

ACCIDENT

Aircraft Type and Registration:	Airbus A300B4-622R(F), D-AEAP
No & Type of Engines:	2 Pratt & Whitney PW4158 turbofan engines
Year of Manufacture:	1994 (Serial no: 724)
Date & Time (UTC):	14 April 2012 at 1753 hrs
Location:	East Midlands Airport, Derby
Type of Flight:	Commercial Air Transport (Cargo)
Persons on Board:	Crew - 3 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Damage to nose landing gear and minor damage to a tug
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	53 years
Commander's Flying Experience:	5,878 hours (of which 111 were on type) Last 90 days - 79 hours Last 28 days - 20 hours
Information Source:	AAIB Field Investigation

Synopsis

After disconnection from the pushback tug, the aircraft taxied forwards into the tug before the ground crew had signalled that they and the tug were clear. There were no injuries to the two ground crew or the three aircrew but there was some damage to the aircraft and the tug.

History of the flight

The aircraft was on a scheduled cargo flight, departing at 1745 hrs from East Midlands Airport to Paris Charles De Gaulle Airport. It was being conducted as a training flight, with a captain-under-training in the left seat, acting as Pilot Flying (PF), and a training captain in the right seat, who was the commander of the aircraft. There was also a loadmaster onboard who was sitting in the cabin.

The aircraft was parked on Stand 102 on the West Apron at East Midlands Airport, a dedicated cargo area (see Figure 1). At 1744 hrs, when the aircraft was ready to depart the commander made a radio call to ATC to request start and pushback clearance. The PF completed the Before Start scan and called for the Before Start checklist. When start clearance had been obtained, he contacted the ground crew headset operator on the flight interphone and advised him that the aircraft was ready to push.

During the pushback, which commenced at 1747 hrs, the flight crew started No 2 engine. When the pushback was complete, with the aircraft facing west, the headset operator contacted the flight crew and the park brake was set. The headset operator then stood by while No 1

