

Safety Culture in ATM: through a glass darkly

There are two points in the title which are central to this topic. Firstly, safety culture is a consideration for the whole air traffic management organisation, not just the operational staff. Secondly, safety culture is a complex phenomenon.

By Anne Isaac and Magnus McCabe

As Don Quixote proclaimed (whilst charging at windmills) truth, sanity and madness are merely a question of perspective. In other words, we humans have an imperfect perception of the world we can see – our perception of abstract phenomena such as 'culture' is even less perfect.

Nothing in safety culture is clear-cut, black or white, true or false, which can make this topic a controversial area to discuss.

Early Work

As with the concept of situation awareness, safety culture is a process, not an outcome. Organisations therefore need to evolve a strategy which enables the teams and groups to develop their attitudes and behaviours towards safety rather than dictating what these will be.

The earliest development in aviation safety culture was at the Flight Safety Foundation's 37th seminar in 1984. Redding and Ogilvie gave a paper on the 'Cultural effects on cockpit communications in civilian aircraft'. Their work was based on the research of Geert Hofstede, whose influence in the cultural influences in aviation would be pivotal. This discussion was followed by the seminal works of Wiener, Kanki and Helmreich in their book on 'Cockpit Resource Management' (CRM). In

this book Neil Johnston, from Aer Lingus, introduced a compelling case about the relationship and influence of culture

on CRM training, particularly on system safety performance. This approach complimented the approaches of Frank Hawkins' SHELL model and James Reason's accident causation model in dealing with system performance.

Cultural Factors

These approaches also need to be viewed within the context of several fatal accidents to fully realise the impact of a coherent safety culture approach.

Those in aviation safety will be well aware of the corporate cultural in-

fluences in the 1989, Air Ontario, Fokker F28 crash at Dryden, Ontario following from the merger of two quite different airline companies. In 1992, the Airbus A320 crash into Mont St. Odile alluded to the issues of corporate culture which shaped flight crew performance as well as the influence of social context in shaping organisational performance. A third air accident a year later in Australia – a Piper Navajo which crashed while conducting a night circling approach at Young, New South Wales – also concluded that the organisational, corporate



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and cultural factors of both the operator and Civil Aviation Authority were considered to have had a bearing on the accident.

These accidents, and the considerable academic debates which have followed, have been clear in their assertion that safety culture is a tripartite concept; one which is based on national, organisational and professional aspects. This can be demonstrated in the following figure:

Safety Attitudes

There has been a large amount of research data which has been generated from the Crew Resource Management (CRM) programmes in various airlines, but what have we found from the ATM environment? Several years of data gathering has certainly demonstrated, although rather difficult to prove statistically, that exposure to Team Resource Management (TRM) has influenced the attitudes and be-

It is clear that the relationship between attitudes and behaviours is greatly influenced by safety culture and that safety culture is a product of attitudes and behaviours.



Figure 1: A model of the intersection of cultures and their outcomes (adapted from Helmreich and Merritt, 1998)

These elements have been highlighted in flight crews by their behaviours and from this analysis the following cultural influences can be demonstrated.

haviours of operational staff in particular with regard to team working, reliance on challenging colleagues when required and improved understanding of communication. In terms of incident events the data also suggests that those operational groups who have experienced TRM reduce the number of team-related incidents by half.

It is clear that the relationship between attitudes and behaviours is greatly influenced by safety culture and that safety culture is a product of attitudes and behaviours. This is an iterative process which takes time to develop and more time and effort to maintain. The figure 3 demonstrates this relationship.

Cultural Differences

In terms of **National Culture**, those behaviours which have demonstrated an increased probability of an unsafe flight are associated with non-compliance to rules and procedures and poor leadership.

With regard to **Organisational Culture**, those behaviours which demonstrate a commitment at all levels to lesson learning, whether it be from adverse events or near misses, are characteristic of a sound and mature safety culture. This can be demonstrated in terms of individuals' responses to error by the following figure.

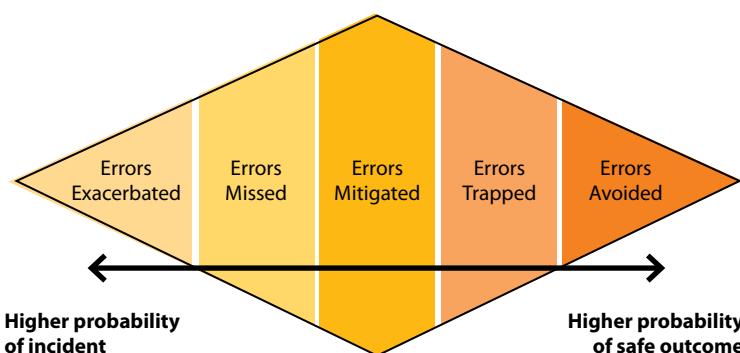


Figure 2: Operator responses to error (adapted from Helmreich and Merritt, 1998)

With reference to **Professional Culture**, the probability of a safe operation is linked with professional pride

and motivation as opposed to behaviour demonstrating invulnerability and disregard for the team.

