
Proximity conflict, Boeing 737-2D6, 7T-VEY, 21 December 1995

Micro-summary: A misinterpreted GPWS and automated tower warnings motivates ATC to command a just-departed DC-9 to maintain 500', expecting a landing airplane to do a go-around. It did not, and landed normally.

Event Date: 1995-12-21 at 1352 UTC

Investigative Body: Aircraft Accident Investigation Board (AAIB), United Kingdom

Investigative Body's Web Site: <http://www.aaib.dft.gov/uk/>

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Boeing 737-2D6, 7T-VEY, 21 December 1995

AAIB Bulletin No: 6/96 Ref: EW/C95/12/5 Category: 1.1

INCIDENT

Aircraft Type and Registration:i) Boeing 737-2D6, 7T-VEY

ii) McDonnell Douglas DC-9-87 (MD-87), EC-FFA

No & Type of Engines:i) 2 Pratt & Whitney JT8D turbofan engines

ii) 2 Pratt & Whitney JT8D 217 turbofan engines

Year of Manufacture:i) Not known

ii) 1991

Date & Time (UTC):21 December 1995 at 1352 hours

Location:London Gatwick Airport, West Sussex

Type of Flight:i) Public Transport

ii) Public Transport

Persons on Board:i) Crew - 6 Passengers - 93

ii) Crew - N/K Passengers - N/K

Injuries:None

Nature of Damage:None

Commander's Licence:i) Airline Transport Pilot's Licence (Algeria)

ii) Airline Transport Pilot's Licence (Spain)

Commander's Age:i) Not known

ii) Not known

Commander's Flying Experience:i) 6,847 hours (of which 1,750 were on type)

ii) Not known

Information Source:AAIB Field Investigation

The Boeing 737, registration 7T-VEY, was on a charter flight from Oran (Algeria) to London Gatwick. Approaching from the direction of SELSI reporting point, the aircraft was transferred to Gatwick Approach control at 1345 hrs. The controller advised that it had 30 nm to run for a straight in approach to Runway 08R and requested confirmation that the crew could lose the necessary height in that distance remaining. The reply was in the affirmative. Radar information indicated that the aircraft was passing FL100 at that time. The aircraft was cleared to descend to 4,000 feet on the QNH of 1006 mb and was requested to remain on its present heading until established on the localiser.

At 1347 hrs, the preceding aircraft (also a Boeing 737, flight number BA2573) was becoming established on the localiser for 08R and advised ATC that in its current position the wind was 242° at 27 kt, stating that there was a 27 kt tailwind in the approach area. The aircraft was advised that the surface wind at Gatwick was from 070° at 5 kt. The controller passed the upper wind information to the Gatwick Aerodrome controller, but did not advise 7T-VEY specifically of this information.

At 1349 hrs, 7T-VEY was cleared to descend to 3,000 feet and to descend further with the glidepath. The crew reported that the aircraft was fully established on the ILS at 1350 hrs and was requested to transfer to the Gatwick Aerodrome controller and to advise him of the speed at that time (although no specific speed control had previously been requested by ATC). On transfer, the crew reported that the current speed was 200 knots. The Aerodrome controller requested the aircraft to reduce speed to 160 knots.

The Aerodrome controller had already cleared EC-FFA (departing on a scheduled flight to Madrid) to line up on Runway 08R after the landing Boeing 737 (BA2573) and to be ready for an immediate departure when cleared. The controller was aiming to get it airborne ahead of 7T-VEY landing. At 1351 hrs, 7T-VEY was requested to reduce speed to minimum approach speed. When the aircraft was slowing through 180 knots, the controller instructed the aircraft to come back to minimum approach speed "as fast as you can please". Immediate take-off clearance was issued to EC-FFA, and 7T-VEY was advised to expect a late landing clearance.

At 1352 hrs, a GPWS "PULL UP" warning was transmitted over the radio. The controller assumed that 7T-VEY was about to initiate a go-around, as the aircraft also activated the alert on the Approach Monitor Aid (AMA) in the Tower. He requested EC-FFA to "stop immediately", but the crew responded that they were already airborne. The controller then instructed EC-FFA to "maintain five hundred feet", which was responded to by the crew. Five hundred feet indicated with QNH set on the aircraft's altimeters would have been about 300 feet above the local terrain level at the departure end of Runway 08R, significantly below the Minimum Safe Altitude in that area.

Shortly after this, the crew of 7T-VEY stated that they had the runway in sight and the aircraft was cleared to land, which it did uneventfully. Re clearance on the original Standard Instrument Departure was then issued to EC-FFA. Post-incident radar data analysis indicated that EC-FFA had initiated its climb while within 0.5 nm from the upwind end of Runway 08R.

