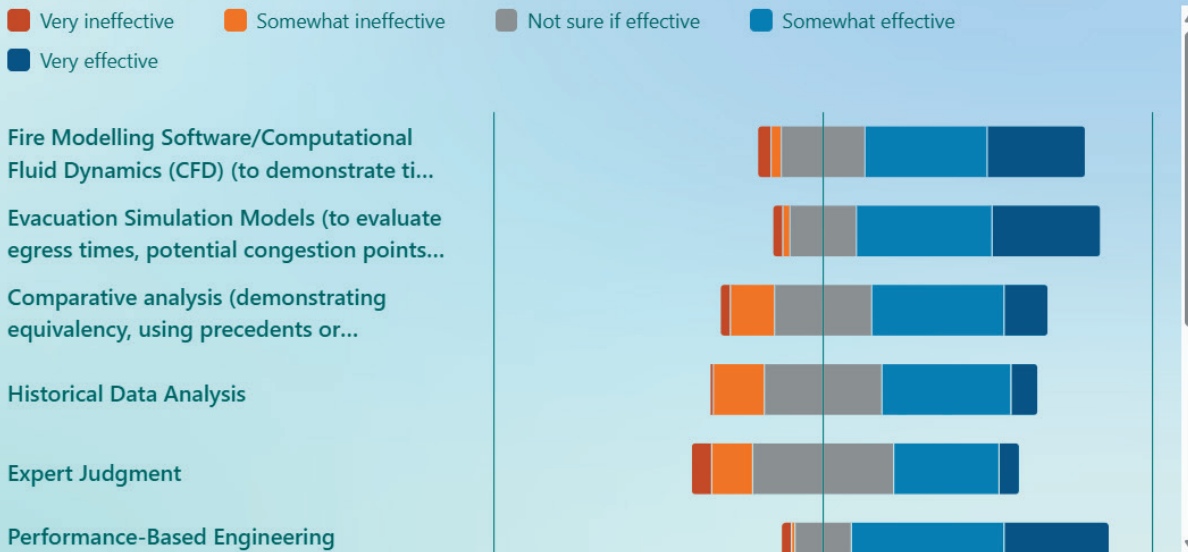
What building design factors do you consider most critical for determining the appropriate safe travel distance?



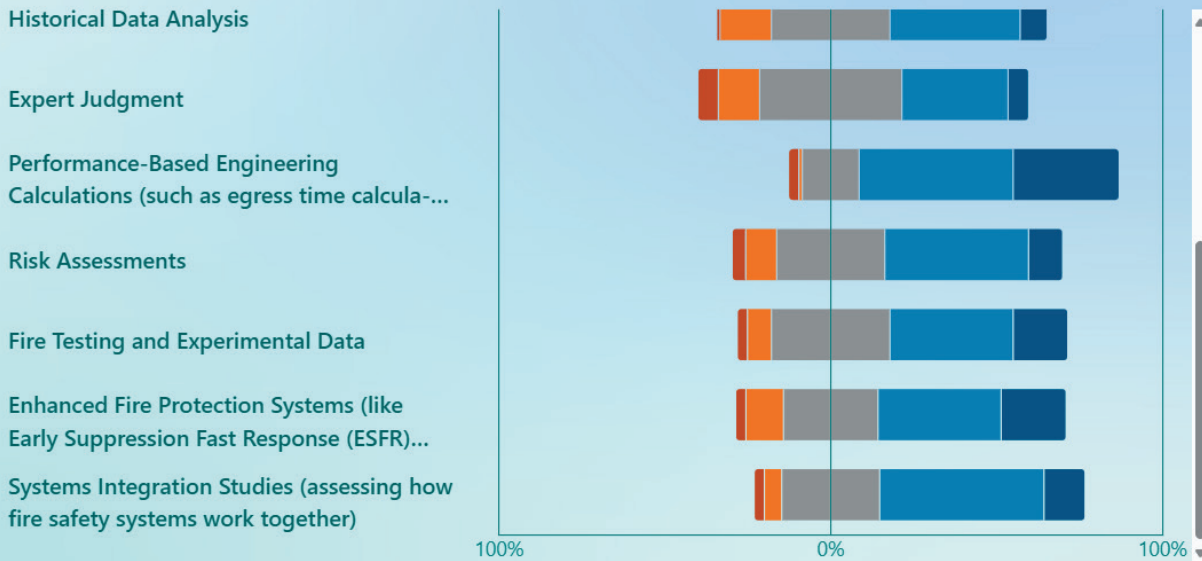
What building design factors do you consider most critical for determining the appropriate safe travel distance?



