Do the Right Thing

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Professionalism and integrity are the last barriers against unapproved or unwise short cuts.

An experienced and qualified aircraft maintenance technician (AMT) with a tight deadline discovered that he needed a special jig to drill a new door torque tube on a Boeing 747. The jig was not available, so he decided to drill the holes by hand with a pillar drill — a fixed workshop drill and an unapproved procedure.

Subsequently, the door came open in flight and the flight crew had to make an emergency landing. The AMT, being a "company man" and trying to get the aircraft out on time, committed what is known as a situational violation. A situational violation occurs when an AMT, typically with good intentions, deviates from a procedure to get the job done.

The reason for a procedural deviation may stem from time pressure, working conditions or a lack of resources. This example is not only a classic maintenance human factors error, but also speaks to the issue of professionalism and integrity conflicting with efficiency.

The European Aviation Safety Agency (EASA), in its suggested syllabus for human factors training for maintenance, specifically mentions *professionalism and integrity* as a training topic. But what is "professionalism and integrity," and can it even be taught? The Merriam-Webster dictionary defines professionalism as "the conduct, aims or qualities that characterize or mark a profession or a professional person" and defines integrity as "a firm adherence to a code of moral

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values." The topic can be nebulous and difficult to develop into a training module, yet is unquestionably a critical part of a healthy safety culture.

Regulations offer some aviation-specific guidance on teaching professionalism and integrity. For instance, the U.K. Civil Aviation Authority has a small section in Civil Aviation Publication (CAP) 716, *Aviation Maintenance Human Factors (EASA Part 145)* about the subject. Two key points discussed are, first, that employees basically know how to behave in a professional manner but may be limited in doing so due to organizational issues such as pressure, lack of resources, poor training, etc.; and that, in a human factors training course, it is up to the trainer to determine whether problems with professionalism are on an individual or organizational level and tailor the training accordingly.

CAP 716 does not elaborate on the topic of integrity as it does with professionalism, perhaps because it is assumed that they overlap. That is partly true, but integrity still warrants a bit more elucidation.

Based on the definition of integrity as "a firm adherence to a code of moral values," this is where things can get interesting. How can an employee adhere firmly to a code of *moral* values that is largely unwritten and not available to look up in the employee handbook? A code of values is something that is learned through upbringing and life experiences. By the time a person becomes gainfully employed, he or she should have a good idea of what is morally or ethically right. Yet corporate greed and power can cause otherwise good people to cross the line, sometimes hazy, between right and wrong.

While financial scandals on a corporate level are rare in aviation, significant events have occasionally led to deviations from integrity, typically in the normal pursuit of cost savings and efficiency. For instance, the crash of American Airlines Flight 191, a McDonnell Douglas DC-10-10, at Chicago O'Hare International Airport on May 25, 1979, was precipitated by procedures that were put in place by the company's maintenance management.

Management accepted the use of a forklift to change engines on the aircraft. The U.S.

National Transportation Safety Board (NTSB) found serious omissions, however, in its final report on the accident:

"Carriers are permitted to develop their own step-by-step maintenance procedures for a specific task without obtaining the approval of either the manufacturer of the aircraft or the FAA [U.S. Federal Aviation Administration]. It is not unusual for a carrier to develop procedures which deviate from those specified by the manufacturer if its engineering and maintenance personnel believe that the task can be accomplished more efficiently by using an alternate method.

"Thus, in what they perceived to be in the interest of efficiency, safety and economy, three major carriers developed procedures to comply with the changes required in [service bulletins] by removing the engine and pylon assembly as a single unit. … Both American Airlines and Continental Airlines employed a procedure which damaged a critical structural member of the aircraft. …

"The evidence indicated that American Airlines' engineering and maintenance personnel implemented the procedure without a thorough evaluation to insure that it could be conducted without difficulty and without the risk of damaging the pylon structure. The [NTSB] believes that a close examination of the procedure might have disclosed difficulties that would have concerned the engineering staff. In order to remove the load from the forward and aft bulkhead's spherical joints simultaneously, the lifting forks had to be placed precisely to insure that the load distribution on each fork was such that the resultant forklift load was exactly beneath the center of gravity of the engine and pylon assembly. To accomplish this, the forklift operator had to control the horizontal, vertical and tilt movements with extreme precision. The failure … to emphasize the precision this operation required indicates that engineering personnel did not consider either the degree of difficulty involved or the consequences of placing the lift improperly. Forklift operators apparently did not receive instruction on the necessity for precision, and the maintenance and engineering staff apparently did not conduct an adequate evaluation of the forklift to

ascertain that it was capable of providing the required precision."

