Engine Failure Makes Engineers Great: Redundancy

Executive summary. On February 20, 2021 a Boeing 777 airplane lost an engine during flight over Colorado. The engine failure was catastrophic and could have resulted in hundreds of deaths. The plane landed safely back in Denver. This failure highlights the greatness of engineers.

Here's a link to the story on this Boeing 777 failure [QR]

You're an idiot, engineers caused this failure. This statement is partially true in that there likely is an engineering failure responsible for this engine failure. However, it was engineering that saved the lives on this plane (and the pilots and crew too!).

What is redundancy? Whether a large plane like this one has two engines or four engines, these planes are made to run with an engine missing. This engineering principle is called redundancy. Redundancy is when a product is designed to operate even after the failure of a component.

In the case of an airplane, when an engine is down and the power is now unevenly distributed, engineers have certainly accounted for this decrease in power and the now-uneven distribution of thrust to the airplane. The result of that engineering is a safely landed plane now in Denver.

Where else is there redundancy? If you're working in a building now or driving in an upward spiral in your parking garage, look around – the columns you see are made to take more load than they're taking now. If a column fails in either of these scenarios, the other columns in adjacent bays are designed to take that extra load to prevent a total building collapse. You can also see it in your condominium or office building out back – what do you think that generator is for? It's backup power right? A redundant power supply in case of loss of power.

The best day of their life. Passengers and engineers associated with that flight today had the best day of their life. Yes, you're right, many of those passengers will be forever traumatized and never able to walk into a plane again. And yes, there are some engineers who are head-in-hands at home on their couch upset because perhaps their error terrorized those plane passengers.

But, I'll guarantee you this. There are some passengers who are high-fiving because they're alive and have been reminded of how precious life is. And, hate to say it but there are some

engineers high-fiving today too because their foresight and technical prowess ensured that failure of engine #2 avoided what could have been one of America's darkest days ever in commercial flight and death.

My story. A pawl brake is a redundant brake system – it's in cranes. This is the redundant brake system in place when a boom is lifted off of the ground. We didn't have our pawl brake engaged on a job I was on and the boom came crashing to the ground. This was due to operator error.

Lastly, my sympathies to the passengers, crew, and engineers involved in this accident. I'm sure many of them are permanently scarred from the emotional roller coaster today, and for the years to come. However, I had an accident in 2016 which put me in a wheelchair for 3 months. The day of that tragic accident was to me, looking back, one of the best days of my life – I'm alive and walking.

Work safe!