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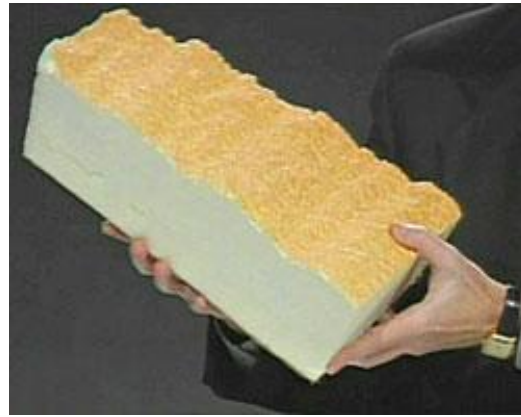
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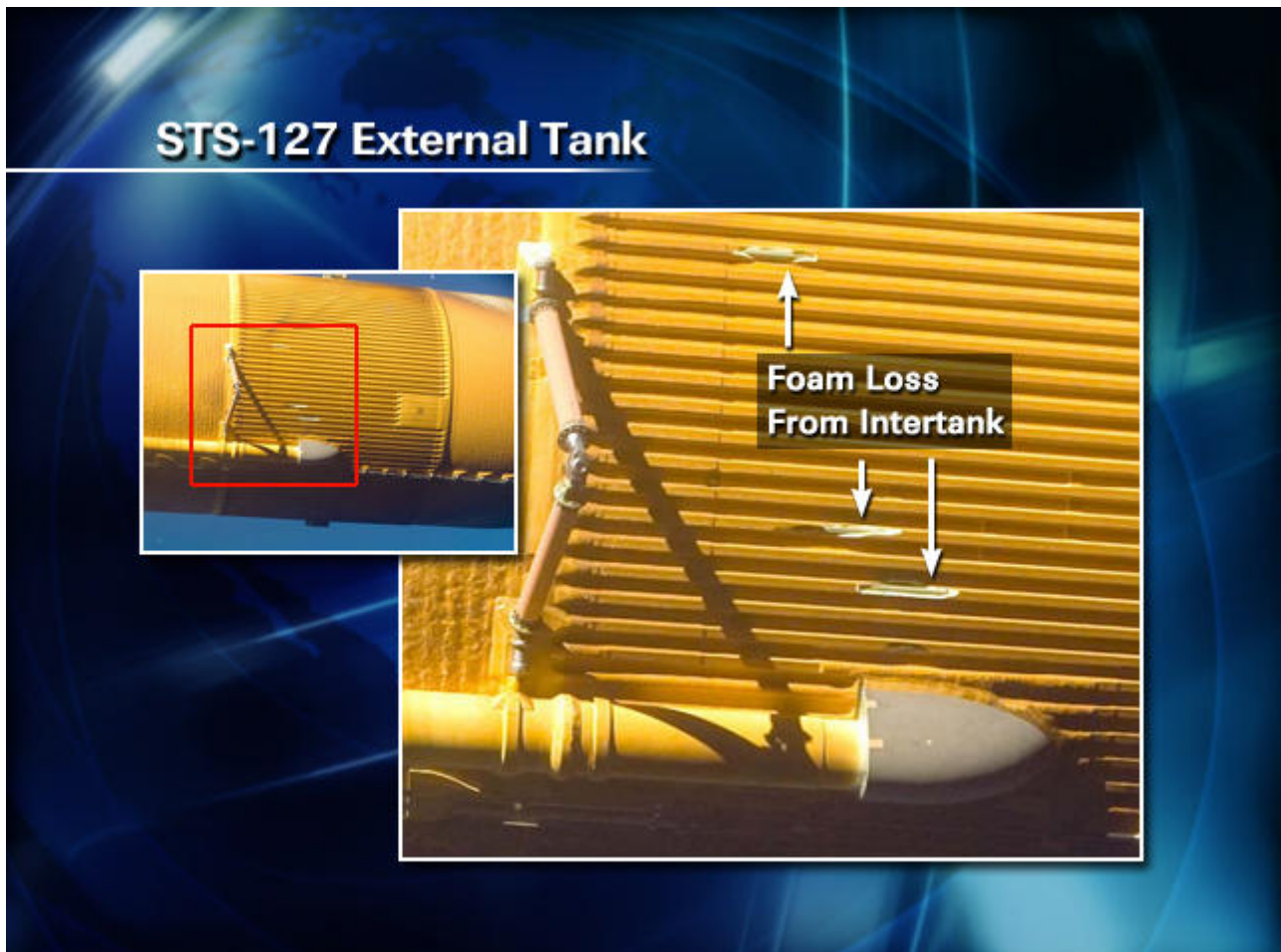
10. COLUMBIA IS LOST



In this still shot from Spaceflight Now/NASA TV, we see shuttle program manager Ronald Dittmore holding a sample of the type of foam insulation which covers the external fuel tank.