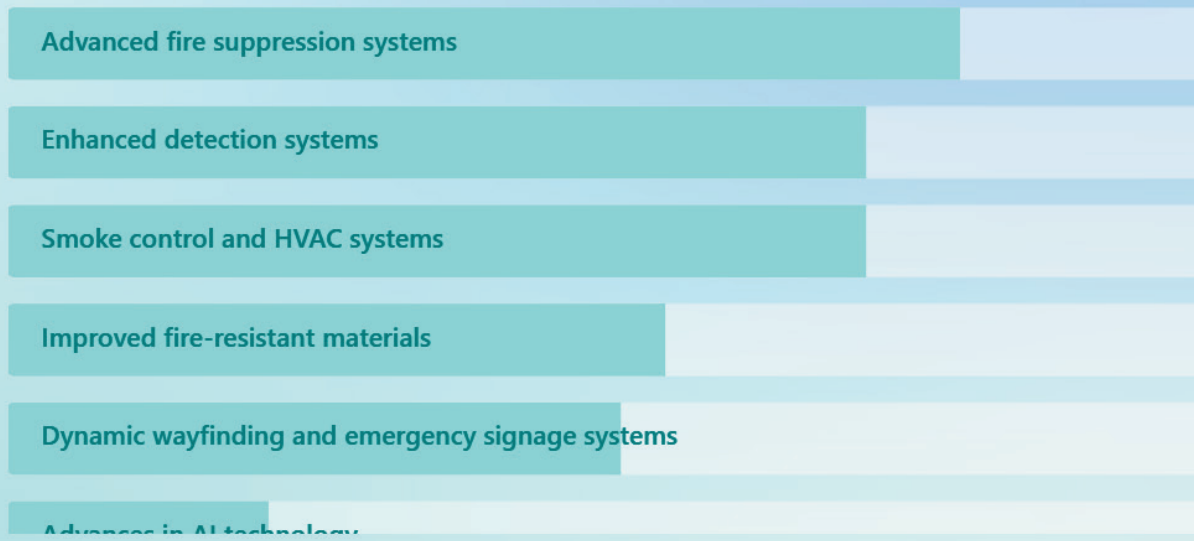
The following methods are used to evaluate or develop travel distance and egress Alternative Solutions. How effective are they for assessing safe travel distances in...



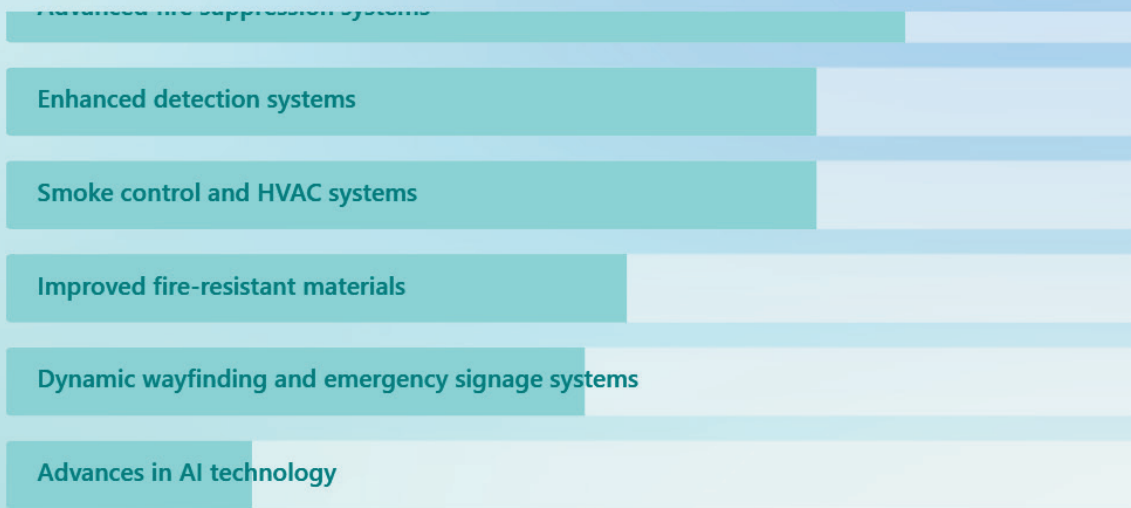
The following methods are used to evaluate or develop travel distance and egress Alternative Solutions. How effective are they for assessing safe travel distances in...



