



CEE Department and Case ASCE Joint Seminar

Natural Catastrophe Insurance & Cat Risk Modeling

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Abstract

Catastrophe risk models are designed to help businesses, insurance companies and organizations assess the probability and severity of potential future disasters so that they can prepare for their financial impacts before they occur. These models mathematically represent the natural occurrence patterns and characteristics of hurricanes, earthquakes, wildfires, severe thunderstorms, and other disasters and combine them with information pertaining to replacement values, construction types, and occupancy classes for the properties at risk to simulate events and provide information on the potential for large losses from future catastrophes.

The use of catastrophe models has become standard practice throughout the property insurance and reinsurance industries. Insurance and reinsurance companies, for example, use catastrophe modeling to estimate the potential loss to their books of business and to help them better assess and manage the risk in their portfolios. In addition to helping with portfolio risk management and optimization, the outputs from catastrophe models are used across the industry to support of a wide range of applications such as setting appropriate insurance rates and underwriting guidelines, evaluating the effects of various policy conditions, and the pricing and structuring of re-insurance and/or catastrophe bonds. We will briefly discuss why it is critical for the insurance industry to understand and quantify their risk from extreme events through a few examples, and then discuss several use cases of catastrophe models in insurance. We will then spend time with the building blocks of catastrophe models through examples. We will highlight areas of possible improvements as we go through these components.

About the speaker: Dr. Cagdas Kafali is a Senior Vice President in AIR's Research and Modeling group overseeing the vulnerability, damage and loss uncertainty research and modeling for various insured assets subjected to natural hazards. Dr. Kafali holds an M.S. in Structural Engineering from Case Western Reserve University and a Ph.D. in Civil Engineering from Cornell University with a minor in Applied Mathematics. In his dissertation he developed a probabilistic methodology for assessing performance of structural/nonstructural systems in multi-hazard environment.

