Hurricanes Charley & Frances:

Overview of Code Requirements and Engineering Considerations for Subrogation Opportunities

Prepared for Cozen O'Connor

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Hurricane Charley made landfall at Port Charlotte, Florida located on the south end of the west coast of Florida on Friday, August 13, 2004. The storm continued on a north-northeast track crossing Orlando, Florida on Saturday, August 14, 2004. Hurricane Frances made landfall on the east coast of Florida near West Palm Beach on Saturday, September 4, 2004. Damages contributed to the two storms are expected to be in the billions of dollars.

Hurricane Charley was a Category 4 storm with wind speeds in the range of 145 mph at landfall. Damage from high winds was severe and flooding accompanied the storm. Hurricane Frances was a slow moving Category 2 storm at landfall and caused severe flooding in its path.

The 2001 Florida Building Code (Code) addresses design wind speeds by referencing Chapter 6 of ASCE-7. Also included in the Code is Figure 1606 for the state of Florida. Design wind speeds in Figure 1606 vary from a minimum of 100 miles per hour in the north central section of the state to 150 miles per hour at the southern tip of the state. Most coastal areas fall within the 120-130 mile per hour design wind. The values for design wind speeds are for three second gusts in miles per hour 33 feet above ground for exposure Category C.
The exposure category reflects the characteristics of ground surface irregularities for the site where a building is to be erected. Exposure Category C is that area which lies within 1500 feet of the coastal construction control line or within 1500 feet of the mean high tide line, whichever is less.

Design for wind loading allows for increased stresses due to the transient nature of wind loading. Gust wind speeds are generally higher than sustained wind speeds experienced in a specific location. The design wind speed is customarily considered to be the sustained wind speed. Shape and use factors allow for increased wind speeds due to gusts.

The Code requires a design wind speed of 130 mph in the Punta Gorda / Port Charlotte area. Hurricane Charley had sustained winds of approximately 145 mph at landfall. Gust speeds likely were in the range of 150+ mph. To withstand the sustained wind forces associated with the design wind (i.e., 130 mph), a structural engineer would have to provide an over design of 11+% for what could be considered an already extremely high wind design environment. Weather data over a widespread area is recorded by the National Oceanic and Atmospheric Administration (NOAA). While some locations in the Punta Gorda and Port Charlotte areas may have experienced winds in excess of the 130 mph design requirement, it is unlikely that maximum wind speeds extended to all areas of damage. Once hurricanes make landfall, wind speeds tend to drop as the hurricane moves over the landmass. Thus, it is likely that damage in some areas was the result of winds below the code mandated design wind speeds. Maximum wind speed data for a specified area may be available from the National Climatic Weather Data Center in Asheville, North Carolina.

For commercial structures, the question of whether or not the structure could have resisted code winds may be determined by evaluating the main wind force resisting systems that were in place prior to the storm. Documentation, in the way of blueprints and specifications should be available from either the building owner or the architect of record. Data derived from the plans and specifications, can be evaluated to determine the adequacy of the design.

It should be expected that these plans and specifications would provide, in detail, the methods of resisting wind forces for the main structure as well as for all sub-assemblies associated with the building. Curtain wall details, cladding details and other detailed information should be provided in a complete set of contract drawings for a specific structure.

For residential structures, the question of determining if the structure was adequate for code specified winds may be a more complex issue. Typically, residential structures are designed and built by a contractor. Certainly, for some custom built residences, plans and specifications will be available. Claims for inadequate design of homes for which there are plans and specifications can be investigated in a manner similar to commercial structures. Most tract type homes, however, will have neither plans nor specifications. In some instances, a survey of what is left of the residence may be beneficial in determining exactly how a particular residence was built. Weather records may provide the only recognizable resource for assessing wind speeds in a particular area. If no part of a structure remains, the process of determining the adequacy of the design prior to the storm may become an impossible task.

Partially damaged residences and structures present the most challenging problems as they relate to damage assessment. Structures which are partially damaged may be required to be brought up to current building code requirements, or, in some cases, may be required to be replaced. In accordance with Section 3401.7.2.2 of the Code, structural repairs that do not exceed 25 percent of the value of the existing building may not be required to meet current code requirements. The upgrade requirements are at the discretion of the local building official.
Repairs which exceed 25 percent of the value of the existing building but are less than 50 percent of the value of the existing building are required to be brought up to current codes. If the value of repairs exceeds 50 percent of the value of the existing building, the entire structure must be brought up to current code requirements. Exceptions to the 50 percent rule are noted for slabs, foundations, tie beams and masonry provided there is no change in the use of the building and the excepted items met the code under which they were originally constructed. Also excepted are involuntary improvements resulting from the right of eminent domain.

The value of repairs represents an interesting and sometimes difficult challenge to those professionals assessing damage. The value of a structure is generally accepted as the cost to rebuild the same structure on a clear site. Issues relating to demolition are sure to cloud the issue. Further difficulty can be anticipated in determining if a structure is 50 percent damaged versus one that may be 51 percent damaged. A significant cost difference must be decided based on the 1 percentage point in question.

The linchpin in the Code is the reference to "structural." The definition of structural is obscure and may raise questions as to what constitutes a structural element. An interior wall in one residence may be structural, while an interior wall in a similar residence may not be structural. As an example, a load bearing brick wall is structural, while brick veneer is not structural. Further, not everything attached to a structure can be considered structural. It is likely that, in cases where disputes arise over what constitutes a structural element, the elements will have to be evaluated on a case by case basis.

For more information, contact the Cozen O'Connor Hurricane Task Force. The Task Force can be reached through Jay M. Goldstein or T. David Higgins at 1.800.762.3575.
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