

ACCIDENT

Aircraft Type and Registration:	Boeing 777-236, G-ZZZC
No & Type of Engines:	2 GE 90-76B turbofan engines
Year of Manufacture:	1995
Date & Time (UTC):	10 January 2006 at 0840 hrs
Location:	London (Heathrow) Airport
Type of Flight:	Public Transport (Passenger)
Persons on Board:	Crew - 14 Passengers - 106
Injuries:	Crew - None Passengers - None
Nature of Damage:	Minor damage to left wing tip
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	39 years
Commander's Flying Experience:	8,600 hours (of which 3,600 were on type) Last 90 days - 150 hours Last 28 days - 78 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and a detailed incident report from the aircraft operator

Synopsis

During the pushback from stand, the aircraft's left wing tip struck the right winglet of a Boeing 747-400 which was parked on the adjacent stand. The location of the stand necessitated a non-standard pushback procedure which potentially reduced clearance with aircraft on the adjacent stand, so additional staff in the form of wing / tail observers were required. During the pushback, ramp equipment at the edge of the stand interfered with the activities of the left wing tip observer who was distracted from his prime task of monitoring wing tip clearance. Although he signalled the driver to stop the pushback, there was insufficient time for the driver to stop his aircraft before it collided with the parked

Boeing 747-400. A report by the aircraft operator made nine internal safety recommendations.

Description of the accident

G-ZZZC had been prepared for a departure from Stand 422 at Heathrow Airport's Terminal 4. The stand was situated at the head of the 'Victor cul-de-sac', which necessitated a pushback onto the taxiway centreline. The adjacent stand (Stand 423) was occupied by a company Boeing 747-400, which was correctly positioned on the stand. It was daylight, the visibility was good and the apron surfaces were dry.

The pushback team would normally consist of four members; the towbarless tractor (TBL) driver, the headset operator and two wing / tail observers. However, on this occasion only one observer had been allocated, due to staff shortages. The proximity of the head of the 'cul-de-sac' necessitated a modified pushback procedure. This entailed turning the aircraft tail to the right initially, as viewed by the TBL driver, then pushing the aircraft back to the rear of Stand 423 until there was sufficient room to reverse the turn. The tail was then turned to the left as the aircraft was

pushed back onto the taxiway centreline in readiness for taxiing out of the 'cul-de-sac' (Figure 1). The specific duties of the observers were to ensure safe clearance of the left wing tip during the initial pushback, and then to ensure clearance of the tail from the blast screen at the 'cul-de-sac' head during the latter stages of the manoeuvre. Any hazard was required to be communicated directly to the TBL driver by the use of approved hand signals, and this requirement meant that the observers were to remain in direct sight of the driver at all times during the pushback.

