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Conference on European Tornadoes and Severe Storms

Occupant protection in tornadoes

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The Wind Science and Engineering (WISE) Research Center at Texas Tech University has conducted research in design of buildings for tornadoes since 1970. On the evening of 11 May 1970 a severe tornado damaged and destroyed almost one-third of the city of Lubbock (home of Texas Tech University) causing 26 fatalities and more than one hundred million dollars (U.S) worth of damage. Engineers from Institute for Disaster Research (currently WISE) conducted damage documentation and analyzed building failure modes in this tornado event. This and other damage documentation efforts have led to a design concept of above ground in-home shelter for occupant protection. The in-home shelter should be easily accessible, strong enough to survive wind pressures and debris impacts, aesthetically attractive, usable when not occupied during storm, and economical. Technical challenges in developing design criteria for in-home shelter included establishment of design wind speed and debris size and impact speed.

An above-ground shelter with reinforced concrete walls and roof survived a direct hit by a tornado that occurred on 3 May 1999 in Oklahoma City. This survival provided real proof of the viability of the above ground shelter to protect occupants. Since the Oklahoma City tornado the Federal government is making grants to homeowners to pay partial cost for construction of in-home shelters. The paper discusses the concept, research, development and implementation of in-home shelters for occupant protection from windstorms.

