

THE

# "WINDS OF CHANGE"

## IN ASPHALT SHINGLE SPECIFICATION AND APPLICATION

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During the 1990s, asphalt shingles and other roof coverings were found to perform below reasonable expectations during multiple hurricanes. This fact is reiterated by the publication of the *Wood Building Performance and Analysis* (Bradford K. Douglas, PE, a special report of the National Forest Products Association, November 1992). The roof coverings (shingles) were the first portions of the buildings that failed during Hurricane Andrew. This failure included both asphalt and tile roofing products. The reason cited for the failures was inadequate fastening. The blow-off of roofing products resulted in exposure of the underlying structure and also produced wind-borne projectiles that resulted in damage to other structures. The fact that shingles and other roof coverings fail under high wind patterns has been known in the industry for decades. Yet, based on our review of installation and testing requirements, only a few manufacturers had apparently dealt with this prior to the early 2000 timeframe.

The Federal Emergency Management Agency (FEMA) prepared *Asphalt Shingle Roofing for High-Wind Regions, Recovery Advisory 2*, to recommend practices for installing shingles that will enhance their wind resistance in high-wind, hurricane-prone areas (both coastal and inland). Some key issues included special installation

methods for asphalt roof shingles used in high-wind, hurricane-prone areas defined as those areas with greater than 90-mph, 3-second peak gust design wind speed.

Based on this document, the roofing contractor should utilize wind-resistance ratings to choose the project shingles. They should not rely on these ratings alone for performance standards, but on the techniques used for proper installation of the shingles, underlayment, and edges to provide a well-constructed project in conformance with the manufacturers' and industry standards. A poorly installed product will simply perform poorly. According to Malarkey Roofing Products, "One of the most critical elements of a successful roofing project is correct installation of the shingle. Market research has shown that most laminated shingles are incorrectly installed due to improper fastener placement."

The installation of shingles is a pivotal concern in proper construction. Partnership in Advancing Technology in Housing (PATH) states, "Between 1991 and 1995, wind and hail resulted in an average of \$8 billion in insurance payouts each year, and wind and hail damage to roofs comprises a significant portion of this cost. Hail damage to asphalt shingles may include severe granule loss, material loss at shingle edges, and impact damage. Wind can also create serious roof damage. It is documented that roof-covering failure due to installation and

product selection was the most widespread type of damage from Hurricane Hugo (Manning, Billy R. and Gary G. Nichols. 1991. 'Hugo Lessons Learned.' in *Hurricane Hugo One Year Later*, Benjamin A. Sill and Peter R. Sparks, Editors. New York: American Society of Civil Engineers)."

The damage to systems by wind occurs not only in the hurricane-prone coastal regions of the United States, but also in a number of additional high-wind regions within the United States. The damage is not always associated with just shingle loss, but subsequent damage to the underlying structures and possibly even damage to adjacent buildings.

Recently, Professional Investigative Engineers (PIE) was called out to look at damaged glass windows in Littleton, Colorado. The reported wind gusts were between 80 and 90 miles per hour (3-second peak gust) versus the minimum design wind-load requirement of Jefferson County of 100 mph exposure C (3-second peak gust). The conclusion of the investigation was that the mulled window assembly did not break because of the structural issues of the unrated mullion. The damage was a result of wind-blown shingle debris from the neighboring townhomes. The shingles were torn or their attachment compromised by wind uplift from the adjacent roofing systems. The shingle product utilized on the townhomes was neither rated nor constructed for the region's wind requirements.











