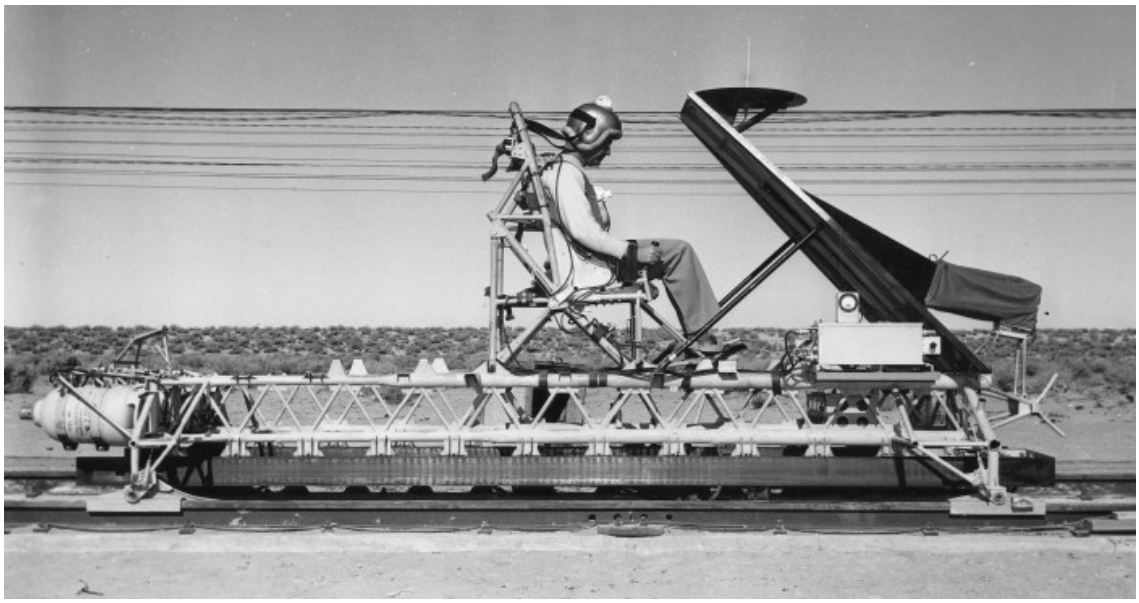
Murphy's Law is not an excuse

Murphy's Law is not an excuse, it is a call to action!

The underlaying concept of Murphy's Law is not new, in 1877 Alfred Holt is quoted as saying "*Anything that can go wrong at sea generally does go wrong sooner or later*"; and there are other recorded instances of similar sayings. But these are not Murphy's Law.

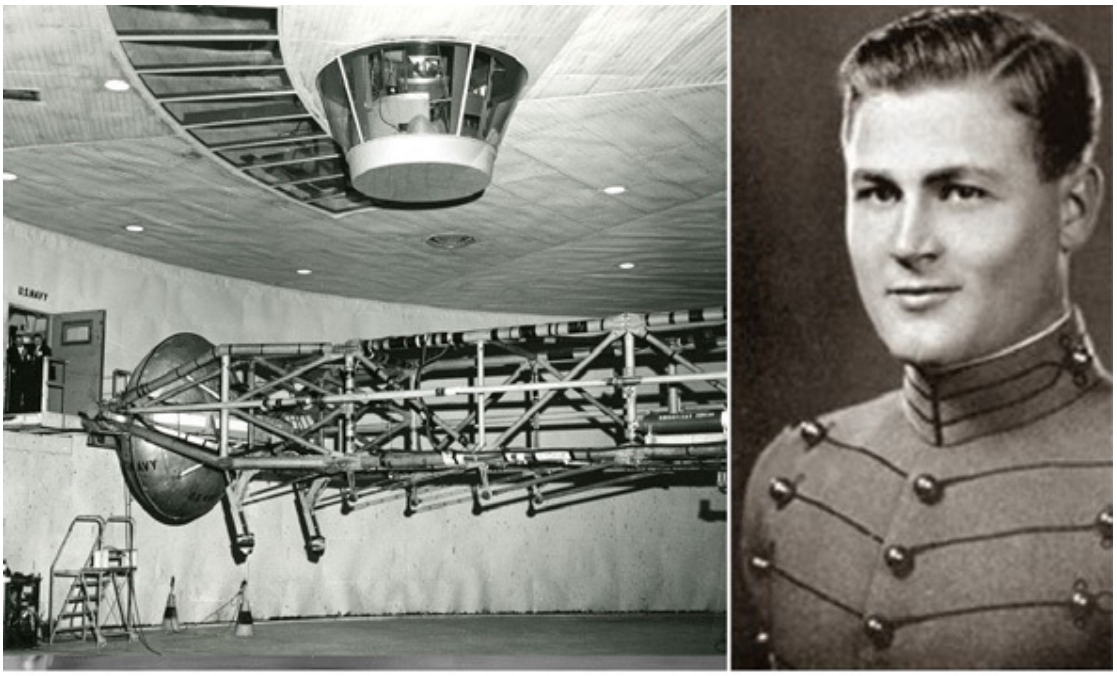
The origin of Murphy's Law can be traced to Dr (Major) John Paul Stapp who was directing Project MX981 for the USA Airforce that started in 1945 and ran through to 1948. The objective of the project was to determine the effect of 'G-forces' on the human body and using this data, to work out how to safely eject pilots from high-speed jet aircraft[1]. The experiments involved rapidly accelerating and decelerating rocket sleds carrying a range of 'payloads', including human volunteers. For many of these experiments, Dr. Stapp was the volunteer so he could apply his medical knowledge directly to what he was feeling. Over the years, he collected a catalogue of broken bones and other injuries but no one was seriously injured or killed in large part due to the application of Murphy's Law.



