

Investigation of Fuselage Penetrations in Burnthrough Protected Area



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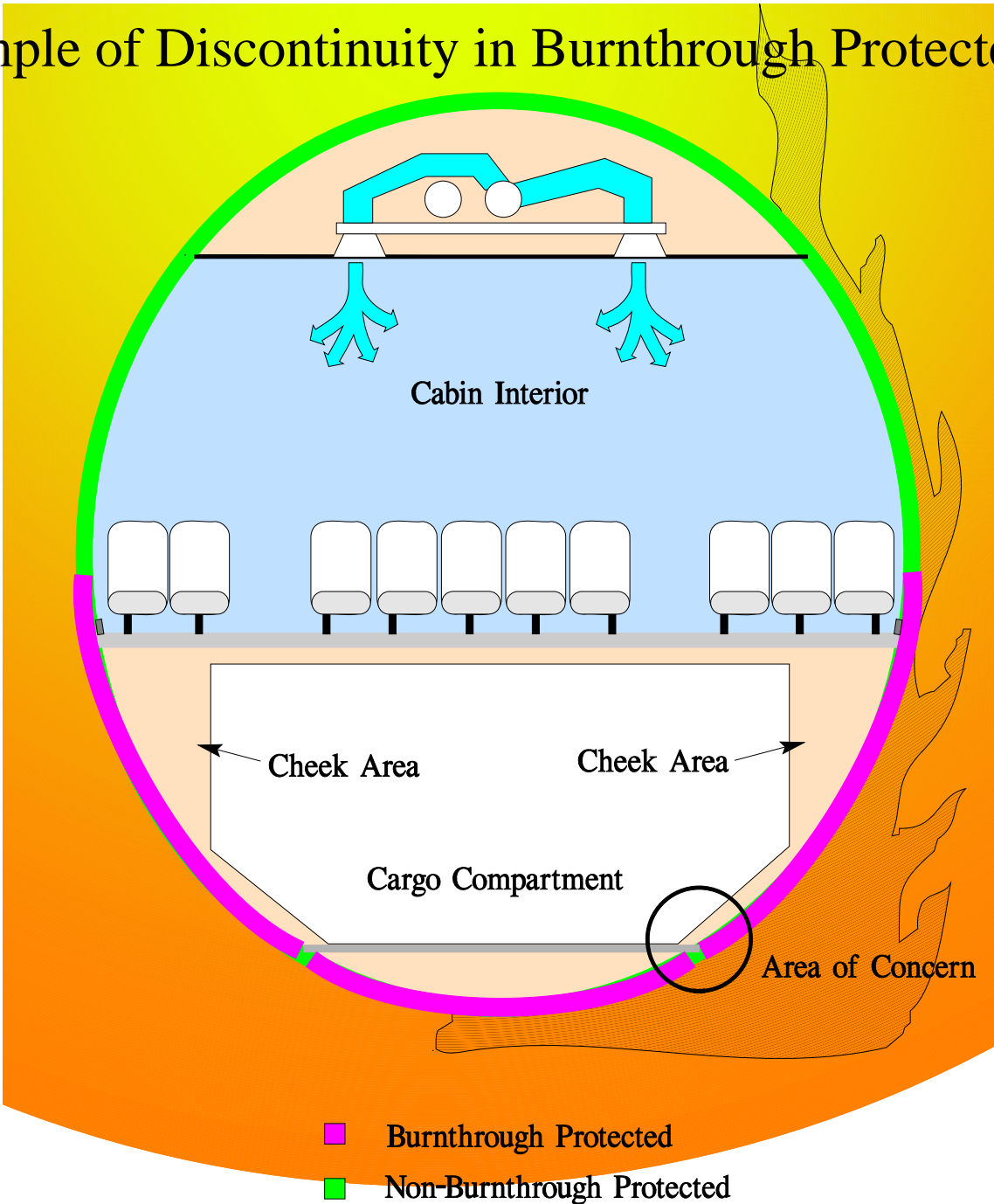
Insulation blankets in burnthrough-protected area of fuselage not 100% connected or contiguous.

Discontinuities such as slots, gaps, holes, pass-throughs, and other openings can exist in the burnthrough protected area of the fuselage.

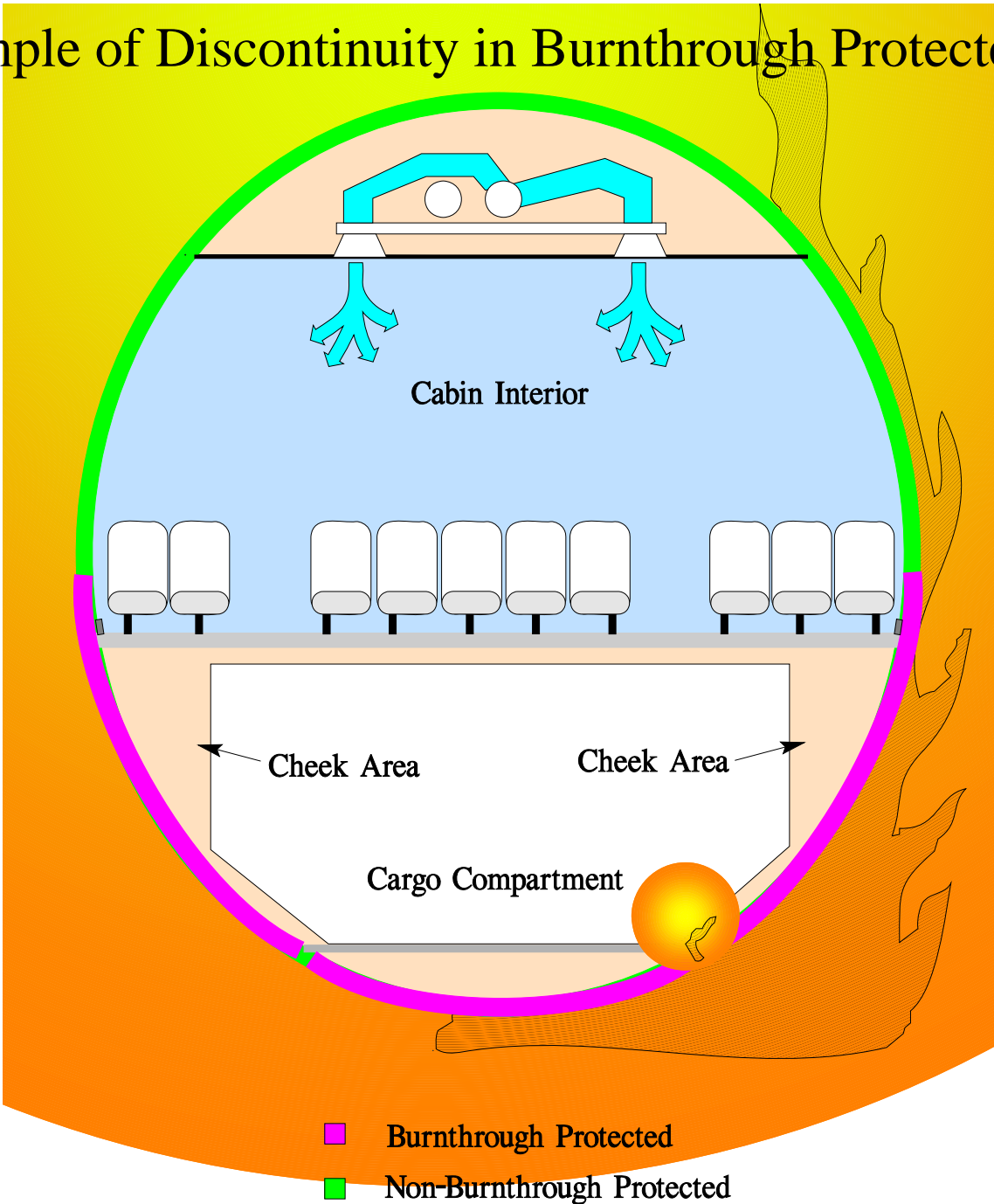
Investigation to focus on what is acceptable level of discontinuities to ensure safety.

Findings of investigation to be implemented into advisory material.

