

# Retrofitted Pentagon Walls: Review of Design, Construction and Destruction

Prepared for the June 28, 2017  
9/11 Truth and Other Deep State Crimes Teleconference

Wayne H. Coste, PE  
Truth Outreach, Inc.



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# OVERVIEW OF THE PENTAGON WALL ISSUE



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# Overview

- Pentagon wall subject of much confusion
- Wall present on 9/11 is frequently referred to as massive and blast resistant
  - Little detailed analysis of the wall is available in 9/11 Truth circles
  - Many who speak about the Pentagon repeat assertions of “massive and steel reinforced”
  - Current author has, himself, repeated this



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# Overview

- Review of construction prior to 9/11 shows much smaller wall mass
  - Old estimate was 96 tons for 80' opening
  - New estimate was 75 tons for 100' opening
- Connections of wall to upper and lower slab is now better understood
  - Through-bolt connections
  - Steel tubes inserted into ground floor slab



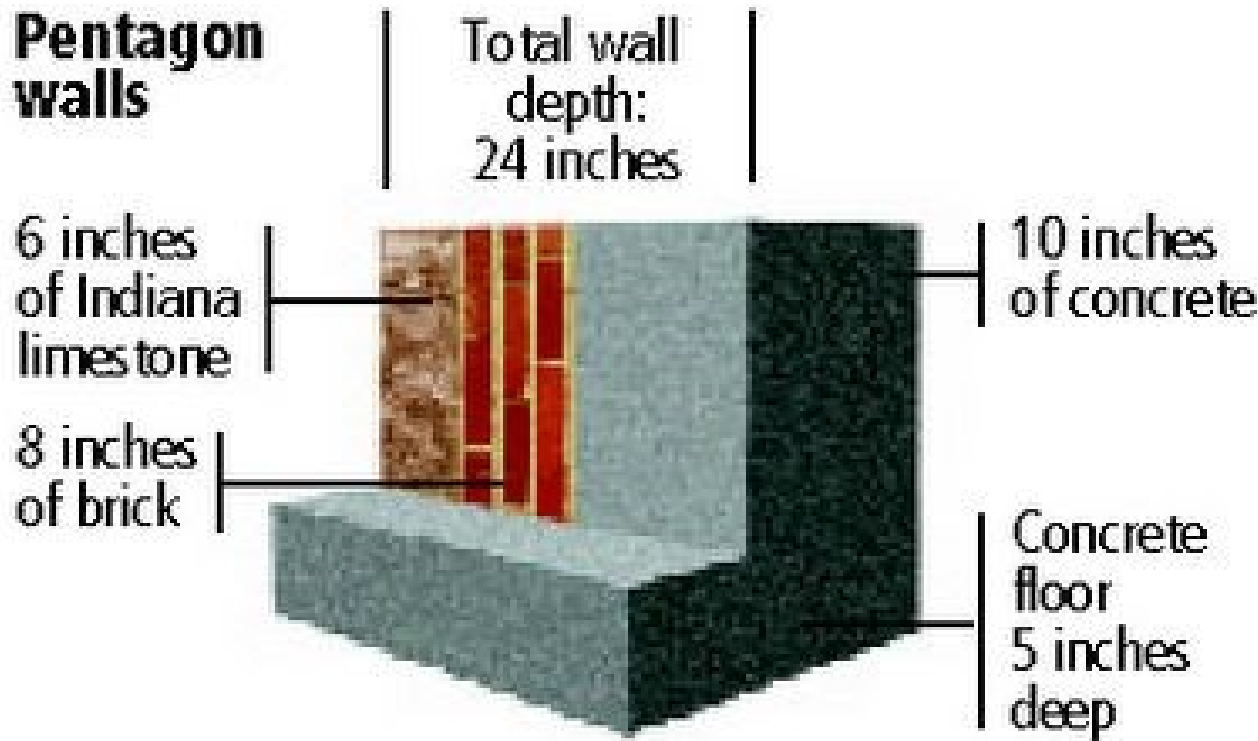
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# E-Ring Wall Rebuilt Before 9/11

