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Lessons on Safety Culture

Challenger, 40 years on: why the lessons are still relevant

Insights from Challenger and Columbia

Description

The Space Shuttle Challenger accident occurred on 28 January 1986, 40 years ago, shortly after its launch from Kennedy Space Center. Seventy-three seconds into flight, the shuttle broke apart during ascent, resulting in the loss of the vehicle and its crew of seven. The technical cause was the failure of a joint seal in one of the solid rocket boosters, which allowed hot gases to escape and damage the external tank.

The launch took place on an unusually cold morning for Florida. The solid rocket boosters had flown on many previous missions, and minor erosion of the joint seals had been observed on earlier flights. At the time, the Space Shuttle programme was operating on a frequent launch schedule and was considered a routine operational system.

On 1 February 2003, the Space Shuttle Columbia was lost during re-entry following a 16-day mission, resulting in the loss of the vehicle and its seven crew members. During launch, a piece of foam insulation detached from the external tank and struck the left wing. The resulting damage allowed hot gases to penetrate the wing structure during atmospheric re-entry, leading to loss of control and destruction of the vehicle. Although the two accidents occurred 17 years apart and in different phases of flight, both involved similar organisational and decision-making conditions within the same programme.

Key findings

The events highlighted how safety culture is shaped not only by technical knowledge, but by how organisations work under pressure. Decisions were taken within a context of demanding schedules, limited margins for delay, and an expectation that the system should continue to perform as planned. These conditions influenced how risk information was framed, discussed, and ultimately acted upon.

Concerns were raised, but they had to compete with operational priorities and uncertainty in the available data. When information could not conclusively demonstrate additional risk, it carried less weight in decision-making. Over time, this shifted the balance toward continued operation rather than pausing to address unresolved issues.

The cases illustrate the ethical dimension of safety decisions. Engineers and managers were required to make judgements that weighed mission objectives, workforce pressure, and the limited solid evidence available. In such environments, responsibility can become diffused, and decisions that feel reasonable can later be seen as contributing to unacceptable outcomes.

Why does it concern me?

These events show how safety culture is influenced by everyday decisions, not just by formal rules or technical standards. Tight schedules, workload pressure, and expectations of success are common across many high-hazard industries, and they shape how people assess risk and make decisions.

When systems perform well over long periods of time, it becomes harder to recognise when conditions are slowly changing. Concerns that do not point to an immediate failure can lose urgency, particularly when acting on them would disrupt plans or place additional pressure on people and resources.

The relevance lies in recognising that safety-related matters are not only technical challenges, but also human and organisational ones. How uncertainty is handled, how pressure is managed, and how ethical responsibility is understood all play a role. The lesson is not about technical failures, but about decisions made in demanding environments, and how easily these can shape outcomes over time.