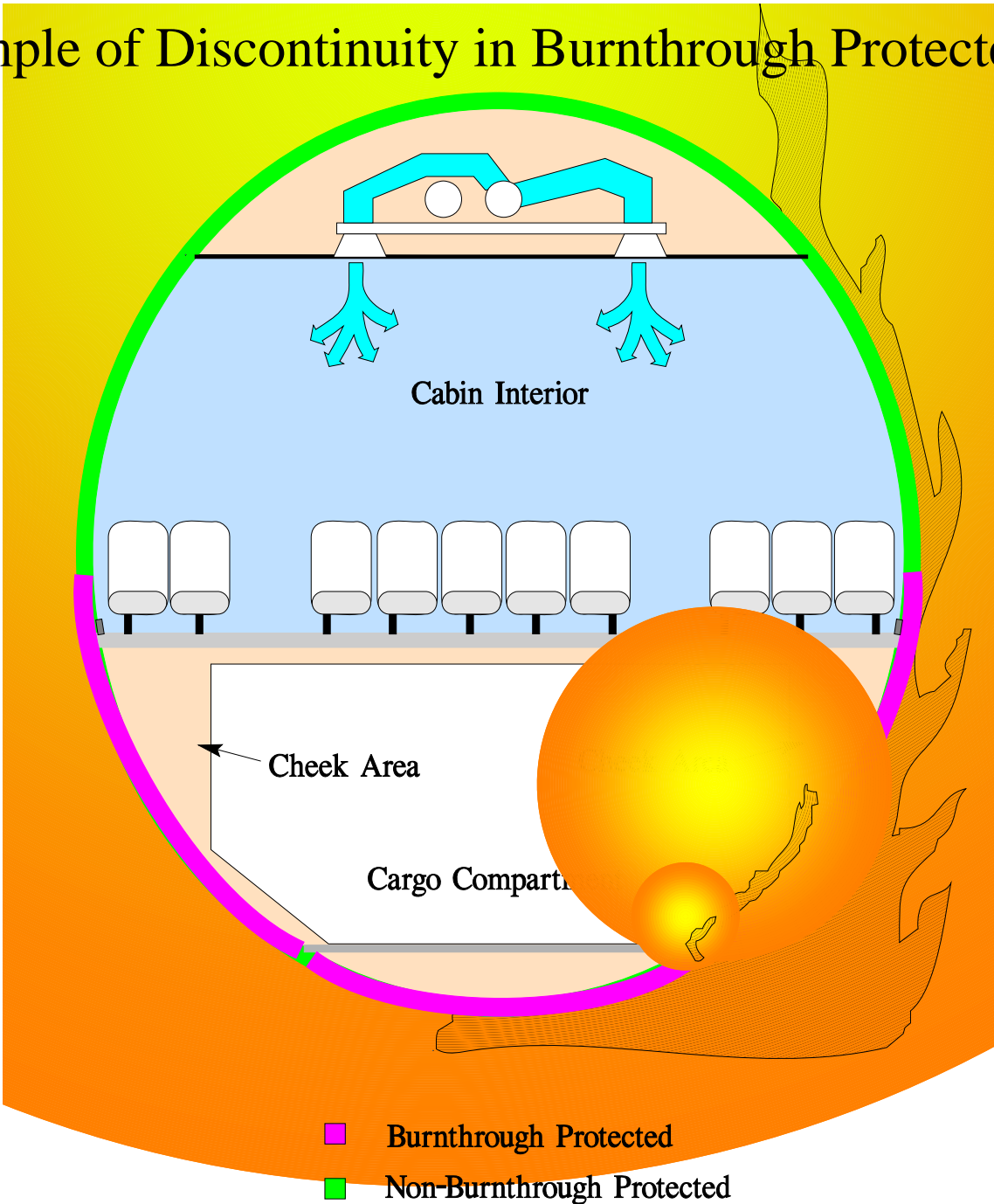
Example of Discontinuity in Burnthrough Protected Area



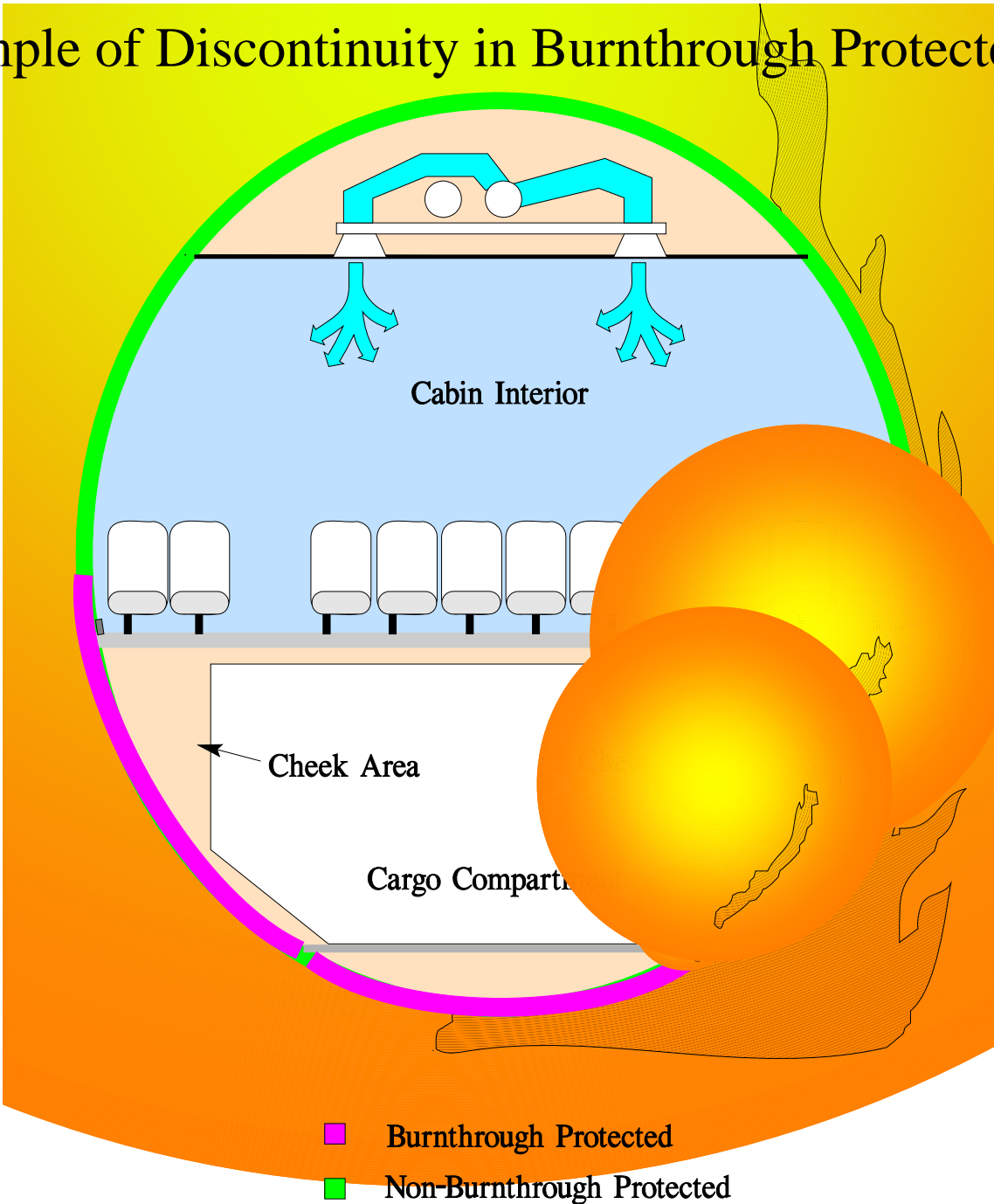
Example of Discontinuity in Burnthrough Protected Area



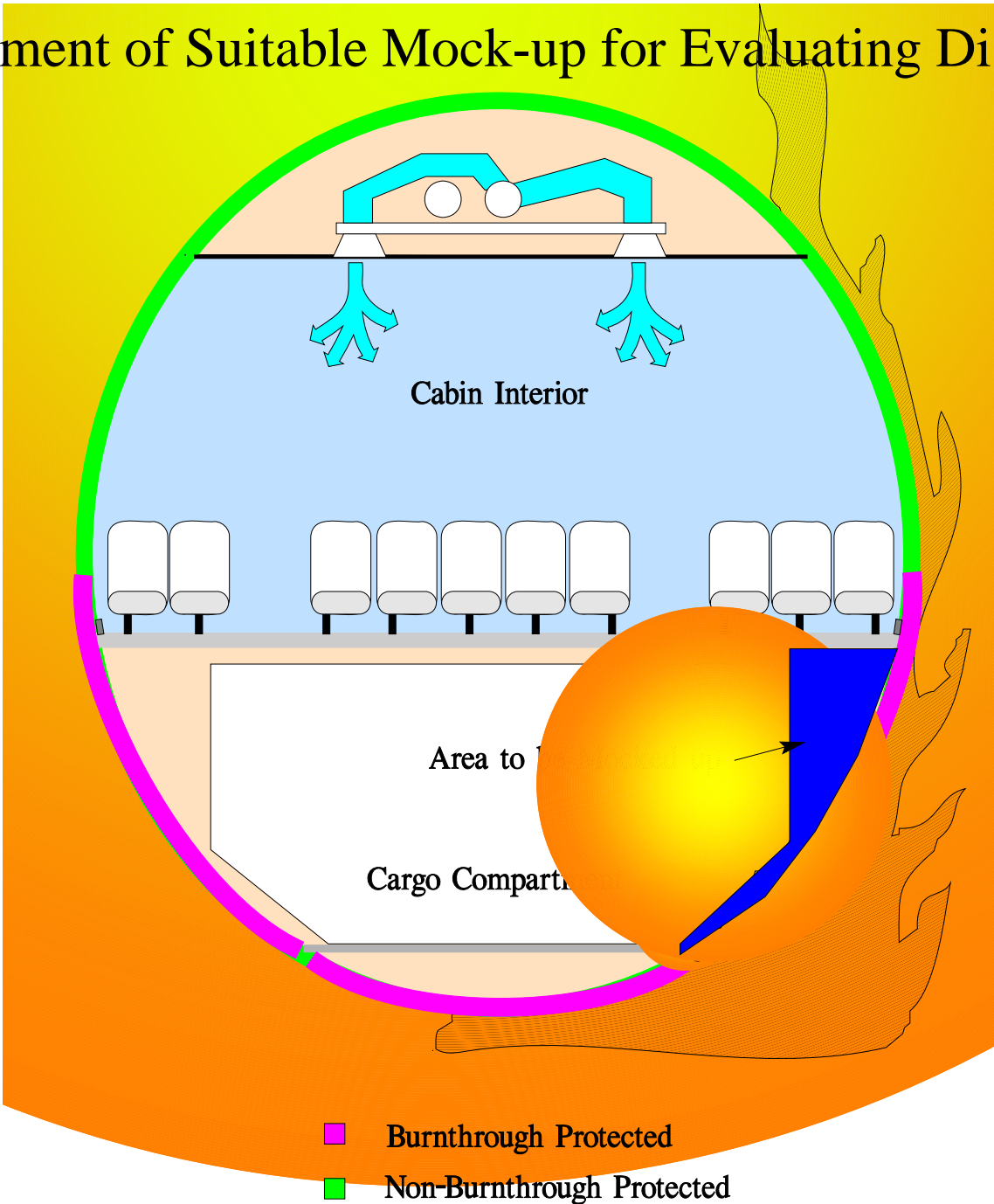
Example of Discontinuity in Burnthrough Protected Area



