Professionalism is the underpinning character of the aircraft maintenance engineer. It is the combination of specialist skills, personal feelings and our attitude to the work we do. Aviation maintenance safety depends on all those who perform the work required to enable aircraft to operate, especially those involved in repairs and inspection to determine the airworthiness and safety of the product, whether aircraft, engine or component. This chapter looks at the qualities of a ‘professional’ engineer.

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Professionalism: It's not the job you do: it's how you do the job.

Anonymous
What is professionalism?

What qualities do you expect to see in effective aviation maintenance professionals? They may demonstrate professionalism by their:

- **Discipline**—they follow approved procedures to perform a given task
- **Communication**—they keep others involved in the task informed of progress and developments
- **Teamwork**—they work together well to resolve problems and maintain control
- **Knowledge**—they have a deep understanding of aircraft systems and their operation
- **Expertise**—they retain and transfer knowledge and skills
- **Situational awareness**—they know what’s going on around them
- **Experience**—they call upon prior training and knowledge to assess new situations
- **Decision making**—they take decisive action/s
- **Resource management**—they allocate resources to ensure control of the larger situation is maintained while specific problems are being addressed
- **Goal prioritisation**—they prioritise safety above personal concerns.

The physical and technical side of maintenance seems to be relatively straightforward. However, one critical part of being an aircraft maintenance engineer is harder to pin down and define. That critical part we commonly call professionalism. We often sit in awe of an accomplished surgeon. Not only do we recognise that surgeon’s technical skill, but also their instinctive awareness; the ability to work within a coordinated team and to make sound decisions for the benefit of the patient’s safety. Just as professionalism in aircraft maintenance, this is difficult to define, but it is unmistakable when we see it.

Have you ever worked with an engineer who stood out from the crowd, or who had superior and unexpected knowledge and skill? Did they demonstrate a willingness to put the safety and airworthiness of aircraft before all else?

Professionalism is that ‘something’ separating the superior engineer from the average one. It is not simply a measure of skill or technique, but also a measure of the engineer’s understanding of the overall maintenance system, and how they contribute to an airworthy product. One capability is physical skill, but equally important components are wise decision making and an elevated self-discipline.
Professionals, especially those involved in aviation maintenance, are recognised as having three essential characteristics:

1. their expert knowledge (as distinguished from a practical skill)
2. their self-control or self-regulation
3. their willingness to take responsibility for placing the safety and airworthiness needs of the travelling public ahead of individual self-interest.

Expert knowledge comes from experience developed over time, especially when that experience concentrates on particular product types such as specific airframes and components.

Self-regulation is based on beliefs, pride and enthusiasm, with individuals making conscious decisions based on the goals of airworthiness and safety.

Finally, aviation maintenance professionalism comprises those demonstrated practices, education, ethics, and values that sustain the interests of safety above one’s own self-interest.

**Developing professionalism**

Three major factors influence the development of professionalism: formal teaching, role modelling, and the culture of the organisational environment.

Broadly, engineers are shaped by the sum of their interactions with other AMEs/LAMEs, supervisors, customers, support staff, and one another, in workshops, hangars, and flight lines. As trainee engineers, apprentices are drilled on the high safety standards required to maintain an aircraft and its components. This is the beginning of professionalism. The attitude of others, especially mentors, will help to shape a novice’s ability to recognise acceptable or unacceptable behaviour when making complex decisions about maintenance tasks. Professionalism can be developed at an individual level when working in isolation, but it can also be facilitated in team environments as a by-product of the organisation’s safety culture.

Professionalism also requires a dedication to continuous improvement. Learning from past events, whether personal experiences (such as remembering the importance of tool control), or organisational and/or industry-wide learning from safety publications, accident reports, professional training etc., requires regular personal input.

Professionalism can be practised and reinforced every day. Professional behaviour often complements other’s professional behaviour; for example when engineers consult with customers and aircrews about the progress of maintenance. Professional pilots would be quite receptive when engineers put the safety of pilots and passengers before schedules.
Establishing minimum personal standards

Personal standards include how you treat yourself, how you treat others, how you behave in front of others, and how you perform your work to the highest level.

Who we are, how we were raised, and how we were taught influence our personal standards. During their training, aircraft maintenance apprentices will adopt the behaviours of the more qualified and experienced people who mentor them. Instilling qualities of professionalism in the early stages of training is important—they can become the foundation of the individual’s attitude and behaviour.

As an engineer you should draw a line where your (and your organisation’s) minimum personal standards exist, thus establishing professional integrity. Any aircraft or component maintenance task requires attention to detail and adherence to procedure, as well as a duty to ensure the task is completed adequately. Sometimes engineers may find themselves challenged by not having the time or resources to meet this requirement. Occasionally, you may be challenged by normative behaviour where the methods used have become the accepted practice at your workplace. ‘I did it this way because that’s how everybody else does it around here’. Ideally you need to recognise this behaviour and decide if the task is being performed as safety requires, or as it normally ‘gets done’. This is where personal standards become apparent/important, and especially what constitutes your minimum personal standards.