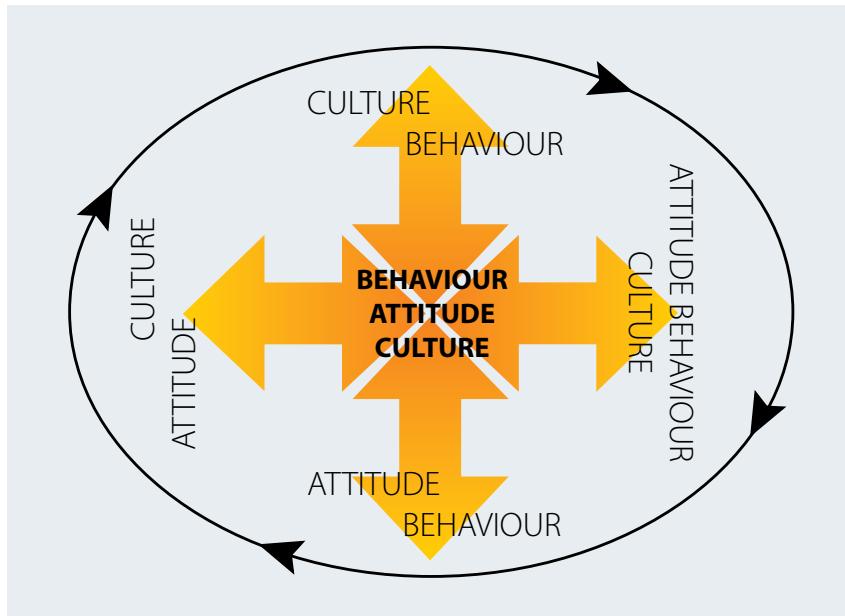


Figure 3: The inter-relationship between attitudes and behaviour and safety culture

Cultural Elements

Since the important first steps in developing an awareness of Safety Culture were taken, our understanding of the constituent components of Safety Culture has become more sophisticated. We now talk about – and can describe in terms of ‘good’ and ‘bad’ – such elements as Just Culture and Reporting Culture. Indeed, the inter-reliance of the building blocks of a Safety Culture have been accurately described by many, among them Prof. James Reason.

Just Culture

The foundation of a good Safety Culture is a functioning Just Culture – one in which members of an organization, from CEO to frontline assistant, controller, or engineer, understand that genuine errors will not be punished but investigated and understood. At the same time, however, a clear line is drawn between behaviours which are acceptable and those which are not. Crucially, where that line is drawn and the reasons why it is drawn there must be clearly understood by all.

Anne Isaac

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Magnus McCabe

Magnus McCabe joined NATS 20 years ago. He has worked in many operational areas including ATC Training, Operational Procedures Design, TRM Training, ATM Incident Investigation and Human Factors in ATM. He is now works in the Division of Safety at NATS HQ where, as part of the Safety Improvement Team, he leads work on Safety Culture, Safety Leadership and Safety Training.

Reporting Culture

One of the results of a strong Just Culture is that a healthy Reporting Culture will develop. When the members of an organization have confidence that their errors and/or safety concerns will be treated justly, they are more likely to become engaged proactively in safety and report things *before* they lead to an incident or accident rather than waiting until the incident has occurred and a report is mandatory.

Learning Culture

Such open reporting in turn leads to a far stronger and broader Learning Culture. Learning lessons is, after all, the flip-side and major benefit of an incident: once the reasons for the incident occurring have been identified and lessons have been learned, the chances of the incident repeating itself are greatly decreased.

Imagine then the exponential benefit of learning preventive lessons from reports *before* an incident has even occurred. Sr. Quixote would never have had to expend all that energy tilting at windmills – those who had previous experience would have warned him to look for giants elsewhere.

Safety Improvement

This is the overarching lesson to be learned by every level of an organization: that the organization’s demonstration of a commitment to Just Reporting and Learning Cultures will shape the perceptions, attitudes, and behaviours of individuals within that organization. This will, in turn, drive an improvement in safety performance. That, surely, must be the ultimate goal of a good Safety Culture in ATM – to increase the awareness of all stakeholders through proactive lesson-learning and turn the organization’s Safety Culture into the strongest safety net in its armoury. ■