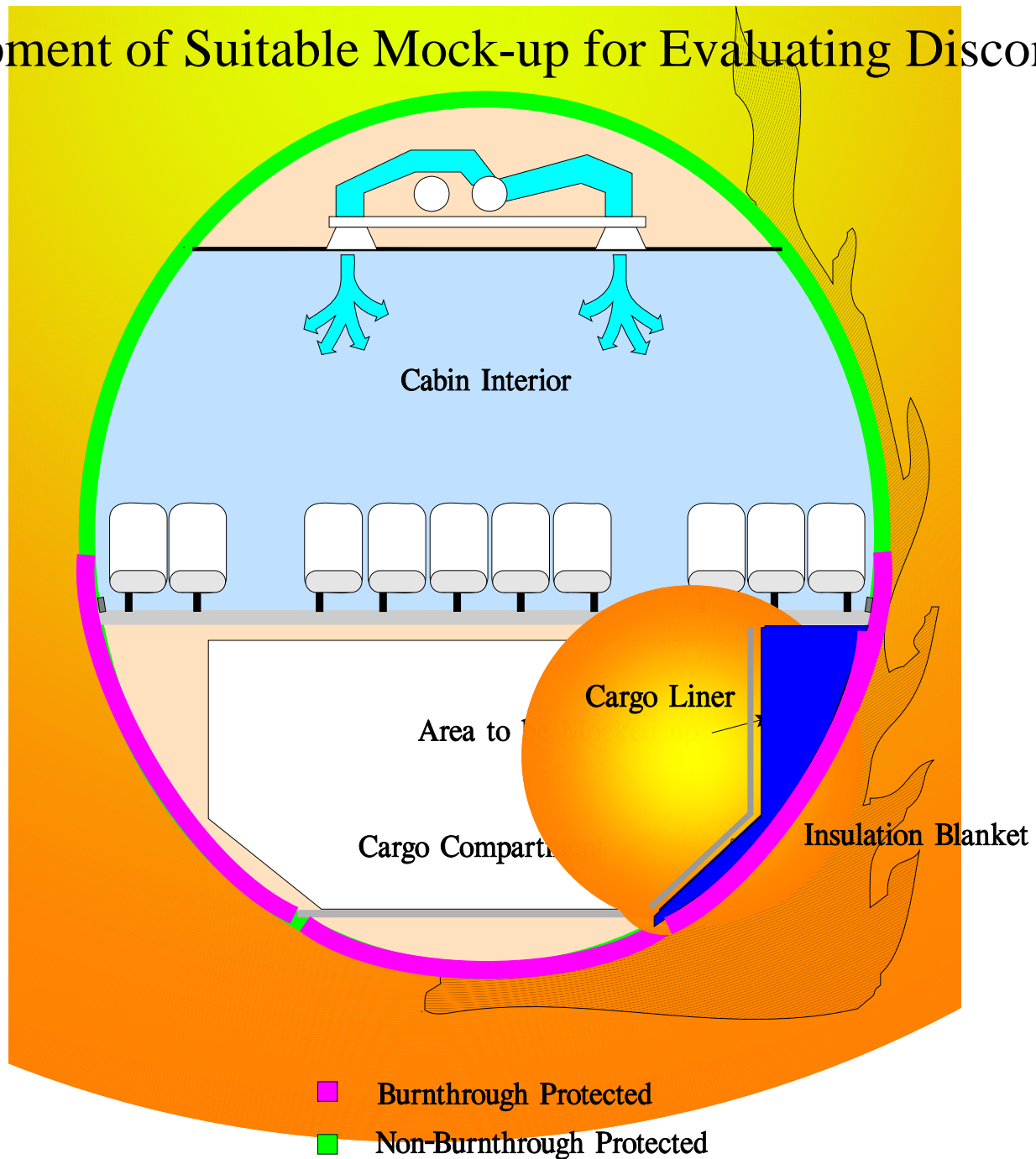
Example of Discontinuity in Burnthrough Protected Area



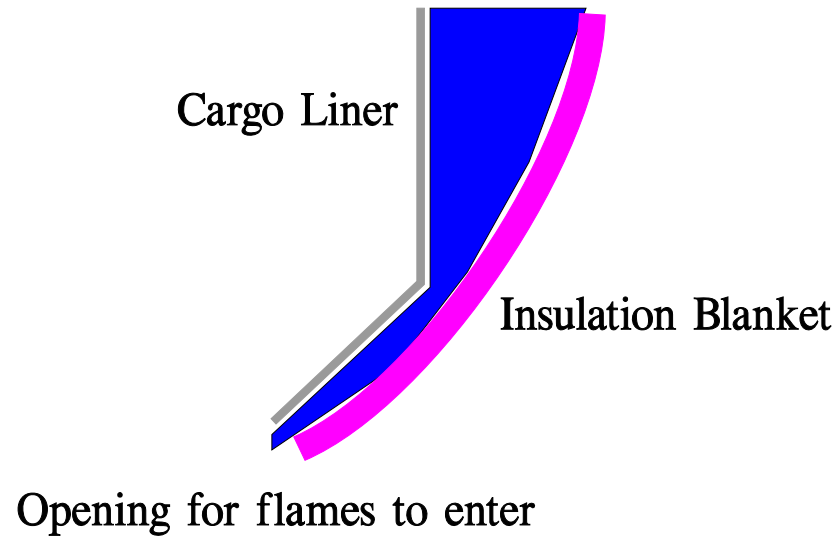
Development of Suitable Mock-up for Evaluating Discontinuity



