
Ground collision, Airbus A319-111, G-EZEU, November 24, 2005

Micro-summary: This Airbus A319 struck an A320 while taxiing

Event Date: 2005-11-24 at 0835 UTC

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

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

Note: Reprinted by kind permission of the AAIB.

Cautions:

1. Accident reports can be and sometimes are revised. Be sure to consult the investigative agency for the latest version before basing anything significant on content (e.g., thesis, research, etc).
 2. Readers are advised that each report is a glimpse of events at specific points in time. While broad themes permeate the causal events leading up to crashes, and we can learn from those, the specific regulatory and technological environments can and do change. ***Your company's flight operations manual is the final authority as to the safe operation of your aircraft!***
 3. Reports may or may not represent reality. Many many non-scientific factors go into an investigation, including the magnitude of the event, the experience of the investigator, the political climate, relationship with the regulatory authority, technological and recovery capabilities, etc. It is recommended that the reader review all reports analytically. Even a "bad" report can be a very useful launching point for learning.
 4. Contact us before reproducing or redistributing a report from this anthology. Individual countries have very differing views on copyright! We can advise you on the steps to follow.
-

ACCIDENT

Aircraft Type and Registration:	Airbus A319-111, G-EZEU	
No & Type of Engines:	2 CFM CFM56-5B5/P turbofan engines	
Year of Manufacture:	2004	
Date & Time (UTC):	24 November 2005 at 0835 hrs	
Location:	Nottingham East Midlands Airport	
Type of Flight:	Public Transport (Passenger)	
Persons on Board:	Crew - 6	Passengers - 110
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to left wing tip and left wing tip of a neighbouring aircraft	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	45 years	
Commander's Flying Experience:	10,670 hours (of which 756 were on type) Last 90 days - 93 hours Last 28 days - 35 hours	
Information Source:	AAIB Field Investigation	

Synopsis

The aircraft was departing on a scheduled passenger flight to Alicante. As it taxied off its stand the aircraft's left wing tip struck the left wing tip of an A320 parked on the neighbouring stand. The commander, who was normally based in Berlin, had initially requested a pushback off the stand, in accordance with the published procedures. ATC advised him that his company's aircraft normally self manoeuvred off that stand. The commander had this 'local procedure' confirmed by the co-pilot, who was relatively new to the company, and the ground crew. After this incident, ATC ensured that all aircraft departing from this stand were pushed back before being cleared to taxi.

History of the flight

The aircraft was departing on a scheduled passenger flight to Alicante. For the commander, who was normally based in Berlin, this was his first experience of a departure from Stand 50, Figure 1. When boarding the aircraft in preparation for the flight, he had noticed the proximity of a light pylon near the left wing tip and an unmanned Airbus A320 belonging to another operator, beyond the pylon on Stand 51, facing the opposite direction to his own aircraft. He checked the aerodrome charts for the Central Apron and confirmed that Stand 50 was designated a push-back stand.

When the flight crew requested clearance from ATC to 'push and start', they were advised that they were clear

to start but pushback permission was omitted. The flight crew repeated the request for pushback clearance and ATC commented that the operator’s aircraft normally self manoeuvred off that stand. ATC also pointed out that there was no tug vehicle present. The commander sought the opinion of the co-pilot, who confirmed that on the previous occasions he had departed from Stand 50 the aircraft had self manoeuvred. The commander also received confirmation from the ground crewman that this was the normal arrangement. Aware that it would take time to arrange for a tug vehicle to push the aircraft back, he elected to start the engines and taxi off the stand in common with the customary practice.

After the engines were started, the commander cleared the ground crewman to unplug his headset. The ground crewman walked out to the left of the aircraft and

took up a position by the left wingtip of the A320 on Stand 51, in order to provide wing tip guidance. The co-pilot requested clearance to taxi and ATC cleared the aircraft to taxi to the holding point for Runway 27. The commander checked that the wingman was giving the ‘thumbs up’ signal and started to taxi the aircraft, with the intention of manoeuvring it onto Taxiway Q and then Taxiway A. The aircraft was taxied straight ahead for a few metres to gain some speed before the commander introduced a shallow turn to the right, aware that he needed to avoid the light pylon and left wingtip of the aircraft on Stand 51. He stated that he then saw the wingman making the ‘stop’ sign (crossed arms above his head) and applied the brakes. At the same moment he felt G-EZEU’s left wing tip strike the A320’s left wing tip.