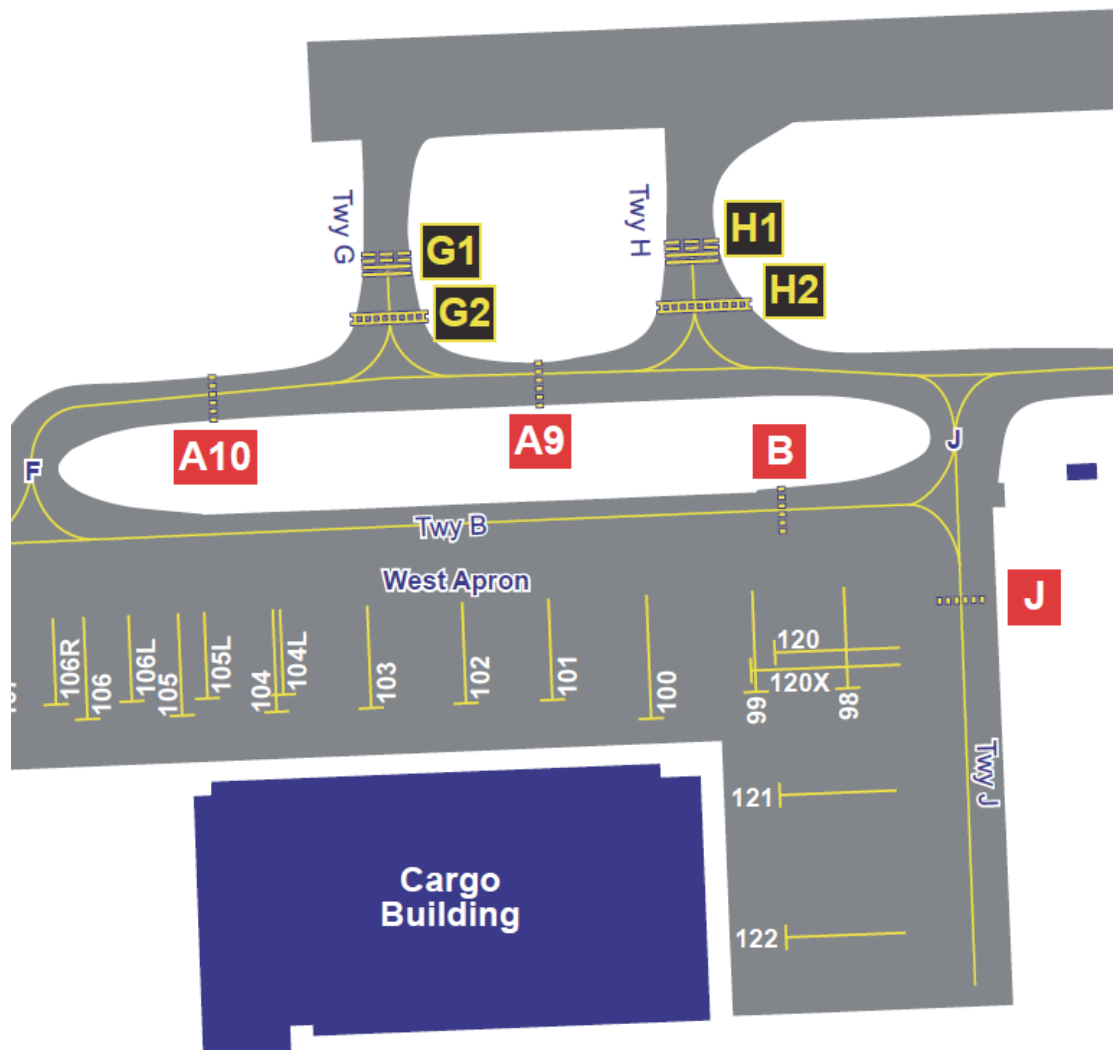


Figure 1

Cargo ramp area at East Midlands Airport

engine was started. When both engines were running, PF told the headset operator to disconnect the tug and that he would look for his hand signals on the left side of the aircraft. The headset operator went to remove the pin from the tug end of the towbar but was unable to get the pin out of the towing eye, so he sought the assistance of the driver. Between them they withdrew the pin and disconnected the towbar from the tug. The headset operator then disconnected the towbar from the aircraft, turned his back on the aircraft and started to push the towbar to an area forward of the aircraft, to reconnect it to the rear of the tug. At the same time,

the tug driver reversed the tug away from the aircraft, before driving forward to pick up the towbar.

Meanwhile, the PF completed the After Start scan, with some intervention from the PNF, and called for the After Start checklist. The checklist was completed and the PF then asked the PNF to request taxi clearance from ATC. At 1753 hrs, the aircraft was cleared to taxi to the Golf 1 holding point for Runway 09, which was near the aircraft and in sight of the flight crew (see Figure 1). The PF switched on the taxi light and increased power to start taxiing.

As the headset operator was moving the towbar to reconnect it to the tug, he described “feeling” the aircraft above him. He pushed himself backwards off the towbar, pushing it clear of the nosewheels, and watched the aircraft pass in front of him, strike the tug and stop. He then called the flight crew on the interphone to inform them that he was still connected.

The tug driver had begun to drive forward to pick up the towbar, when he realised the aircraft was moving. He attempted to drive clear but was unable to do so and the aircraft struck the rear left side of the tug, pushing it a short distance. As the tug and aircraft both stopped moving, the driver exited the vehicle and quickly moved to a safe area.

The aircraft had taxied forward a total of 8 metres, before stopping. The aircraft engines were shut down a minute later, at 1754 hrs, following instructions from the headset operator. The flight crew advised ATC that they had a problem and that they could not move off the taxiway. ATC offered further assistance, which was declined. At 1801 hrs, the AFRS was notified of a ground incident and attended the scene. At 1818 hrs, ATC upgraded the incident to an aircraft accident.

Damage to the aircraft and tug

The aircraft’s nose landing gear drag strut was damaged and one of the drag strut attachment pins had sheared. There was also damage to the left steering actuator, on the nose landing gear leg, and damage to the nose landing gear doors. Both nosewheels were replaced.

There was some damage to the bodywork on the tug which was subsequently repaired.

Ground personnel and equipment

The headset operator was experienced in a wide variety of airside operations but was relatively new to the job of headset operator. He had completed his training for the role a few days prior to the accident and this was his fourth shift as a headset operator.

When the aircraft’s engines are started during pushback, the usual procedure is for the headset operator to walk alongside the aircraft while monitoring the starts. When the aircraft is in position on the taxiway the headset operator asks the flight crew to set the parking brake. He then waits until he receives a message from the flight crew that both engines are started and he is cleared to disconnect. He disconnects the towbar, first from the tug and then from the aircraft. Once disconnected, the tug reverses and then drives forward to the side of the aircraft, to allow the towbar to be re-attached to the rear of the tug by the headset operator. When the towbar is re-attached, the tug is driven clear of the aircraft to a position in full view of the flight crew. The headset operator then disconnects his headset from the aircraft and walks to the side of the aircraft, to a position from which he can signal to the flight crew that the ground equipment and ground crew are clear.