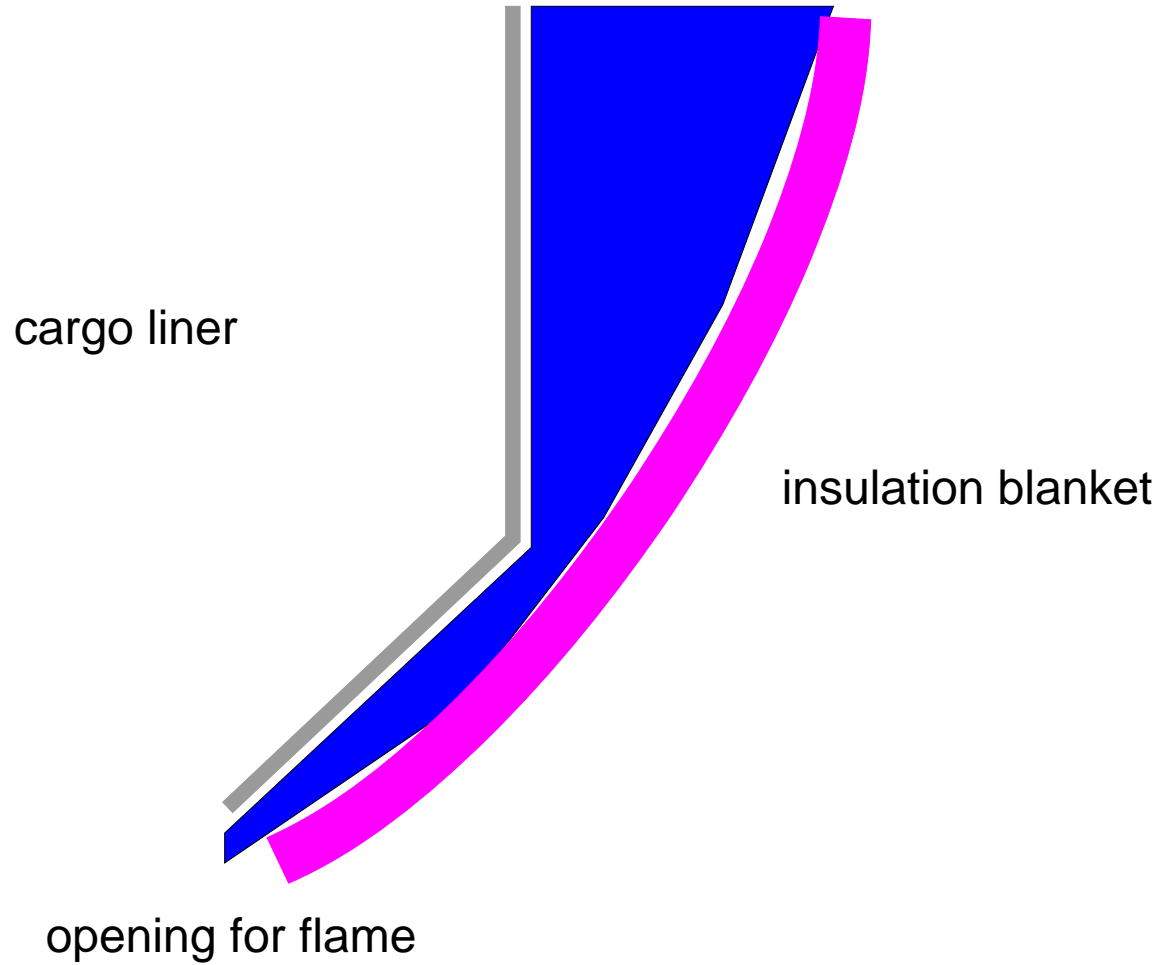
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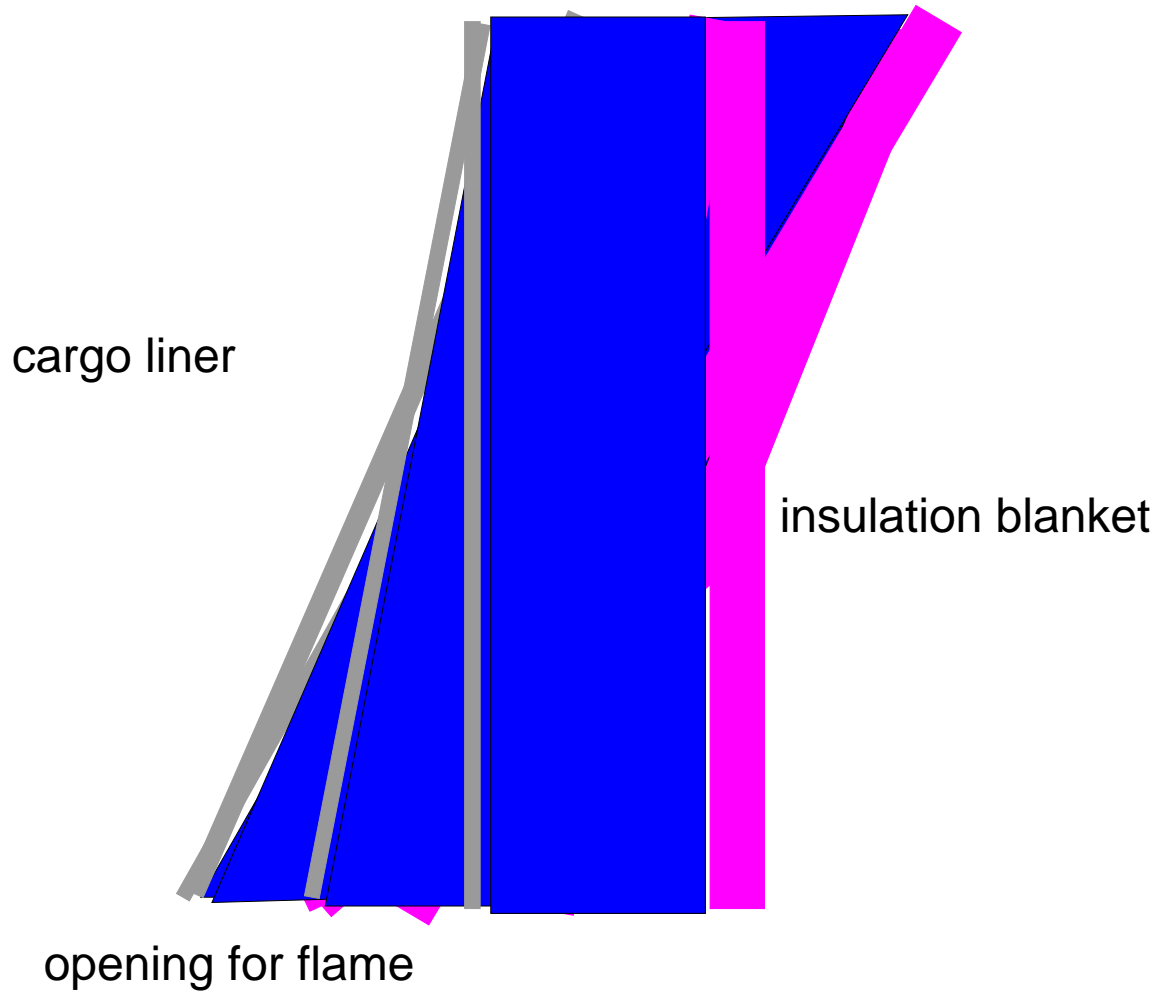
Initial Area to be Mocked-up



