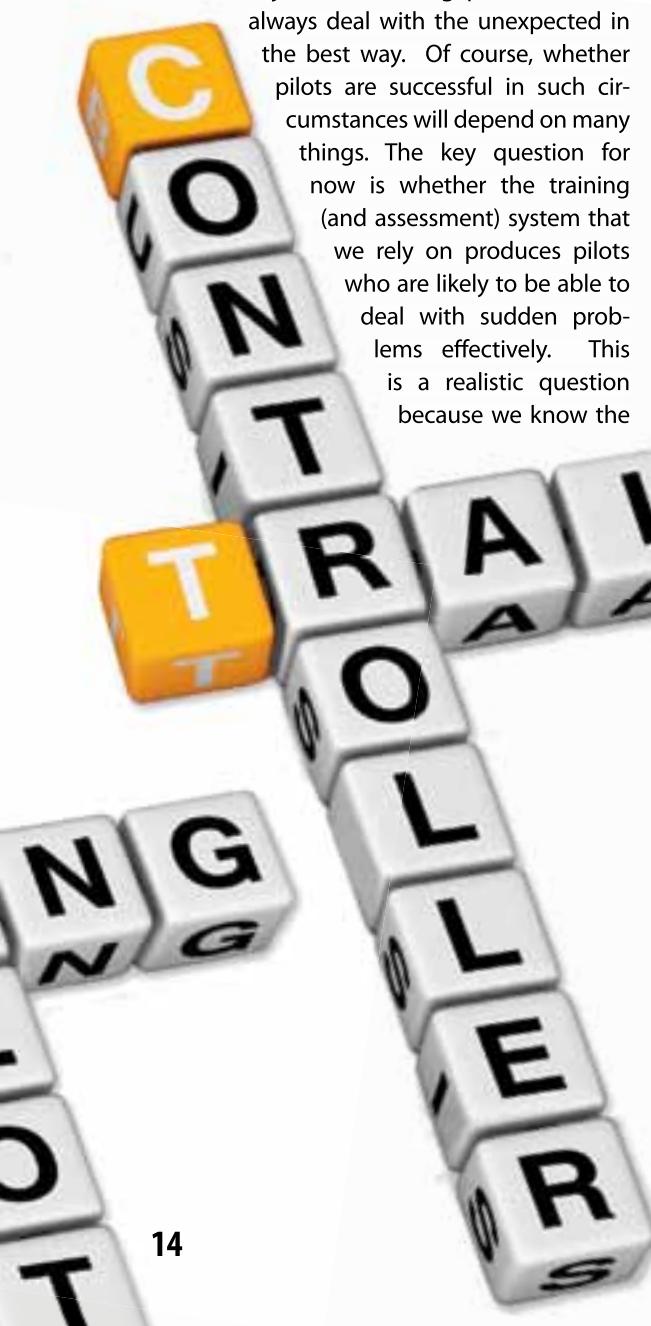# Providing effective training for the unexpected

By Captain Ed Pooley
Of course, training for safety is very important. And I would suggest that such training for controllers and pilots has a common objective for a common operating environment.

There has been much evidence of, and discussion about, whether pilot training and competency assessment as presently configured necessarily does the job of delivering pilots who can always deal with the unexpected in the best way. Of course, whether pilots are successful in such circumstances will depend on many things. The key question for now is whether the training (and assessment) system that we rely on produces pilots who are likely to be able to deal with sudden problems effectively. This is a realistic question because we know the majority of fatal air accidents are the direct consequence of 'failures in human performance'.

For the purpose of subsequently stimulating some thought on the potential read-across from the pilot training world to the controller training world, I am going to make some observations about the system of training which most pilots of multi crew jet and turboprop aircraft experience. I will not ignore the process of initial aircraft type validation but I will focus more on the recurrent training / requalification process.

I will not make any reference to the selection process which recruitment is based on. Although this has a significant effect on both initial training success rates and (perhaps less obviously) indirectly on the subsequent recurrent training performance of those who are recruited and successfully complete their initial training, it is absolutely a subject which I believe needs space of its own.

I will take it as a given that the development and retention of practical competency is founded on considerable classroom and / or CBT theory - and perhaps also by some supporting self study for those who recognise that there is always something to be added to their store of knowledge and understanding as specialist professionals.

I want to focus first on what happens in training once the candidate can handle normality well. How do you set about training - or retraining - for the unexpected? After all, this is the most common (but nevertheless still rather infrequent) challenge to pilots in today's world of automated reliability. Of course, the training programme always includes some of the 'most likely' occurrences. These will often involve selective system failures and reversion to flight control with less of the protections against deviation than prevail when the aircraft is 100% serviceable. They will also involve resolution of conflicts with other aircraft, dealing and responding to difficult weather conditions and the possibility of incapacitation or irrational behaviour of the

other pilot. Flight Operations Regulators typically stipulate a cycle of subjects to be covered at least once over a 3 year cycle - recognising that there is far too much subject matter to mandate it at every re-qualification.

This is all useful activity as far as it goes, but the focus is based quite narrowly on specific circumstances which in many cases will never be encountered. It has been suggested that the average interval between failures of the latest big fan jet engines is of the order of 100,000 flying hours, a figure which is some way off the flying hours accumulated during the career of even the longest-serving long haul pilot!