Recorded information

The aircraft’s flight data recorder (FDR) and cockpit voice recorder (CVR) were removed from the aircraft and downloaded at the AAIB. A closed-circuit television (CCTV) camera recording of the pushback was also available. This captured most of the pushback, all the tug movements, the moment of the collision and the subsequent ramp activity.

The FDR recordings of the engine EPR and thrust lever angle parameters were only sampled every four seconds. Also, there was no requirement to record parameters

associated with the use of aircraft's brakes. However, the recording of the longitudinal acceleration enabled the calculation of the speed of the aircraft at the point of collision (2.4 m/s = 4.7 kt) and the distance travelled (8 m) (see Figure 2).

Tug information

The tug was 6 metres long, 2.5 metres wide and 1.8 metres high. It was fitted with an orange high visibility light which was on at the time of the collision. Its mass was 30 tonnes.

Aircraft information

The flight interphone system is selected on the radio panel and when selected all parties can hear the communications. Thus the headset operator could hear all the communications made between the pilots as well as those addressed to him.

Visibility from flight deck

The forward and downward visible segment from the flight deck to the ground is restricted by the aircraft

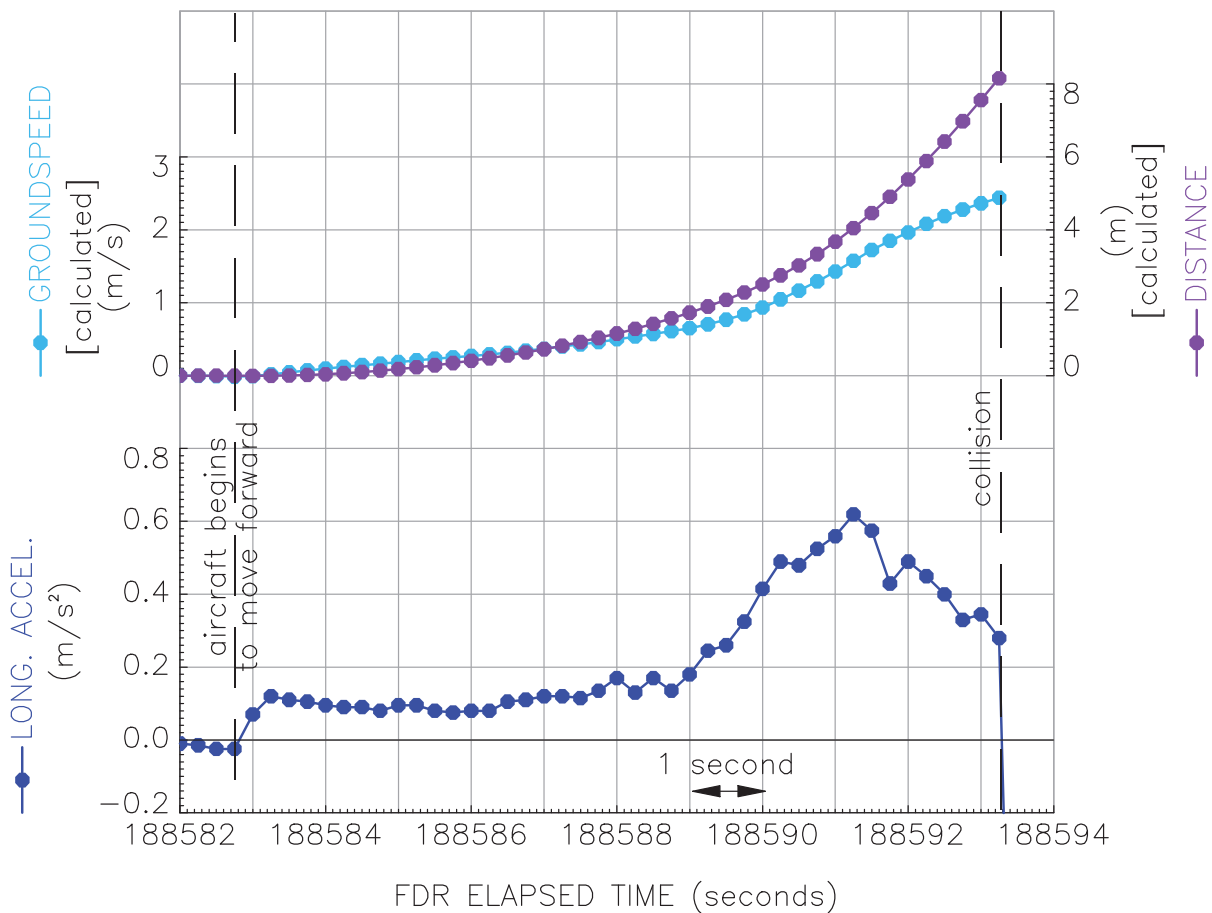


Figure 2
FDR derived groundspeed and distance

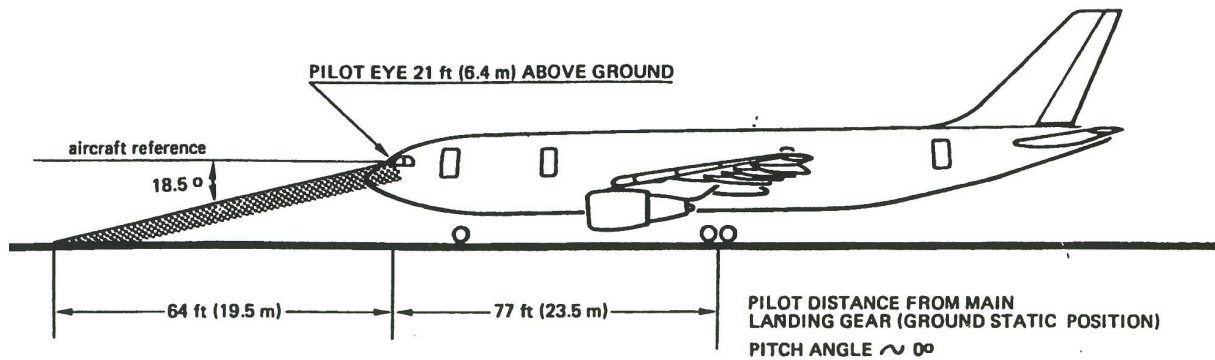


Figure 3

Field of view from pilot's seat

structure. With the pilot's seat position adjusted for flight, a 1.8 m high object (the height of the tug) becomes visible when approximately 14 m in front of the pilot.

Organisational and management information

The operations manual contained, as the final item of the After Start procedure and before the After Start checklist, a check for a hand signal from the ground crew on one or other side of the aircraft. The After Start checklist did not contain an item to check that the hand signal had been received.

There are a variety of Standard Operating Procedures (SOP) that have been developed by operators in order to prevent aircraft moving before ground equipment and personnel are clear. For example, some operators do not allow the After Start checklist to be read until both pilots have seen the hand signal, some include 'ground crew clear' as an item on the after start checklist and some do not allow a call to be made to ATC for taxi clearance until the ground crew's hand signal has been seen.

