



Facing the Storm

When properly designed, detailed, and constructed, structural steel offers an excellent solution for buildings subjected to high hurricane winds. of Factory Mutual and/or Underwriters Laboratory, which contain strict guidelines for purlin spacing and proper attachment to resist the roof uplift forces from hurricanes

The Building Envelope

While proper design of the MWFRS is essential to good performance of the building structure during powerful gulf coast storms, protection of the building envelope is equally critical and considerably more problematic. Experience from observation of building damage from these storms shows most damage occurs because some portion of the building envelope has been breached. There are several causes for this Attachment of the roof deck has already been mentioned, but other elements, such as proper adherence of the roof membrane, ûashing, gutters, parapets, windows, doors, rooftop vents, rooftop equipment, and other portions of the exterior cladding, are equally critical to protecting the building from damage. These attachment details are all too often poorly conceived in the design phase and woefully executed in the construction stage, leading to failure and breach of the building envelope. Many post-hurricane assessments reveal that the MWFRS remains undamaged but extreme losses are incurred due to wind and water inúltration.

Recognizing these risk factors, a building design team would be well advised to consider the following precautionary steps in designing a building envelope for hurricanes:

- Design all portions of the building envelope for component-and-cladding forces contained in ASCE 7-05. Even better, undergo a wind tunnel study on critical projects where the budget can afford it. Wind tunnel studies are known to be more accurate in predicting the magnitude and distribution of hurricane wind pressures than the analytical method in the standard.
- 2 Properly detail all elements of the building envelope to resist these forces. This takes an experienced architect and cladding designer familiar with detailing for hurricanes. Attachment requirements suggested or required by Factory Mutual and Underwriters Laboratory should be followed where guidance exists for the considered materials. Sources of information can be found in the Factory Mutual *Research Approval Guide* and the FMRC Data Sheet I-28, "Wind Loads to Roof Systems and Roof Deck Secure-

ment.[^] Information can also be found in the UL publication *Rocfing Systems and Materials Directory*.

- **3.** Consider engaging the services of a cladding and/or rooúng consultant experienced in the design and installation of building envelope components and systems
- 4. Consider performing a full-scale cladding test in a recognized testing facility on important projects. Guidelines for such testing can be found in publications by the National Association of Architectural Metals Manufacturers (NAAMM). Of particular interest are of 1