THAT WAS CLOSE, HOW DID THAT HAPPEN?

by Mike Edwards

It was early evening as the passengers boarded for the one hour flight. As usual at this time of day, the flight was running about 30 minutes late "due to late arrival of the inbound aircraft". The passengers looked tired and grumpy, as were the two pilots – Ben, the Captain and Jerry, the First Officer. They generally got on well, but tiredness had made them tetchy and irritable. They got start up clearance from the Tower and briefed for the standard "EMMA Two Charlie" departure off runway 29.

In the Tower, Lisa was the Aerodrome Controller in charge of the runway, and Bill was plugged in on the Ground position. They worked well together and had a conspiratorial smile at every grunt, which passed for co-ordination from Alistair, downstairs on radar, for whom the word "dour" would be optimistic.

It was Ben's turn to fly the aeroplane (call sign Homebird 69 Bravo Charlie) for the last sector back to base in the South. Jerry got taxi clearance "via Mike, Bravo Three hold for runway Two-Nine". Bill knew that these crews were happy with a departure from Bravo, which was about 600m down the runway from the threshold. Just then, Alistair piped up from downstairs "Check southbound, I've got another infringer, probably looking for Kingley". Kingley was a small grass airfield just outside the Control Zone.

Bill transferred Homebird 69BC to Lisa as it taxied along "Mike", the plan being to depart two from the full length, the second of which was the same vortex category as the Homebird.

The infringer was circling randomly to the south so Alistair and Lisa agreed a plan to take the Homebird 69BC north and east after take-off instead of the normal south bound SID. Lisa had just cleared SkyTrans 491 to depart from the full length when Homebird 69BC came on to her frequency. Lisa responded with "Homebird 69 Bravo Charlie good evening, short delay to your departure, I have a revised clearance for you while we wait". Jerry told her to go ahead and then wrote down the new heading and level on his pad. Ben tutted and said "great, all around the houses, wonderful" and then "get it loaded". This was directed at Jerry to update the FMS.

Jerry spent the next 30 seconds or so with his head "in the office" and looked up to see them crossing the stop bar towards the runway. "Stop bar" said Jerry in a questioning way. "We've got line up clearance" said Ben. Jerry couldn't remember a line up clearance, but didn't say anything as Ben was clearly not a happy bunny. He tried to look right towards the runway threshold but the angle of the taxiway and the high wing of the aeroplane made it difficult.

Meanwhile, back in the Tower, Bill was standing up and laughing. So Lisa stood up too to see what was so funny. They chuckled as they watched the antics of a marshaller trying to manoeuvre a light aircraft on the GA Apron which was next to the Tower. He clearly wasn't getting through to the pilot and his signals were getting more extreme as he shook with frustration.

Ben was turning the aircraft on to the runway, looking left at the remaining runway length as he did a full and free movement check, when they heard someone say "Stop Stop" in an agitated voice on the R/T. Just then an aircraft came passed their nose on the far side of the runway under heavy braking.

" Er Tower, SkyTrans 491 that was close, how did that happen?" Lisa turned around and went as white as a sheet. "Oh my……standby SkyTrans"" Homebird 69….."was all she could manage. She looked at her strips, which all looked correct. What had she done? Bill had been quickly on the phone to the Supervisor and a relief controller ran up the stairs, took over and unplugged Lisa. SkyTrans 491 vacated the runway and held on the taxiway; and Homebird 69BC requested a minute and then reported ready for take-off.

So, what did happen?

- The RTF recordings showed that the controller, Lisa, had used non-standard phraseology in telling Homebird 69BC that she had a revised clearance "while we wait". The pilot report from Homebird Airways stated he had been cleared to "line up and wait".

- Homebird 69BC was using a holding point on a taxiway that was angled primarily to speed the exit from the runway 11. This made it more difficulty for pilots to turn enough to see the final approach and threshold.

- Captain Ben crossed an illuminated red stop bar onto the runway. He did this because he believed that he had a clearance to line up, which must therefore also be a clearance to cross over the stop bar.

