

A Structural Reevaluation of the Collapse of World Trade Center 7

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ABSTRACT

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This report presents the findings and conclusions of a four-year study of the collapse of World Trade Center Building 7 (WTC 7) — a 47-story building that suffered a total collapse at 5:20 PM on September 11, 2001, following the horrible events of that morning.

The objective of the study was threefold: (1) Examine the structural response of WTC 7 to fire loads that may have occurred on September 11, 2001; (2) Rule out scenarios that could not have caused the observed collapse; and (3) Identify types of failures and their locations that may have caused the total collapse to occur as observed.

The UAF research team utilized three approaches for examining the structural response of WTC 7 to the conditions that may have occurred on September 11, 2001. First, we simulated the local structural response to fire loading that may have occurred below Floor 13, where most of the fires in WTC 7 are reported to have occurred. Second, we supplemented our own simulation by examining the collapse initiation hypothesis developed by the National Institute of Standards and Technology (NIST). Third, we simulated a number of scenarios within the overall structural system in order to determine what types of local failures and their locations may have caused the total collapse to occur as observed.

The principal conclusion of our study is that fire did not cause the collapse of WTC 7 on 9/11, contrary to the conclusions of NIST and private engineering firms that studied the collapse. The secondary conclusion of our study is that the collapse of WTC 7 was a global failure involving the near-simultaneous failure of every column in the building.

All input data, results data, and simulations that were used or generated during this study are available at <http://ine.uaf.edu/wtc7>.