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Driving-rain map of Canada

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Publisher's version / Version de l'éditeur:

<https://doi.org/10.4224/20358604>

Technical Note (National Research Council of Canada. Division of Building Research); no. TN-398, 1963-05-01

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NATIONAL RESEARCH COUNCIL OF CANADA

DIVISION OF BUILDING RESEARCH

No.

398

TECHNICAL NOTE

PREPARED BY D. W. Boyd*

CHECKED BY LWG

APPROVED BY RFL

DATE May 1963

PREPARED FOR C. I. B. Working Commission on Rain Penetration

SUBJECT DRIVING-RAIN MAP OF CANADA

Rain driven by the wind against the wall of a building, and then forced into cracks by wind pressure, poses several problems for the builder. The severity of these problems depends largely on the strength of the wind during rain and on the amount of rain as well as on the properties of the wall itself.

To make a rational assessment of the effect of the weather in wetting a wall would require a very detailed study of hourly weather reports for long periods of time. It has been suggested, however, that the product of the mean wind speed and the annual rainfall could be used as a simple index of the probable relative severity of the problem. Lacy and Shellard (1, 2) prepared a map of the British Isles based on this index. The C. I. B. (Conseil International du Bâtiment) Working Commission on Rain Penetration has asked other countries to prepare similar maps.

The method of preparing the driving-rain map of Canada was somewhat different from that used by Lacy who combined separate wind and precipitation maps. The results should, however, be quite comparable.

* D. W. Boyd is a member of the staff of the Meteorological Branch of the Department of Transport, seconded to work full time as Climatologist with the Division of Building Research. This Note therefore represents a joint contribution from this Division and the Meteorological Branch.

The most recent readily available summary of mean annual wind speeds in Canada is that contained in "Climatic Summaries, Volume II" (3). This volume lists mean annual wind speeds for 175 stations based on observations taken from 1937 to 1954 inclusive, or on whatever observations were available within this period.

Average annual rainfalls for the standard period 1931 to 1960 have not yet been published, but were provided for most of these stations by the Climatology Division of the Meteorological Branch in Toronto. Records for more than ten years within this period were available for 141 of these stations. In Canada anywhere from less than 5 per cent to about 50 per cent of the total precipitation may be snow, and it is therefore important to use the annual rainfall rather than the annual total precipitation in computing the driving-rain index.

For each of these 141 stations the product of the annual rainfall and the mean wind speed was formed in inches-miles per hour, and then converted to square metres per second by multiplying by 0.01135. These values were plotted on a map of Canada on a scale of 100 miles to 1 inch and the isopleths drawn in. The attached map is a reduced copy of a tracing of the original.

The shading indicates the exposure gradings used by Lacy in reference (2). Moderate exposure, between 3 and 7 sq metre per sec, applies to most of the coastal areas, the St. Lawrence valley, and the Lower Lakes Region. The only places with severe exposure of over 7 are the Avalon Peninsula and a part of Vancouver Island and some other islands off the B.C. coast.

REFERENCES

- (1) Lacy, R.E. and H.C. Shellard. An index of driving rain. Meteor. Mag., Vol. 91, p. 177-184, July 1962.
- (2) An index of exposure to driving rain. Great Britain, Building Research Station Digest (2nd series), No. 23, June 1962.
- (3) Climatic summaries for selected meteorological stations in Canada, Vol. II (revised), humidity and wind. Department of Transport, Meteorological Branch, Toronto, 1951.