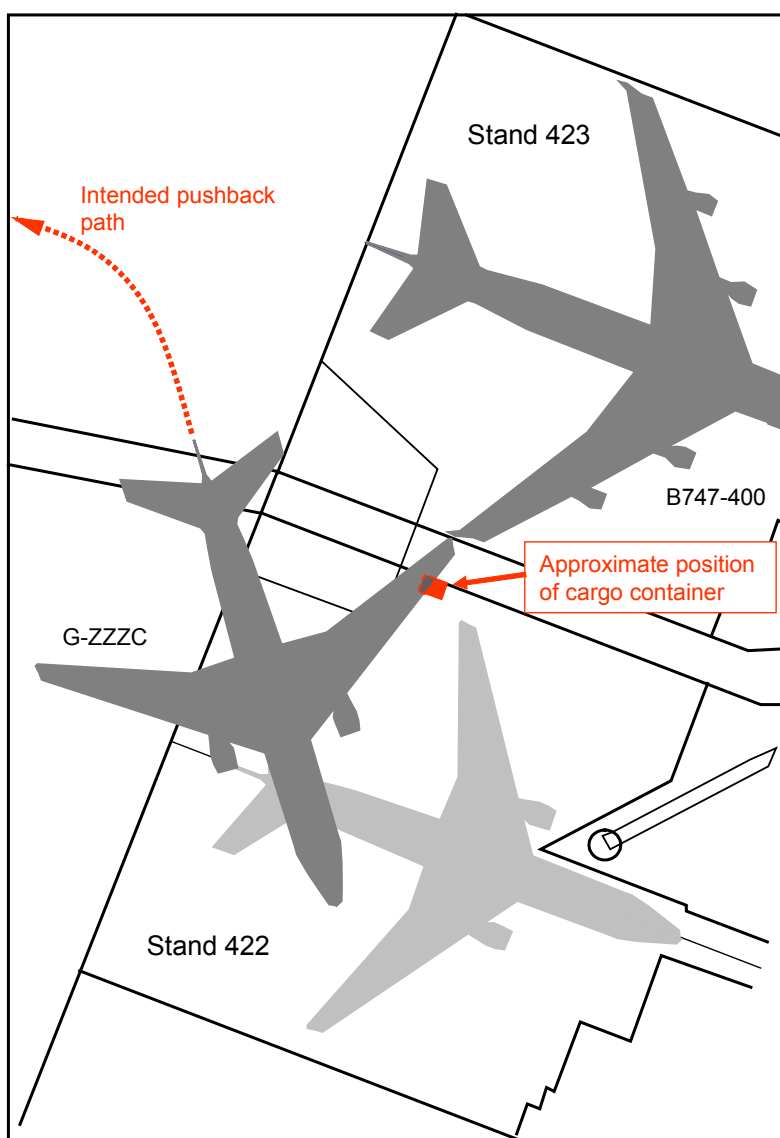


Figure 1

Aircraft positions at point of collision

It was common practice for aircraft cargo / baggage containers and their dollies to be parked at the edge of the stand areas and in the clearway areas between stands. On this occasion, four container dollies and one cargo container on its dolly were parked on the edge of Stand 422. The TBL driver and the headset operator had discussed the location of the container and dollies, and had agreed they did not present a hazard to the pushback manoeuvre.

When ATC clearance for the pushback was received by the flight crew, only the TBL driver and headset operator were present, so there was a short delay to the departure before the third team member arrived. As he did so, he parked his vehicle in the interstand clearway area, made his way directly to an appropriate position to observe the left wing tip for the commencement of pushback and gave a 'safe' hand signal to the TBL driver. There was no discussion between the third team member and the driver or headset operator regarding the container and dollies. The driver then commenced pushback, turning the aircraft so that it could be pushed back in a straight line behind the adjacent Boeing 747-400. The driver later considered that he might have oversteered the initial turn, but was conscious that the wing observer would warn him if there was insufficient wing tip clearance.

As the pushback progressed and the wing of G-ZZZC approached the Boeing 747-400, the wing observer found himself behind the container and may have been momentarily out of the driver's sight. As the wing observer moved around the container he continued to indicate a safe clearance by holding his arms out horizontally but shortly afterwards quickly changed the signal to an arms crossed 'stop' signal and shouted to the TBL driver. The driver saw the signal and stopped the pushback, but not before the left wing tip had struck the right winglet of the parked aircraft.

Damage to aircraft

The Boeing 747-400 right winglet was punctured by G-ZZZC's left wing tip, which suffered damage to three static discharge wicks and the navigation light assembly. Both aircraft were taken out of service for repairs.

Personnel information

All three members of the push back team were correctly trained and experienced in their respective tasks. Additionally, both the TBL driver and the wing observer were trained and experienced in each other's position as well as that of headset operator. All team members were within their company's working hours limitations and were fit for their duties. Both the driver and wing observer had received specific training with regards to operations from Stand 422.

Discussion

The overall plan for the pushback was in accordance with the company procedures for Stand 422, though these required that two observers be allocated to the manoeuvre. This requirement had been introduced after a similar accident in 2002.

The TBL driver had initially over-steered to the extent that the subsequent straight pushback took the aircraft on a collision course with the Boeing 747-400. Since this was a recognised risk with pushbacks from Stand 422, the driver was dependent upon the presence and effectiveness of the wing tip observer who would be expected to signal if clearance was inadequate. Prior to pushback, the headset operator had drawn the driver's attention to the container and dollies, and together they had agreed that these did not present a hazard to the pushback. Although the items may have presented no physical hazard to the aircraft, they were situated in the general area that the wing observer would be required

to walk across, at a time when his attention would be focussed on the wing tip. As such they did represent a hazard to the overall operation.

The wing tip observer, who had not been involved in the earlier discussion about the container, arrived very shortly before the pushback. In fact, it was only his arrival at the stand which was delaying the departure. It is unlikely that he had time to consider fully the significance of the container and dolleys, or appreciate that they could, at some point, impede him and obstruct his direct line of vision to the driver. However, once the pushback was under way he would have had the option of signalling a temporary stop to the driver whilst he negotiated the obstacles and re-positioned himself. It was as, or shortly after, the wing tip observer negotiated the obstacles that he became aware of the lack of clearance and signalled the TBL driver to stop. The signal was not given, or not noticed, in sufficient time for the driver to bring the tractor and aircraft to a stop.

It is likely that the presence of the container and dolleys in his path distracted the wing tip observer at a critical time from his primary task of monitoring wing tip clearance, and may have prevented the driver from seeing the 'stop' signal straight away.

Safety actions

In its report into the accident, the operator made nine internal safety recommendations with the aim of preventing a similar accident from happening again. All of the recommendations were accepted by their addressees.

Among the areas addressed by the recommendations were:

- a. the provision of visual guidance to assist drivers with the initial turn from Stand 422,
- b. adherence to the requirements for minimum numbers of team members for pushback from certain stands, including Stand 422,
- c. the need for staff to arrive on stand with time to plan and execute their allocated tasks adequately, including the recording of times when staff are allocated duties,
- d. the need for ramp equipment to be parked in designated safe areas, with particular emphasis on Stand 422 and other stands where wing observers are required.