A HOLISTIC APPROACH FOR HINDCASTING THE RECOVERY OF THE 2011 JOPLIN TORNADO

Stephanie F. Pilkington[*1], Navid Attary[1], Hussam N. Mahmoud[1], John W. van de Lindt[1], Maria Koliou[2], Merhdad Memari[3], Steve Smith[4], Andrew Curtis[5]

[1]Colorado State University, Fort Collins, CO 80523, USA, [2]Texas A&M University, College Station, TX 77843, USA, [3]American International Group, Inc. (AIG), Philadelphia, PA 19103, USA,[4]Missouri Southern State University, Joplin, MO 64801, USA, [5]Kent State University, Kent, OH 44242, USA

*Stephanie.Pilkington@colostate.edu

The May 22, 2011 Joplin tornado damaged nearly 7,500 residential structures and 553 non-residential structures, resulting in approximately $2 billion in direct economic damage and 161 fatalities. While the community has taken years to recover, and still has not fully recovered, this record setting event provides a case study that could be used in verifying models devised to predict damage states, loss, and, ultimately, recovery trajectory from similar events. As the wind hazard research field moves forward, being able to anticipate results of catastrophic events would greatly aid communities in making future decisions on how best to invest with the objective of achieving their resilience goals. The research conducted through the NIST Center for Risk-Based Community Resilience Planning includes data collection (in collaboration with Kent State University and Missouri Southern State University for this hindcast) and processing of various hazardous events in order to validate and verify various modeling approaches. Physics-based modeling approaches have been applied to the Joplin community for assessing building damage states and the excepted loss for each building. The results of which are then verified through post-survey recorded data and observational data provided by Kent State and the Missouri Southern. Damage states are first determined through fragility analysis of 19 different archetypes. Based on the resulting damage state probabilities, the loss is then calculated based on guidance in referencing FEMA's HAZUS. The resulting recovery was previously monitored through video geo-tagged data in 6-month intervals for the first two years and then yearly starting in 2014. In addition to the modeling analyses, the post-processing of such data is critical in building a detailed hindcasting model, which can form the foundation for hindcasting future wind hazard-based recovery analysis of communities. Ultimately, this brief presentation will highlight the modeling and hindcasting of damage states and subsequent direct physical loss estimates as well as introduce the recorded recovery data for future comparisons.