Trust or doubt?

Earlier this year, an Airbus A340-500 operated by Emirates Airline nearly failed to take off when departing Melbourne, Australia for Dubai...

By Gilles Le Gallo

The Preliminary Report of the Investigators[1] says that the takeoff was planned as a reduced-power takeoff with the First Officer as the handling pilot for the departure. When the Captain called for the First Officer to rotate at the calculated airspeed, the attempt to do so was initially unsuccessful. After a repeat of the call, the First Officer applied a greater nose-up command and as the aircraft nose was raised, the tail made contact with the runway surface, but the aircraft did not begin to climb. Only when the Captain then selected maximum take off thrust did the aircraft begin to climb, achieving a positive rate of climb 300 metres past the runway end.

Whilst preparing to return to Melbourne, the crew noticed that they had inadvertently entered an aircraft take-off weight which was 100 tonnes below the actual take-off weight of 362 tonnes when completing their pre departure take-off performance calculation using the on-board EFB[2]. This had led to the calculation of a thrust setting and take-off reference speeds that were much lower than the ones required for the actual aircraft weight.

The aircraft subsequently landed without further event at Melbourne. The tail strike was found to have caused substantial damage to the tail of the aircraft and also damaged some airport lighting and the airport instrument landing system.

1- Aviation Occurrence Investigation AO-2009-012 Preliminary Report by the Australian Transport Safety Board see http://www.skybrary.aero/bookshelf/books/666.pdf

2- EFB is the accepted abbreviation for the 'Electronic Flight Bag' often now carried on the flight deck; think 'laptop'!

Although the Investigation into how this error came to occur is ongoing, we can already see that output from the calculation was so different from the sort of figure that should have been expected that it might seem surprising that it wasn't noticed.

How come experienced pilots did not spot such an error?

Crucially, there might be seen to have been over-reliance and/or over-confidence in the latest EFB system. A focus on the process of obtaining 'magic' parameter figures for take-off rather than questioning the results. Second thoughts about the results output would have triggered a remark such as "sounds like pretty slow take off speeds for our aircraft on this kind of leg" based upon an order of magnitude of difference to figures from previous experience.

We learn to work out the order of magnitude of figures at school even though at the beginning this might not be necessarily obvious. When my daughter was at that stage I used to check her homework. One day the maths exercise was about calculating the surface area of the kitchen floor. She had worked out that the kitchen was 10 square millimetres. When I looked at her work I immediately said "This is wrong" and she replied without delay "How can you say that, you did not do the exercise!" On that day she learned the concept of the order of magnitude of figures. We must all have had this experience somewhere on the way through our general education.
ATM is a system and like any system it is composed of equipment, procedures and humans. The tail strike event above shows that equipment (the aircraft) should not be trusted blindly. What about the other elements of the system, say the human part?

We need to trust in our capability to do our work. An ATCO should not go to work telling himself "Gosh no way I am going to make it today". Conversely would it be a good idea to think "I am so good that I need no help to do a perfect job – not the procedures worked out by those useless people in the offices neither my colleagues – aren't they all dumb"? Well not really.

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What is needed is a good balance between trust and doubt in all elements of the system, handing-over/taking-over without following a structured process leads to a poor start of shift quite often….just like getting rid of cross-checking procedures for data entry may not be a good idea.

Editorial Comment

Sadly, the recent example which Gilles has chosen to illustrate his very important point is just the latest in a long list of similar occurrences involving the lack of any flight crew 'gross error check' to disclose mistakes in data input or manipulation using EFBs. Unless there are serious actual consequences, many events of this sort are not publicly investigated. That such things can happen in a well-respected operation like Emirates as well as to freight charter operators with an arguably rather less secure operational foundation reminds us that human performance is no respecter of your operational environment or circumstances. At least flight crew making pre-flight performance calculations – and there were four of them in that particular flight deck for take off – have the opportunity to cross check each others actions as well as to independently review the results. Sometimes everyday life for a controller can be rather more solitary, making cross-checking a more self-contained affair! ■

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