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Human Factors

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Remember how it feels to be mistaken for an American rather than a Canadian? It may be only just across the border, but there are so many things about being a Canadian that are different. Many of these differences are cultural - the shared beliefs and attitudes we may have about everything from the shape we think a football should be, to the way in which we perceive and respond to errors or accept risks.

With the recent prominence of Safety Management Systems has come a focus on safety culture, but this is in fact just one way in which culture can affect safety.

In the 1990s, two Dutch scientists, Geert Hofstede¹ and Fons Trompenaars², studied in detail the differences between national culture and the way that this affects business and life-style decisions. Their work examined topics ranging from the way we perceive hierarchy in society (the so-called 'power-distance' effect) to the way in which an individual prioritizes things for their own benefit, or for the greater good of society (individualism or collectivism). Understanding how various nationalities may react to each other, their boss or subordinate; the amount of uncertainty they are prepared to accept; the power they think they have over their destiny and so on, is not just interesting for academics, it has a direct impact on operational staff.

The rise of Crew Resource Management (CRM) in aviation was, in part, aimed at dealing with cultural barriers to communication. Professional culture, the effects of seniority and the ease with which individuals can question their senior officers have all been factors in accidents. The switch from military to civilian flying also provides potential barriers - something that was seen with tragic consequence within Korean Airlines where several fatal accidents occurred, partly because junior crew-members felt unable to challenge their colleagues, partly because of their relative ranks during previous military service.

As CRM became popularized in the 1990s, the problem of cultural compatibility became apparent. A course designed for American pilots is not, for example, appropriate for, say, China or Japan. For example, a course was given to pilots in a particular airline where a strong power-distance effect existed - in other words where junior pilots felt unable to speak up. The instructor was delighted when throughout the course the senior captains enthusiastically agreed with the instructor that junior crewmembers should feel empowered - surely this CRM training was really working? However, the autocratic management style returned as soon as they were back on the flight deck. The instructor was the 'senior officer' in the class and could not be questioned, but then back on the flight deck, the captain was in charge again.

Of course, like so many things in human factors, there is no simple rule. There is no such thing as an 'unsafe' national culture. Indeed, different combinations of cultural traits can be assembled to produce the same successful outcome – for example, a culture where questioning of authority does not come easily, can be balanced with strict adherence to standard operating procedures which include cross-checking.

Professional culture is also very different. across the aviation industry. Pilots and air traffic controllers, maintenance engineers and flight attendants may, at times, feel like they are from different planets. The words they use, the clothes they wear, and the nature of the tasks they undertake all indicate different approaches to work. Remember the joke that says, *How do you know when there is a pilot at your party? They are the one that says 'Hello, I am a pilot!'* - I am not sure I have ever heard the same one about air traffic controllers or maintenance engineers!

Safety culture; a term which was developed after the fire at the Chernobyl nuclear reactor in 1986 has become all too popular, thanks to work in Safety Management Systems. James Reason³ points out "few phrases are so widely used yet so hard to define as safety culture". Simply put, safety culture relates to an organization's attitudes and responses to safety. A mature safety culture is reflected in a shared responsibility and enthusiasm for safety; not just about compliance or lip-service. It is not something that can be switched on and off or bought from a vendor or consultant. The American Institute of Chemical Engineers observes, "Safety culture is how the organization behaves when no one is watching."

How an organization reacts to error or deals with failure is probably the greatest test of its culture. It is seen to be just and fair in punishing willful violations, but at the same time accepting that most errors and indeed some violations come about because most staff are trying to do a decent job? Changing a culture for the better can take five or even ten years, but changing it for the worse can happen very quickly. The reaction to an incident or accident will tell the staff all they need to know about the organization's attitudes to safety.

In 2006, a B737 cargo aircraft suffered a landing accident at Birmingham airport, UK. During an approach to another airport, the pilot inadvertently disconnected the autopilot leading to a high rate of descent. A go-around was called, but it was too late to avoid contacting the ground, breaking of the right main landing gear. The aircraft diverted to Birmingham where an emergency landing led to a hull-loss, albeit without injury.

The resulting investigation report⁴ highlighted a number of causal and contributory factors including inappropriate transmission of a company message at a late stage (500 feet) of a Cat III automatic approach, and ineffective training of the co-pilot - the latter prompting a recommendation that the regulatory authority require the operator to review their standard operating procedures. As a result of the accident, approximately one month later, the operator sacked the pilot and they were quoted in the Mail Reporter newspaper⁵ as saying, "Although the Air Accidents Investigation Branch investigation continues, it has been established that the automatic pilot was disengaged. That is down to human error. Although the pilots did manage to recover superbly and made a text book emergency landing at Birmingham airport, they instigated the incident with a momentary lapse and the company operates a zero accident tolerance level."

What do you think the other crews interpreted a zero accident tolerance level to be? Was ineffective training of the co-pilot not perhaps a symptom of a greater, systemic problem? Was this not an opportunity to learn the lessons of what went badly and at the same time what went well? – the pilots

did manage to recover superbly and make a text book emergency landing. An event badly handled by an organization may change the culture of that organization significantly?

ICAO⁶ reminds us because a culture is shaped by its environment and evolves in response to changes in that environment, culture and context are really inseparable. Deployment to operational theatres or postings to overseas locations have the potential to change the culture of any group. The change may be subtle and slow - culture is often described as being like a fish in water; it is all around you, but you can't see it. In other words, the potential for cultural drift or 'risky shift' can be dangerous and invisible.

Take the example of the introduction of night vision goggles and helmet mounted displays into helicopter operations in an overseas air force. The need for such equipment was heightened by an imminent major sporting event, which was also identified as a major terrorist target. Although there were crashworthiness concerns raised by the air force's airworthiness group, the operational need was such that, the perceived risk was temporarily accepted. The event passed with no incident and the crews became happy to use the new equipment. Soon after, a heads of government meeting was to be hosted, so again a special case argument was made and the equipment used again, still without survivability issues being addressed. Slowly, the new equipment had become accepted without appropriate testing and was becoming the way we do things around here. This is a dangerous slide and eventually the airworthiness group became quite unpopular by demanding the equipment withdrawn until properly assessed. Did the lack of incidents mean it was safe? Should the operational need always come first? If the latter, then at what point will someone speak up - that may be down to culture.

References

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