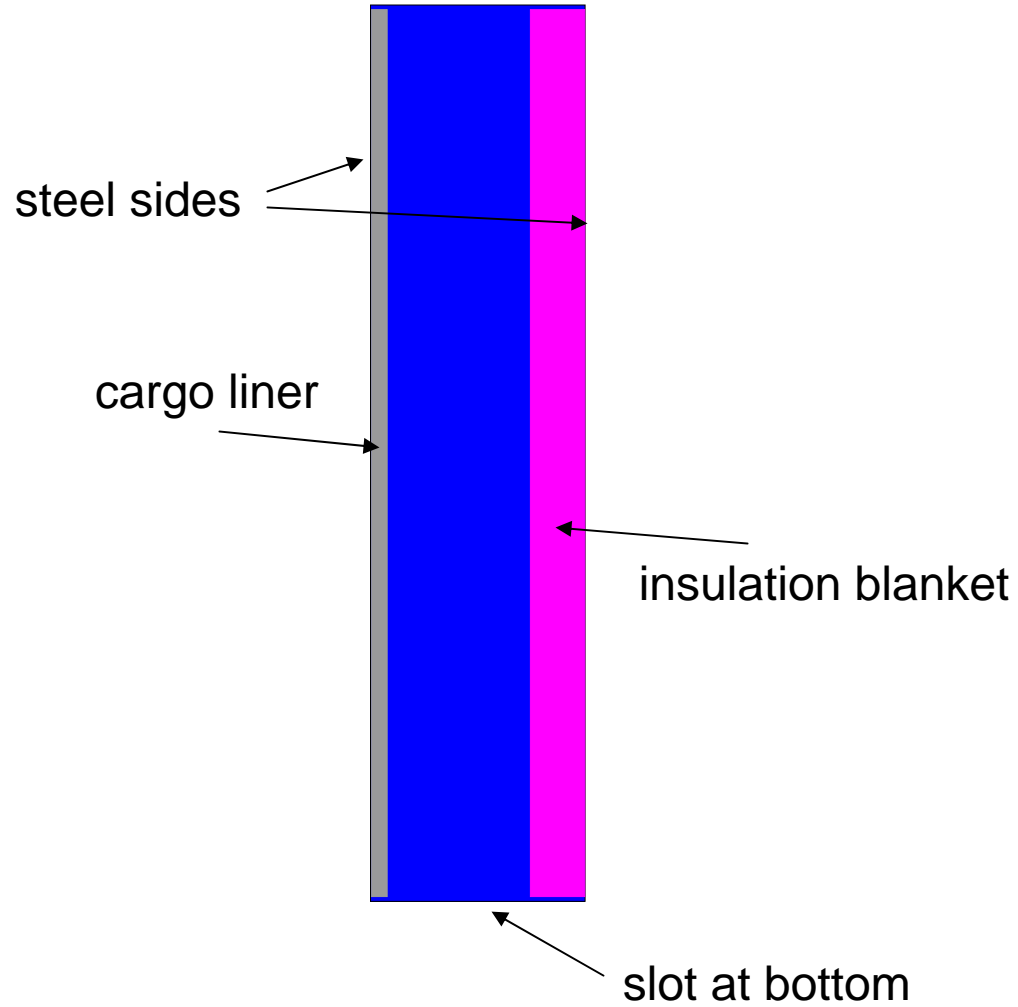
Initial Area to be Mocked-up



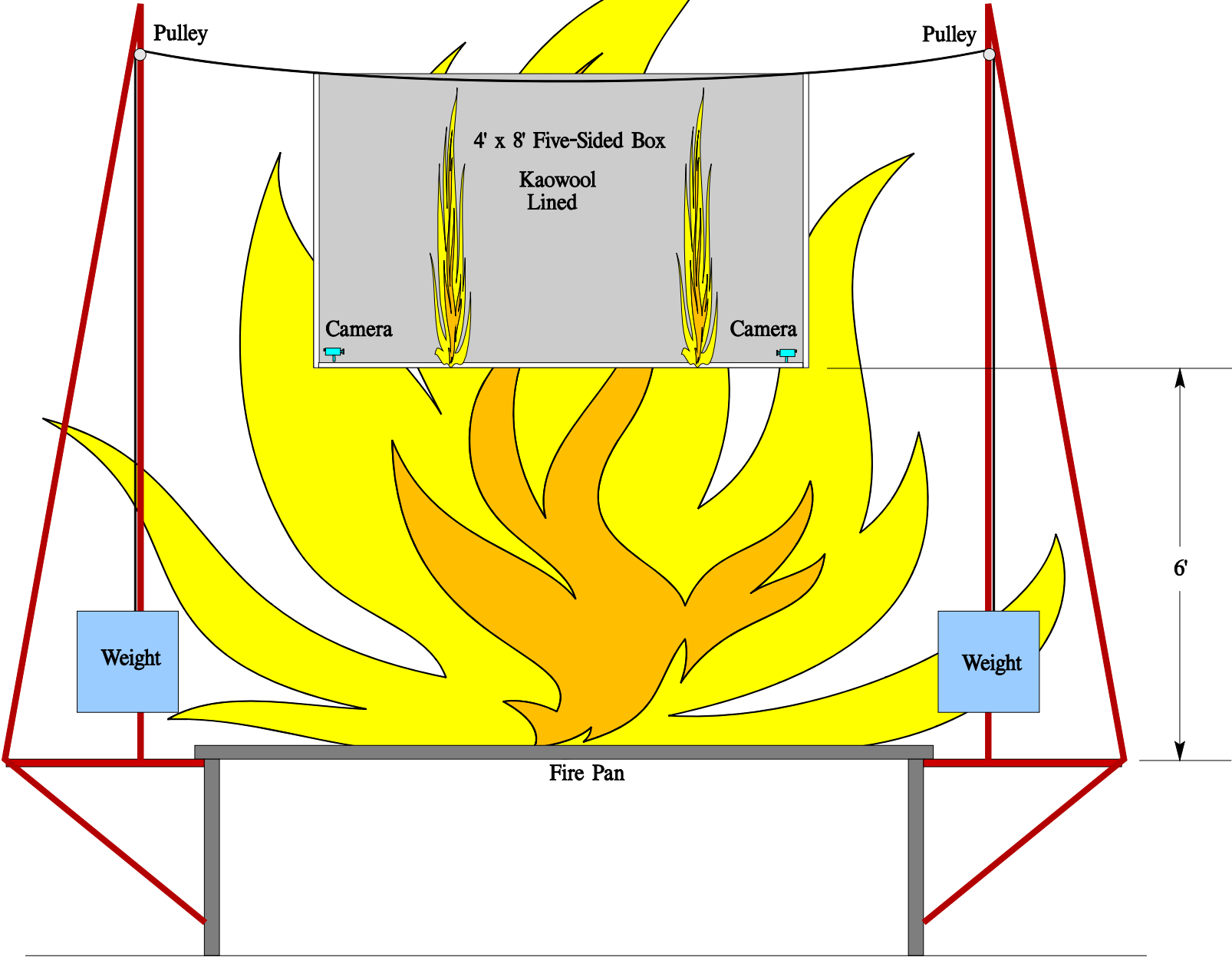
Formation of Mock-up



Mock-up Box Cross Section



Adjustable Height Concept Mock-up Box



Initial Mock-up Configuration Above Fire Pan

Camera

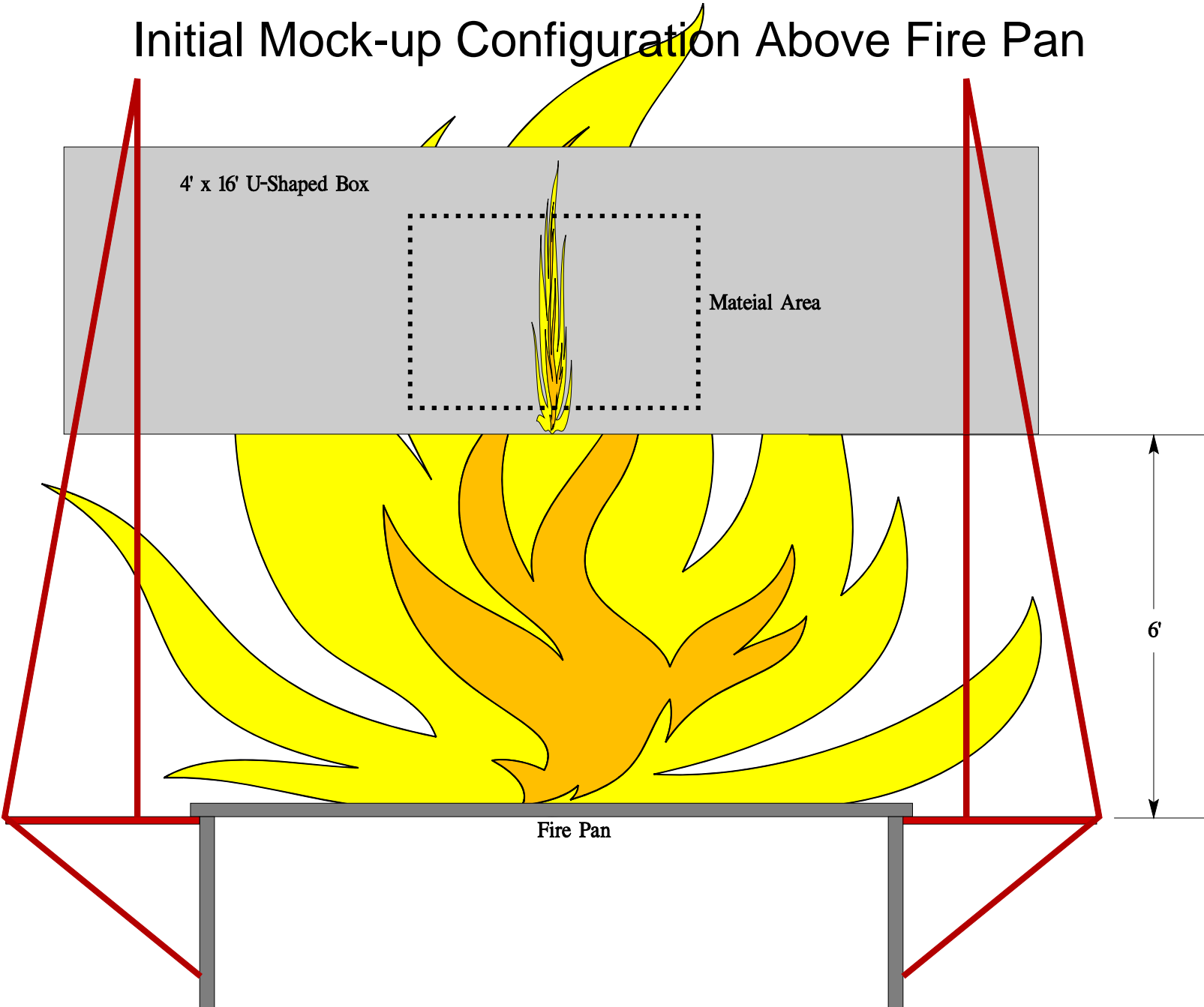
Camera

4' x 16' U-Shaped Box

Material Area

Fire Pan

6'