Are you sure this is the best way to acquire new OJT training skills?

> It has been suggested that the average interval between failures of the latest big fan jet engines is of the order of 100,000 flying hours, a figure which is some way off the flying hours accumulated during the career of even the longest-serving long haul pilot!

On the other hand, there are so many detailed abnormalities which might (but will probably not) be encountered, it could be that a significant proportion of recurrent training would be better released from the cycle of predictable compliance-driven exercises and re-focussed on the development and use of a large bank of abnormal scenarios. Their function would not be to train the response to their specific detail but to focus on the effectiveness of the response to the unexpected. The scenarios would be designed to present a similar level of challenge and would be entirely 'unseen' beforehand with the debrief solely based on the effectiveness of the response.

Of course this is merely a (significant) development of the LOFT[1] concept which is already commonplace and it would still be necessary to incorporate 'core business' such as TCAS RA and TAWS responses. But this modification to focus on initial responses to whatever occurs would be a good solution to accident reduction when so many of today's accident chains start suddenly and unexpectedly and where this 'startle factor' often leads to inappropriate initial responses which create secondary circumstances from which recovery may be much more difficult than the appropriate response to the first situation would have been. The evidence produced so far in respect of the 2009 loss of the Airbus A330 over the Atlantic[2] is but one notable example of this.

This proposition does not directly address the significant distinction ▸▸

1- **Line Oriented Flight Training**
2- **See http://www.skybrary.aero/index.php/A332,_en-route,_Atlantic_Ocean,_2009_(LOC_HF_AW_WX)**
3- **See http://www.skybrary.aero/index.php/B772,_London_Heathrow_UK,_2008_(AW_LOC)**
4- **See http://www.skybrary.aero/index.php/B738,_Mangalore_India,_2010_(RE_HF_FIRE)**

Providing effective training for the unexpected (cont'd)

in respect of whether the sudden-onset abnormality came directly 'out of the blue' like the Boeing 777 fuel icing event at Heathrow in 2008[3] or was the eventual result of an excess of 'can-do' as in last year's Mangalore landing overrun[4], but it would be a step in the right direction.

Next, I want to look briefly at the relationship between training and formal competency assessment. For pilots, the latter is typically focused on a tick-box process that mainly uses flight with inoperative engines as the way to 'load up' the pilots to prove that they can still safely control the aeroplane under pressure. This is an easy-to-standardise, but rather old fashioned tool in the context of Performance 'A' aeroplanes and the high engine reliability noted earlier. The testing is predictable and entirely lacking in any direct connection to the 'line oriented flight training' and coverage of periodic mandatory systems subjects which forms, for the re-qualification case, the refresher training element. To emphasise this disconnect, the testing element is generally completed prior to the training element!

So my second proposition is that, rather than just repeatedly relying on one predictable version of a high workload situation, pilot competency assessment might more usefully follow the refresher training provided rather than precede it. It might also mirror declared training objectives more closely. This would place new demands on the competency assessment process which would need to adapt to a system where judging pass/fail would be a lot more demanding. Especially since it should use unpredictable 'test' scenarios selected from the large bank developed for training purposes under proposition one above (excluding of course the scenarios just previously used for training purposes!)

So now I invite you to consider the possible relevance of these issues which many believe currently exist in pilot training regimes to the rather similar process of training ACC or Terminal Radar Controllers who must work busy sectors and have shifts punctuated by essential periodic rest breaks. For the purposes of this comparison, perhaps it could be assumed that, as for pilots of multi crew commercial aircraft, basic controller competency achieved by simulator training is then validated by on-the-job training - analogous to the line training of pilots

Thought about it briefly? Good! To conclude, I have a question for the controller community on behalf of the pilot community. Arising from the apparent read-across of OJT for controllers to Line/Route Training for pilots - and of course the acquisition of the necessary tick in the box at the end of it - is an interesting disparity between the delivery of one-to-one validation training in the two cases. In the world of pilots, Training Captains are a carefully selected small subset of all Captains who themselves have had, when First Officers, to be assessed suitable to command. The progression is not at all automatic or expected, it's based on the assumption that the minority who are really suited to the role and will enjoy it are appointed. Certainly, I can say that I really enjoyed my time as a Check/Training Captain and I know that this was the case for almost all of us. We received more salary than Line Captains, but we contributed proportionally more to the maintenance of overall safety standards than they did as individuals. For controllers on the other hand, it seems to us pilots that most controllers can 'look forward' to joining the OJTI List unless there is a good reason why they shouldn't. Which is the exact opposite of the pilot case. I don't know about the salary differential involved, but it might be a case of spreading the training budget across too many people who do not all have the task focus that makes task delivery effective in the pilot world. Certainly there are incident reports out there in the public domain which have shown, apart from task slippage, that some OJTIs actually positively dislike the duty. Surely, ATC could learn a rather obvious lesson from Flight Crew Training - that motivation is as important for the Trainer as for the Trainee…. and that not every controller makes a good trainer, however good they are at their job.

Captain Ed Pooley is an experienced airline pilot who for many years also held the post of Head of Safety for a large short haul airline operation. He now works as an independent air safety adviser for a range of clients and is currently acting as Validation Manager for SKYbrary.