Other information

The field of view from the flight deck of a large aircraft is very restricted and some aircraft are equipped with under body cameras to increase the flight crew's situational awareness.

Often, pushback tugs are fitted with a rotating light to increase their visibility. However, this is mainly effective at night. Some tugs are fitted with a flag on an extended aerial, above the cab, to increase their conspicuity to pilots in daylight conditions.

Discussion

The incident occurred in daylight and clear weather conditions on a dry ramp surface. The pushback proceeded without incident until the headset operator was unable to withdraw the towbar pin from the tug. With the assistance of the driver, it was then removed but the process of disconnecting the tug took longer than usual.

The PF advised the headset operator that he would expect to see him on the left side of the aircraft, for hand signals. Once both the engines had been started, the PF carried out the After Start scan, during which he was corrected in some actions by the PNF. This took a little extra time and may have caused a distraction, possibly resulting in the omission of the action of waving off the headset operator. After completing the scan, the PF called for the After Start checklist and, immediately afterwards, for clearance to taxi, omitting the check for a hand signal from the ground crew at the side of the aircraft. Analysis of the CCTV, recorded flight data and the field of view

from the flight deck indicated that it is likely that the tug and ground crew were not visible to the pilots when the aircraft started to taxi.

Ground personnel carrying out tasks close to an aircraft, together with any equipment, may well be out of sight of the flight deck. The safe completion of the pushback procedure relies on the flight crew being certain that all is clear before starting to taxi. This is achieved by the means of SOPs for flight and ground crews. On this occasion, the final safety element relied on the flight

crew observing a hand signal before starting to taxi. While there may be equipment available that increases the area observable from the flight deck, the operation is dependent upon an operator's SOPs being robust.

Safety action

The operator has reviewed its procedures since the event. A revised After Start checklist has been introduced which includes '*HAND SIGNAL RECEIVED*' as the final check.