

SERVICE WORKS

“UP ON TOP” NEWS

Membrane Roofing and Foam Adhesives

There are multiple choices of roof membrane systems available, including traditional bituminous, polymer-modified bituminous, thermoplastic, elastomeric, metal, and sprayed-in-place polyurethane foam. Variables include the roof deck, type of air or vapor retarder, surfacing, thermal insulation, etc. Traditional attachment methods include hot-applied systems, mechanical fasteners, or even ballasted systems. Yet, cold-applied adhesives were one of the earliest and most versatile systems around. Their heydays were the years following the 1953 fire at General Motors' transmission plant in Livonia, MI. In that event, a steel "fireproof" building was constructed using hot asphalt to attach a bituminous vapor retarder to a steel deck, and to attach the thermal insulation to the retarder.

An under-deck fire occurred, and the

steel deck transferred the heat load to the bituminous materials directly above. The asphalt melted and vaporized, entering the building through the various seams and weld-holes of the metal deck, feeding the fire. A total of 34.5 acres of building was reduced to rubble. In studying this loss, the combustible nature of the bitumen was a major contributor.

The roofing industry responded to this disaster quickly, introducing thin (4-millimeter) PVC vapor retarders installed in solvent-based cold adhesives. The quantities of adhesive used in these systems was restricted by fire and cost considerations. They were applied in ribbons roughly 0.25-inches thick, usually on 6-inch centers, to ensure contact with the vapor retarder (or the following layer of thermal insulation). Once a layer of approved thermal insulation was in place, practice reverted to solid moppings of hot asphalt to install the rest of the roof system.

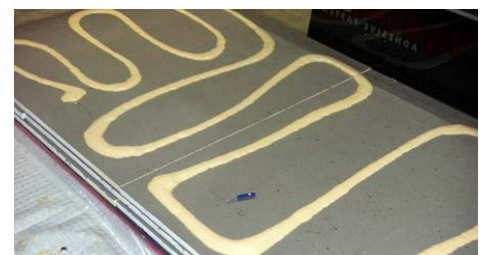
While this practice of using fire-resistant vapor retarders and reduced quantities of adhesive solved the fire problem, new problems appeared. Blow-offs were attributed to inattentive application, where the installer skipped application of adhesive at the perimeter. Since the adhesive application cart has to turn around, the end runs of the adhesive spreader were starved as half the adhesive dropped into the ribs of the deck.

There is a new generation of adhesives, generally called *low-rise* or *slow-rise* polyurethane foam. As contrasted with

the earlier solvent-based adhesives, these products cross-link fairly quickly, not requiring 30 (or more) days to reach full strength. Secondly, the rise of the foam provides a thicker layer of adhesive, assisting in making contact between the various layers of material. As with the earlier materials, there is very little material per square, so fire contribution from the adhesive is negligible.

The benefits of low rise polyurethane foam adhesive are:

- The cured adhesive is inert, and generally would not be affected by moisture penetration into the roof system. (This was true of hot-applied asphalt and solvent-based asphalt adhesives as well.)
- The system can be cost effective, compared to mechanical attachment.
- Mechanical fasteners cause holes in the roof deck that could be a problem in the future when the building is reroofed.
- The system requires no kettles and fumes are far less than when using hot (or solvent-based) asphalt applications.



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