## Note: Section Without Windows

Wedge One's outer wall frequently characterized as solid, massive, limestone, brick and reinforced concrete wall



**Two-foot thick wall without windows**

**Protect occupants from blast and flying glass / bricks**

**NOTE: Sections with windows replace concrete with steel and Kevlar window frame**



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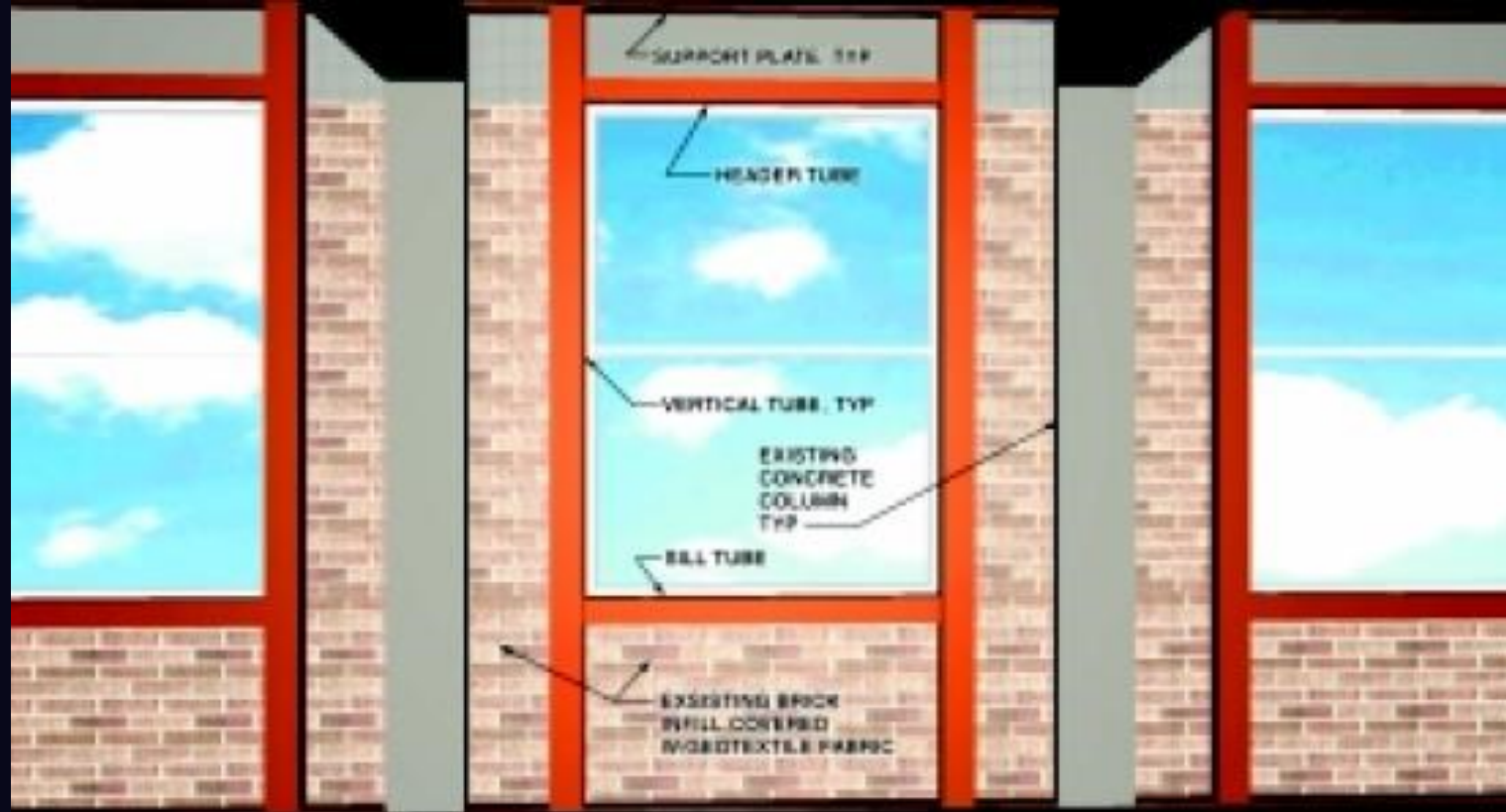
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# E-Ring Wall Rebuilt Before 9/11

