SUPPORTING PILOT COMPETENCE

Competency issues sometimes emerge from accident investigations. Where this is the case, it is usually associated with training and monitoring, and the design and implementation of SOPs. Understanding the reasons for SOPs is critical for judgement and decision-making, as **Captain Ed Pooley** explains.

KEY POINTS

- **Pilots must be individually competent for their role before release from supervision.**
- **Competence is achieved by delivering task-appropriate training to carefully selected individuals.**
- **Pilots are necessarily specialists from the start, but expertise comes – in varying degrees – from experience. The acquisition of 'expert' status is neither a given nor a necessity.**
- **Competence includes procedural compliance driven by understanding rather than solely by directive.**
- **Effective monitoring of actions taken is the primary defence against omissions and unintended or inappropriate actions. Monitoring by humans is not 100% reliable and so the process must fully embrace the opportunities provided by system automation.**

I'm going to start with a very brief discussion about how I believe competence and expertise apply to pilots in two-pilot fixed wing aircraft. I'm then going to look at some real events where competence has failed to deliver safe outcomes, and suggest why. I'll conclude by proposing ways we could improve the extent to which competence is delivered more reliably. Some of this should read across to controllers, too. Like pilots, controllers are first trained to obtain a licence and then task-trained for a specific use of that licence.

Self-evidently, task competence is essential. Contrary to the usual mantra of 'knowledge, skills and attitudes', I prefer the variation 'aptitude, knowledge and skills' – in that order. Aptitude and the ability to absorb knowledge ought to be part of any selection process. And any training regime must be explicitly focussed on the skill-based competence it seeks to establish. Recurrent training, whether in the classroom, in a simulator or during supervised flying, must involve sufficient training to revalidate competence rather than just be a hoop to be jumped through. This is particularly important to revalidate competencies that may, in today's age of automated reliability, rarely if ever be needed.

Once a licence holder has gained some initial relevant experience, the build up of expertise will have begun. Useful expertise will not automatically accumulate at the same rate for everyone, and this will affect the career path that follows. Clearly an aircraft commander will need to have demonstrated sufficient relevant expertise as a First Officer before being considered for such a position. And for appointment as a Training Captain, the evidence of skill based on expertise and on consistent demonstration of competency will need to be very carefully considered alongside the particular aptitude and the extensive knowledge required for this role.

That's the theory. But human performance is inevitably imperfect.

This is relevant in selection for training, in the design of training regimes, and in the assessment of competence for our actual performance on the front line. Whilst I am absolutely not discounting what we can learn from what goes well, especially when the unexpected presents itself, I'm now going to offer a few cases where things have gone wrong on the front line. These have been independently (and competently – still unfortunately far from a global achievement) investigated in order to remind ourselves of ways that this can happen. I have deliberately chosen cases where the aircraft operator involved can be characterised as an established and reasonably large business that actively seeks to achieve safety. Such operators will invariably recognise, to varying degrees, that the safety they seek depends on a great deal more than regulatory compliance, which for them serves merely as a baseline rather than the goal. But we should bear in mind that such an approach is still a very long way from being universal.

The order in which the events below are presented is of no significance. Although in a few cases, the aircraft involved may have been destroyed, no occupant fatalities resulted nor, in many cases, any risk of it. I have mostly avoided using more than one example from any particular airline. Note also that the selection made is not predicated on the potential seriousness of the outcome but on the effect of competency problems, and how these might have come about.

It is not suggested that these competency problems were the fault of the individuals, nor that competency was the only issue. In most cases, problems of competency are associated with training or monitoring, or both, and coexist with problems in the design and implementation of SOPs. Rather, the cases are presented as examples where aspects of competency, and the implications for training and procedures, must be considered in order to learn.

▸▸

An A340-300 arriving at **Paris CDG** in 2012 continued descent on an ILS Cat 3 approach when so far above the glideslope that eventually, when 2 miles from the runway and still 2500 feet above it, it pitched up abruptly as the false glideslope upper lobe was captured and in the resultant confusion, control was almost lost before recovery was achieved. The formal conclusion of the investigation noted (1) inadequate monitoring of the aeroplane's flight path by the controller and by the crew during the CAT III precision approach and (2) the crew's decision to continue the approach after the FAP when the aeroplane was above the glide path. The report also observed that the Cat 3 SOP did not include any operational limits for its use. Ref. 2.

