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Communication in the cockpit - P.A.C.E - 'Black Box Thinking' (extract) - 2015

"Social pressure, and the inhibiting effects of authority, had destroyed effective teamwork." - Matthew Syed re United Airlines Flight 173, 'Black Box Thinking'

United Airlines Flight 173 took off from JFK International airport in New York on the afternoon of 28th December 1978, bound for Portland, Oregon, as its final destination. The sky was clear, the flying conditions close to perfect... but when it began its descent to land, a light on the cockpit dashboard confirming that the landing gear was down, failed to come on. The captain aborted landing, and began circling whilst he tried to work out if there was a problem.

At 17:46 local time, the fuel level dropped to 5 on the dials... **The engineer became agitated.** He informed the pilot about the state of the fuel, warning about flashing lights in the fuel pump. The cockpit voice recording transcript reveals his growing **anxiety**.

At 17:50 **Engineer Mendenhall tried again** to alert the captain to the dwindling reserves... with each second, the reserves of fuel were diminishing. The first officer and engineer could not understand why the pilot was not heading directly to the airport.

At 18:06 the fourth engine flamed out. 'I think you just lost number four, buddy, you...' Thirty seconds later, he repeated the warning. "We're going to lose an engine, buddy'.

United Airlines 173 was perfectly capable of landing. The landing gear, it was later established, was in fact down and secure. Even if it hadn't been, an experienced pilot could have landed the plane without loss of life. The night was crystal clear and the airport had been in sight since the initial descent had been aborted. **But now it was too late.**

Eight passengers and two crew members died. One of them was **Flight Engineer Mendenhall,** who had vainly attempted to warn the pilot of the dwindling fuel reserves. This was, in part, a problem of **communication**...

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Communication in the cockpit, cont.

... Listening back to the voice recorder, Diehl (a psychologist) noted that as the dangers spiralled, Mendenhall became ever more desperate to alert the pilot (McBroom), but **he couldn't bring himself to challenge his boss directly**. Engineer Mendenhall paid for his reticence with his life.

This is now a well-studied aspect of psychology.

Social hierarchies inhibit assertiveness. We talk to those in authority in what is called **'mitigated language'**.

You wouldn't say to your boss: *'It's imperative we have a meeting on Monday morning.'*

But you might say: *'Don't worry if you're busy, but it might be helpful if you could spare half an hour on Monday.'*

This **deference** makes sense in many situations, but it can be fatal when a 90 tonne aeroplane is running out of fuel above a major city.

When Diehl and his colleagues published the report on United Airlines 173 in June 1979, it proved to be a landmark in aviation.

Within weeks, NASA had convened a conference to explore the benefit of a new kind of training: Crew Resource Management. The primary focus was on **communication**. First officers were taught assertiveness procedures. The mnemonic which has been used to improve the assertiveness of junior members of the crew in aviation is called **P.A.C.E. (Probe, Alert, Challenge, Emergency).** *Captains, who for years had been regarded as big chiefs, were taught to listen, acknowledge instructions and clarify ambiguity.*

Checklists, already in operation, were expanded and improved. The checklists have been established as a means of preventing oversights in the face of complexity. But they also **flatten the hierarchy**. When pilots and co-pilots talk to each other, introduce themselves, go over the checklist, they open channels of **communication**. It makes it more likely the junior partner will speak up in an emergency.

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P.A.C.E - guidelines for communication under pressure

5 Lessons from United Airlines Flight 173

1. **Cognitive Tunnelling**: when we are stressed, we become blinkered, focusing in on what we see as the primary threat; often becoming oblivious to more important information that we are effectively unable to see.
2. **Social Hierarchies**: perceived hierarchy, whether formal or informal, can inhibit assertiveness. Things that can influence perceived differences in power and status: job title, age, experience, class, education, ethnicity, length of tenure, etc.
3. Senior colleagues should strive to account for the impact of social hierarchies by **listening, asking questions,** and undermining 'illusions' that they have all the answers.
4. More junior colleagues should strive to **PACE**.
5. **Structuring meetings** with elements like 'check-ins' and 'check-outs' helps level the playing field.

An example of P.A.C.E (a nurse to a doctor)

PROBE - 'Doctor, what other options are you considering if we can't get the tube in?'

ALERT - 'Doctor, oxygen is 40 per cent, and is still dropping, the tube is not going in, what about a tracheostomy kit?'

CHALLENGE - 'Doctor, we need to conduct a tracheostomy now or we will lose the patient.'

EMERGENCY - 'I'm alerting the resuscitation team to do the tracheostomy.'

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