## Note: Section With Windows

Wedge One's outer wall reconstructed with blast resistant windows to withstand a terrorist attack specifically from bomb blasts and high-force lateral impacts



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# DESIGN PARAMETERS



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# Retrofitting the Pentagon for Blast Resistance

## Article

**Retrofitting the Pentagon for Blast Resistance**, Michael N. Biscotte, P.E., and Keith A. Almoney

Michael N. Biscotte is a Vice President and registered engineer, and Keith Almoney is a staff structural engineer with Hayes, Seay, Mattern & Mattern, Inc. (HSMM), in Roanoke, VA.

## No Reinforced Concrete Wall Backing

... **The idea of supporting the brick infill walls with a reinforced concrete wall "backing" was rejected** as a "typical" approach because of the Pentagon's extensive fenestration (although this design was accepted for "blank" wall panels with no window openings) ...

## Selected Approach

This solution has a tubular frame for each windowed wall panel, consisting of two vertical tubes welded at each window's head and sill. The frame becomes the structural support for the blast-resistant windows, **with the vertical tubes giving new blast protection to the infill walls.**

Source: <http://911research.wtc7.net/mirrors/guardian2/pentagon/pentagon-retrofit.htm>



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# Retrofitting the Pentagon for Blast Resistance (cont)

To make the solution work, HSMM designed a practical floor-ceiling connection scheme for the vertical tubes. The tubes must withstand large deflections to perform their intended function of absorbing blast loads. Large deflections, however, with their inherent shear, create significant tensile force on connecting hardware in a blast situation. This condition eliminated the more direct "top/bottom" approach of connecting the vertical tubes to the concrete slab above and below with expansion anchors.

## Second third and fourth floors

... The answer was to weld the tubes **to long, narrow plates running along the floor and ceiling. These plates connect to their counterparts on floors above and below with through-bolts**, using 3/4"-diameter A36 threaded rods. To maintain good connection to the slab for constructibility and to compensate for variations in tube length, the vertical tubes are also welded to opposed double gusset plates, which in turn are welded to the floor/ceiling plates. This solution connects the window frames from floor to floor. This design directs dynamic horizontal blast forces through the flexible tubes into the floor diaphragms. This approach was uniformly applied to the window panels on the second, third and fourth floors.

Source: <http://911research.wtc7.net/mirrors/guardian2/pentagon/pentagon-retrofit.htm>



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# Retrofitting the Pentagon for Blast Resistance (cont)

## First floor

... Because the first floor is slab on grade, connecting the tubes to the floor slab by through-bolting would not work. And since anchor bolts could not take the calculated tensile and shear forces, a different approach was required. **A core-drilled hole in the slab on grade accommodates the tube bottom so the tube will bear horizontally against the floor through a bearing plate.** After inserting the greased end of the tubes, the holes are grouted to create a bearing surface and protect the capped tubes' ends from soil moisture corrosion.

The first floor ceiling configuration created a separate connection challenge ... The tubes' top connection used the same through-bolt scheme as the other floors, aligning with the bottom plates on the floor above.

Source: <http://911research.wtc7.net/mirrors/guardian2/pentagon/pentagon-retrofit.htm>



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# “Blast-Resistant Windows” not “Blast-Resistant Walls”

"Under the renovation plan [...] **the outer wall was reinforced with structural steel tubing to increase its lateral stability and provide support to new blast-resistant windows.** The building's windows indeed required special attention. Analysis of attacks on large structures elsewhere bore out that flying glass from blast-shattered windows caused many casualties, including deaths. The Pentagon's original [...] windows [...] offered no resistance to blast-generated fragmentation. Reinforcing the windows on the outside of the E Ring and the A Ring would diminish the blast and fragmentation effects of exterior explosions. New windows for the E Ring, the same size as their predecessors but with glass 1½ inches thick and weighing more than a ton apiece, were welded into special tubular steel frameworks. On 11 September many survived the blast."