A Boeing 767-300 made a belly landing at **Warsaw** in 2011 when the crew were not able to lock the landing gear down using either the alternate or free fall procedures after earlier loss of a single hydraulic system. The reason for this was that a tripped circuit breaker controlling all emergency electrical circuits was not noticed and reset. This meant that the electrical release of the landing gear up locks, which is common to both alternate and free fall gear deployment procedures, was prevented. Ref. 5.

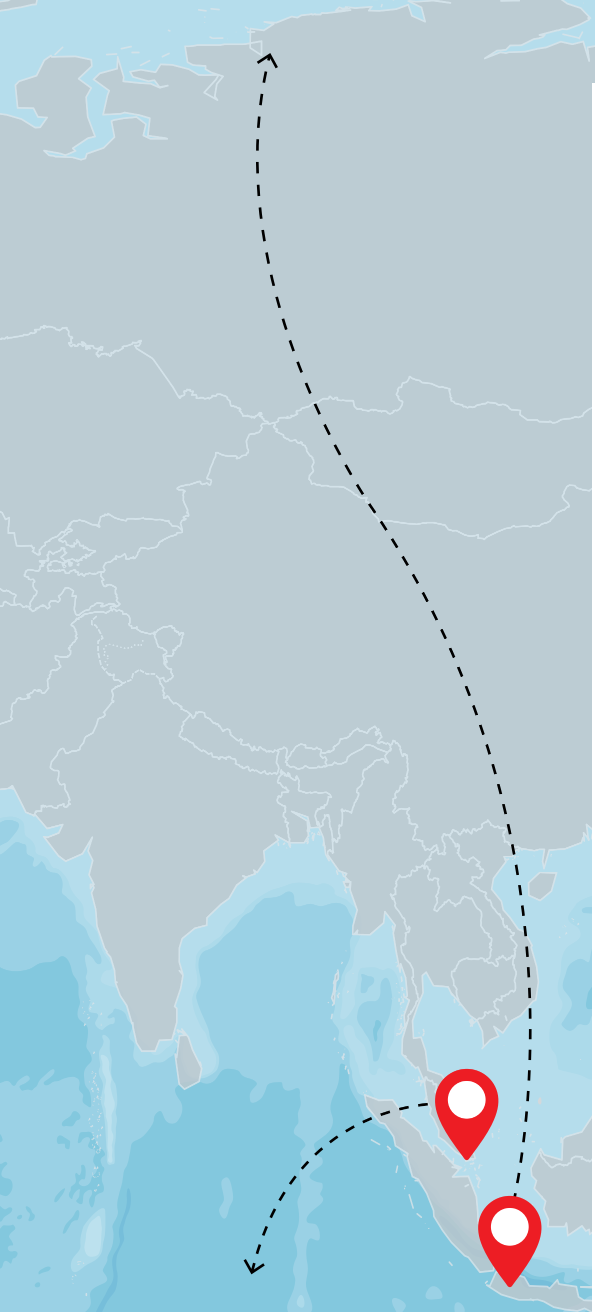
A Boeing 767-300 was in the cruise eastbound over **Atlantic** in 2011 when the First Officer awoke from an abnormally long period of 'controlled rest'. After a startle response (reportedly based on mistaking the planet Venus for the lights of an opposite direction aircraft at the same level), the First Officer put the aircraft into a steep dive towards an opposite direction aircraft 1000 feet below, causing multiple passenger injuries. The Captain took control and recovered the aircraft. Sleep inertia after excessive 'controlled rest' was considered likely to have been contributory. The procedure for 'controlled rest' was examined and it was found that the rest taken prior to the excursion did not comply with it in a number of respects. Ref. 6.

An A319 departing **Ibiza** in 2016 did not follow the previously trouble-free procedure to taxi off the gate using a clearly marked sharp left turn, and the right wingtip struck the air bridge, where it became lodged. One engine taxi departures (OETD) are a discretionary fuel saving technique described in the Operations Manual. The procedures explicitly require consideration of the direction and degree of turn away after pushback and during taxi, but presume that engine 1 will be started first. By omission, the Operations Manual effectively assumes that pilots will understand that it would be ineffective to attempt to follow a taxi line that requires a significant and sustained turn in a confined space using the engine on the inside of the turn. Ref. 1.

