

# ***Technicians' Practical Training: The Challenges and Current & Future Solutions***

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## **Introduction.**

Technician training has evolved as much as aircraft design itself over the last 100 years, with significant advances across the whole spectrum of instruction from basic trade training, through to new-technology, cockpit and aircraft simulation and CBT. Whilst keeping pace with aircraft technological advances has occupied the training world continuously since the 1920's, basic trade practices and principles remain as important as ever. This paper argues that great benefits could be achieved by updating *the basics* to reflect the current crop of challenges the industry faces.

## **The Challenges.**

Aircraft design continues to make great strides, eliminating safety risks and improving efficiency and reliability whilst reducing the amount of maintenance required. A study of global safety data and incident analysis however, shows that maintenance error continues to persist as a significant problem, despite the introduction of Human Factors competence requirements along with error management system elements in the civil world and their emergence in the military maintenance environment.

If we continue to focus on advances in technology and fail to address the human error problem, we will not see the improvements in safety, reliability and commercial performance that we need in these competitive times.

Apprentices, or trainee technicians, have a number of principles drummed into them from day one. The following list should look familiar to those that have followed this path into the industry:

A job is not finished until you have tidied up

Check your tools before you use them and account for them all at the end of every job and every shift. (Look after your tools and your tools will look after you)

Complete a loose-article check before you close any panel

Sign-up the paperwork at the end of each job and each shift

These principles become second nature – actions that technicians do every day, without having to think about them.

Current organisation approval requirements mandate companies to ensure the competence of their maintenance staff. Competence can be defined as a mix of Knowledge, Skills and Attitude. Technician training has evolved to ensure a high level of knowledge transfer, including the basic trade practices and principles. The basic trade skills have also been effectively trained for many years. Attitude has also been formally influenced and ensured to varying levels for many years.

A web search for "The 4 stages of competence" reveals a recurring definition, modelling knowledge and skills development as shown below. The origin of this definition is unknown, but seems to reflect a logical progression that applies to technicians:

Unconscious incompetence. The individual neither understands or knows how to do something, nor recognizes the deficit or has a desire to address it.

Conscious incompetence. Though the individual does not understand or know how to do something, he or she does recognise the deficit, without yet addressing it.

Conscious competence The individual understands or knows how to do something. However, demonstrating the skill or knowledge requires a great deal of consciousness or concentration.

Unconscious competence. The individual has had so much practice with a skill that it becomes "second nature" and can be performed easily (often without concentrating too deeply). He or she may or may not be able to teach it to others, depending upon how and when it was learned.

Clearly, the fourth stage is the desired state for technicians – they do the things that we want, without even thinking about it.

Training related to Human Factors and Error Management has typically, and often necessarily with mature technicians, been provided as an add-on or standalone subject. We have seen some successful knowledge transfer relating to these subjects; however it would appear that the majority of HF programmes have only managed to lift their technicians to a level of conscious competence, the third stage in the model. This in itself is positive if the organisation has managed to create and maintain an environment where error management is continuously supported and nurtured.

All too often however, good error management principles fall by the wayside, often due to the perception that they are an "add-on" and not part of the "core" job. Herein lies the current challenge for trainers around the world - How do we ensure that error management principles are part of our technician's unconscious competencies?

### **Current and future solutions**

We need to enshrine a new set of principles alongside the traditional basics relating to tools, paperwork and tidiness and make good error management a core part of the job. Imagine if, in their first week of training, technicians were convinced that they must report their errors, so that others can learn from them or that confusing maintenance instructions can be lethal and must be reported, or even that it is unacceptable to work from memory!

To do this we have to review the basic principles we drum into our technicians in those early days and the way in which they are embedded in basic training. We need to keep reinforcing them until they are part of the Unconsciously Competent skill set - Contributing to the management of error without even thinking about it.

Can we teach the more mature technicians the same skills? I believe that we can, but it is much more challenging than the case of the malleable young trainee. I believe that this can only be achieved with a sustained period of management encouragement and demonstrated commitment to error and safety management. The future lies in the reflexes of our trainee technicians.

If you would like to discuss the content of this paper, please contact Bob at Baines Simmons.