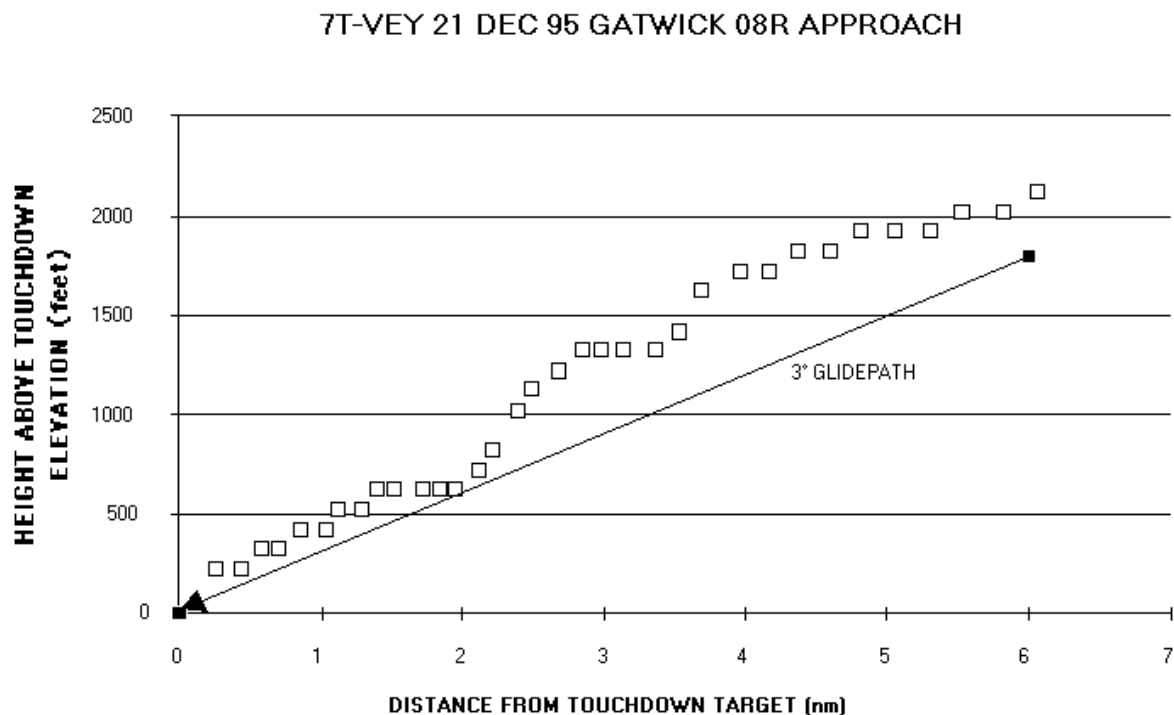
The weather at the time was a surface wind of 070°/4 kt, visibility 3,600 metres in mist, overcast cloud base 300 feet, temperature +4°C, dew point +4°C. A Met Office aftercast gave the upper winds as: 1000 feet - 140°/15kt, 2000 feet - 150°/20 kt, 5000 feet - 230°/20 kt, 10000 feet - 260°/30 kt.

The Approach Monitoring Aid (AMA) at Gatwick operates by analysing data from the Gatwick Watchman secondary radar system. Aircraft are tracked down the approach from a range of 5 nm,

but alerts are only generated if the aircraft deviates more than $\pm 1.5^\circ$ from the localiser centreline track within 2 nm from touchdown. Glidepath monitoring is not carried out by this system.

In this case, full post-incident analysis of secondary radar data indicated that 7TVEY deviated north(left) of the localiser track during the approach. At 2.5 nm from touch down the deviation was about 90% of full scale localiser indication ($\pm 2.5^\circ$) then reduced. At about 1.7 nm from touchdown the displacement was again similar, thus triggering the AMA alert in the Tower.

Analysis of the vertical profile of 7T-VEY was carried out using the mode C transponder data. The final approach profile is shown below:



The maximum rate of descent, some 2,100 feet per minute, was achieved just outside 2 nm from the touchdown target. With the Mark 1 GPWS system fitted to this aircraft, the only aural alert available for Mode 1 (Excessive Descent Rate) was "WHOOOP WHOOOP PULL UP". On the later standard of GPWS fitted to the Boeing 737 series, this rate of descent would have triggered only a "SINK RATE" aural warning at this height above the ground.

The Manual of Air Traffic services, Part 2, for London Gatwick Airport indicates that the correct procedure in the event of an aircraft triggering the AMA system alert while more than 1 nm from touch down is to pass advisory information to the crew detailing the apparent displacement and to seek confirmation that the aircraft is correctly aligned with the runway in use or that the crew is visual with the correct runway. If the aircraft is outside the tracking zone and within 1 nm from touchdown, then it is to be instructed to initiate a missed approach.

The situation of an aircraft executing a go-around while another is in the process of taking off is not covered specifically in the MATS Part 2. It is the responsibility of the Aerodrome controller to effect suitable separation between the aircraft by allocating appropriate altitudes or divergent headings,

before transferring control to the Gatwick Departure Radar controller. It is not accepted practice to level off an aircraft below the Minimum Radar Vectoring Altitude when low cloud and poor visibility conditions prevail.