Source: Pentagon 9/11, Defense Studies Series, Alfred Goldberg et al, Office of the Secretary of Defense, Washington, D.C., 2007



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# CONSTRUCTION PHOTOS BEFORE 9/11



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# Wall Has No Visible Concrete Mass



Window frame supports

Blast resistant windows

Kevlar for safety from blast related shrapnel

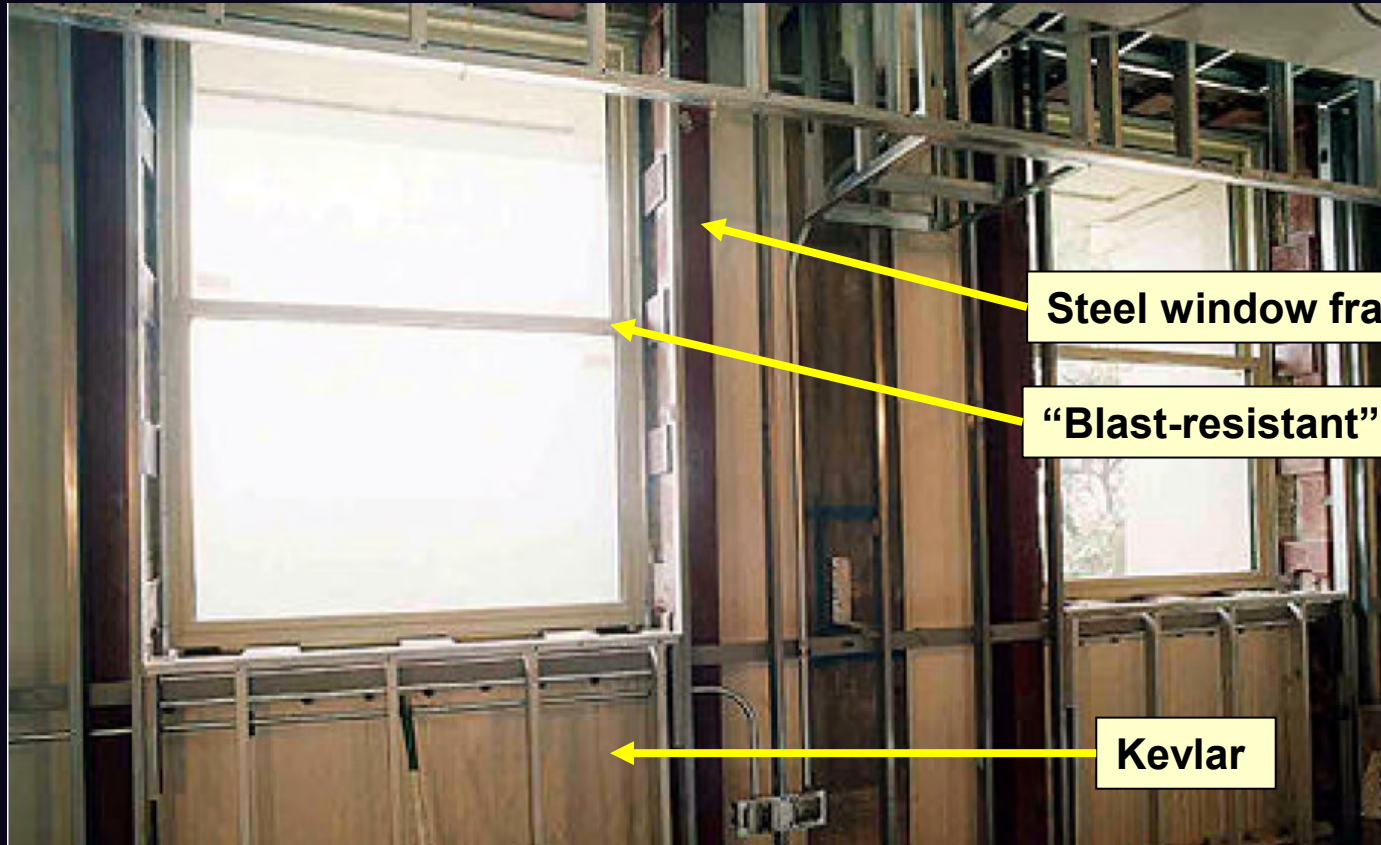
Bolted connections to floor via steel rail



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# Steel Frames Support Windows Frames Are Not Building Structure



Steel window frame

“Blast-resistant” window

Kevlar

“Structural steel, running through all five floors, strengthens the walls around the blast resistant window units. A geo-technical mesh is stretched between the steel tubes to prevent debris from becoming shrapnel in the event of an external explosion.”