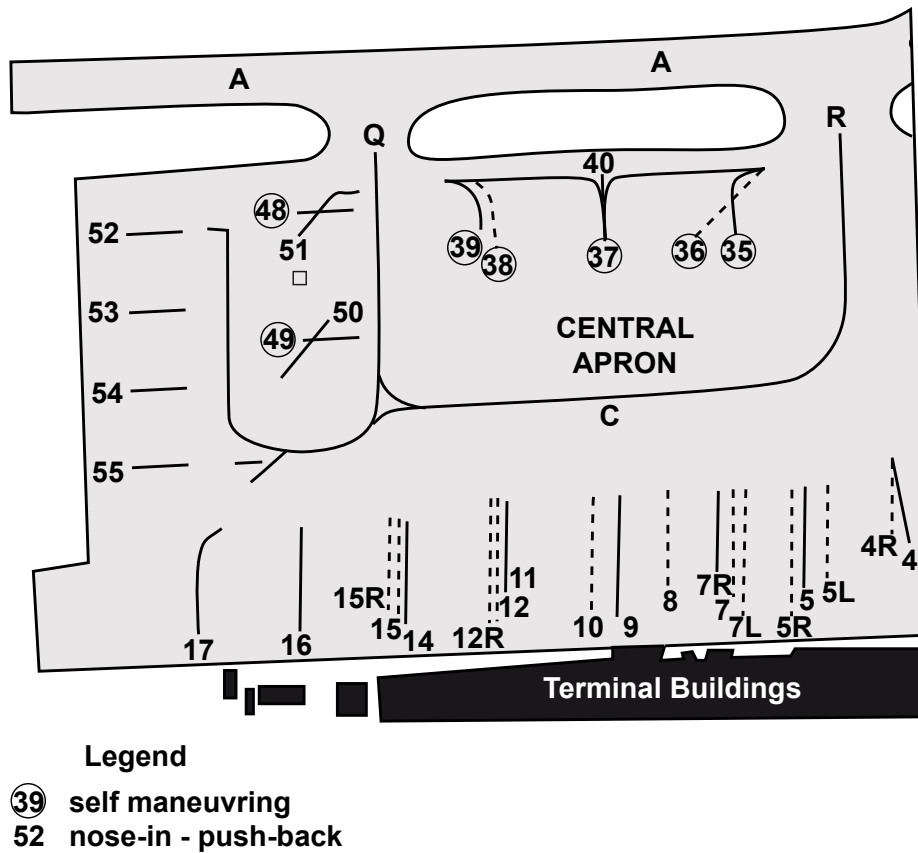


Figure 1

Diagram of stands layout of the central apron at East Midlands Airport at the time of the wingtips collision

The wingman stated that, having taken up his position by the A320's left wing tip, he gave the two thumbs up sign with outstretched arms to indicate wing tip clearance and the aircraft taxied straight ahead off the stand, instead of turning to the right as was usual. Although he expected G-EZEU to turn right, it did not and he realised that its left wing tip was going to contact the left wing tip of the aircraft on Stand 51. The wingman gave the stop sign by crossing his arms above his head but the reflection off the commander's side window prevented him from seeing whether the commander had observed his signal. G-EZEU continued to taxi and the two wing tips made contact, showering the wingman with debris. He recalled that he had given the stop sign when G-EZEU's left wing was abeam the A320's forward left door and that the aircraft stopped when its damaged wing tip was level with the A320's rear left door. Neither the occupants of the aircraft nor the wingman were injured.

After G-EZEU came to a standstill, the commander applied the parking brake. He visually confirmed that there was no sign of any fuel or hydraulic fluid leakage from his left wing and the co-pilot advised ATC of the incident. In the light of the minimal damage, the crew declined the assistance of the airport fire service and asked the handling agent to send an engineer out to the aircraft for a closer inspection. The passengers were reassured and, after an engineer had confirmed that it was safe to continue, G-EZEU was taxied on to Stand 1 via Taxiways Q, A and R.

On arrival at the stand, the crew carried out a normal shutdown and the passengers were disembarked on to coaches. As a precaution, the airport fire service had followed the aircraft to the stand.

Damage to the aircraft

The estimated relative positions of both aircraft at impact is shown in Figure 2. G-EZEU suffered damage to its left wing tip assembly and winglet. The upper section of the winglet had bent aft and a small section of the top of the winglet (approximately 20 cm by 15 cm) had separated and become embedded in the left wing tip leading edge of the A320. The navigation lights in the A320's left wingtip were damaged and the wing lower surface in this area exhibited scrape marks. Neither aircraft sustained any internal structural damage as a result of the impact.

