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During the Rogers' Commission hearings, to determine what caused the *Challenger* to explode less than two minutes into its launch, Dr. Richard Feynmann conducts an experiment to show how it was that the O-rings failed. Image online, courtesy NASA.

Boisjoly and other engineers were alarmed the night before the scheduled *Challenger* launch. Freezing temperatures were forecasted. Cold weather could cause the joint design problem to worsen (because the rubber O-rings would not quickly return to their proper shape).

Meteorologists predicted the thermometer would drop as low as 18 degrees Fahrenheit at Cape Canaveral. Ice, in fact, covered portions of the launch pad the morning of liftoff.

Participating in a conference with company and NASA officials the night before launch, Boisjoly and others expressed their concerns. They warned Morton Thiokol and NASA not to launch the shuttle on the 28th. Later, testifying about the conference before Congress, Boisjoly said:

I...grabbed the photographic evidence showing the hot gas blow-by comparisons from previous flights and placed it on the table in view of the managers and somewhat angered, admonished them to look at the photos and not ignore what they were telling us; namely, that low temperature indeed caused significantly more hot gas blow-by to occur in the joints. I received cold stares...with looks as if to say, 'Go away and don't bother us with the facts.' No one in management wanted to discuss the facts; they just would not respond verbally to...me. I felt totally helpless at that moment and that further argument was fruitless, so I, too, stopped pressing my case.

As a Presidential Commission (headed by William P. Rogers) investigated the tragedy, Nobel-Laureate Dr. Richard Feynman (one of the world's most beloved science lecturers) pointedly discussed (during a televised hearing) his O-ring concerns with a responsible official (Larry Mulloy):

I took this stuff that I got out of your seal and I put it in ice water, and I discovered that when you put some pressure on it for a while and then undo it, it does not stretch back. It stays the same dimension. In other words, for a few seconds at least and more seconds than that, there is no resilience in this particular material when it is at a temperature of 32 degrees.

That lack of resilience in the O-rings (which Dr. Feynman called part of "our problem") became a critical issue during *Challenger's* last launch.

In a speech about his efforts to delay *Challenger's* launch, Boisjoly tells what he did after the conference call.

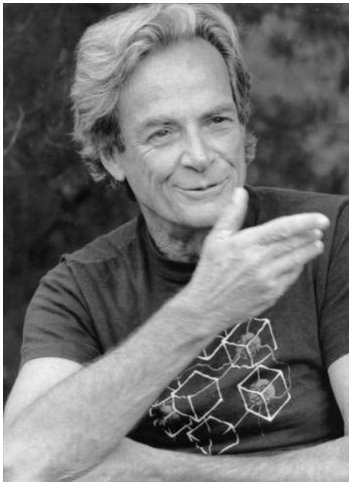
I wrote the following entry in my notebook after returning to my office. "I sincerely hope that this launch does not result in a catastrophe."

See [Alignments to State and Common Core standards for this story online at:](http://www.awesomestories.com/asset/AcademicAlignment/LAST-MINUTE-PLEAS-Challenger-Disaster)

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See [Learning Tasks for this story online at:](http://www.awesomestories.com/asset/AcademicActivities/LAST-MINUTE-PLEAS-Challenger-Disaster)

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Dr. Richard P. Feynman - At Ease

Surely You're Joking, Mr. Feynman! (Adventures of a Curious Character)

Paperback: 350 pages

Publisher: W. W. Norton & Company (April 1997)

View this asset at: <http://www.awesomestories.com/asset/view/Dr.-Richard-P.-Feynman-At-Ease>



LAST-MINUTE PLEAS

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Challenger - Flight Warnings Ignored

Clip from *Challenger: The Untold Story* - online, courtesy the National Geographic Channel at YouTube. Copyright, National Geographic, all rights reserved. Clip provided here as fair use for educational purposes and to acquaint new viewers with the production.

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Dr. Richard Feynman - Discovers the O-Ring Problem

Clip from the Rogers Commission hearing, featuring the questions of Dr. Richard Feynman.

View this asset at:

<http://www.awesomestories.com/asset/view/Dr.-Richard-Feynman-Discovers-the-O-Ring-Problem>



Challenger - O-Ring Failure Caused the Disaster

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Feynman, Dr. Richard P. - BBC Interview

Clip from BBC Horizon/PBS Nova, *The Pleasure of Finding Things Out*, Richard Feynman Interview (1981).

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