

Use of Emerging Remote-Sensing Technologies to Determine Neighborhood Wind/Water Damage Patterns

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Hurricane damage to structures can involve both wind and storm-surge damage, and the settlement of insurance claims requires distinction of probable damages arising from wind action and from storm-surge action. This distinction is complicated when structures have been completely destroyed, leaving minimal evidence of damage to the structure itself. The situation is further complicated when engineers are retained several months after the event, after additional damage evidence is removed. The establishment of neighborhood damage patterns from evidence collected quickly after the hurricane then becomes a necessity for the assessment of probable damages attributed to wind or storm surge.

Recent advances in remote-sensing technologies provide engineers with a highly effective means of establishing neighborhood damage patterns. Efforts to rapidly collect voluminous ground-based field damage data as well as high-resolution aerial and satellite digital imagery of post-hurricane scenes have successfully been implemented following major hurricanes during the past three years. These data preserve damage scenes and give engineers ready access to both synoptic and site-specific views of damage conditions, including critical indicators of probable damage due to wind and/or storm-surge action. The identification of damage “signatures” of both wind and storm-surge damage within remote-sensing imagery has proven valuable for the establishment of neighborhood damage patterns. These data archives are helpful for guiding detailed post-storm damage surveys as well as establishing damage patterns long after the event.

A massive number of legal challenges involving insurance settlements have resulted from damages caused by Hurricane Katrina, necessitating the distinction of wind and storm-surge damage. Analysis of post-storm remote-sensing imagery – in conjunction with field-based ground-truthing endeavors – has formed a critical part of the distinction of wind and storm-surge damage. This practical investigation has led to the identification of damage signatures helpful to determining causes of damage.

This paper examines the use of remote-sensing imagery and field reconnaissance in the identification of visual damage signatures to establish neighborhood damage patterns in areas damaged by Hurricane Katrina. This study concentrates on visual signatures of wind and storm-surge damage applicable to the main types of Gulf Coast residential construction.