Of the following advancements, which do you think will have the greatest impact on travel distance requirements? Put in order of...

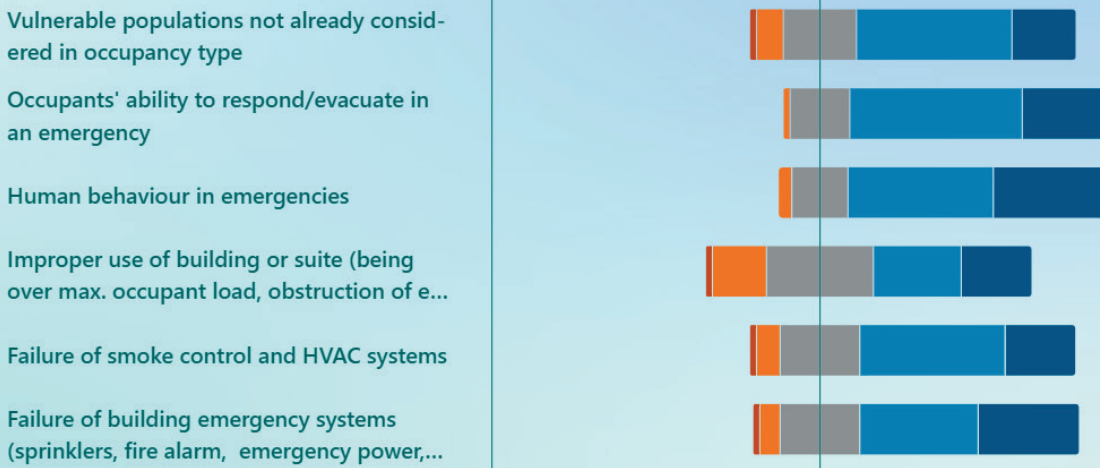


Of the following advancements, which do you think will have the greatest impact on travel distance requirements? Put in order of...



Listed below are a variety of occupant demographics, unforeseen events and human errors that can occur. Which of the items listed do you think additional research should...

■ Strongly disagree
 ■ Disagree
 ■ Neutral
 ■ Agree
 ■ Strongly agree



Listed below are a variety of occupant demographics, unforeseen events and human errors that can occur. Which of the items listed do you think additional research should...

Occupants' ability to respond/evacuate in an emergency

Human behaviour in emergencies

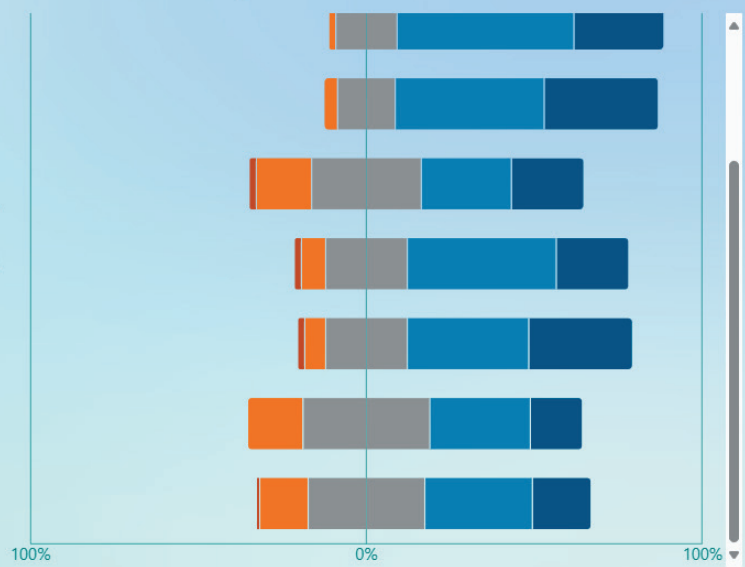
Improper use of building or suite (being over max. occupant load, obstruction of e...

Failure of smoke control and HVAC systems

Failure of building emergency systems (sprinklers, fire alarm, emergency power,...