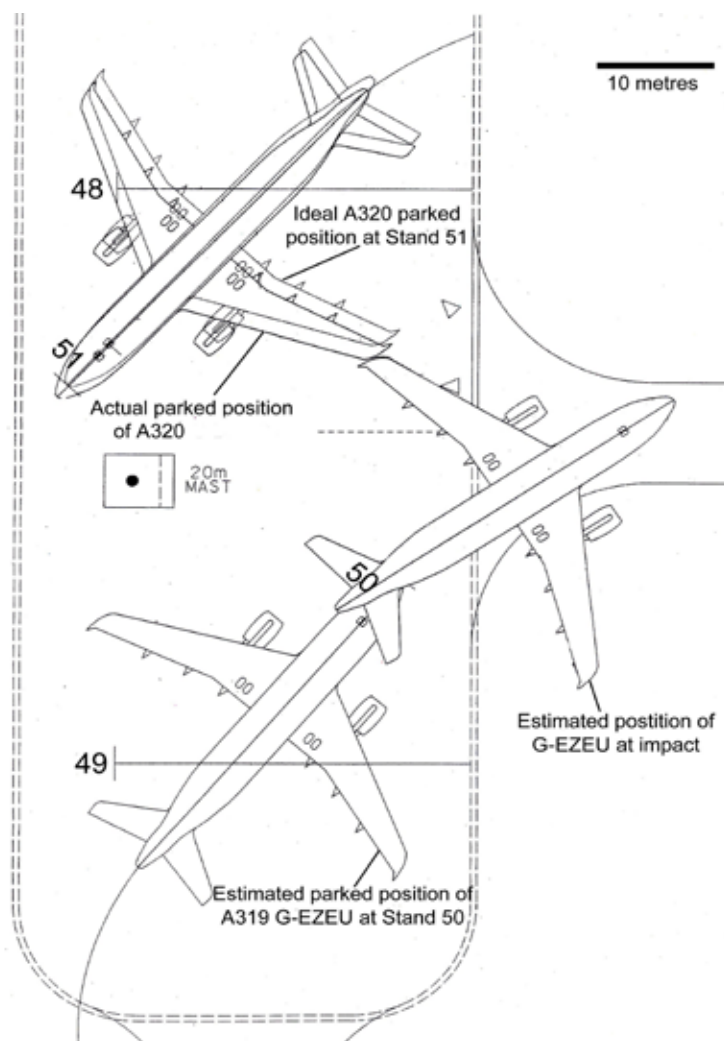


Figure 2

Estimated relative positions of the aircraft at impact

Personnel

The commander was employed by the operator at their Berlin base. He had positioned to Nottingham East Midlands Airport on 22 November to operate out of the airport, temporarily, for the first time. On 23 November, the day before the incident, he had commanded the same scheduled departure to Alicante from Stand 1, a push-back stand. On completion of the return flight back to Nottingham East Midlands, the aircraft parked on Stand 7L.

The co-pilot had joined the company four months earlier in July, to be based at Nottingham East Midlands Airport. He had completed his training by the middle of October and this was his fifth or sixth departure from Stand 50. The three other commanders, with whom he had operated on all his previous departures from that stand, had self manoeuvred the aircraft.

The co-pilot had been based at Nottingham East Midlands Airport with his previous employer but he had always operated their turboprop aircraft from other stands on the central apron. The accident occurred on his first duty following two weeks leave.

The wingman had been employed on ground crew headset duties, which included the wingman's role, for one year. He commented that during training he had been informed that Stand 50 was not a push-back stand.

Procedures

The charts that the operator provided for its flight crews indicated that Stand 50 was a pushback stand. This reflected the procedures contained in the United Kingdom Aeronautical Information Package (UK AIP) and, as a result, there were no taxiway markings leading forward off the stand.

The obstacle clearance dimensions for aerodrome aprons and stands are specified in CAP 168, entitled '*Licensing of Aerodromes*'. It states:

The dimensions of the apron should be such that the minimum clearance between a manoeuvring aircraft and any obstruction is 20% of wingspan.

'For nose-in push-back stands this safety clearance may be reduced to 4.5m where a suitably managed guidance system, acceptable to the CAA, is acceptable.'

The Central Apron at Nottingham East Midlands Airport, including Stand 50, was remarked in March 2003 and within a few months it had become common practice, agreed between the operator and ATC, for the operator's Boeing 737-300 aircraft to self manoeuvre off Stand 50. At the beginning of September 2005, the operator introduced the Airbus A319 to their base at Nottingham East Midlands and the practice of self-manoevring off Stand 50 continued. Having taxied forward off the stand, it was usual for the operator's aircraft to leave the Central Apron via Taxiway C.