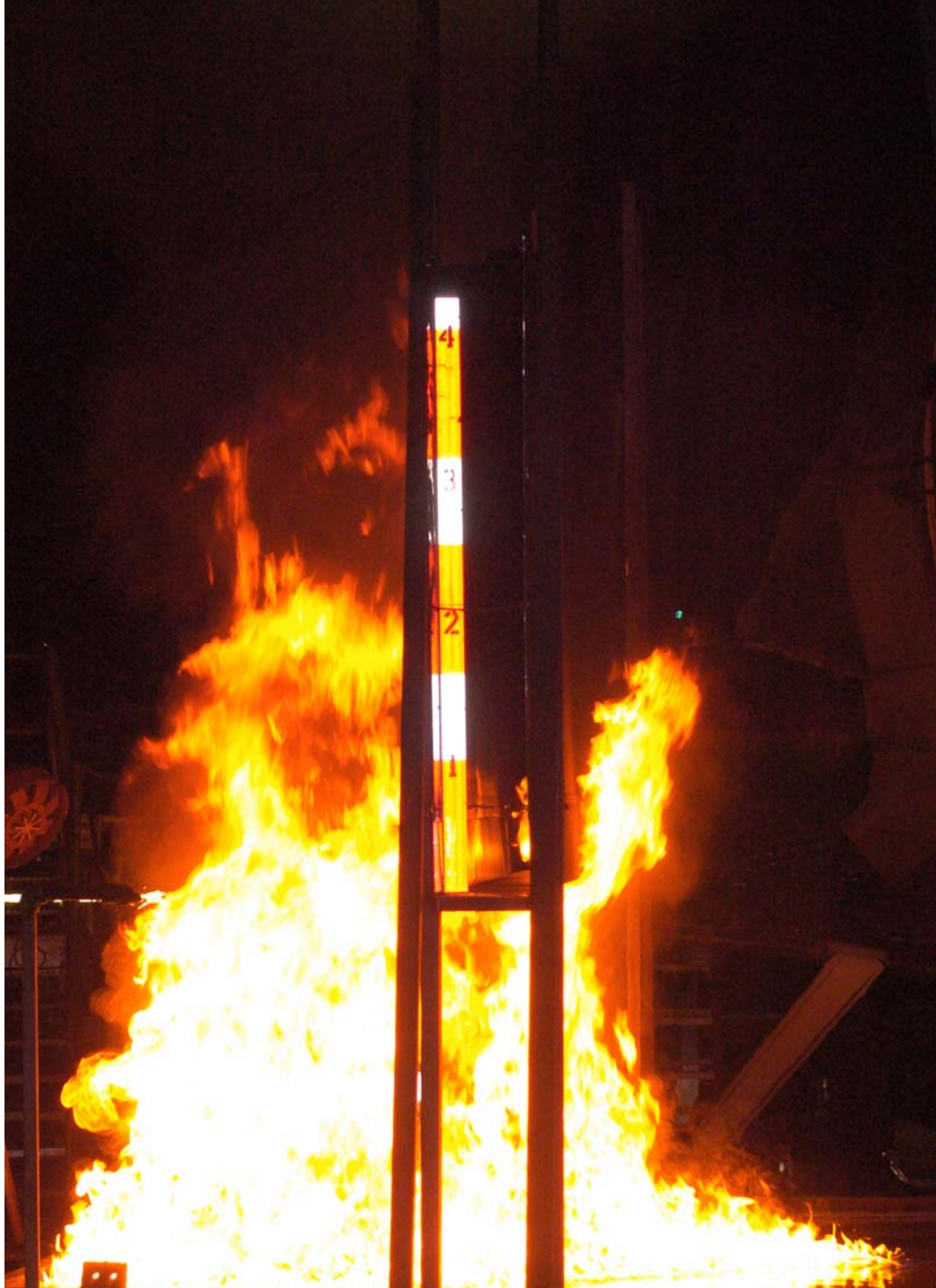
Mock-up Box at 6 Feet Above Fire Pan



Mock-up Box at 3 Feet Above Fire Pan



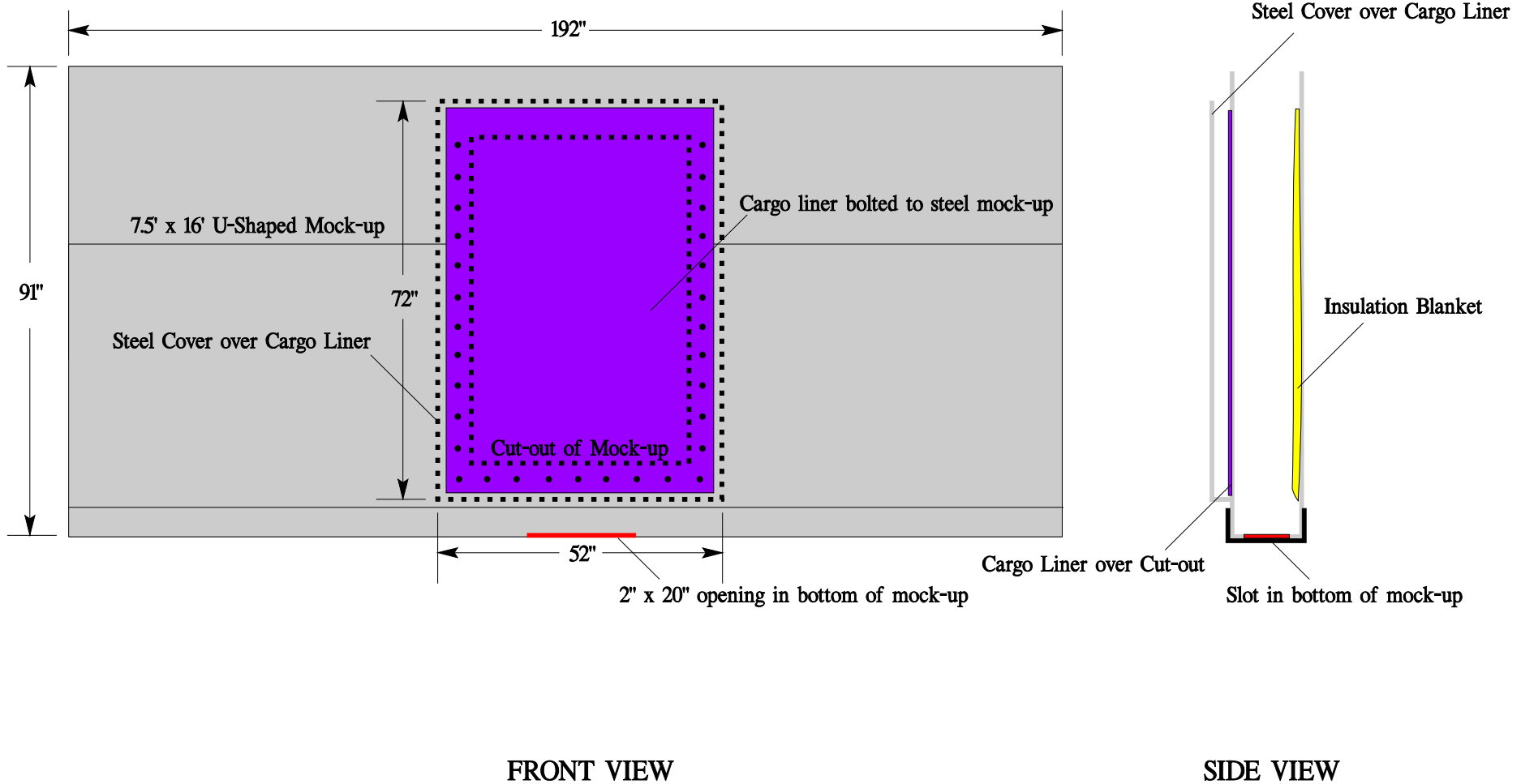
Begin Test



30 Seconds



Modified Mock-up Box Configuration



Modified Mock-up Box Configuration



Cargo Liner Mounted Over Opening



Cargo Liner Mounted Over Opening



Modified
Mock-up Box
Configuration
Over Fuel Pan



Modified Mock-up Box Configuration



Insulation Blanket Mounted in Mock-up



Typical Mock-up Box Test With Materials



Post-Test Damage to Cargo Liner



Post-Test Damage to Cargo Liner



Post-Test Damage to Cargo Liner



Post-Test Damage to Cargo Liner

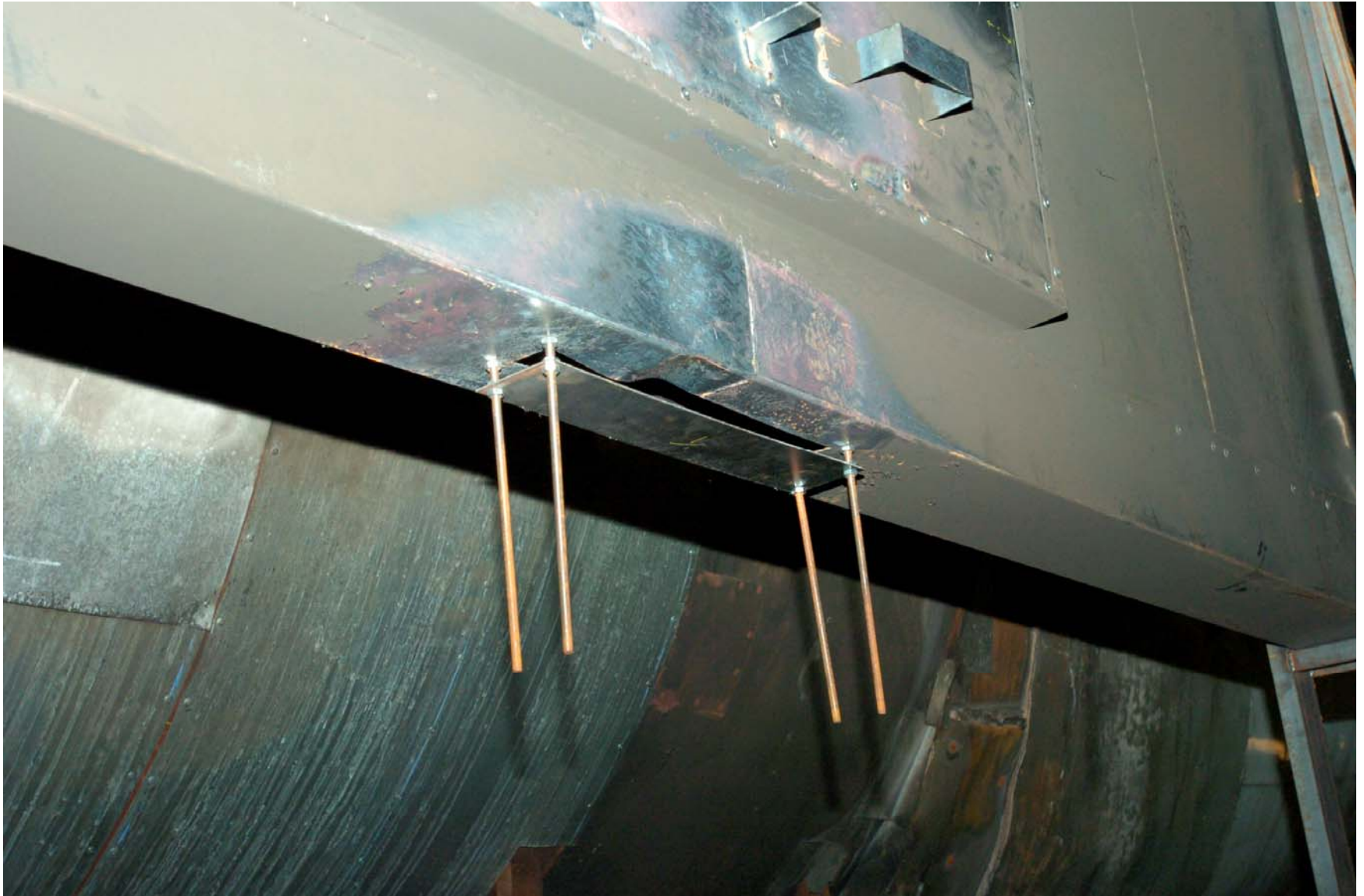


Post-Test Damage to Insulation Blanket



Steel Baffle Test (5/02/07)

