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The fire hazard of paper-backed batts in enclosed ceiling spaces McGuire, J. H.; Ruscoe, B. E.

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NATIONAL RESEARCH COUNCIL OF CANADA

DIVISION OF BUILDING RESEARCH

No.

352

TECHNICAL NOTE

NOT FOR PUBLICATION

FOR INTERNAL USE

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CHECKED BY GWS

APPROVED BY NBH

DATE November 1961

PREPARED FOR Record Purposes

SUBJECT

THE FIRE HAZARD OF PAPER-BACKED
BATTS IN ENCLOSED CEILING SPACES

The use of paper-covered insulation batts incorporating a vapour varrier on one side has been drawn to the attention of the Division of Building Research as a possible factor in the rapid spread of fire throughout buildings. It is suggested that the possible danger is especially significant in buildings under construction (where the paper backing is exposed) or in the attic spaces of completed buildings. To date the Fire Section has believed that so many factors affect the development of fire in partially completed buildings that the role of paper-backed batts could not be very significant. In recent months, however, certain incidents have suggested that the rapidity with which a fire has spread through a building has been due to paper backing on batts in enclosed wood floor and plaster ceiling systems. This note describes tests performed to evaluate the hazard.

A section of a ceiling-floor space was constructed (Fig. 1) and the paper covering of the batt ignited along a 16-in. front. Flames spread slowly to 4 ft from the source of ignition but went out without involving the joists or sub-floor.

With the same construction, a crib consisting of 40 gm of fibreboard was set on the paper backing and used as an igniting source. The paper ignited almost immediately and the flame front spread slowly away from the source. At a slightly later stage the crib fire ignited both the joists and the underside of the sub-floor, and a fully developed fire spread rapidly through the space.

Using a similar section, differing only in that the paper backing was removed from the batts, the same procedure was followed. The crib ignited the joists and sub-floor and again a fully developed fire spread rapidly throughout the space. The times for spread of fire to the further end for both tests were 5 min 15 sec and 4 min 35 sec, respectively. No particular significance is attached to the difference in these times, although it may have been associated with the consumption of oxygen by the slowly spreading fire in the paper-backed batts.

A second type of construction (Fig. 2) was adopted to investigate the likelihood of spread of fire along the underside of the batt when a furring strip technique is used to support the plasterboard. With this arrangement the cavity was continuous only in the direction of the furring strip for 1 in. or so on either side. It was not found possible to develop a self-sustaining fire under these conditions even by igniting the tarred vapour barrier with a propane torch. To investigate the importance of the partial closing of the cavity by the sagging of the batts in this second type of construction, a further test was carried out using 2- by 2-in. furring strips that eliminated the effect. Again, it was not found possible to establish a self-sustaining fire even when a light draught was induced in the area.

It was concluded from these tests that the covering on insulation batts has very little over-all effect on the likelihood or the development of a serious fire in a ceiling space. In this context a small fire involving the paper only may be disregarded.

The fact that paper covering is more readily ignitable than other materials will generally not be highly significant, since the consequence of ignition of the paper will usually result only in the destruction of the paper itself. In some circumstances, however, a spread of fire along the paper in a ceiling space could give rise to the ignition of, say, the paper on a batt in a wall space and this in turn might well result in the establishment of a fully developed fire in the wall space. Under these circumstances the ease of ignition of the paper in the ceiling space would be highly significant.

It must be emphasized that the scope of this note is confined solely to the fire hazard associated with paper-backed batts in enclosed ceiling spaces. The hazard associated with their use in wall spaces has not been investigated.

