

Building Safety on the Three Cultures of Aviation

Robert L. Helmreich, Ph.D.
Professor and Director
University of Texas Aerospace Crew Research Project
Austin, Texas, USA



Effective efforts to achieve safety must recognize the importance of culture. Organisations must have a full understanding of cultural influences on their operations if safety efforts are to succeed. The basic premise of this discussion is that it is essential to build on the strengths of national culture and to enhance professional and organisational cultures to establish a robust safety culture.

Culture surrounds us and influences the values, beliefs, and behaviours that we share with other members of groups. Culture serves to bind us together as members of groups and to provide clues and cues as to how to behave in normal and novel situations. When thinking of culture, what comes to mind first is national culture, the attributes that differentiate between natives of one culture and those of another. For pilots, however, there are three cultures operating to shape actions and attitudes. The first, of course, is national culture. But there is also a strong professional culture that is associated with being a member of the pilot profession. Finally, organisations have their own cultures that are closest to the daily activities of their members. While national cultures are highly resistant to change because they surround an individual from birth, professional and organisational cultures may be modified if there are strong incentives.

All three cultures are of importance in the cockpit because they influence critical behaviours. These include how juniors relate to their seniors and how information is shared. Culture shapes attitudes about stress and personal capabilities. It also influences adherence to SOPs and how automation is valued and used. Each of the three cultures has its strengths and weaknesses. The strengths enhance safety and the weaknesses diminish it.

National culture. National culture represents the shared components of national heritage. These include behavioural norms, attitudes, and values. Some aspects of national culture that have been identified as critical in aviation include Individualism-Collectivism, Power Distance, and Uncertainty Avoidance or regard for Rules and Order (Hofstede, 1980; Helmreich & Merritt, 1998). Individualists focus on the self and personal benefits while collectivists are more attuned to their primary groups. Collectivism is often associated with high Power Distance, which reflects a willing acceptance of unequal status and deference to leaders. Behaviourally, high Power Distance is seen in an unwillingness to question the decisions or actions of leaders, even when they may be inappropriate. Those high in Uncertainty Avoidance (Rules and Order) feel that rules should not be broken, even when it may be in the interests of the company or safety. They also feel that written procedures are needed for all situations and that strict time limits should be observed for activities. Those low in Uncertainty Avoidance may be more prone to disregard SOPs, but also may be more effective in developing ways to cope with novel situations.

Communication between people of differing national cultures is often impaired by language barriers as well as cultural values. Language problems are an unfortunate but universal aspect of culture. The fact that English is (in theory if not practice) the universal language may exacerbate the problem. While people from many cultures are multi-lingual, those from Anglo cultures frequently speak only English and may not understand the problems those from other cultures have in understanding English communications. There is not a simple solution to the problem of language but it must be faced.

Professional culture. A very positive aspect of the culture of pilots is pride in their profession. They love their work and are strongly motivated to do it well. This can help organisations work toward safety and efficiency in operations. The professional culture of pilots also has a strong *negative* component in a near-universal sense of personal invulnerability. We have found that the majority of pilots in all cultures feel that their decision making is as good in emergencies as normal situations, that their performance is not effected by personal problems, and that they do not make more errors in situations of high stress. This misplaced sense of personal invulnerability can result in a failure to utilize CRM practices as countermeasures against error.

Organisational culture. The organisation provides the shell within which national and professional cultures operate and is a major determinant of behavior. It is at the organisational level that the greatest leverage can be exerted to create and nourish a safety culture. To achieve this requires the strong and demonstrated commitment of senior management as well as policies that encourage open communication and action instead of denial as a reaction to problems and risks uncovered.

Increasingly, organisations are becoming multi-cultural. Individuals from different nations are working together in the cockpit, which can result in language barriers within the cockpit as well as between the aircraft and the outside. Pilots may also come from different professional backgrounds such as military versus civilian

experience. Finally, because of widespread failures and mergers, individuals from very different organisational cultures may find themselves working together in a new organisational culture.

Organisational Requirements for a Safety Culture

Before an organisation can build a safety culture, senior management needs to decide if it is prepared to take the necessary actions, including those that are costly. There are some basic conditions that must be met to have any chance of success. These are:

- Trust
- A non-punitive policy toward error
- Commitment to taking action to reduce error-inducing conditions
- Diagnostic data that show the nature threats and the types of errors occurring
- Training in threat recognition and error avoidance and management strategies for crews (CRM)
- Training in evaluating and reinforcing threat recognition and error management for instructors and evaluators