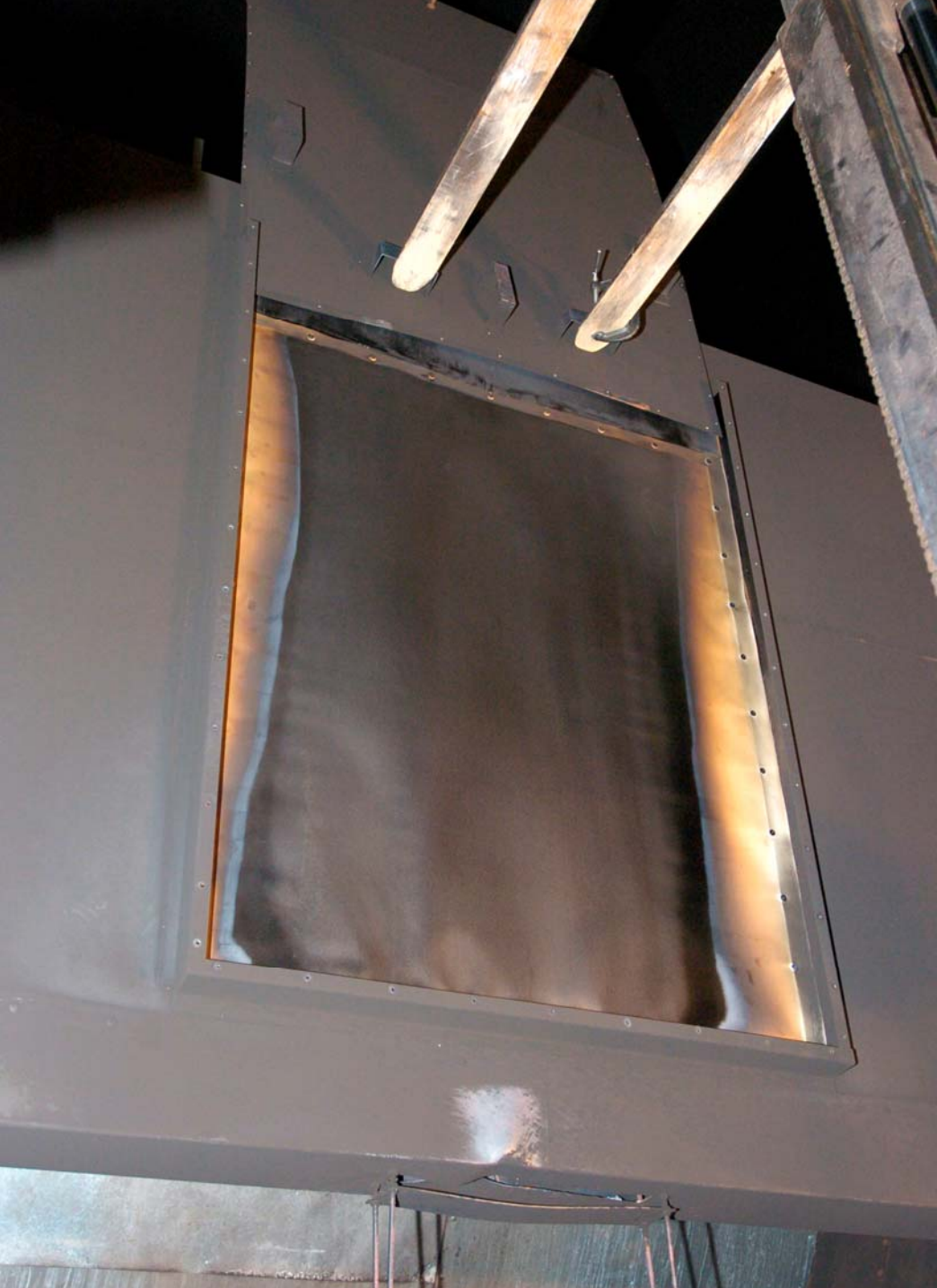
4- by 22-Inch Steel Baffle Below Opening



30 Seconds



Cargo Liner
Post Test



Intumescent Coated Steel Baffle (5/16/07)

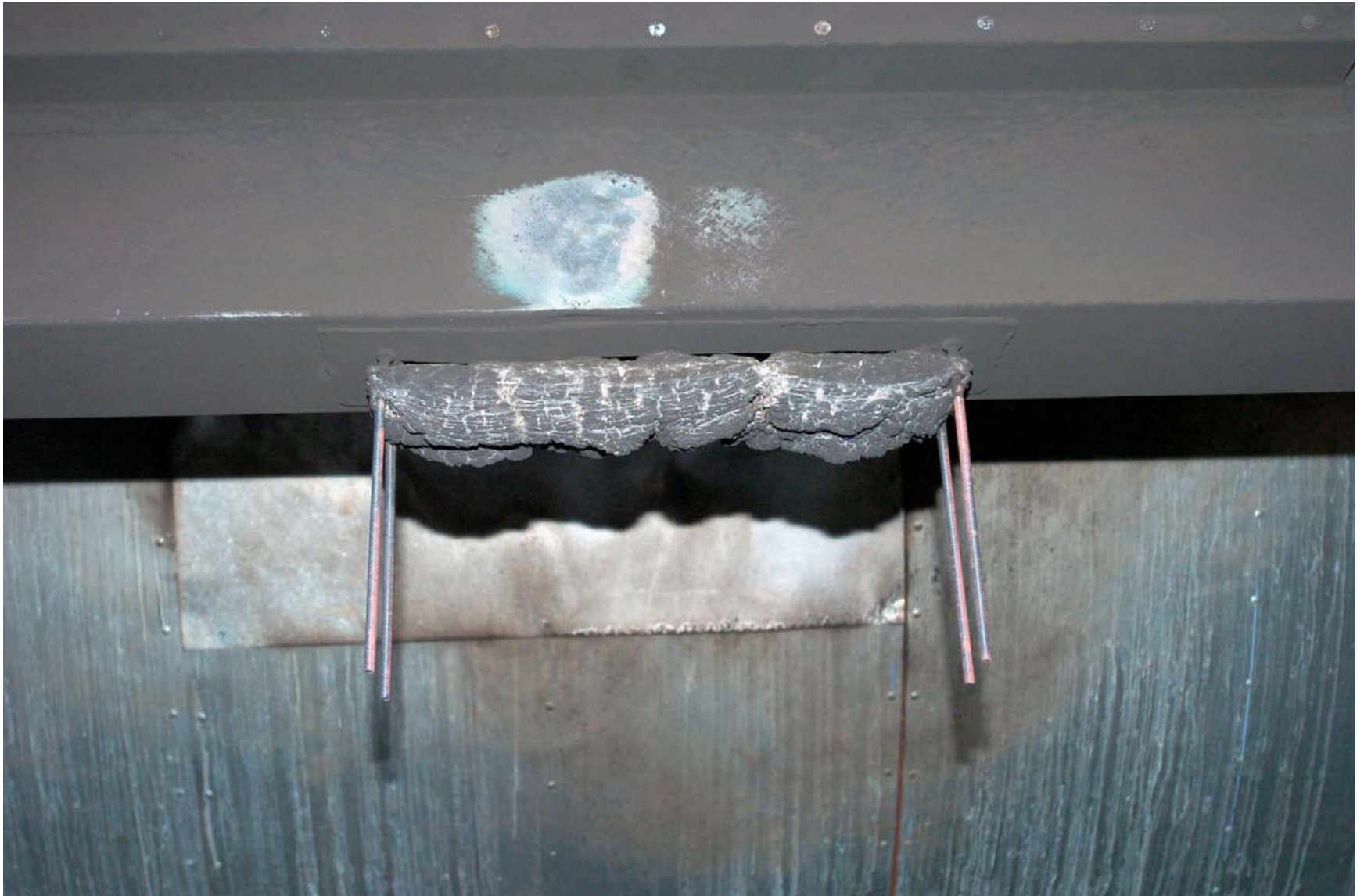
Intumescent Coated Steel Baffle (5/16/07)



Intumescent
Coated Steel
Baffle
30 Seconds



Intumescent Coated Steel Baffle Post Test



Cargo Liner
Post Test

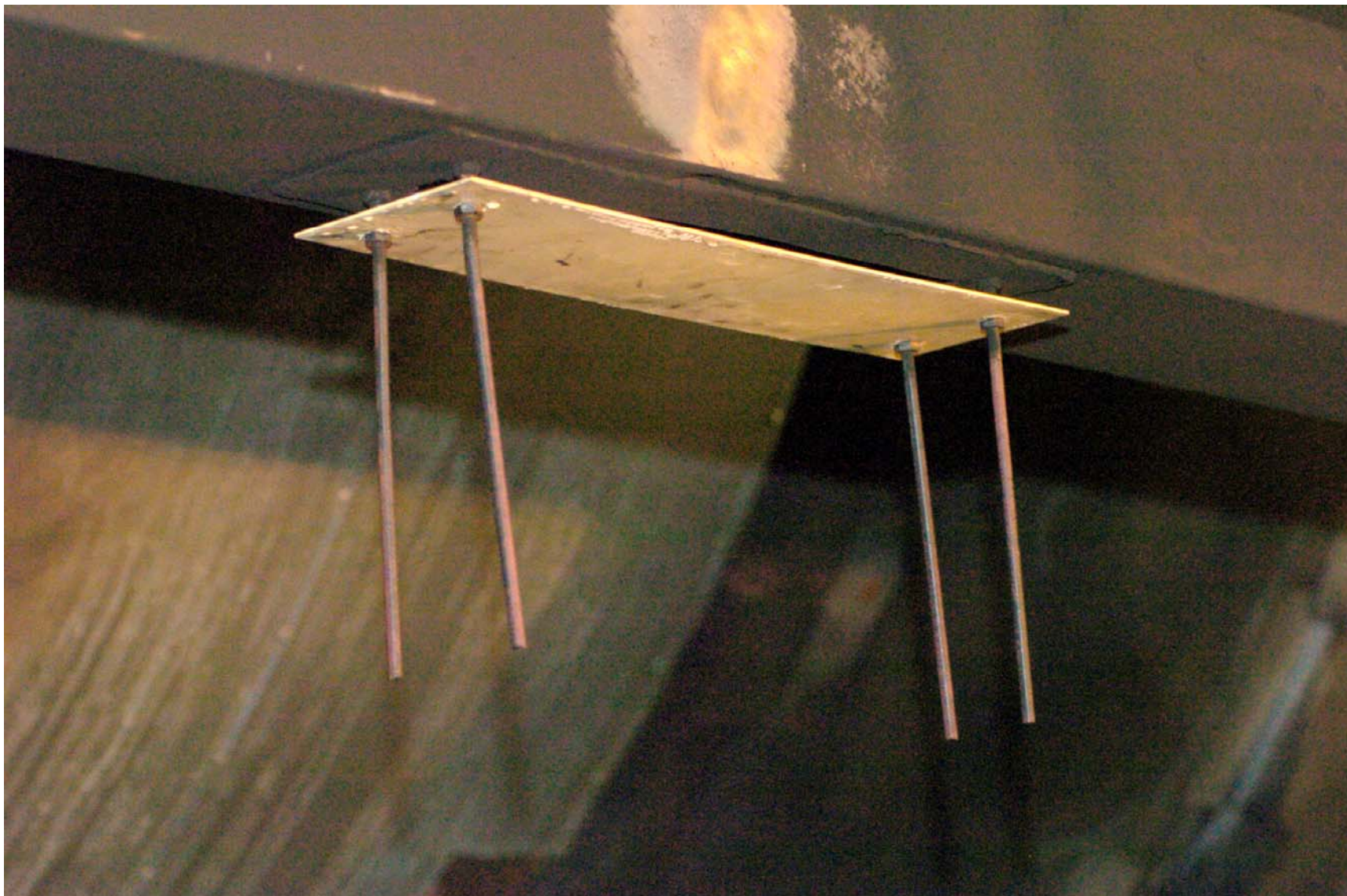


Insulation
Blanket
Post Test



Oversized Intumescent Coated Aluminum Baffle (6/1/07)