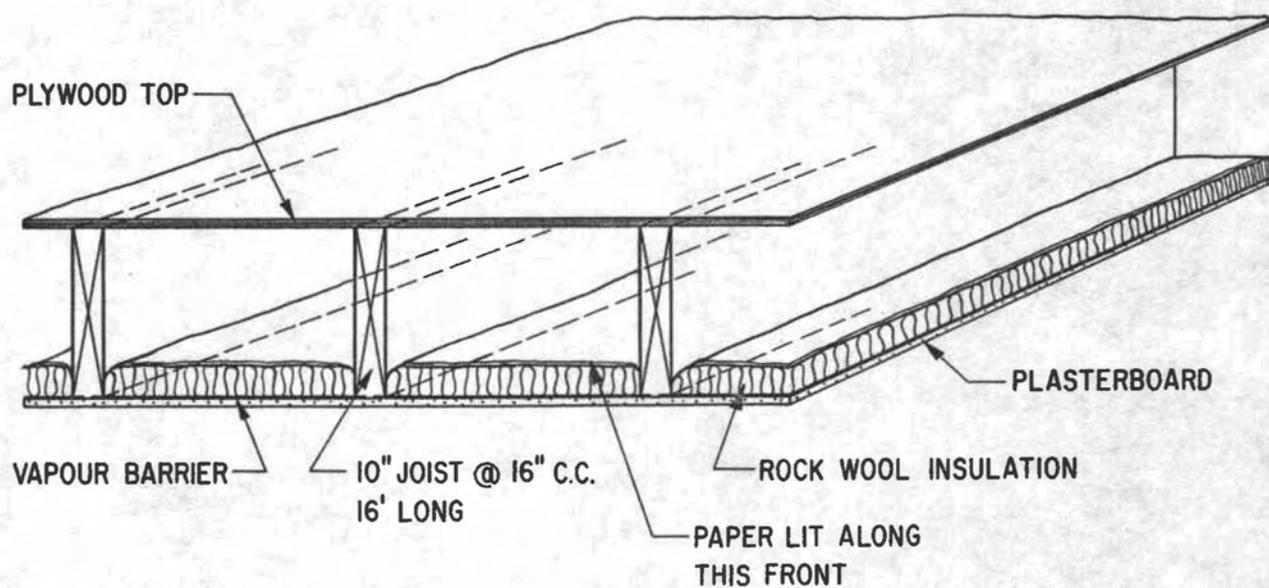


FIGURE I SECTION OF FLOOR SPACE

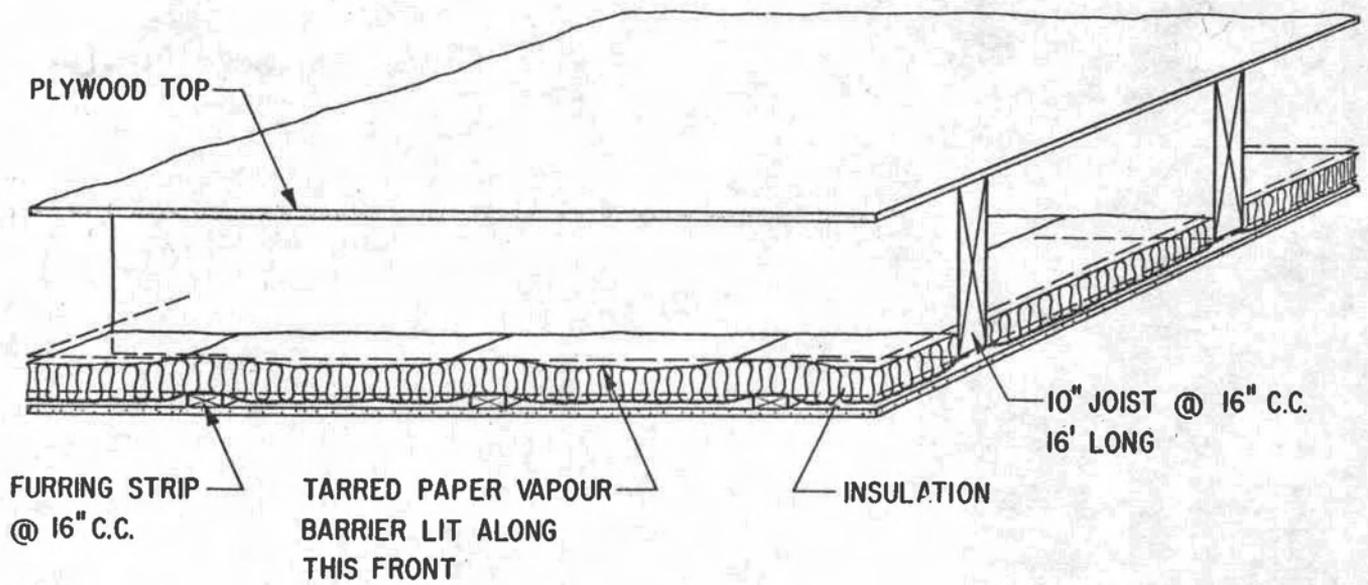


FIGURE 2 SECTION OF CEILING SPACE