The B737-300 has a wingspan of 28.89 metres and 20% of that span equates to a minimum clearance of 5.78 metres. The A319's wingspan is 5.2 metres greater, at 34.09 metres.

JAR OPS 1 places responsibility on the commander by stating:

'for the operation and safety of the aeroplane from the moment the aeroplane is first ready to move for the purpose of taxiing prior to take-off until the moment it finally comes to rest at the end of the flight.'

This responsibility is reflected in the operator's Operations Manual, which also states:

'When departing from the ramp, local procedures for start up and taxi clearance are to be followed.'

Further, under the heading '**Manoeuvring**' it specifies that:

'It is the Commander's and/or the ground engineer's responsibility to ensure that there is adequate clearance when taxiing in the vicinity of obstructions.... If necessary a wing tip watch shall be provided preferably at each wing tip'.

Flight Recorders

The aircraft was fitted with a Solid State Memory Flight Data Recorder (FDR) capable of recording a range of flight parameters into solid state memory¹. The aircraft was also fitted with a Cockpit Voice Recorder (CVR) which recorded crew speech and area microphone inputs into solid state memory, and which provided 120 minutes of combined recordings and area microphone and 30 minutes of separate higher quality recordings. Both recorders were downloaded at the AAIB and data and audio recordings were recovered for the ground-collision accident.

A time-history of the relevant parameters during the ground collision is shown at Figure 3. The data presented at Figure 3 starts one second before the parking brake is released and shows an initial recorded heading of just over 038°M and about 24% N_1 on both engines.

Footnote

¹ Parameters that would have been useful to the investigation but were not recorded included nose wheel steering angle and tiller angle, and distance travelled on the ground. Ground speed was recorded but with a resolution of one knot and a one second sample rate.

Five seconds after the aircraft started to roll forward, the N_1 started to increase on both engines, reaching a maximum of 31% on engine No 1 (left side) and 28% on engine No 2 (right side), three seconds later. As the thrust was increasing, and after approximately five metres of forward movement², the aircraft started a turn to the right; this was consistent with the use of differential thrust. There was no evidence of rudder pedal or brake pedal movement during the turn and nose wheel steering angle and tiller angle were not recorded.

The aircraft continued turning to the right for approximately 12 seconds to a heading of 058°M before colliding with the A320. The rate of change of heading at the point of collision was about 2.8° per second and the ground speed, at most, six knots. The turn to the right immediately slowed, consistent with the left wing being temporarily constrained, and the brakes were applied, bringing the aircraft to a stop eight metres further on. The final heading was recorded at just over 059°M and the aircraft had travelled a total distance of 38 metres.

Analysis

While responsibility for the safe operation of the aircraft lay with the commander, on this occasion he was presented with a set of circumstances which strongly encouraged him to follow an alternative plan to the one he had expected. He had intended to carry out the published procedure and his decision not to do so was influenced by those with whom he would normally liaise when departing from a self manoeuvring stand. Their advice was given greater credibility by virtue of their

Footnote

² The parameter *DISTANCE [calculated]* was calculated by integrating twice the recorded longitudinal acceleration. The first integration generated the parameter *GROUND SPEED [calculated]* which is shown in Figure 3 against the recorded ground speed of lower resolution.

