

collapse was likely due to the falling of debris from the collapse (NIST NCSTAR 1-9 Appendix B). It is consistent that the falling debris (on the east side of the building) imparted some momentum in the east west direction as it descended.

Table 3–1. Comparison of global structural model predictions and observations for WTC 7, Case B.

Observation Time (s)	Analysis Time (s) with Debris Impact Damage	Analysis Time (s) without Debris Impact Damage	Event
≈ -6 s ^a	-6.6 s	-6.6 s	Start of cascading failure of floors surrounding Column 79
N/A ^b	-1.3	-1.4	Buckling of Column 79, quickly followed by buckling of Columns 80 and 81
$\equiv 0$	$\equiv 0$	$\equiv 0$	Start of descent of east penthouse
2.0	2.4, 2.7	2.3, 2.6	Descent of east penthouse below roofline (First value: observed from the northwest and below; second value: observed from the north at the roofline)
N/A ^b	3.5 to 6.1	3.2 to 13.5	Buckling of columns across core, starting with Column 76
6.9	6.3	9.8	Initial downward motion of the north face roofline at the eastern section of the building
8.5	7.3, 7.7	8.7, 9.2	Descent of the east end of the screenwall below the roofline (First value: observed from the northwest and below, second value: observed from the north at the roofline)
9.3	6.9, 7.3	10.6, 10.9	Descent of the west penthouse below the roofline (First value: observed from the northwest and below, second value: observed from the north at the roofline)

a: From NIST NCSTAR 1-9, Appendix C and Chapter 8.

b: Not available

The two calculated times and the observed time for the descent of the east penthouse below the roofline were quite similar, independent of the debris impact damage. At this point, the two computations were also similar to each other in the manner in which the vertical progression of the collapse was proceeding.

The horizontal progression of buckling core columns was interior to the building and could not have been observed from the street. The process occurred over a longer duration of 10.3 s (13.5 s minus 3.2 s) for the analysis without debris impact damage than for the duration of 2.6 s (6.1 s minus 3.5 s) for the analysis with impact damage. In the analysis without debris impact damage, the lack of core framing damage on the lower west side resulted in a sequence of interior column failures from east to west that occurred at a more uniform rate. In the analysis with debris impact damage, the core framing damage on the west side resulted in a more rapid failure of the west interior columns in the last stages of the horizontal progression.