6- by 24-Inch Intumescent Coated Aluminum Baffle



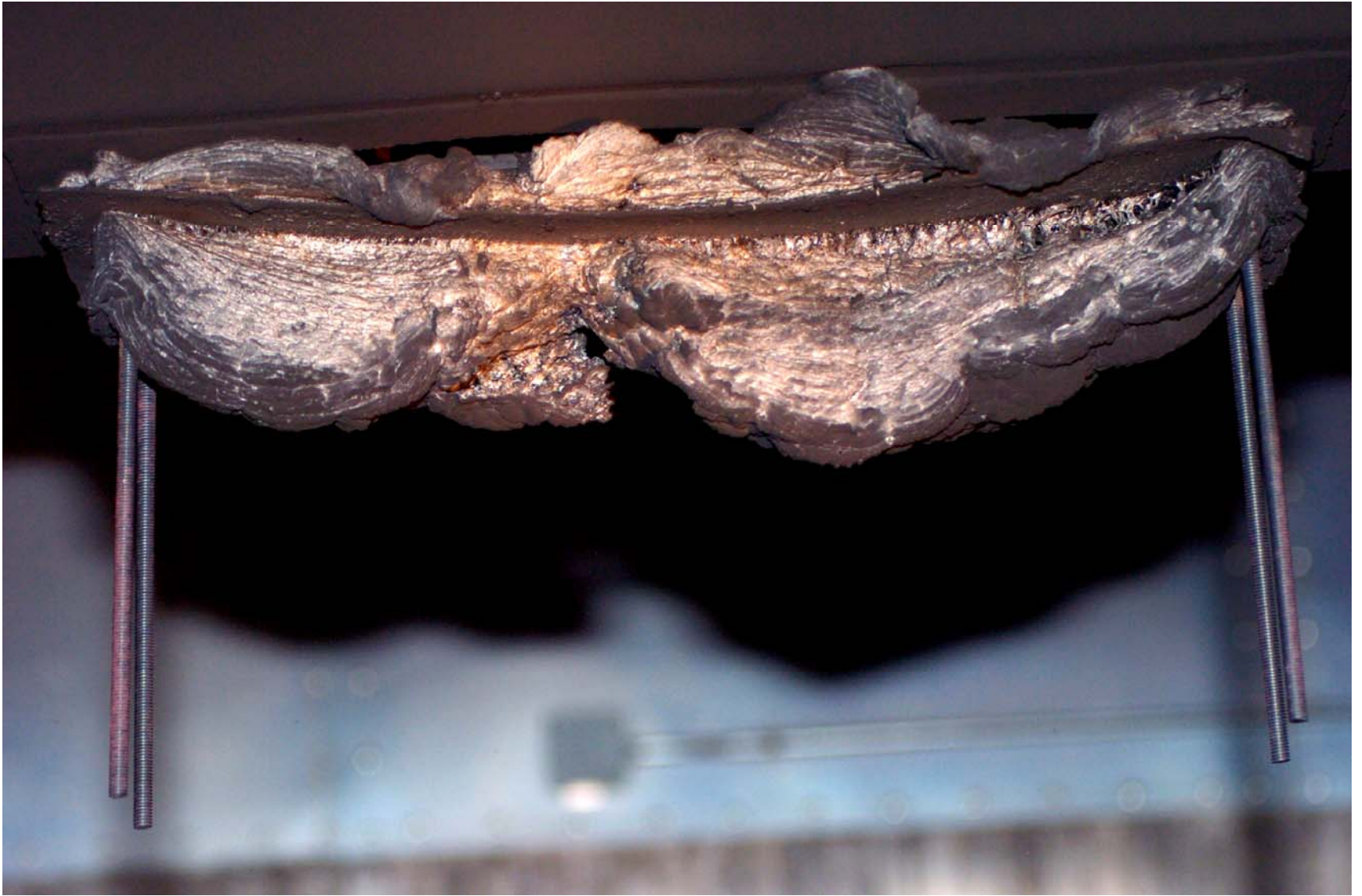
20 seconds



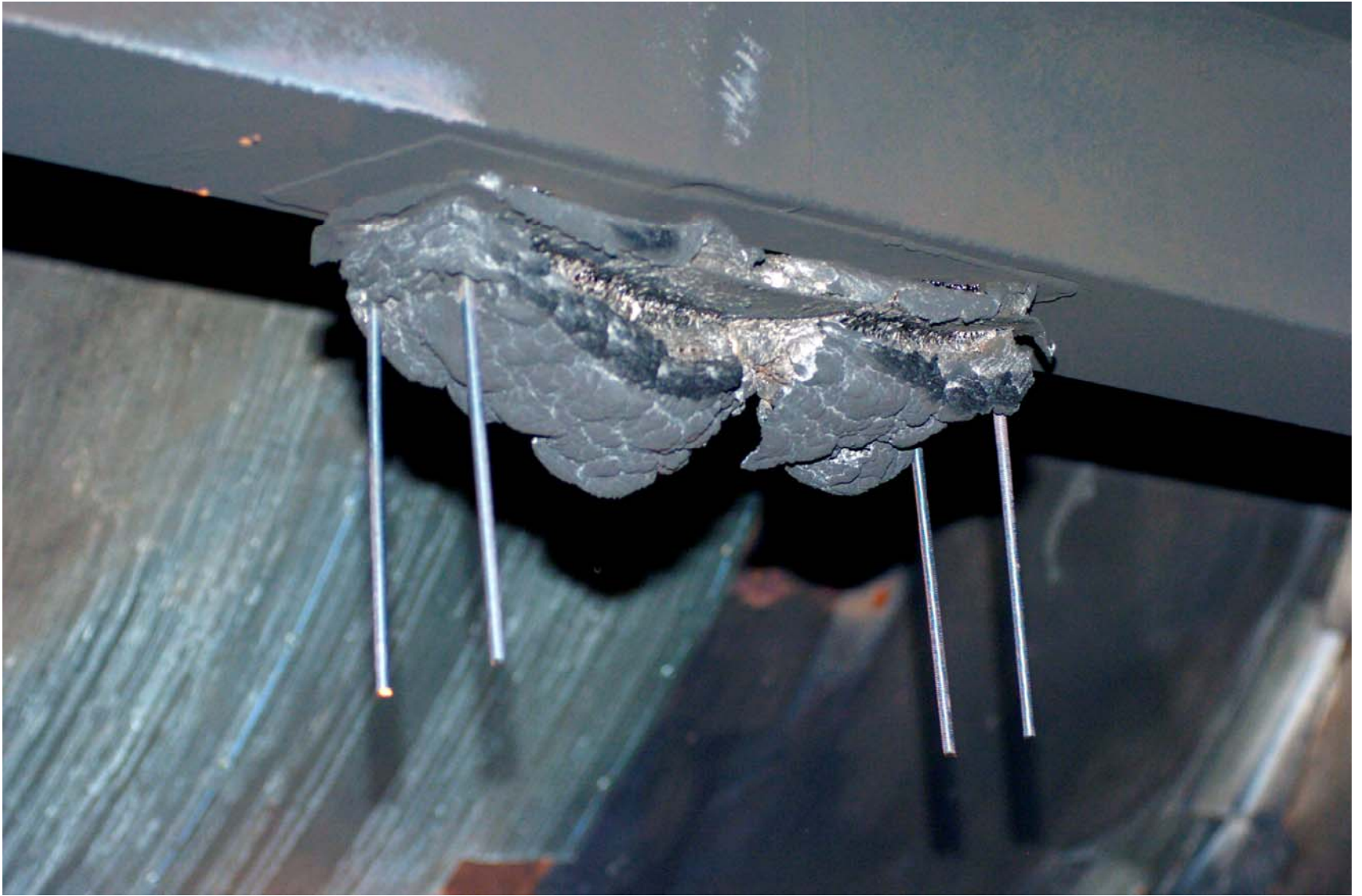
60 seconds



Intumescent-Coated Aluminum Baffle Post Test



Intumescent-Coated Aluminum Baffle Post Test



Cargo Liner Post Test



Insulation Blanket Post Test



Summary of Full-Scale Testing of Penetrations

8 tests conducted with 2- by 20-inch opening in mock-up

Unblocked opening allows flames to enter and climb approximately 3 feet using 4-foot-high box

Unblocked opening allows flames to enter and climb up materials during modified box tests

Non-coated baffle provides marginal decrease in fire penetration

Reduced opening size (1-inch width) provided no decrease in fire penetration

Intumescent-coated baffles limit damage to insulation blanket/cargo liner