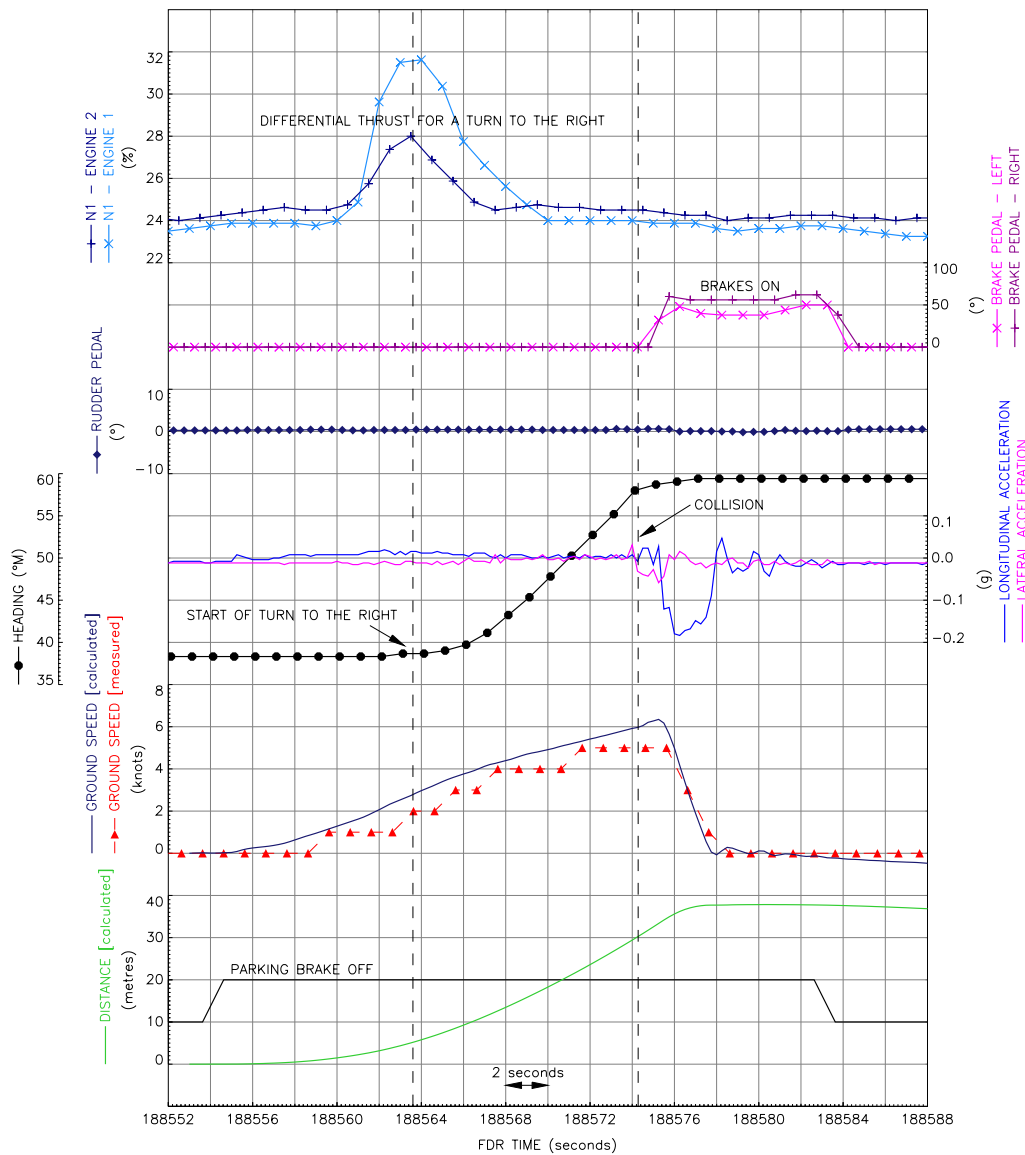


Figure 3
 Salient FDR Parameters
 (Accident to G-EZEU on 24 November 2005)

familiarity with operations at Nottingham East Midlands Airport. By contrast, this was the commander’s first departure from Stand 50 and his second day on temporary loan from his home base in Berlin. In addition, the commercial pressure to depart on time mitigated against waiting for an available push-back tug.

The commander was aware of the nearby obstacles on the left side of his aircraft but was informed by ATC,

the co-pilot and the ground crewman that it was normal to self manoeuvre off Stand 50. However, he was not advised that it was also customary to taxi to the right, on to Taxiway C, as opposed to turning left onto Taxiway Q, as he intended. In addition, the historical precedent was based on the initial operation of the B737-300, whose wingspan is 5.2 metres less than the A319-100. This difference in wingspan further eroded the A319’s wingtip clearance from obstacles

when self manoeuvring off Stand 50; a clearance that is provided for in CAP 168 when the approved (pushback) procedure is followed.

Despite the wingman giving the stop sign before the two aircraft left wing tips came into contact, the commander did not see the signal in time to stop G-EZEU and prevent the collision. A possible reason for this is that the commander was lulled into a false sense of safety because the non-standard procedure that was being advocated had become the norm.

After this incident ATC ensured that all aircraft departing from Stand 50 were pushed back before being cleared to taxi, thereby following the published procedure for that Stand and maintaining the approved obstacle clearance criteria. The operator issued a notice to crews (NTC) reminding them of the correct published procedure for the Stand. Subsequently, that part of the airport's manoeuvring area was redesigned, as part of an unrelated plan, and Stand 50 no longer exists.