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Changing The Engineering Culture

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Topics in the Paper

- **What is the Corporate Safety Culture.**
- **How does that effect the Business.**
- **Human Factors, were it fits with Culture.**
- **Professional Sub-Cultures.**
- **Defining the current Engineering Culture.**
- **Making changes to the Safety Culture.**



Corporate Safety Culture

- **Safety culture is defined as the product of individual and group values attitudes, perceptions, competencies and patterns of behaviour.**
- **Or “the way we do things around here”.**
- **Companies often state that safety is their highest priority, but fail to live up to that maxim.**
- **Commercial pressure must not be allowed to outweigh safety even if it effects the bottom line.**



Corporate Safety Culture

- **The ultimate goal of the safety culture is to eliminate accidents.**
- **The Board must be actively involved, or potentially it will be a drag on resources.**
- **Top management's drive and commitment must be unwavering.**
- **Commitment to safety must be demonstrable.**
- **The Company's safety performance is the product of the Safety Culture of the organisation plus its Luck Factor**



Safety Culture and Performance

The Company's safety culture is perhaps the most significant influencing factor on safety performance.

It is primarily evidenced by its effect on human behaviours and attitudes in the workplace.

The performance of the staff and the influences of their supervisors and managers determines the level of human error suffered by the Company.

Company Culture can be changed, and if the commitment is there, this change can be an improvement!



Styles of Safety Culture

Management are able to determine the style of safety culture of the organisation, their actions not words have a significant effect on that culture.

Styles of Safety Culture



Blame

Just and Learning

No Blame

- **Safety Culture is not only about the management's commitment to safety,**
- **It's also about the subsequent approach the staff take to safety in the workplace.**



Styles of Culture

Question the Board should ask about its culture?

- **What is the safety culture in the company?**
- **Is it Robust enough to support the safety performance we require?**
- **Does it need to change and if so what do we need to do?**

Ideally Management should seek to develop be a Just and Leaning Culture, that is capable of supporting the Company's business principles and safety objectives



Just and Learning Culture

A Just and Learning Culture should:

- **be supportive of the staff and management.**
- **engender honest participation.**
- **seek to learn from its mistakes and errors.**
- **accept that mistakes will happen.**
- **encourage open reporting.**
- **treat those involved in the errors justly.**
- **consider the implications of management and their systems in all incidents.**



Human Error

- **Controlling human error within the maintenance environment is the most significant challenge we face today in the aviation industry.**
- **The Company's safety culture is the a powerful tool that can be used to reduce the likelihood of human error progressing to an accident.**
- **This is particularly important in the maintenance organisation, where to date, provision of resources, human factors, technical and development training and perceived importance is minimised.**



Human Error

Controlling human error within the maintenance environment is the most significant challenge we face today in the aviation industry.

In March 2000 a board member of the NTSB announced that of the 14 FAR-121 carrier hull losses that had occurred in the last 5 years to US registered aircraft, 7 were caused by maintenance shortfalls.

This is a far worse figure than previously considered.

Accident studies show that the attitudes to safety by the Engineers and their Maintenance Managers implicates a poor safety culture in the organisation.



Human Error

To Err is Human!

Error is a natural condition of being human!

We are all error prone, even our most experienced engineers!

The vast majority (80%+) of our incidents are caused by human error.

Management should not be surprised when Human Error occurs!

But they should be surprised if their systems of work are not robust enough to contain the error!



Common Incident Features

An AAIB assessment of key features of Serious Maintenance Incidents concluded that:

- **There was inadequate pre-planning, equipment or spares**
- **Time pressures existed**
- **All the errors occurred at night**
- **A Handover of work was involved**
- **Supervisors were doing hands on tasks**
- **There were staff shortages**
- **Interruptions occurred during the task**
- **Manuals were confusing**
- **A failure to use approved data or procedures**
- **There was an element of can-do attitude**



Common Incident Features

Almost all of those common features that appeared in the incidents reviewed are “organisational system” related.

Those that were not are:

- **Failure to work to the procedures - which flaunts the stated organisational system.**
- **Can-do attitude - which undermines the organisational systems.**

However, these are often “management condoned” shortfalls in normal operations.



Professional Sub-Cultures

Studies into company cultures in many industries have identified that beneath the corporate culture, there can also be professional sub-cultures within the organisation.