During launch, an external fuel tank is positioned between the two solid rocket boosters. Although the boosters are recovered and reused after liftoff, the external tank (which has been sprayed with foam insulation) is neither recovered nor reused. Instead, it is jettisoned into a remote area of the ocean where it breaks apart.

Before it was used on the actual launch of shuttle missions, insulation for the external tank was tested in-flight on an F-15B. After the insulation material was approved and actually applied to external fuel tanks, bits and pieces of the substance began to break loose during various shuttle launches. This NASA image depicts such an event which occurred during *Endeavour's* STS-127 mission.



NASA managers considered that foam-loss phenomenon to simply be an external tank maintenance issue ...

until January of 2003.

Assessment of the impact which breakaway insulation could cause to the shuttle changed the day after *Columbia* launched on January 16, 2003. Officials examining photos and videos, which strategically placed NASA cameras took during the launch, noticed something potentially concerning.

Eighty-two seconds after liftoff, a piece of external-tank insulation broke loose (see it happen at about seven minutes into the video) and appeared to strike *Columbia's* left wing.

If that debris were a chunk of ice, as at least one Langley Research Center engineer speculated, it would have weighed more than sixty pounds. And a sixty-pound object, in motion at those speeds, "would be the equivalent of a 500-pound safe hitting the wing at 365 mph."

Thoughts like that began to worry some NASA managers. What if the insulation problem were no longer just a maintenance issue?

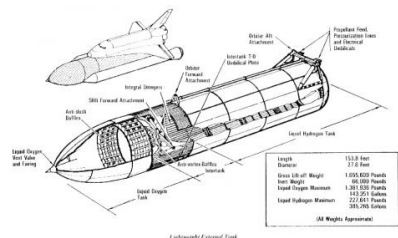
See Alignments to State and Common Core standards for this story online at:

<http://www.awesomestories.com/asset/AcademicAlignment/EXTERNAL-TANK-INSULATION-Columbia-Space-Shuttle-Explosion>

See Learning Tasks for this story online at:

<http://www.awesomestories.com/asset/AcademicActivities/EXTERNAL-TANK-INSULATION-Columbia-Space-Shuttle-Explosion>

Media Stream

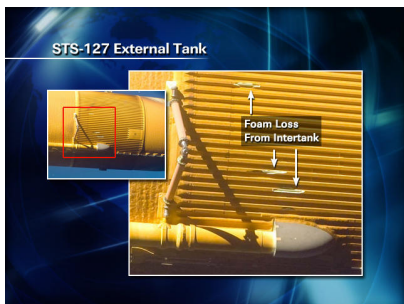


External Fuel Tank

External-tank diagram, NASA.

Information and quoted passage, NASA Shuttle Reference Manual (online at NASA's web site).

View this asset at: <http://www.awesomestories.com/asset/view/External-Fuel-Tank>



Foam Loss on STS-127

NASA.

View this asset at:

<http://www.awesomestories.com/asset/view/Foam-Loss-on-STS-127>

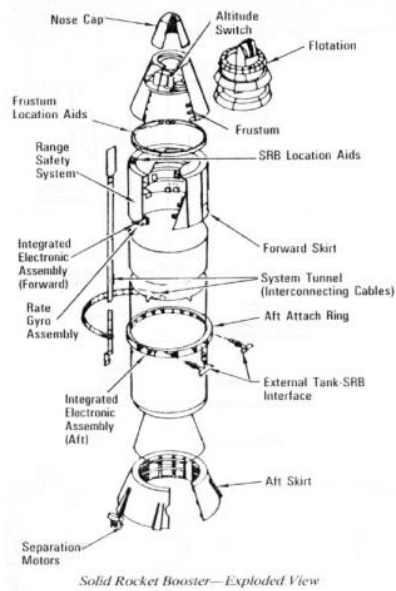


External Tank Configuration

Image online, courtesy NASA.

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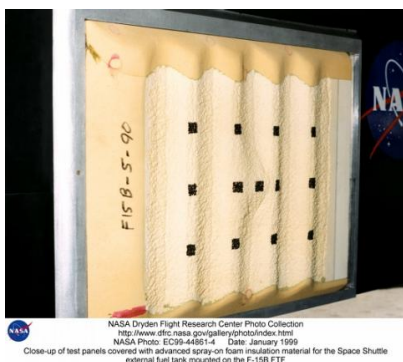


Solid Rocket Booster - Exploded View

Image online, courtesy NASA.

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Foam Insulation

NASA photo.

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F-15B Testing External-Tank Insulation

Image online, courtesy NASA.

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Insulation Test Panel on F-15B

Image online, courtesy NASA.

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EXTERNAL TANK INSULATION

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Columbia - Debris Strikes the Orbiter

Clip from "[Columbia's Last Flight](#)" - from the series "Seconds from Disaster" - online, courtesy National Geographic Channel at YouTube.



Director:

Sid Bennett

Producer:

Anna Kirkwood

Original broadcast:

June 28, 2005 - Season 2 of "Seconds from Disaster," Episode 1

View this asset at:

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