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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**