  It is best practice that pilots should never cross a lit stop bar even if they have a runway entry clearance from ATC. This is supported by all signatories to the European Action Plan for the Prevention of Runway Incursions (EAPRRI), which include EASA, IATA, IFALPA, IFATCA, ECA, and EUROCONTROL.

- First Officer Jerry was concerned about Captain Ben crossing the stop bar and did query it. But when the Captain asserted that he had a line up clearance, the FO did not push the issue because he knew that the Captain was tired and irritable, thus allowing human performance and the flight deck relationship to over-ride the safety of the aircraft.

- In the Tower, the Aerodrome Controller, Lisa allowed herself to become distracted from her primary role of monitoring movement on the runway. An aircraft had been cleared for take-off and her primary task was to observe that departure. She could not have prevented the runway incursion but there is a chance that by remaining vigilant the risk of collision could have been reduced.

This story is illustrative of the most severe and challenging type of Runway Incursion. This is **Sudden High-Energy Runway Conflict (SHERC)**. These events typically involve a situation where, once it has been initiated, the time available for ATC to prevent a collision is likely to be less than the time so needed.

SHERC events are intrinsically last minute occurrences where an aircraft or vehicle enters the runway ahead of an aircraft that is in the act of landing or taking off. This can happen for a variety of reasons, but can be grouped into four areas:

1. Incorrect ATC clearance
2. Aircraft or vehicle becoming confused as to its physical position on the airport
3. Aircraft or vehicle mishearing or misinterpreting its ATC clearance
4. Aircraft or vehicle not complying with its clearance due to the mind-set and focus of attention of the pilot or driver.

EUROCONTROL through its Safety Improvement Sub-Group is carrying out an Operational Safety Study on Sudden High-Energy Runway Conflicts. The general methodology is to examine what assistance is available to controllers, pilots and drivers to prevent the runway incursion from happening in the first place; and secondly if that fails, what assistance is available to prevent it turning into a runway collision.

The Study suggests that there is currently no silver bullet, no one procedure or tool that can prevent all SHERC events. It has found that a combination of procedures and hardware have the highest potential to prevent most events. Whilst everything helps, the study suggests that the following could have the largest positive impact in the prevention of SHERC events:

- Functionality to give ATC alerts of aircraft/vehicles not conforming to clearances or ATC clearances that are conflicting

- The correct use of ATC memory aids, such as a common method of indicating that a runway is actively occupied, plus competency checks that monitor compliance.

- The use of stop bars together with procedures never to cross an illuminated bar.

- The installation of Autonomous Runway Incursion Warning Systems (such as Runway Status Lights)

- Flight deck equipage showing Airport Moving Maps.

The EUROCONTROL study includes the analysis of real SHERC events around the globe and found that once a SHERC event had been initiated, almost all of them relied upon belated visual detection from pilots or drivers for collision avoidance.

Visual detection by ATC of SHERC events is limited by meteorological conditions and is unlikely to be effective once the event has been initiated. This would suggest that ATC training should emphasise the importance of Preventing SHERC events by focussing on the correct use of memory aids, visual vigilance and precise ATC clearances.

Finally, the study found that the use of stop bars together with procedures for all pilots and drivers to never cross a lit stop bar or for ATC to never give a clearance across a lit stop bar could have prevented half of the actual serious runway incursions studied.

EUROCONTROL, in a joint initiative with the Flight Safety Foundation European Advisory Committee are producing a series of very short videos, called SKYclips, to highlight particular risks to operational safety. The crossing of lit stop bars or the clearing aircraft to cross them is the subject of one and can be accessed on SKYbrary[1].

After the event, Lisa had to listen to the RTF recordings three times before it dawned on her what her contribution to the event had been. She won't be saying THAT ever again!

Ben was called into the Chief Pilot's office to be told that the company SOP was indeed to never cross a red stop bar without checking with ATC, and why didn't he know that. Trouble was that Ben did know actually.

Jerry was glad of a day off. He had promised his kids that he would take them to the new Ice Cream store.

1- http://www.skybrary.aero/index.php/Stopbars_(SKYclip)

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