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NATIONAL RESEARCH COUNCIL OF CANADA

DIVISION OF BUILDING RESEARCH

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TECHNICAL NOTE

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DATE February 1965

PREPARED FOR Record Purposes

SUBJECT A ROOF SPACE CONDENSATION PROBLEM

In February 1960 an inquiry from a motel owner concerning ventilation and condensation was answered by letter detailing the requirements for ventilation and the proper use of vapour barriers. During a visit to the area in 1961, the motel owner was contacted and he stated that he was not having any more problems with condensation having followed the recommendation outlined in the letter of February 1960. The motel was not examined as the owner seemed reluctant to go into the matter further.

Late in 1963, however, the new owner of this same motel contacted the Atlantic Regional Station. In his opinion, the former owner was having trouble late in 1961 but did not recognize the problem. The new owner's examination of the building disclosed a severe condensation problem and in January 1964 a visit was made to the motel.

The building is of wood-frame construction built on a crawl space and fully insulated (Figure 1). The first phase of the building, consisting of ten units, was erected about nine years ago. Although original units involved cathedral ceilings, some were later converted to flat ceilings at considerable cost to provide additional ventilation via an attic space.

A careful examination of the building disclosed that the worst problem existed in the old section where the roof sheathing on the south-east exposure had rotted due to condensation. The roof rafters were still fairly sound and the roofing was intact. The owner was reluctant to repair or replace the roof before correcting the condensation problem. During the examination in January, the dew point in the motel rooms was 35° to 39°F and 41° to 55°F in the crawl space. The minimum vent area requirement of

1/300 is met by the continuous strip vents in the soffit (Figure 1). To facilitate air movement a 5-in. vent pipe was installed over each pair of bathroom units to vent the ceiling space above the bathrooms. Severe condensation was evident around these vents and also in motel rooms 7, 8, 9, and 10.

Although the original plans specified 45-lb felt under 4-in. gravel fill in the crawl space (Figure 1), there was some doubt if this was placed over the entire area. On examination of the crawl space it was discovered that the ground was damp and when disturbed, wet. In one place free water was evident.

It was also evident that there were relatively large clearances around the plumbing pipes, and moisture from the crawl space could escape to the ceiling space via the plumbing wall and so bypass the ceiling vapour barrier and insulation.

It was recommended that the crawl space under the entire motel be covered with 4-mil polyethylene and that the areas around the plumbing pipes be caulked to prevent air movement from the crawl space to the roof space.

On 17 January these suggestions were carried out, and a letter from the owner on 22 February 1964 stated that the condensation problem seemed to have been corrected. Satisfactory performance throughout the remaining winter months was confirmed at the time of a visit from the Station on 5 May 1964.

From the results of this experience it appears that a vent area that is 1/300 of the ceiling area will not prevent condensation if a source of excess moisture that can gain ready access to the roof space is present. When, however, the source of moisture (in this case a damp crawl space) is controlled, the area of the vent is probably large enough. The problem was made more acute by the low slope roof, particularly where the ceiling is directly on the underside of the roof rafters, thereby reducing the volume of air over the ceiling. The absence of a continuous vent at the ridge also made the problem worse.

Once again this points out the need for very careful control of moisture sources and proper vapour barrier use and drainage in crawl spaces.

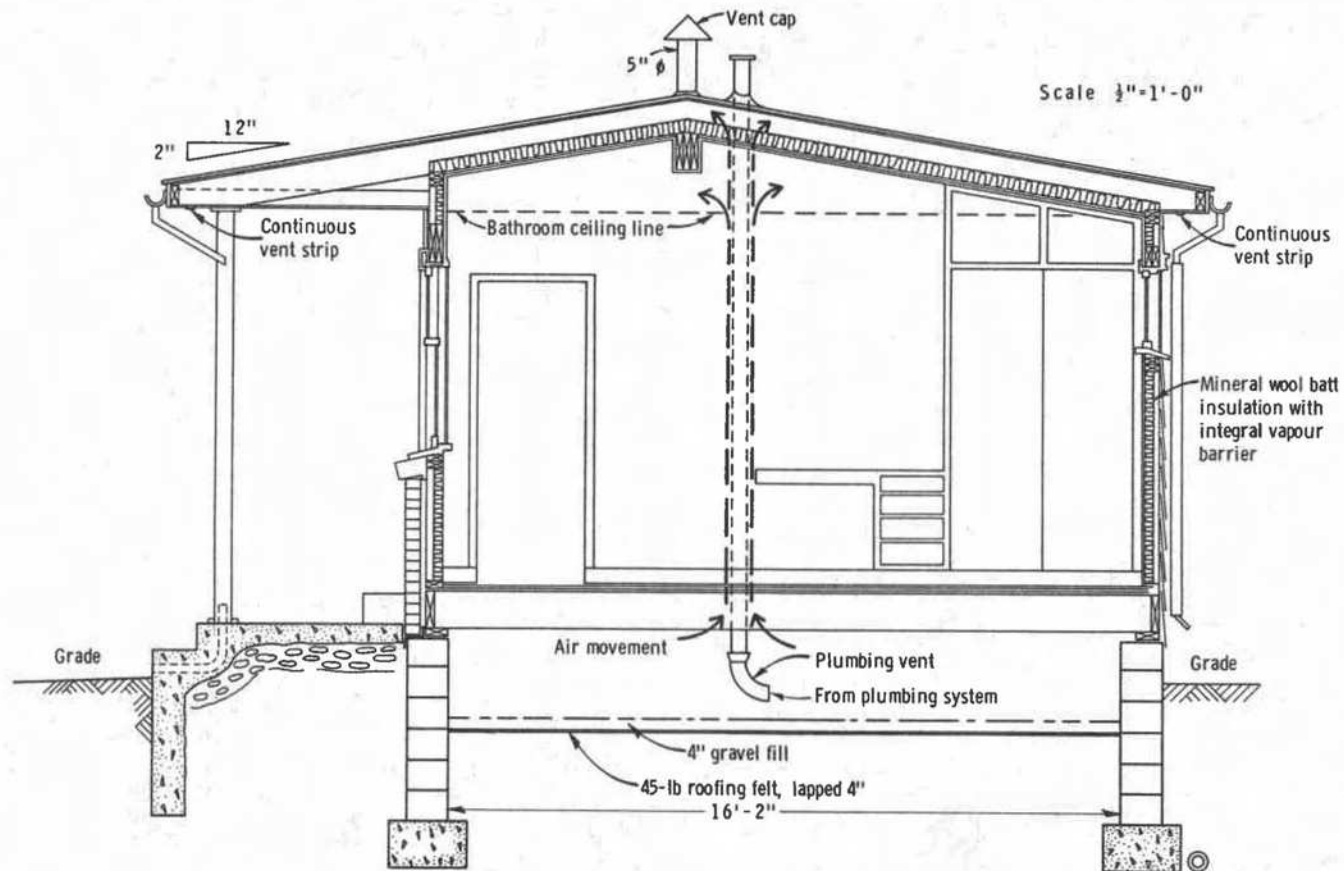


FIGURE 1 SECTION THROUGH MOTEL UNIT

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