

## SERVICE WORKS

## “UP ON TOP” NEWS

## Roofing Fasteners For Today's Roofs

For the past 5 decades, the commercial roofing industry has been preoccupied with the membrane components of the roof. The alphabet soup of EPDM, PVC, SPF, TPO, KEE, CPE, CSPE, MB (APP), and MB (SBS) is still a primary focus, along with the older asphalt and coal-tar pitch membranes.

We also have a variety of attachment methods: fully adhered, mechanically attached, ballasted roofs, cold process, vacuum, and self-adhered membranes. While the above systems deserve recognition, much of their success can be attributed to the various fastening devices that have evolved. Fasteners fasten a roofing component to the roof deck, and the type of deck dictates the dominant features of the fasteners.

This newsletter will look at fasteners from a historical perspective, since many building owners and managers have to

deal with repairing or reroofing older properties at some point; it can be important to recognize what the existing roof deck is and how the roof is attached to it.

During WWII, steel was in short supply. Gypsum decking was readily available. It was fireproof, which was important in case the United States was attacked. The gypsum slurry was poured over form boards and usually wire-reinforced for added strength. Since gypsum had a potential for developing shrinkage cracks, the bituminous roofing industry used nailed base sheets to bridge the developing cracks and to serve as the foundation of the BUR roof system. One of the standard nails used was a cut nail, which gained withdrawal strength by rusting. The nail was driven through a thin tin cap. Somewhat later, a conical nail was developed which expanded when driven into the gypsum, forming a wedge to resist pullout. This was more reliable than waiting for rust to develop.

Another popular type of deck is called lightweight insulating concrete. While this product has somewhat better insulating qualities, for new construction, it invariably incorporates expanded polystyrene foam for today's necessary high R-values. These decks are poured over a form deck, commonly 26-gauge slotted steel, but also have been poured over structural concrete by using less water and a fill richer in Portland cement (called the non-ventilating substrate mixture).

Because lightweight insulating concrete decks contain high water content even after years of service, the roofing indus-

try does not attempt to solidly adhere a roof membrane to it, but instead uses special fasteners designed for this low-strength fill. The most popular type of fastener is a hinged fastener that cuts through the base sheet and forms a wedge in the lightweight concrete. Pull-out strengths for these decks are quite low, typically about 40 pounds withdrawal, compared to several hundred pounds per fastener in steel, wood, and concrete. Fastener spacing density is increased to compensate for the low pull-out.

Steel roof decks are one of the most popular types of deck in today's construction. Because steel decks have flutes, they require a bridging layer, which is typically roof insulation. By 1986, FM Global elected to prohibit not only hot-asphalt application of the insulation, but cold adhesives as well. This gave great impetus to the development of all sorts of mechanical devices, especially self-drilling and self-threading screws combined with various stress plates.

As the single-ply industry gradually captured more and more of the roofing market, innovations included placing fasteners only in the seams of the single-ply membranes. To be cost effective, more sophisticated fasteners and stress plates were introduced, as well as “fixation bars” that were fastened through the membrane and covered with a membrane batten, either welded or adhered.

Whatever type of roof deck your building may have rest assured that the fasteners holding the roof system on have gone through an evolutionary process and have improved to meet today's high standards.



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