A Boeing 777-300 began a go around from the runway at **Dubai** in 2016 after touching down late, but its initiation was attempted by selecting TO/GA thrust on the switches (the airborne go around procedure) instead of advancing the thrust levers to the TO/GA position as the SOP requires for a rejected landing. The aircraft reached 85 feet above the runway with thrust at idle before descending onto it – all occupants escaped before the destruction of the aircraft was completed by fire. Ref. 3.

Captain Ed Pooley is an Air Operations Safety Adviser with over 30 years experience as an airline pilot including significant periods as a Check/Training Captain and as an Accident/Incident Investigator. He was Head of Safety Oversight for a large short haul airline operation for over 10 years where his team was responsible for independent monitoring of all aspects of operational safety. Ed has been an active contributor to SKYbrary and HindSight magazine for many years and is a member of the Flight Safety Foundation's European Advisory Committee.

An Airbus A330-200 left the landing runway at **Jakarta** in 2013 after the final stages of the daylight approach were continued after the Captain, as Pilot Flying, had lost his previously acquired visual reference in heavy rain. The First Officer reported that he had not intervened because he could still see the runway. The aircraft touched down with the right main landing gear on the grass and continued like this for 500 metres before regaining the runway, sustaining damage that precluded taxiing in. Prevailing SOPs clearly required that a go around should have been flown. It was considered that the Captain's failure to do so "might have been the result of his insufficient intuitive decision making to cope with the situation". Ref. 7.



A Boeing 767-300 began its night takeoff at **Singapore** in 2015 from a parallel taxiway instead of from the runway for which take off clearance had been given. The crew did not 'follow the greens' as instructed and crossed an illuminated red stop bar. Ref. 4.

"SOPs must be properly documented and trained, and finally that this training must include *an appreciation of why they exist.*"

What can we learn from these few selected events? Compliance with SOPs is clearly important but SOPs need to be supported by an appropriate context. That context includes recognition that the SOPs must exist where appropriate, must be properly documented and trained, and finally that this training must include an appreciation of why they exist. The importance of the last of these, which can be described as 'background knowledge', is frequently ignored in favour of a 'just do it' approach. More classroom training of pilots in this area would be beneficial.

Interestingly, explaining what underlies SOPs is also likely to improve the quality of judgement and decision making, which is needed when what happens is not entirely addressed by them. This could be because the response to a situation is either seen as a matter of licence-level awareness of the operation of a generic aircraft. It could also be because the circumstances that are encountered are unanticipated or are so rare that they are not the subject of an entirely SOP-based response.

Of course, this leaves unintended non-compliance with appropriately constructed SOPs still reliant on monitoring one's own actions or monitoring by the other pilot. This monitoring is heavily relied upon to support compliance, but is not fully effective given that pilots, however competent, will still make mistakes. It also ignores the risks that can follow the actions of a pilot who is 'startled' and then suddenly acts contrary to training. This is an area where we have so far been rather slow to embrace all the opportunities that modern aircraft systems have given us to introduce automated gross error monitoring. We could start with pilot FMS inputs but that could be just the beginning. A comprehensive in-depth assessment of this area could be made but I am not sure that one has yet been published. If this is so, it is overdue and we do not need to wait for more fatal accidents. The opportunity to enhance operational safety performance by leveraging automated systems in this way is clear, and it would constitute a realistic support for competence. S

References

1. A319, Ibiza Spain, 2016.
   https://www.skybrary.aero/index.php/A319,_Ibiza_Spain,_2016
2. A343, vicinity Paris CDG France, 2012.
   https://www.skybrary.aero/index.php/A343,_vicinity_Paris_CDG_France,_2012
3. B773, Dubai UAE, 2016.
   https://www.skybrary.aero/index.php/B773,_Dubai_UAE,_2016
4. B763, Singapore, 2015.
   https://www.skybrary.aero/index.php/B763,_Singapore,_2015
5. B763, Warsaw Poland, 2011
   https://www.skybrary.aero/index.php/B763,_Warsaw_Poland,_2011
6. B763, en-route, mid North Atlantic, 2011.
   https://www.skybrary.aero/index.php/B763,_en-route,_mid_North_Atlantic,_2011
7. A332, Jakarta Indonesia, 2013.
   https://www.skybrary.aero/index.php/A332,_Jakarta_Indonesia,_2013