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# Wall Bolted to a Steel Header Bolted to the Floor Slabs



Bolted connections to  
floor/ceiling along steel rail



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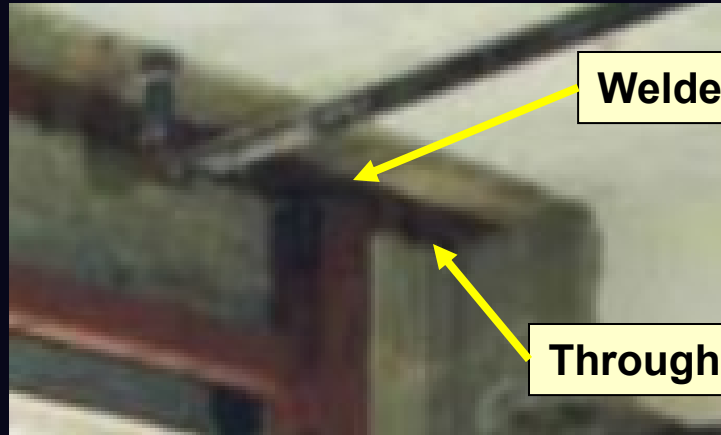
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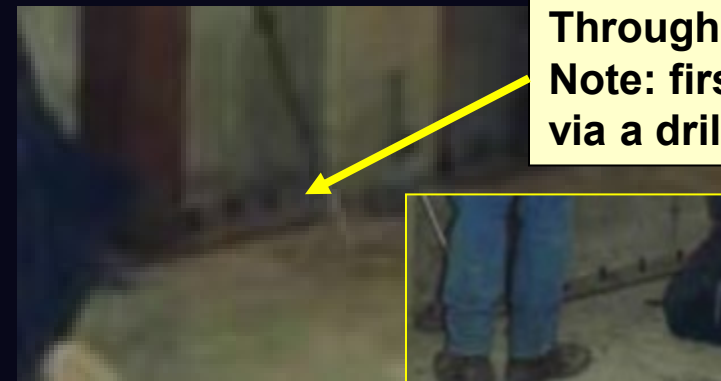
# Frames Bolted in Place



Workers in Wedge 1 install framework that will strengthen the walls around new blast-resistant windows.



Welded to header



Through bolts to upper floor

Through bolts to lower floor.  
Note: first floor connection is via a drilled hole in the slab.

Note: Photo from "Status Report to Congress - March 1, 2000"

Source: <https://web.archive.org/web/20010605215639/http://renovation.pentagon.mil:80/PDF/03.2Status2000.pdf>  
<https://web.archive.org/web/20000901020842/http://renovation.pentagon.mil:80/congress.htm>  
[https://web.archive.org/web/\\*/http://renovation.pentagon.mil:80/PDF/\\*](https://web.archive.org/web/*/http://renovation.pentagon.mil:80/PDF/*)

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## POST 9/11 EVENT PHOTOS



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# Steel Windows Frame From Inside



Steel window frame

“Blast-resistant” window melted

Kevlar



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# Water and Fire Damage Exposes Wall

A photograph showing the interior of a building with significant structural damage. A large opening in the wall reveals a brick infill section. Below the brick, there is a layer of fiberglass bat insulation. The surrounding structure is heavily charred and debris is scattered on the floor. Two yellow arrows point from text boxes to the brick and insulation areas.

