



Learn... and Live

Airline crew or light aircraft private pilot, there's something to be learnt from every emergency situation. **By James McBride**

The first officer called, "Eighty knots... vee one... rotate!" and the captain started to raise the nose of the airliner. The pitch attitude began to increase. Then without warning, there was a huge noise from the left-hand side and the left engine fire warnings all illuminated.

This was an experienced crew. They barely exchanged glances as the captain continued the takeoff. As the severely damaged engine began to fail, he used more power on the live engine, controlling the flight path and correcting for asymmetric thrust.

"Positive climb!" Now the first officer's voice was a little strained, but the captain replied calmly enough, "Gear up."

The first officer moved the landing-gear handle to the up position and the undercarriage made its usual grinding noise as the wheels retracted. The captain relaxed just a little bit. He was calm, he was in control, flying well and now that the drag was away he knew the aircraft would accelerate and climb. The fire bell now started after its inhibited period and the first officer cancelled it immediately to prevent the distraction. At 400ft the captain called, "Confirm the failure." His voice was authoritative... and reassuring. He had practised this procedure many times before in a simulator and was well in control of the aircraft, and his first officer was an experienced pilot with several thousand hours on type.

"We have an engine fire on the left side!" The first officer had regained his composure after the shock of seeing all of the warning signals and knew what he must do next.

"Roger that. Carry out the memory items for a left engine fire," responded the captain as he trimmed the aircraft to obtain the best climb performance. Just after takeoff and at high gross weight, the aircraft was struggling to perform well and it would be a shallow climbout. The first officer did as he was asked and called aloud each of the actions as he was about to take them so the captain could monitor what he was doing..

"Auto-throttle, off. Left thrust lever, confirm? Closed. Left fuel control switch, confirm? Cut off. Left fire handle, confirm? Pull and rotate. Firing the first bottle. Starting the stopwatch."

Thirty seconds is a long time when you are watching an engine fire warning to see if the extinguisher will do its job, and while this was happening, the captain said, "My radio, I'll put out the Mayday."

"Mayday, Mayday, Mayday, this is..." His radio call was textbook and completely clear. The controller responded immediately and advised, "Call approach frequency one, one, niner, decimal four when able, they have you on radar."

"Firing the second bottle!" Now the first officer did look concerned as the engine fire warnings still remained and the first extinguisher had not put out the fire. The stopwatch



Profile

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made a loud click in the flight deck as he thumbed the button. Another thirty seconds went by and the warnings remained. Now it was really serious and he knew it. The first officer practically shouted across the cockpit, "It's still on fire!"

Now a new tension filled the cockpit. Both extinguishers had been used and there was still a fire. The commander's professional composure gave way. "S**t! Tell them we want a priority approach to land. Do it now. We need to get this thing on the ground bloody quick!"

The Captain put the autopilot in and started a turn back towards the airport. There would be little time to warn the cabin, he thought to himself, 'I'll just have to call Brace, Brace on final approach... if we make it that far.'

It was seven minutes since rotation and the incident began. They knew that every second would count. How long before the wing spar burned through, or the engine exploded? They could only guess, but with an uncontained engine fire and no way of extinguishing it, they were likely to find out.

The first officer was now busy on the radio to air traffic control... and calling out the speeds for landing... and reading through the rest of the drills from the emergency checklist. As a high-speed, one-armed paper-hanger he was doing quite a good job. The captain glanced at him, looking for the right moment to give an abbreviated, emergency landing brief – then he looked down at the engine fire

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handle on the centre console. It was still illuminated bright red, but there was something wrong. Even more wrong than the fire warning...

The captain let out a very unprofessional oath as realisation dawned. The extinguisher discharged lights were not lit... the fire extinguishers had not been fired! He reached down and twisted the fire handle first to one side and then to the other until both 'bottle discharged' lights illuminated. Simultaneously the fire warning went out... and then I hit the 'Total Freeze' button on the instructor console in the back of the flight simulator. Everything fell silent...

Being an experienced crew, they virtually debriefed themselves, with only some facilitation from me as the examiner, to ensure that they understood that it was



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➔ essentially a breakdown in Crew Resource Management (CRM) which led to the technical failure of not actually firing the extinguishers.

Although the right-hand seat pilot turned the fire handle, he did not 'hold against the stop for one second' as specifically instructed in the Emergency Checklist. With full situation awareness of the extinguishing system, he would have been looking to see that the bottle discharge lights illuminated confirming his actions.

In the case of the captain, he took at face value the statement by the first officer, "It's still on fire!" to mean that although both extinguishers had been used correctly, they had failed to put out the fire. The old adage, 'Never assume, check' was repeated in the debrief along with a review of the decision-making process to make certain that they were aware that if they had employed this correctly as a crew, the omission would have been spotted earlier.

As examiners of professional pilots working in simulators, we are often seen as 'Trappers'. Some of our colleagues view us as being there to impede their progress and only to point out the human failings which we can all make in stressful situations. Nothing could be further from the truth; however, there are times while observing when we must stay silent and resist the temptation to intervene in order that the learning process is not interrupted.

The scenario told above actually occurred. While it was unfolding before me, I had a very real urge to warn them and reassure them that I had not been the b*****d examiner who had given them an engine fire which they could not extinguish.