As a sideline, Dr Stapp collected and drafted various 'laws' one of my favourites is Stapp's Law: *The universal aptitude for ineptitude makes any human accomplishment and incredible miracle.* He named the laws after the person who first stated the 'law', but Stapp tightened the way the law was expressed to make it succinct and memorable.

[1] During and after Project MX981, Dr. Stapp used his data to advocate for the inclusion of restraints and design features in automobiles to reduce the incidence of death and serious injury. His advocacy was successful and recognition of his contribution to saving hundreds of thousands of lives continues to this day via the Stapp Car Crash Conference®.

To validate the experiments in Project MX981, Stapp required very accurate measurements of the stresses being experienced by the volunteer. He became aware that Captain Edward A. Murphy was working on another project involving centrifuges, that included designing very accurate systems to measure the G-forces being experienced by the person in the centrifuge.



Murphy was only involved in Project MX981 for a couple of days but has an impressive CV; in later years, his engineering skills were used in a range of advanced projects including the SR71 'Blackbird', the X15 rocket plane and helping to design the life support systems for the Apollo Missions.

From Stapp's perspective, Murphy's sensors seemed to be ideal for accurately measuring the forces the person strapped to the rocket sled was experiencing rather than the sled itself. Murphy happily agreed to Stapp's request to modify his sensors and shipped a couple of modified sensors across for use. However, the first experiment using two of Murphy's gauges failed completely; no measurements were recorded! When Murphy came out the morning after to investigate the failure, he found the gauges were oriented incorrectly, and recalled saying '*If there is more than one way to do a job and one of those ways will result in disaster, then somebody will do it that way*'. Murphy had made accurate drawings of the gauges and instructed the people who would install them, but had not made it clear that the gauges had to be positively oriented in only one direction.

The origins of Murphy's Law lays in a conversation following this failure. Murphy recalls saying '*Well I really have made a terrible mistake here; I did not cover every possibility*' Major Stapp replied '*Well that's a good candidate for Murphy's Law*'[2]. The simplest statement of the law is ***'If anything can go wrong it will!'***.

[2] As a side note, Murphy was good friends with Laurence Peter, the author of the "Peter Principle" – people inevitably get promoted until they reach their level of incompetence, and knew Cyril Northcote Parkinson, the author of 'Parkinson's Law' – work expands to fill the time available.

The experiments continued with the final test run before the project was terminated, with Dr. Stapp as the volunteer, resulted in the sled accelerating from o to 630 mile per hour (1017 Km/Hr – the highest land speed of any human) in 5 seconds creating a force of 20Gs; then stopping in 1.4 seconds imposing 46.2G of force on Stapp.

When asked many years later about the remarkable safety record of Project MX981 Stapp said one of the key factors was the application of Murphy's Law. '*The entire team adhered to 'Murphy's Law', they always kept in mind whatever could go wrong would, so they made extreme efforts to think up what could go wrong and fix it before the test*'[3].

While your project is unlikely to have the risk profile of a ride on a rocket sled, designing potential problems and failures out of the overall system pays dividends; success is designed in, not tested in. To apply Murphy's Law proactively, you need to think through everything before you start work and ask yourself if this part fails, does the system still work, will it still do the function it was supposed to do? What are the single points of failure? What are the processes someone can do incorrectly?

This type of thinking establishes the potential critical failure points where there is a need to put redundancy into systems and to make sure the opportunity for human error is eliminated wherever possible. There are formal approaches to applying Murphy's Law such as FMEA (Failure Mode and Effect Analysis) and 'reliability engineering' used in system engineering[4] and on the design of critical systems but you probably don't need to be this sophisticated on your project. Simply asking your project team to think through what can go wrong and what can we do about it works in most normal situations and can save a lot of pain later. This approach may be included in the project's regular risk reviews or simply included in the agenda for the daily stand-up or other team meetings.

So next time something goes wrong and someone says 'It's Murphy's Law', you can respond, 'No, it is a failure to apply Murphy's Law that caused the problem!'.

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[3] For more on Murphy's Law: https://youtu.be/Ow50TBiytiE

[4] For more on ***FMEA*** see: https://mosaicprojects.com.au/WhitePapers/WP1003_FMEA.pdf

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