

NIST releases final report on Cowboys facility collapse

January 27 2010

The National Institute of Standards and Technology has released its final report on the May 2, 2009, collapse during a severe thunderstorm of the fabric-covered, steel frame practice facility owned by the National Football League's Dallas Cowboys. The final report is strengthened by clarifications and supplemental text based on comments provided by organizations and individuals in response to the draft report on the collapse, released for public comment on Oct. 6, 2009. The revisions did not alter the study team's main finding: the structure collapsed under wind loads significantly less than those required under applicable design standards.

Also left unchanged after the comment period is NIST's recommendation that other fabric-covered frame structures be evaluated to ensure adequate performance under design wind loads. These evaluations, says NIST, should determine whether or not the fabric covering provides lateral bracing for structural frames considering its susceptibility for tearing; whether the building should be considered partially enclosed or fully enclosed based on the openings that may be present around the building's perimeter; and whether the failure of one or a few frame members may propagate, leading to a partial or total collapse of the structure.

The Cowboys facility was designed as a series of identical, tubular steel frames with a tensioned fabric covering. Assumptions and approaches used in the design of the building resulted in significant differences between the original calculated wind load demands and structural

capacities compared to those derived by NIST. For instance, the NIST calculated internal [wind pressure](#) due to the presence of vents and multiple doors based on classifying the building as "partially enclosed" rather than "fully enclosed" as stated in the design documents. Also, NIST did not rely on the building's fabric to provide lateral bracing (additional perpendicular support) to the frames in contrast to what was stated in the design documents. Finally, NIST included the effects of localized bending in calculating the expected wind resistance of the structure, whereas the design documents did not indicate that such bending was taken into account.

Based on data acquired during a reconnaissance of the collapsed facility, NIST developed a two-dimensional computer model of a typical structural frame and then analyzed that frame to study its performance under various wind conditions. NIST worked with the National Oceanic and Atmospheric Administration's (NOAA) National Severe Storms Laboratory to estimate the wind conditions at the time of collapse. The researchers determined that, at the time of collapse, the wind was blowing perpendicular to the long side of the building. Maximum wind speed gusts at the time of collapse were estimated to be in the range of 55 to 65 miles per hour—well below the design wind speed of 90 miles per hour as specified in the national standard for wind loads.

NIST and NOAA analyzed the available wind data and concluded that a microburst (a small, intense downdraft which results in a localized area of strong winds) was centered about one mile southwest of the structure at the time of collapse. The [wind](#) field in the vicinity of the structure was predominately lateral, as assumed in design.

NIST is working with various public and private groups toward implementing changes to practice, standards, and building codes based on the findings from this study.

More information: The complete text of the final report may be accessed at [www.bfrl.nist.gov/investigatio ... s/investigations.htm](http://www.bfrl.nist.gov/investigations.htm)

Provided by National Institute of Standards and Technology (NIST)

Citation: NIST releases final report on Cowboys facility collapse (2010, January 27) retrieved 26 April 2024 from <https://phys.org/news/2010-01-nist-cowboys-facility-collapse.html>

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