As I pointed out later, where would the training value



Procedural trainers such as this Cirrus trainer give GA pilots a chance to simulate problems without taking to the air

have been in that? Our job in the examining role is to keep it as real as possible in the simulator, so that not only can we make a true evaluation of pilots' performance, but more importantly ensure that the learning points have maximum emphasis. Many is the time that we try to get this across by explaining to the pilots that we know what it is like to be in their shoes and that we are crucially aware that it is "dead easy to fly from the jump seat".

In a similar way, instructors and examiners in General Aviation will make every effort to maximise the training value such that their trainees and candidates realise their own potential at every stage. A good example of this is when flying instructors progressively increase the workload on their trainees as they approach the time of their first solo flight.

While the following examples may not be textbook instructing practice, they do make points about how one might help a student to learn, either in the simulator or in a real aeroplane, by taking a student safely out of their personal 'safety zone' and developing their abilities.

To reassure one particular student who was nervous about the idea of flying solo and carrying out the landing alone, the instructor deliberately took his coat from the back seat of the aeroplane and put it over his head so he couldn't see. "Talk me through this circuit, but I'm not going to watch." The student did just that, proceeded to land the aircraft without any problem and went solo shortly afterwards. As I say, not standard instructing practice and probably not applicable to every student, but it did build confidence and broke the student's reliance on the instructor.

An extreme example of an instructor making sure that his student learned the lesson 'always keep your hand on the throttle after takeoff' occurred many years ago when I was going through basic flying training. The aircraft was a de Havilland Chipmunk which had a tandem cockpit and the instructor sat in the rear, with full dual controls. This particular instructor was keen to see that his trainees learned their lesson well and while the hapless student in the front seat forgot to keep his hand on the throttle lever, the engine suddenly lost power and revs as the throttle was smartly closed in the rear cockpit. Immediately the student ➔

Airliner cockpits are complex environments, ripe for simulation



➔ put the nose down to glide the aircraft and prevent a stall. He tried to open the throttle, but it was as if it were jammed shut... Then came the growling voice in his ears from behind, "Now y'see lad what 'appens if yer take yer 'and away for even a moment just after takeoff. Th'engine dies and yer throttle jams shut and we're goin' t'have ter force land th'aeroplane!"

A brief discussion and negotiation then took place between the cockpits, along the lines of, "Please sir, let me have the throttle back, I promise I won't do it again!"

Again, maybe not an instructional ploy you'd condone in every situation as it raises safety issues in itself, but it certainly taught the student a bigger safety lesson.

Fortunately the days of training young pilots by scaring them half to death have gone. Trainees will always be challenged to give of their best and to achieve their true potential by good instructors who make the effort to push

Did you know?

Simulators are now so realistic that some fledgling airline pilots can now do their whole training without ever entering an aircraft



Training in the simulator will include exercises in working as a crew as well as in handling and emergency procedures

THE SIMULATION EXERCISE

Once upon a time – at the start of the simulator revolution in the 1980s – there was a theory that maybe not too long after the year 2000 none of us would have to leave our houses. Everything in life would be simulated – work, sport, leisure and the rest. We now know that that isn't going to happen, at least not in the near future.

However, some simulators are so close to being lifelike that the line between real and virtual becomes blurred. Many airliner simulators have reached this level.

Home PC simulators have always lagged behind the airline ones in terms of 'realness'. Nobody would advocate training on them, and then taking off solo with true aerial instruction. As anecdotal evidence from many instructors has shown, people who

have 'flown' simulators and then transfer to real aircraft have a number of deficiencies. However, PC the simulation experience is improving as the hardware improves.

In the middle, between home and full six-axis simulators, are the procedural simulators. These can be excellent for teaching good habits and procedure techniques in areas such as teamwork, instrument flying and radio work. Given a structured training plan to work in conjunction with any form of simulator, you can achieve huge improvements in your flying in the real thing.

Equally importantly, simulators can allow instructors to safely give students problems and situations which can then be discussed and analysed afterwards.

them further. This is especially true of students who are passing with ease, whichever course they are on. In basic flying training, for instance, it is a simple matter to convince the apprentice navigator that they have perhaps put 'the drift' on the wrong side as they are conducting their navigation exercise.

A mental problem which is so easy to solve on the ground all of a sudden becomes a worrying mental challenge when you have half-a-ton of flying metal in one hand doing 100mph, and you are running for your first turning point. The helpful, "Are you quite sure the drift is on the correct side for the wind?" is normally all that is required to prompt a hurried replan of the calculations with the inevitable errors, which are only discovered on the next leg of the navigation exercise as the aircraft goes completely off-track.

Eradicating mistakes

We all make mistakes from time to time. So long as the instructor obtains the training value out of the lesson to ensure the trainee resists the distractions which can cause errors and crosschecks their work every time, then the exercise is a valuable one.

In his iconic book about commercial flying, *Fate is the Hunter*, Ernest Gann tells the story about a hoary old captain who used to challenge young co-pilots by lighting matches and holding them under their nose while they were trying to fly a complicated approach on instruments in bad weather. Each time the sulphurous, smoky burning substance came near their nostrils, they had to blow it out, while – with their eyes streaming – they also had to fly the airliner on instruments. Not surprisingly, Gann found that his own bad weather instrument flying improved markedly when he was flying with other captains who did not try to distract him in such a manner.

Was that good instructing or not? Was the end worth the means? It may be that it's down to the particular co-pilot and the individual situation.

But it all goes to prove: if you simulate circumstances at least as bad as you can expect in real life, it will have a beneficial training value, and will increase your safety immeasurably. ■

