

Turkish airlines flight

[Environment](#), [Air](#)



Turkish Airlines Flight 981: DC-10 Cargo Hatch Failure

On March 3rd, 1974, Turkish Airlines Flight 981 suffered a catastrophic fuselage failure at an altitude of 23,000 feet and crashed into a wooded area of Ermenonville, France (ASN, 2008). All 346 passengers were killed upon impact (ASN, 2008). The aircraft, a DC-10 built by McDonnell Douglas and owned by Turkish Airlines (THY), took off from Paris' Orly Airport, and crashed 12 minutes into the flight, on route to London Heathrow (ASN, 2008; Bradley, 1995).

The initial cause of the failure was due to a poorly engaged latch mechanism of the DC-10's rear cargo door (ASN, 2008). At 23,000 feet, the "cargo door exploded open", creating a hole in the fuselage (Bradley 1995). The "sudden depressurization" severely damaged the floor structure of the aircraft, thus "impairing the flight controls (tail surfaces)", which ran the length of the floor assembly (ASN, 2008). The pilots had no control over the aircraft's tail – the DC-10 pitched downward and accelerated before crashing into a forest in Ermenonville (ASN, 2008).

The cargo hatch in question was operated at Orly by a subcontracted company, hired by THY (Bradley, 1995). The man responsible for closing the hatch could not read English, and thus was unable to read "the clear instructions", which explained how to properly secure and check the door (Bradley, 1995). A peephole was available to check the position of the sliding locking pins, but he failed to verify them (Bradley, 1995). The engineer responsible for checking the integrity of the work was not present, and his replacement did not inspect the lock pins (Bradley, 1995). The door

appeared to be secure, but the locking pins were not sufficiently engaged (Bradley, 1995).

The DC-10's cargo hold was held shut with hooks, latching onto a fixed bar (Birsch and Fielder, 1992). Electric actuators were used to close the door, and metal locking pins held the hooks in place (Birsch and Fielder, 1992). The pins held the door shut and the electric actuator served as a fail-safe, failing only at very high pressures (Birsch and Fielder, 1992). Hydraulic actuators fail at low pressures (and by extension, lower altitudes) - this would have caused the latch to break sooner in flight (Birsch and Fielder, 1992). Without the massive depressurization, the floor of the aircraft would have survived, and flight controls would not have been lost (Birsch and Fielder, 1992). The DC-10 was designed to use hydraulic actuators, but due to the cost of maintenance, electric actuators were implemented (Birsch and Fielder, 1992).

Another flaw in the DC-10's design was the strength of the floor assembly, which held the tail's flight control hydraulics (Birsch and Fielder, 1992). Vents were added to the floor of the cabin, to aid in quickly dissipating pressure in the event of a high altitude fuselage failure (ASN, 2008). According to the Aviation Safety Network, these vents were found to be "inadequate", and did not reduce the damage to the floor, and thus the embedded flight controls (2008).

The DC-10 crash in France came to be through a series of avoidable and unavoidable errors (Bradley, 1995). As indicated by Edgar Bradley, the only unavoidable fault lay with the cargo door operator, who did not know the

correct locking procedure – all other errors could have been avoided (2008). The vents, along with the locking mechanism, were known DC-10 issues following a 1972 crash in Windsor (NTFS, 1973; ASN, 2008). No subsequent modifications were made to the DC-10 (ASN, 2008). Even though the risks were established, the engineers made no changes, as the legality of the situation had not changed – illustrating a low standard of responsibility at the engineering level. The risks may have been greatly lowered had management decided to resolve the issues, but according to Bradley, “[they] were not very keen to because of the cost involved” (2008). This cost-benefit analysis falls into Mill’s utilitarianism principle of ethics (Kay, 2010). To the management and engineers responsible, the knowledge of the design flaws did not justify spending money on repairs needed to avoid the disaster. This is a clear breach of the ethical standard of utilitarianism, in which one must “promote the greatest good for the greatest number” (Kay, 2010).

To avoid similar catastrophes, companies, as well as individuals responsible, should be required to hold themselves to a higher professional standard than fear of a malpractice lawsuit. There needs to be a shift towards the benefit side of the cost-benefit analysis, so that the principle of utilitarian ethics is upheld. This said, on March 7th 1974, the FAA’s “Airworthiness Directive”, required all DC-10’s to be retrofitted with modifications that would prevent a similar event from occurring (Birsch and Fielder, 1992).

Reference List

Aviation Safety Network (ASN). ASN Aircraft Accident McDonnell Douglas DC-10 [...]. <http://aviation-safety.net/database/record.php?id=19740303-1> (accessed March 1, 2010).

<https://assignbuster.com/turkish-airlines-flight/>

Birsch, D.; Fielder, J. H. The DC-10 Case: A Study in Applied Ethics, Technology, and Society, SUNY Press, 1992; pp 76-80.

Bradley, E. A. Determination of Human Error Patterns: The Use of Published Results of Official Enquiries into Systems Failures. Quality and Reliability Engineering Int., 1995, 11, pp 411-427.

Kay, C. D. Notes on Utilitarianism. <http://webs.wofford.edu/kaycd/ethics/util.htm> (accessed March 1, 2010).

National Transport Safety Board (NTFS). Aircraft Accident Report: American Airlines Incorporated McDonnell Douglas DC-10-10, Near Windsor, Ontario, Canada, June 12, 1972. Washington, D. C.; 28 February 1973.

[http://libraryonline.erau.](http://libraryonline.erau.edu/online-full-text/ntsb/aircraft-accident-reports/AAR73-02.pdf)

[edu/online-full-text/ntsb/aircraft-accident-reports/AAR73-02.pdf](http://libraryonline.erau.edu/online-full-text/ntsb/aircraft-accident-reports/AAR73-02.pdf) (accessed March 1, 2010).