Brick infill

Fiberglass bat insulation under window sill

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# Views of the North End Showing Column 9AA Window Frame Tube



Steel window frame tube bent inward



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# Limestone, Bricks and Steel Frames Visible Near Column 3



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# Limestone, Bricks and Steel Frames Visible Near Column 3



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# Column 9AA and Window Frame Tube to its Right



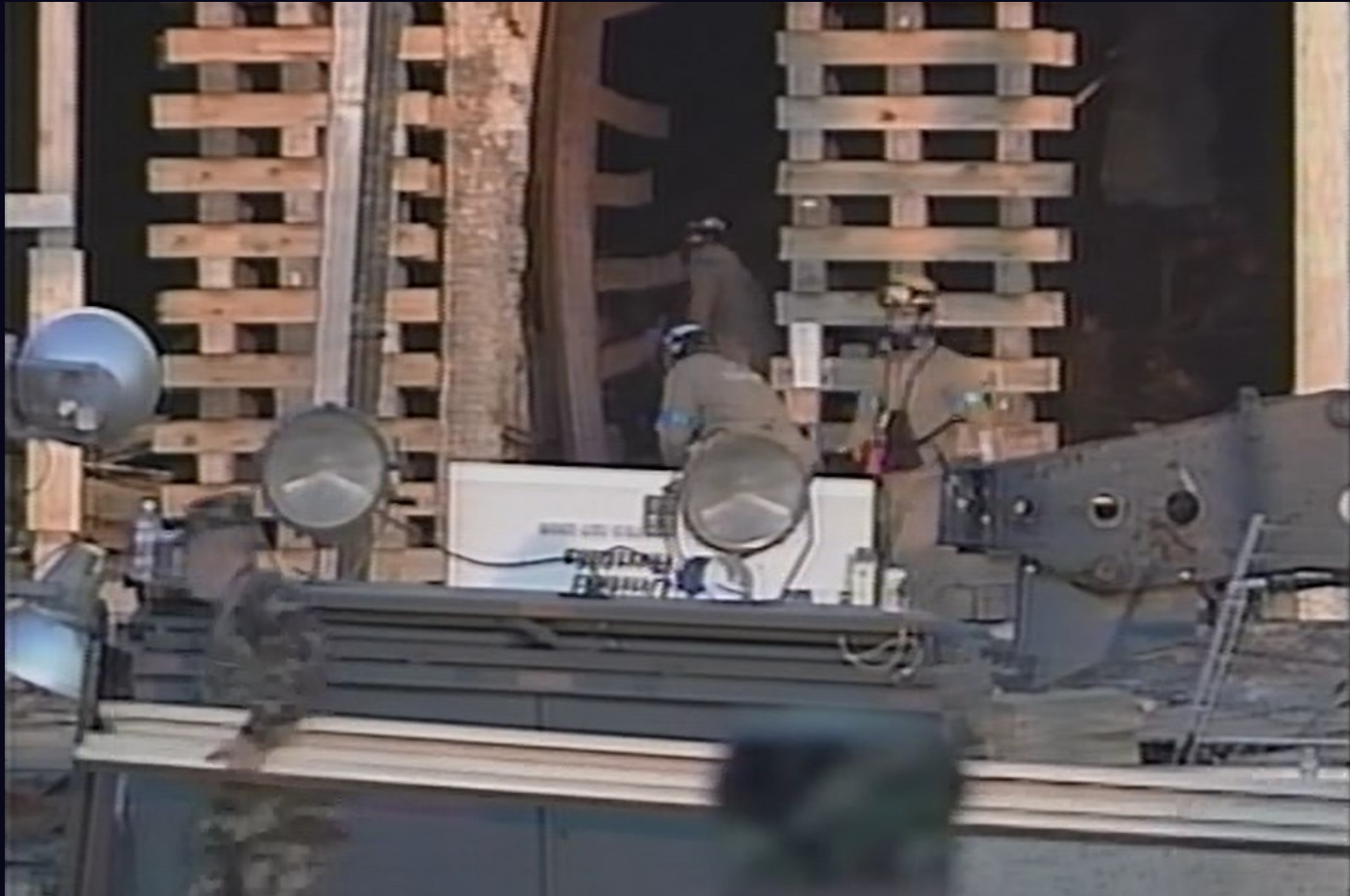
ASCE Pentagon Building Performance Report



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# Column 9AA and Adjacent Steel Window Frame Tube