The premises are quite straightforward. If there is not trust and a non-punitive policy toward inadvertent human error, the organisation will not hear from its members and will not be in a position to take a proactive stance toward safety. There is growing awareness that safety is a system phenomenon and that accidents represent a concatenation of multiple factors that cannot be addressed by training or by new technology alone (Wiener, 1993; Sherman, Helmreich, & Merritt, 1997). Attempts to increase the safety of flight operations must address broader system issues as well as training at the individual and crew level. These efforts require accurate and extensive data on the way both individuals and organisations function within the aviation system to guide safety initiatives. Data on performance in both training and the line operations are not research luxuries, but essential elements of safety and efficiency. It is necessary to have an accurate picture of line performance and to know the nature and kinds of threat or risk that are found in the system (Maurino, in press). It is also essential to understand the types of errors that are occurring and their frequency. The key to safety is awareness of risk or threat (including that from the environment, equipment, and humans in the system) and effective error avoidance and management. Hence, organisations need to take steps to gain data on system performance and the nature and extent of threat and error in their operations in order to take effective steps. The following types of data have been identified as critical for an understanding of flight operations and safety; each offers a unique perspective on the system's function:

1. **Training performance.** The assessment of performance in the training/checking environment has historically been a primary source of information on performance and it remains a primary source of information about crewmember qualifications. Nevertheless, it must be recognized that performance under these conditions reflects crewmember skill and ability, not whether or not SOPs are followed adequately in the operational environment. Under conditions of jeopardy, crews will inevitably attempt to fly ‘by the book.’
2. **Line checks.** The same characteristics apply to the line check. It demonstrates skill and awareness of SOPs, but not necessarily how aircraft are operated when the crew is not being evaluated. Like performance in training, that during line checks reflects the behavior of those under jeopardy and is not necessarily reflective of daily practices.
3. **Line audits.** Our research group has developed and advocated the use of non-jeopardy line audits as a primary source of data on system function and crew performance. Using trained observers in an environment of trust, the line audit provides a snapshot of system performance and generates data that point to both operational problems and strengths and to curriculum requirements for training. Recently, the audit process has been expanded to measure off-normal conditions that are sources of threat to safety and to record errors and their management.
4. **Surveys (anonymous).** One important information source is the survey conducted under conditions of anonymity. Such data provide insights into crew perceptions of safety and acceptance of CRM concepts. Survey data provide an important adjunct to audit data in showing areas of strength and weakness in an operation.
5. **Incident reports.** The development of national incident reporting systems has been an important contribution to safety. More recently, a partnership between the FAA and airlines has resulted a partnership under which crewmembers can report errors to their organisations without jeopardy. Such data provide timely information to organisations that can be used for rapid response.
6. **FOQA.** Flight Operations Quality Assurance (FOQA) programs use digital FDR information to seek exceedences in flight parameters. The data are of enormous value; their only limitation is that they do not provide information on the root causes (for example, work overloads, cognitive slips, ATC communications) that resulted in the triggered event.

Threat Recognition and Error Management (TREM): Training to recognize risk and avoid and manage error. After achieving the understanding that data can provide, organisations can take action to reduce or eliminate systemic sources of risk. They can then develop training programs to help those at the ‘sharp end’ of the organisation, their pilots. Crew Resource Management (CRM) was developed as a set of behaviours and strategies for crews to follow in the interests of safety (Helmreich & Foushee, 1993). As CRM has evolved and become more sophisticated, it can be viewed as a set of error countermeasures that lead to recognition of threat or risk and effective management of inevitable error (Helmreich, Merritt, & Wilhelm, in press).

Diagnostic data tell the organisation about the influence of the three cultures in its operations. This information will help in the development of local strategies that are congruent with the situation and the cultures at hand which will lead to training that can be more readily accepted and practiced on the line. A few examples may illustrate how this might work. If the national culture in the organisation is one in which juniors do not question the decisions or actions of their superiors, CRM training that stresses the need for assertiveness on the part of junior officers is not likely to be accepted. On the other hand, if the desired behaviour is couched in terms of the need to support the superior by providing information that may prevent catastrophe and loss of face for the leader and the organisation, it may become part of the organisational culture. Similarly, formal training in the limitations of humans and the inevitability of error can reduce the stigma associated with error and reduce denial of personal vulnerability. This, in turn, can increase willingness to share information on operational errors. Building a trusting organisational culture that has free and open exchange of vital information between pilots and management may be the most difficult task. Again data can tell the extent to which trust is lacking. For example, in surveys of pilots we ask pilots whether they feel management would act on safety concerns as well as their trust in management. When there is distrust and a lack of belief in a commitment to safety over profits, demonstrated action more than words is necessary. To end on a positive note, we have noted in our research a number of success stories. Organisations we have studied have overcome bitterness surrounding mergers and poor labour relations as well as the negative impact of financial distress, and have developed a robust safety culture. The results more than justify the effort and produce additional gains in the form of efficiency and morale.

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