Availability of municipal firefighting services (fire services unable to attend call)

Failure of infrastructure, like inadequate water supply for sprinkler systems



Listed below are a variety of occupant demographics, unforeseen events and human errors that can occur. Which of the items listed do you think additional research should...

an emergency

Human behaviour in emergencies

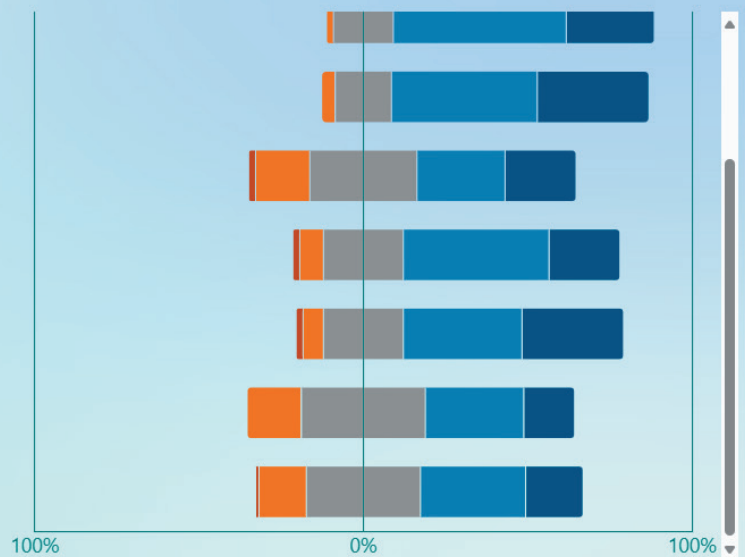
Improper use of building or suite (being over max. occupant load, obstruction of e...

Failure of smoke control and HVAC systems

Failure of building emergency systems (sprinklers, fire alarm, emergency power,...

Availability of municipal firefighting services (fire services unable to attend call)

Failure of infrastructure, like inadequate water supply for sprinkler systems



Emerging Risks & Human Factors - Debate
WORKSHOP 1

Debate Proposition: "Travel distance requirements should be expanded to account for emerging fire risks, human behavior, and technological advancements."

Room 1: Travel distances should be updated for emerging fire risks, human behaviour, and technological advances, but needs to stay **prescriptive in nature** with clear objectives and functional statements and additional specific guidelines.

Prescriptive along with a performance pathway	Prescriptive requirements provide a benchmark for a good building that goes through a complex reasoning	There should be a common framework prescriptive path with introduction of variables and options	Risk factors - if you're in medium risk, need to determine what the actual risk is.	Needs to be some sort of performance methodology to help create equivalency
Starts the framework and provides a common language to all stakeholders	Other prescriptive codes allow for a defined scope three and provide the methodology to calculate that specific risk.	Prescriptive requirements provide a common language to all stakeholders and provide a clear path to follow	It would be for people to understand what the actual risk is and how to manage it	Outing can be the way to help the building owner understand the risk and how to manage it
Doesn't require the additional need for consultants, modelling etc. Easier design and review	Travel distance now needs more analysis with someone having specialized knowledge	Performance would add to much cost to the Owner		

Room 2: Travel distances should be **performance based** and address emerging fire risks, human behaviors, and technological advancements primarily through engineering models rather than prescribed distances.

An Engineer is a Professional. They are taking on the responsibility of ensuring the AS is approximately equal.	performance based design or greater than the minimum code. It is a more holistic design. It is a more holistic design. It is a more holistic design.	the building code is a minimum standard. It is a minimum standard. It is a minimum standard.		
Accommodates flexibility in design and innovative designs	Facilities taking into account the various scenarios of the design. It is a more holistic design. It is a more holistic design.	Performance based - is a minimum standard. It is a minimum standard. It is a minimum standard.		
Allows you to take more factors into consideration	Our feelings were that there should be a challenge of building performance that also allow occupancy changes over the life cycle of the building.	Prescriptive should be a baseline but performance is needed for different occupancies to accommodate flexibility of design.		

Emerging Risks & Human Factors - Debate
WORKSHOP 2

Debate Proposition: "Travel distance requirements should be expanded to account for emerging fire risks, human behavior, and technological advancements."

