CRCA CANADIAN ROOFING CONTRACTORS ASSOCIATION

Technical Bulletin

VOLUME 38 March 1993

Fibreboard Overlays

Controversy has existed for some time regarding the application of hot applied roof systems over various insulation substrates. The controversy centres around the compatibility of the insulation with the hot bitumen that bonds the roof membrane to it. Other problems include dimensional instability (cupping, warping, shrinking etc.), rigidity problems and "off-gassing".

Prior to the late sixties and early seventies, most built-up roofs employed either a thin layer of fibreboard or rigid fibre glass (top wrapped with a kraft paper as a bonding surface) as their insulation substrate. That situation changed when energy costs increased and other types of insulation became more prominent.

The use of polystyrenes, expanded and extruded, became commonplace in many areas. These insulations have a relatively low melting point compared to fibreboard or fibre glass. Properly bonding a roof membrane to these insulations could be very difficult.

Expanded polystyrene has normally had a protective layer of fibreboard "back-mopped" over it to facilitate the application of the hot roof membrane. Even that had problems because unrepaired broken corners in the fibreboard could allow hot bitumen to seep through and create a void in the polystyrene.

Fibreboard, however, was not universally used as an overlay for extruded polystyrene until approximately 10 years ago. When fibreboard was not used, the first of four plies of roofing felts was "roller coated" with hot bitumen so that the bitumen would cool enough to allow the felt's application to the insulation without melting taking place. The balance of the roof membrane was then applied in the normal fashion. The difficulty in this system was achieving the right temperature of bitumen at the point of application - too hot melted the insulation, too cold didn't bond properly. Goldilocks had sort of the same problem with the bears' porridge.

The seventies and eighties saw insulation levels increase dramatically. During these years other insulations, especially polyisocyanurates, polyurethanes and phenolics, were being promoted for their high thermal resistance. These insulations had either facers (foil, kraft paper, fibre glass, etc.) or a factory installed overlay such as perlite. A hot applied roof, ostensibly, could be applied directly over most of these newer insulations without fear of heat damaging them. Other problems occurred - blistering and ridging in roof membranes, warping of the insulation boards and delamination were all attributed to the intense heat of the bitumen applied directly to the primary insulation.

Well, enough of the history - how have we addressed these problems?

The answer was, and is, fibreboard and, sometimes, more fibreboard. When fibreboard is properly applied over any other insulation, it acts as an effective buffer between the primary roof insulation and the hot applied roof membrane. In fact, two layers of fibreboard, with joints offset, or a single layer, with shiplapped edges, is preferred over polystyrene insulation to prevent the bitumen seepage referred to earlier.

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There is also an advantage to applying fibreboard over the insulations that have facers which alllow hot roof membranes to be applied directly to them. That advantage occurs at the time of reroofing. Without a fibreboard overlay, roof membranes cannot be removed from these insulations without also removing their facers. They can, however, be removed from a fibreboard overlay. This allows for a complete inspection of the existing insulation. Wet and damaged insulation can be located and replaced quite easily and a new roof membrane can be installed with confidence. This would minimize the amount of waste that our industry adds to landfill sites while also maintaining good roofing practice. This has become increasingly more important because, in this environmentally conscious age, adding to landfill sites is not very prudent. And we can't forget the cost of replacing the primary insulation.

Another benefit is that wood fibreboard, unlike most other materials, expands when cooled in an enclosed environment such as a roof. Joints between wood fibreboard overlays close when cooled, providing stress relief to the contracting piece of roof membrane bridging the joint. The reason for the fibreboard expansion is that wood is more dimensionally sensitive to moisture than to temperature changes. The natural moisture in a roofing system will move upwards in winter and downwards in summer. A fibreboard overlay, therefore, expands in winter, closing the joints between boards and providing stress relief for a fully bonded roof membrane when most critical. In summer, the joints will open slightly, but at a temperature where membranes can better accommodate substrate movement. (Movement between fibreboards was measured on actual roofs over a four year period in Montreal. The average movement over a 24 hour period was less than 0.1mm.)

What can we conclude from all of this? The Canadian Roofing Contractors' Association (CRCA) believes that fibreboard is one of the best surfaces on which to apply hot bituminous roof membranes. Adding fibreboard to a roof system is not the panacea for the problems that occasionally occur in hot applied roof systems, but it is relatively inexpensive, environmentally prudent and potentially preventive.

Note: Fibreboard is specified under CAN/CSA - A247-M86 "Insulating fibreboards" as type 1, "Roof Boards".