

APPLICATION OF DIFFERENT THUNDERSTORMS FROM TEXAS AND ITALY ON THE CAARC BUILDING

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ABSTRACT

The study of thunderstorms has been one of the most important topics of research in wind engineering over the last three decades. While decades of wind engineering research has been based on stationary wind phenomena, crucially thunderstorms, often responsible for design wind speeds around the world, are transient by nature. Thunderstorm studies have sought to understand this key difference, studying as best as possible with information available, spatial and temporal variations, however, such characteristics have not been compared across different geographical regions. Such comparisons are relevant to determine whether thunderstorms, and smaller-scale downbursts, share the same properties around the earth, and help establish whether there are significant differences in their normalized characteristics such as: intensity, acceleration, velocity profile, and response spectra. The research performed here aims to take this first step: a sample of anemometer records of thunderstorm events collected from the database of Texas Tech University (TTU) and University of Genoa in Italy are analyzed and compared. Analysis of wind speed records is performed to provide a better understanding of the developing wind field (spatially and temporally) during these transient events. The wind loading related to these thunderstorms is applied on a structural model of the CAARC building using two different techniques: Thunderstorm Response Spectrum Technique (TRST) formulated by Solari (Solari *et al.*, 2015), and another method introduced by Chen and Letchford (Chen and Letchford, 2005) that applies thunderstorm action as an impulse loading.