

# Aviation Psychology for Culture Centric Training & Development

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# Background

- Few considerations that we already know:
  - Inadequate investment on Human Factors training by companies
  - Digital Mobility – Issues related to human factors understanding by interface stakeholders
  - The cloud, Cyber security and Data protection teams and their training
  - A new generation of technical staff who will work on aircraft electrics
  - Extensive changes in propulsion, batteries and flight control systems etc.
  - Aviation as a discipline is expanding and depending upon other disciplines

# Are we blind to ourselves?

- Use of Cell Phone during driving?
- Is it only while talking on phones that we get distracted? Or on a road, a thought can trigger a sequence of mental events that can make us forget about our surroundings and we may overshoot our highway junction.
- How many times have we walked in our work areas while we were totally oblivious of our surroundings? Are we becoming blind to ourselves? Why now? Why more and more everyday?

Humans use 'denials' to break the rules



# Aviation Psychology and Human Factors

Common applications of Aviation Psychology are Human Factors, ergonomics, CRM and psychometric testing for recruitment.

Are these applications adequate? More importantly are the assessment methods valid for the type of job they are expected to do?

With the modern life style and amount of distractions, deeper understanding and training of work force in line with psychological principles seems vital.

# Selection process of employees in aviation

- Psychometric tests are now compulsory for recruitment in various companies of the world. Aviation being in the forefront of those disciplines still seems reluctant to apply those assessment and training methods in all its departments for various understandable reasons.
- How aviation psychologists can not only help in identifying the right person for the right job but to continuously contribute by being part of NOTECH skills training to technicians, engineers and senior managers.

# Why for Maintenance personnel

- When CRM was introduced roughly 4 decades ago for pilots; there was a realisation that in time compressed environment or in any stressful condition people tend to behave in an undesired – unintended way e.g. destructive obedience or ignoring advices
- With technology catching us on up so fast and so close; all businesses are time critical – hence cost critical.
- The requirement to identify hazardous shades in **our own** personality as a technician, engineer, a pilot or an accountable manager is equally (if not more) important than learning principles of Human Factors, Threat and Error Management (TEM), Team Resource Management (TRM) and/or Maintenance Resource Management (MRM)

# What psychometrics must find out

- Emotional intelligence is one of the major trait that an employee who is working on aircraft and his managers need the most.
- We find people who are excellent professionals but only till they are not under any emotional arousal. The moment they are exposed to stress of, for instance, negative feed back, deadlines, conflict, anger and other routine stressors; they lose their balance. Result can be distraction, fixation, inflexibility and invulnerability. etc.
- While the safety systems and trainings on safety may be vital, how much can we benefit from a workforce who 'themselves' could become a defence system against errors?



# The symptoms of Hypoxia – An example

- Hypoxia is lack of oxygen in our body. Why its dangerous is that its insidious and invisible.
- By the time we know we are affected, its too late. So the chamber tests were used to 'identify the symptoms' – Break the denial

# What after psychometrics?

- Another step needed is to develop a recruitment program of psychometrics where people are not only rejected or selected but the tests must be utilised to design relevant human performance training.
- The role of an aviation psychologist will be to give their input on the content of human performance training curriculum which is based upon a specific organizational culture and work areas.
- During every stage of initial training and recurrent training, the modules of training have to be reviewed in line with incidents and accident findings across the industry or the organization (or both) with a particular organizational role.

# Human Factors Syllabus

- Individual and social behaviours change with technology
- The content of Human Factors syllabus is universally similar
- It has not matched the shifting challenges
- That means:
  - The distractions have multiplied over few decades
  - The emotional resilience in people has changed over years
  - Issues related to cost and economics have mushroomed even more
  - Little effort was affordable to review and redesign Human Factor training

In short the Human Factors training is for the humans but how much have those humans changed today we may not know. Aviation Psychologists have an uphill task to bring back the real facts about the workforce involved with safety critical systems.

This may ensure a Human Factors Training to be relevant and valid.

# We have a right to know ourselves

Humans use ***denial*** as one of the many defence mechanisms or excuses to their wrong actions.

These denials are sometimes visible

For example : A hospital visitor not wearing a mask into a particular area where masks are recommended (not mandated) to be worn. Following are few of the possible reasons:-

**Invulnerability** : Either he thinks he is invulnerable (a denial). This could be based upon his social learning or previous experience of not getting sick.