Personal standards

You are tasked with reassembling an exhaust manifold on the engine of a customer’s aircraft. The aircraft is due out later that afternoon. As part of the reassembly task, you need to fit bolts securing the manifold assembly to the exhaust ports. According to the manufacturer’s manual, these must be fitted and torqued to a set value. The torque wrench you need is one of two the company owns. They are normally stored in the tool cupboard, which is located at the back of the hangar.

While following the procedure, you get to the stage where the bolts are to be fitted. Although a specific torque figure is quoted in the manual, you have noted that others have installed this component without using the torque wrench. From memory, the last time you installed this component, the engineer you worked with at the time said ‘once you’ve done a couple of these, you get to feel when the bolt is done up enough—the torque figure given in the book is only a guide’. Based on this previous advice and knowing that nothing untoward has happened on previous installations of this type in the past, you consider using a standard spanner from your toolbox instead of a torque wrench. Also, if you were to decide to use a torque wrench, you would have to leave the task and walk to the other end of the hangar to the tool cupboard, which is often obscured by aircraft parts and assorted ground equipment.

It’s been done this way before by colleagues for whom you have a high level of respect, so what do you do?
Personal integrity—resisting at-risk behaviour

Would you certify on behalf of another engineer you hardly knew, who had completed a given task that you were responsible for, if you had not seen the work performed or completed (inspected)?

This dilemma is more common in aviation maintenance than one would imagine. Often an engineer will be overseeing multiple tasks on different areas of the aircraft and/or aeronautical product at the same time. Engineers may even be involved with other aircraft when this work is being performed, but are still responsible for it. They may have to certify that the work has been performed in accordance with approved standards. They may even be involved in one of the tasks requiring the certification oversight.

Sometimes this behaviour might be influenced by a lack of personnel and/or time. Personal integrity should empower the engineer to check that the work has been completed correctly, in accordance with the approved standards. This behaviour should be seen as promoting safety, integrity and professionalism but, above all else, it promotes resistance to at-risk behaviour.
Taking it for granted

During the reactivation of an engine thrust reverse mechanism after maintenance, an experienced AME reactivating the engine thrust reverse centre drive unit (CDUs) lockout needed a suitable platform to visually inspect the upper locking mechanism of the engine cowl reverser halves. As he left the task, another AME (who had recently joined the team) offered to complete the reactivation of the CDUs.

Returning to the engine with the required platform, the senior AME observed the engine’s final cowlings being closed by the AME, with the help of a LAME who had been working on the opposite engine. The senior AME asked the newer AME if the CDUs were returned to flight condition. The newer AME informed the senior AME that the task was complete and that they just needed to latch the final sets of engine cowls (which was observed).

When it came time to complete the maintenance documentation, an entry for the thrust reverse lock-out had to be cleared. The newer AME had already left the aircraft to clean up, and as it was nearing the end of the late shift, the senior AME signed for the task being completed in accordance with the aircraft maintenance manual, believing the task had been completed competently. He did this without actually checking the CDUs, as the other engineers were closing the engine so that they could ready the aircraft, leaving it in a serviceable and released-to-service condition.

The aircraft was flown the next morning and when landing in gusty wind conditions on a shorter than usual runway, although full thrust reverse was applied, the affected engine did not respond accordingly. As a precaution, and to avoid asymmetric reverse thrust, which could lead to loss of control, both engines were selected to forward thrust and maximum wheel braking then applied. As a result of this action seven of the eight wheel brakes needed to be replaced before the next flight.

An investigation into the maintenance activities from the evening before revealed that the newer AME had not performed the reactivation of the CDU task before and merely observed the senior engineer removing the lock plate bolts. Not fully aware of why this action was being performed, the newer AME thought the bolts were being fitted, not removed, and therefore required tightening. This action left the lockout plate fitted with the drive lock inserted, thus mechanically deactivating the thrust reverser.

Key lessons

- All personnel involved in the task must be fully aware of its progress. This vigilance is an important part of professional behaviour.
- Good communication can avoid the potential for making risky decisions. Making risky decisions is not normally a sign of professional behaviour.
- Never sign for work you have not performed, especially if you have not inspected or observed it personally.
- Trust should not replace good communication and proper task vigilance. Again, if you did not do the work, you should not sign for it.
Key points

- Professionalism comprises those attitudes and behaviours that place the interests of safety above one’s own self interest.
- Professionalism can be developed in isolated one-person operations, as well in as larger organisations with a number of engineers.
- Professionalism is a characteristic that can both drive (and be driven by), the safety culture of an organisation.
- Colleagues and mentors have a strong influence on professionalism, from the earliest days of an engineer’s career.

When you are ready, please turn to page 59 of the *Workbook for Engineers* and complete the exercises.