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PDII Tech Issues and Solutions

WRR 3 Perrow's Normal Accident Theory and Space Shuttle Challenger

1)

In your own words, describe what is meant by a "normal accident". How does a normal accident occur?

A normal accident is an accident that is bound to happen, not because this particular event is bound to happen, and not because it's at all likely, but because when the stars all align in just the wrong way and several unlikely events just happen to occur at the same time, they result in a much larger accident.

2)

For the Space Shuttle Challenger disaster, briefly provide the main technical cause and 2 other "non-technical" (e.g., human factors, social, economic, ethical, cultural, political, environmental) causes/explanations.

The main technical issue of the Space Shuttle Challenger disaster was the O-ring seal. Joint rotation was much greater than expected, the rings eroded from the hot gas quite quickly, and most importantly for this instance, they were unreliable in cold conditions.

One non-technical issue was the lack of willingness to delay for safety. After delays over the previous months, being delayed by the previous Columbia mission, and a short delay from ice on the launch pad, leadership grew impatient. NASA wanted to get Challenger launched as soon as possible to get a satellite up to observe Halley's comet before the Russians, as this would help prove to Congress that the program was worth the budget.

Another non-technical issue was communication and bureaucracy. Many engineers realized how big of an issue and how extremely dangerous this was, but like with many other issues, leadership wasn't on exactly the same page. Leadership certainly understood that there was added risk, but hugely underestimated it. Part of the solution was ironically adding more bureaucracy, with a safety office and safety advisory panel.

3)

Normal Accidents are described as "inevitable" or bound to happen. In your opinion, was the Space Shuttle Challenger disaster inevitable? Why or why not?

I don't believe this particular accident was "inevitable", as it could have been prevented at countless points along the way, and I wouldn't consider it a normal accident as there were people

who understood the huge risks and exactly what was happening, but I do believe that an accident of this type was inevitable. When you have a system as complicated as spaceflight where all it takes to cause disaster is some cold weather the night before a launch, and all it takes to ignore the risk is some politics, both of which are fairly common, you're bound to have occasional disastrous consequences.