**Lack of knowledge** : He doesn't know the consequences

**Inadequate knowledge**: He thinks he knows the consequences but actually he does not fully understand the 'mechanism'

# We are blind to our 'Mechanisms'

- While hours of studies and training are spent in understanding the aircraft systems and 'mechanisms'; even an iota of that is not spent in understanding the human 'mechanisms'.
- This lack of correct understanding is not justifiable yet a norm. It makes us draw wrong conclusions about our abilities. Just like an experiment with incomplete variables.
- The accountable managers and mid level managers can actually benefit by using such psychological resources to know the limitations of their own teams and themselves.

# When we are in a hurry...

- A technician rushes to trouble shoot a fault after reading a tech-log entry on engine. Half way down the stairs, he asks his colleague, was it a left engine or a right engine?
- Question is not that what he should do next. Question is 'why' at all did he 'forget'? Does he have an answer? Yes. But incomplete. That is 'I was in a hurry'. What happens to our blood circulation when we are in hurry? How does a flight fight response 'makes us tunnel visioned'? How our eyes 'jump 'across pages and lines missing out vital blind areas? Can I tell the 'symptoms' of my body when I am in stress or in haste? If I can identify the symptoms, can I regulate my breathing at those very moments? Can I make effort to build defences against my own self!!!

# Talking about 'human redundancies'

- Like redundancies in machines; can we develop human redundancies?
- Can we 'train' our workforce to 'identify' their impending human performance indicators well before they become a victim of their own breakdown! Just like we train crew to identify 'symptoms' of Hypoxia.
- Can we think of designing (or redesigning) the training curriculum of 'human defence system' as first safety net based on a our 'skill' to spot the **onset** of human performance degradation?
- What redesigning are we talking about?



# Redesigning and reviewing

- Example of sterile cockpit :
- The term sterile cockpit is as old as 40 years or more ever since used for a quiet flight deck minimising unnecessary conversation below 10000 from engine start to engine shut down.
- Even today this term is not reviewed for its applicability. While sterile cockpit reduced distraction due to inter cockpit and cabin cockpit communication; there is a strong evidence that even a quiet cockpit may not be sterile. For example, during taxi out a casual remark on a financial business opportunity may initiate a thought process in both minds where while no one is talking anymore but the minds may be distracted.

# Why now?

- These changes in the 'mechanism' based approach of human factors is more relevant because despite more awareness, humans have become more distracted due to large amount of information processing. This is in comparison to the times decades ago, when human factors were being formulated.
- In those times the aircraft were ergonomically complex and workload was high enough. Today, at certain phases of flight and with more experience, operating crew finds enough time to chit chat, even during critical flight phases, like taxing – (which may not be considered critical by many)

# Culture Specific Training and Procedures

- In few parts of the world cultural diversity brings a new form of challenge. Instructions are not followed due to various cultural orientations towards rules.
- Humans have an innate interest to know about themselves? Whether a horoscope or a palmist or a fortune teller; they want to know about themselves irrespective of their culture.
- Our lowest level of workforce has a right to know about themselves on a scientific basis. They are an asset who should have an access to their own weak areas. Aviation has the ability to customise various regulatory trainings with a view to enhance self awareness in workers.

# United Airlines Flight 173 – 28 Dec 1978

- Crew distraction to a gear unsafe indication resulted into flameout and crash as fuel management was compromised. All three crew members were blamed. It further strengthened the need of CRM training.
- Today I feel that CRM like training on similar modules is vital for the maintenance teams e.g. MRM or Maintenance Resource Management.
- Few airlines do these trainings as their own initiative but this may need to be regulated in the same way as it is for pilots.

# Recommendations

- Development of reliable and valid personality tests that put special focus on emotional intelligence.
- Periodic indoctrination and training on human factors and Maintenance Resource Management.
- Devising methods to provide professional feedback to workers on their attention, memory, emotional intelligence and other psychological elements by using professional aviation psychologists.
- Using 'relevant' personality assessment AND development tools to recruit or upgrade managers so that emotionally stable leaders may lead the teams

# Recommendations

- In incident investigations aviation psychologists may be utilised to find the 'invisible' factors that could have caused an accident or incident to happen.
- Volunteer engineers, technicians or managers may like to academically pursue aviation psychology as a subject because it takes a very big effort for a simple psychologist to 'think' or 'feel' the real challenges of relevant field.
- Their initiative can build a team of researchers who can then pin point on the gaps in recruitment, training content and accident investigations as applied fields of Aviation Psychology.