THE EXPLOSION



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This NASA image depicts the first evidence of black smoke from the lowermost joint of the right-hand Solid Rocket Booster (SRB) on the day STS 51-L (the official designation of *Challenger's* final mission) left the launchpad. The image shows the condition of the aft field joint milliseconds after liftoff.

As *Challenger* ascended, it encountered tremendous wind shear <u>32 to 62 seconds</u> after liftoff. (It was the worst wind shear any shuttle launch had ever faced.) Already weakened by the cold weather, the O-rings (which may have been resealing after liftoff) lost all chance to keep from completely eroding.

As the <u>O-rings eroded</u>, the aft field joint came completely out of alignment. A gap had opened through which blow-by gases could come into contact with <u>Challenger's</u> external tank. The potentially fatal failure cycle - known to responsible officials before liftoff - had commenced.

At 58.32 seconds, an <u>unusual plume</u> in the lower part of the right Solid Rocket Booster was <u>recorded</u> by cameras tracking <u>Challenger's</u> liftoff. At 58.772 seconds the first indication of <u>smoke</u> is visible from the right SRB. A fraction of a second later, at 58.778, the "first flickering <u>flame</u> appeared on the right SRB in the area of the aft field joint." By 59.262, the flickering flame had <u>grown</u> into "a continuous, well-defined plume."

At 64.660 seconds after liftoff,

...there was an abrupt change in the shape and color of the plume. This indicated that it was mixing with leaking hydrogen from the <u>External Tank</u>...Within 45 milliseconds of <u>the breach</u> of the External Tank, a bright <u>sustained glow</u> developed on the black-tiled underside of the Challenger between it and the External Tank.

Meanwhile, the crew was given the command to give the shuttle more power:

You are go at throttle up

The <u>last response</u> (this video includes historical footage, recreations and animations) ever publicly heard from *Challenger*, rebroadcast many times the night of the disaster, was:

Roger, go at throttle up

People watching the news that night took some small measure of comfort from those last words: "At least they never knew what happened."

Except - those were **not** the last recorded words of *Challenger's* crew.

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

http://www.awesomestories.com/asset/AcademicAlignment/THE-EXPLOSION-Challenger-Disaster

See Learning Tasks for this story online at:

http://www.awesomestories.com/asset/AcademicActivities/THE-EXPLOSION-Challenger-Disaster

Media Stream



Challenger's Last Launch - Unusual Plume

Image online, courtesy NASA. A different view of this event also appears, within a group of pictures, at <u>pages 26-27</u> of the "Report of the Presidential Commission on the Space Shuttle *Challenger* Accident."

View this asset at:

http://www.awesomestories.com/asset/view/Challenger-s-Last-Launch-Unusual-Plume



Visible Smoke

Image online, courtesy NASA.

View this asset at: http://www.awesomestories.com/asset/view/Visible-Smoke



Visible Flame

Image online, courtesy NASA.

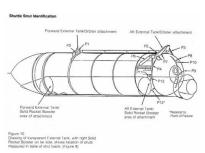
View this asset at: http://www.awesomestories.com/asset/view/Visible-Flame



Growing Flame

Image online, courtesy NASA.

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External Tank Cutaway Drawing

Image online, courtesy NASA.

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http://www.awesomestories.com/asset/view/External-Tank-Cutaway-Drawing



The Breach Photo Series

Image online, courtesy NASA.

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<u>Challenger - Last Words from the Crew</u>

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