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# Window Frame Connected to Ground Slab is as Described



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# COLLAPSED WALL PHOTOS



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# What is Visible in the Post-Collapse Wall Photos

- All components of the wall are clearly visible in the post-collapse photos
  - Limestone exterior sheathing
  - Bricks
  - Concrete wall blocks
  - Support columns
  - **Steel window frame supports**
  - **Blast resistant windows**



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# E-Ring Wall Crumbled Exposing All Wall Components



Limestone facing

Brick under limestone

Steel window frame

“Blast-resistant” window



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# Steel Supported Window Frames Rebar Associated With Columns

Blast-resistant windows

Steel window frames

wall blocks (Limestone?)

Shattered tree stump



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# Steel Supported Window Frames Rebar Associated With Columns

Steel frame was not continuous  
between floors

floor to ceiling on each floor



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# Header that Window Frame was Bolted to is Visible



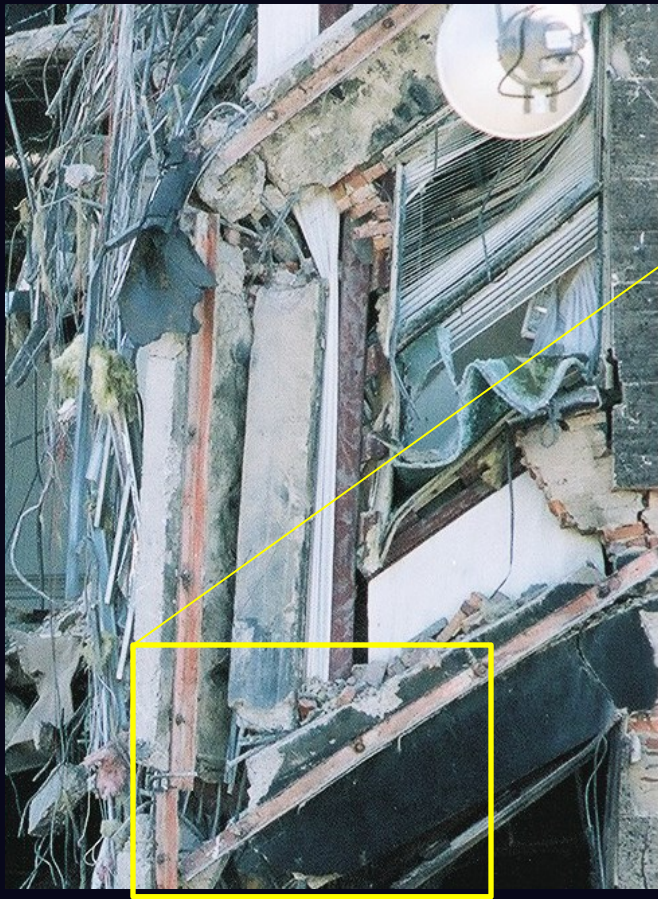
Through-bolt connection



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# Rail that Window Frame was Bolted to is Visible



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# Video of Impacted Wall Crumbling (Poor Video Quality)

Bob Pugh “I heard a crunch and I looked back to my left and the Pentagon – actually the floors were collapsing right across from where I was standing.” <https://www.youtube.com/watch?v=-xtEJ4zrIPM> at 9:20



Source: <https://www.youtube.com/watch?v=bCspmm5YIXE> at 25:50



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# Questions



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## APPENDIX



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# My Old Calculation of Mass of Wall

- Mass of wall
  - 12 ft high opening
  - ~~80~~ ft wide contiguous opening
  - ~~960~~ sq ft (total wall area)
    - ~~720~~ sq ft (of concrete wall)
      - Assuming 25 percent is window space
      - Assuming ~~267~~ lb/sq-ft of non-window wall
- ~~96 tons wall mass~~



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# My Revised Calculation of Mass of Wall

Item	Mass (tons)
Window Pane	1.0
Frame for Window	0.5
Mass of bricks per window	1.7
Mass of limestone per segment	1.8
Mass of column per segment	2.5
Total tons per window segment	7.6
<b>Total tons for 100 feet of wall</b>	<b>75.5</b>



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