This means that the approach taken to work by a group may differ to that which the company envisage.

One such professional sub-culture is the Maintenance Sub-Culture.

There is no malice or ill intent in such sub-cultures, it just relates to the beliefs and understanding of that group and affects the way they work.



Maintenance Sub-Culture

This could be generalised as being:

- **Engineers are trained problem solvers and trouble shooters.**
- **They are committed to their own safety standards, they often doubt the need for all the controls, rules and auditing.**
- **They see adversity as a challenge.**
- **They work in teams, but as Individuals not as Team Players or use the strength of the team.**
- **As with most people, engineers enjoy a little risk taking, although exiting, it is error prone.**



Maintenance Sub-Culture

Engineers have a macho attitude, evidenced by:

- They have great faith in the ability to get the job done!**
- They don't like to be seen as not knowing something about the aircraft!**
- They are highly reliant on their ability to memorise tasks and even part numbers!**
- Related to work, they are poor communicators!**
- They are resistant to being monitored, or supervised!**
- They are prone to believing they know better than the company or manufacturer's procedures?**



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Management's Approach to the Maintenance Sub-Culture

Maintenance Managers are often happy to condone issues, such as working from memory, whilst everything is going right, but may be quick to criticise if it goes wrong!

Commercial pressure frequently allows safety controls to be eroded!

Although, it is known that engineers face adversity in the workplace every day, little is done to identify what, or indeed fix the problems.



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Management's Approach to the Maintenance Sub-Culture

Compliance Monitoring would aid managers in identifying what was happening in the workplace.

Compliance Monitoring is a requirement in JAR 145.65b, this states:

“the JAR-145 approved maintenance organisation must establish a quality system to monitor product standards and compliance with and adequacy of the procedures to ensure good maintenance practices and airworthy aircraft”.

However, this is largely under achieved or ignored?



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Management's Approach to the Maintenance Sub-Culture

The leaders of Maintenance Organisations have an awareness of what is happening in the workplace,

However, perhaps through pressures on them, they rarely use such controls as compliance monitoring or line supervision to identify workplace shortfalls.

If management are serious about reducing human error and having a more robust safety culture in their companies, they must recognise the perceptions and real problems faced in the workplace and address them.



Making the Changes

The culture of an organisation is extremely slow to improve, but can be eroded more easily.

To recognise the need to change, define the changes required, communicate that to everybody and then make it happen will take time and a lot of commitment from managers the staff and contractors within the maintenance organisation.

However, these are steps that need to be taken if we are to make a difference in our industry.



Developing the Right Safety Culture

- Establish your Corporate Principles
- Define your Safety Objectives
- Establish your Safety Plan
- Lead by example, Live Your Word (do what you say, say what you do).
- Use the Substitution Test when things go wrong.
- Motivate
- Communicate.
- Manage Change, confusion is the enemy.



Motivation

Motivation is a management issue:

- **Motivated staff perform better than those that are de-motivated.**
- **Empowerment of the staff at appropriate levels gets commitment and involvement from the staff.**
- **Some Self Determination is a great motivator.**
- **A feeling of having a view that is sought after, considered and sometimes used motivates people.**
- **Money and fear are poor motivators, they don't have a lasting effect and are not the answer.**



Communication

Communication involves staff & builds on the culture:

- **Be open in your communications where possible and is practicable in the business.**
- **Remember that unsaid communications (actions and attitudes) say more than verbal communications.**
- **Communication requires a transmitter & a receiver.**
- **Rumours are destructive, but are addictive, they are the natural by-product of not enough information.**
- **Communication should be open, frequent and two-way (up and down or peer to peer).**
- **Develop the Team Briefing approach (leadership/fellowship)**



Managing Change

- **What are the implications of the Change?**
- **How will the change be effected in practice?**

It is not enough to issue a note or amendment and expect the changes to take place in practice.

Safety Significant change has to be managed into place and is a line management responsibility

If the change is important, so is the effort that needs to be put in to make it work.

Most people are resistant to change, they believe that they do things safely, and it is not them that the accident will happen to!



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Changing Cultures

Safety Is No Accident!

**The Safety Culture of your
Maintenance Organisation is of your
making and can be used to reduce the
risks to your business**

The Choice is Yours