Maintenance management failed to discover that using the forklift was creating an unseen crack in the accident aircraft's engine pylon. This crack continued to propagate and eventually caused the left engine to depart from the aircraft on its takeoff rotation and the aircraft to crash shortly after becoming airborne. Two hundred and fifty-eight people (including 13 crewmembers) aboard the aircraft and two people on the ground were killed.

The crash of American Flight 191 can be interpreted as an example of the integrity line being crossed in one respect. The forklift procedure was designed so that the aircraft would spend less time in maintenance and more time generating income. When management changed a procedure without adequate safety analysis, however, lower level employees were "along for the ride."

Integrity also encompasses adequate company and regulatory oversight of a maintenance procedure. This issue was involved in the crash of Continental Express Flight 2574 in 1991, in which 47 screws were not re-installed on the horizontal stabilizer during a shift turnover. The NTSB said, "The probable cause of this accident was the failure of Continental Express maintenance and inspection personnel to adhere to proper maintenance and quality assurance procedures for the airplane's horizontal stabilizer deice boots that led to the sudden in-flight loss of the partially secured left horizontal stabilizer leading edge and the immediate severe nose-down pitchover and breakup of the airplane. Contributing to the cause of the accident was the failure of the Continental Express management to ensure compliance with the approved maintenance procedures, and the failure

of FAA surveillance to detect and verify compliance with approved procedures."

Such failures can be extrapolated to a fundamental question about personal integrity. Why would employees, as individual professionals, go "along for the ride" with these types of breaches in integrity if they know they are working contrary to approved procedures? Sometimes this is a matter of *norms* of the safety culture, or the "normal" way work is being conducted, whether right or wrong.

Social psychological phenomena such as cognitive dissonance and conformity also may be involved. Cognitive dissonance occurs when reasoning is consonant (in agreement) and dissonant (incongruous) at the same time. This might happen when an employee knows that an incorrect procedure is being used universally but, at the same time, does not want to speak up for fear of castigation.

Similarly, *conformity* is a strong social psychological phenomenon that occurs when an employee chooses to "go with the crowd" rather than stand out as a complainer, loner, non–team player, etc. Conformity can be further exacerbated by the tremendous peer pressure that often develops in groups. Individual employees need to realize that, although these pressures are commonplace and perhaps inevitable, they do not relieve the employee from the responsibility to speak up and challenge unsafe instructions. Otherwise, on a personal level, they are overstepping the bounds of integrity and their actions may become a contributing factor in an aircraft accident or incident.

The topic of professionalism and integrity is clearly not popular in the field of aviation human factors. It is reasonable to assume that this is due to the topic's socially awkward nature and the diversity of opinion and work experiences. Trying to "teach" the topic

also can be confounding because many instructors have a hard time compiling relevant information. Overall, there is not much guidance compared with that available for other human factors topics.

So, again, can professionalism and integrity be taught? Perhaps in principle, but applying them in the workplace is largely the responsibility of the individual, since they are based on values, not a technical process that can be measured and supervised.

What should be the baseline expectation for professionalism and integrity among AMTs? From my own search for common principles, I propose these as starting points:

- Arrive at work on time and be prepared to work.

- Stay current on procedures, and strive to increase your knowledge.

- Respect your peers — even if you don't particularly care for them.

- Be part of the team effort to make safety the no. 1 priority.

- Be assertive with management whenever necessary for safety.

- Watch for opportunities to draw the line between right and wrong.

- Be alert for business expediency that drives unsafe deviations from approved procedures.

- Do not "go with the flow" when the flow is going the wrong way.

- Ask yourself if actions deemed legally or technically acceptable could be morally wrong. ◗

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