Room 1: Travel distances should be updated for emerging fire risks, human behaviour, and technological advances, but needs to stay **prescriptive in nature** with clear objectives and functional statements and additional specific guidelines.

Sets standard to evaluate	We at least have an established baseline	Travel distance to address new hazards and new occupancies (Automated storage)	Updates/changes should be "needs driven" - so what is the need?
Consistency	Need to understand the prescriptive requirements to identify if an alternative solution is needed	Need to understand the established minimum requirements of travel distance.	Ease of application very important
Need to understand the prescriptive requirements to identify if an alternative solution is needed	Need to understand the established minimum requirements of travel distance.	Ease of application very important	Performance based design allows you to meet client expectations or target design that is outside of prescriptive approach

Room 2: Travel distances should be **performance based** and assessment primarily through engineering models rather than prescribed distances.

If time and money were no object then, yes	Much more accurate to the specific building	Both prescriptive and engineering solutions are viable. However there are typically a number of prescriptive design options.	A guideline may be helpful to ensure the proposed solution looks at all aspects of the occupancy and use	These model outputs are known? Data for fire protection systems across Canada could exist within a few issues exist	egress modelling and fire modelling would be a huge plus
Renovations would be much more economical and feasible	Lower risk occupancies would be able to be assessed on a more relaxed level	We could better predict and protect disabilities and accessibility concerns	We can more accurately represent complex situations / buildings / occupancies	Modeling every time could create a lot of work. It is a very high cost modelling solution. It is a very high cost modelling solution.	Occupancy factors (probability, severity). Should also include new world data and innovation. Method to justify potential level distances.
Calculations used already for safety factors, could similar calculations be used for more prescriptive	How to guarantee the approved performance based on specific performance methods will depend on the life of the building	What is the level of performance / equivalency provided in an alternative solution			

Emerging Risks & Human Factors - Debate
WORKSHOP 3

Debate Proposition: "Travel distance requirements should be expanded to account for emerging fire risks, human behavior, and technological advancements."

Room 1: Travel distances should be updated for emerging fire risks, human behaviour, and technological advances, but needs to stay **prescriptive in nature** with clear objectives and functional statements and additional specific guidelines.

It's simple, a number, measurable, observable, easy to confirm.	A simple number is easier to enforce.	A simple number means anyone can do it, you don't need to hire an engineer.	Overall, is just easier.	It would be a baseline of performance and human behavior. It would be a baseline of performance and human behavior.	Might need some sub-categories of occupational occupancies to expand a prescriptive table of occupancies.
Cost effective - reduce the need to pay professionals	Would prescriptive in nature the same as writing a reference number that would address the objectives and objectives?	prescriptive allows MPM/IMM compliance to be stated clearly (i.e. assumes a worst case scenario)	Elemental distance can influence the calculation. It is a design choice. It is a design choice.	Gives specific quantities to achieve a design. Helps the review and design process.	Prescriptive requirements + additional guidelines would be beneficial.
Concern: Designs can be manipulated by professionals.	Allows a minimum requirement.	Requires no assumptions.	Has no operational inputs.	prescriptive is easier going forward with cost considerations. It is a design choice. It is a design choice.	Identify the time of hazard and time to exit safely.

Room 2: Travel distances should be **performance based** and address emerging fire risks, human behaviors, and technological advancements primarily through engineering models rather than prescribed distances.

Meaningful software tool. You can't use the tool until you have the data. It is a design choice. It is a design choice.	Inexperienced AS is a challenge, and most of us aren't also engineers	An option would be to have a peer review process to these cases?	Are owners and insurers aware of what designers are putting forward? Can they make it if risk is more cases by case.	It would be a baseline of performance and human behavior. It would be a baseline of performance and human behavior.
PD does work, and it's not a challenge, but there are challenges with it and get some work	Design for situation, could be an advantage.	AHJ authority to talk on a national level to insurers about this topic is disclosure part of consideration.	Would give more freedom with detailed based design (could be more prescriptive. But a design choice).	
For an AHJ could be hard to quantify the model. Would need to consider this.	PD is not just about reducing the level of elements, but about addressing scenarios that were not considered in building code	Performance based should be tethered to the prescriptive based measures to anchor them.	What framework or structure is in place to enable AHJ review?	Assembly buildings also differ quite a bit in usage / occupancy etc.

