

SERIOUS INCIDENT

Aircraft Type and Registration:	Boeing 747-436, G-CIVU	
No & Type of Engines:	4 Rolls-Royce RB211-524G2-T-19 turbofan engines	
Year of Manufacture:	1998 (Serial no: 25810)	
Date & Time (UTC):	20 December 2019 at 1543 hrs	
Location:	London Heathrow Airport	
Type of Flight:	Commercial Air Transport (Passenger)	
Persons on Board:	Crew - 17	Passengers - 328
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to the No 1 engine cowl and to the rear of a fuel transfer vehicle	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	60 years	
Commander's Flying Experience:	28,400 hours (of which 14,800 were on type) Last 90 days - 201 hours Last 28 days - 56 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot, reports submitted by the operator, the refuelling company and the airport authority, and further enquiries by the AAIB	

Synopsis

A Boeing 747 collided with a fuel transfer vehicle (FTV) as it was approaching its final parking position on stand at Heathrow. The FTV had remained on stand after refuelling the previous aircraft. Neither the flight crew nor the ground staff responsible for the arrival saw the FTV before the collision.

The operator and airport authority have taken safety action to prevent reoccurrence.

History of the flight

G-CIVU landed on Runway 27R at London Heathrow at 1537 hrs and taxied towards Stand 331 on Terminal 3. The stand was occupied by an Airbus 320, operated by the same company, which was running behind schedule. The Airbus commenced push back at 1539 hrs, pushing back far enough to allow the 747 onto the stand. It was dark and raining heavily.

The commander of the Boeing 747 saw the stand guidance system illuminate with the correct aircraft type and started to taxi onto stand. He reported that his initial focus was to the right of the aircraft to ensure its wingtip was clear of the Airbus. He did not see any

vehicles on the stand although he recalled it was difficult to see the white stand markings due to the standing water, heavy rain and the glare of the terminal lights. The aircraft continued onto stand, parked in the normal position and shutdown. After the passengers had disembarked the flight crew were informed that the No 1 engine had collided with a fuel transfer vehicle (FTV) which had been parked on the stand. The FTV driver had been in the cab but had not been injured.

The stand guidance system had been switched on by one of the operator's ground staff who was responsible for supervising the arrival. The supervisor was required to check that the stand was clear of obstructions prior to switching on the guidance system. On this occasion two supervisors had been assigned to the arrival. On arrival at the stand one of the supervisors walked out along the stand centreline as the Airbus pushed back, to check for FOD¹. He had his hood up due to the rain. As he reached the middle of the stand he turned to the left (away from the FTV) and proceeded to the jetty in preparation from the arrival of the 747. He reported that his intention was to check for FOD; he did not confirm that the stand was clear and did not see the FTV. On arrival the other supervisor went to the stand guidance control panel. He saw his colleague walking the centreline and assumed he had checked the stand was clear so switched on the guidance. He then waited by the stand guidance emergency stop button. However, due to the position of the jetty, ground equipment and parked vehicles it was not possible to see the right side of the stand (where the FTV was parked) from this position. He did not see the FTV and was not aware of the collision, so did not activate the emergency stop button.

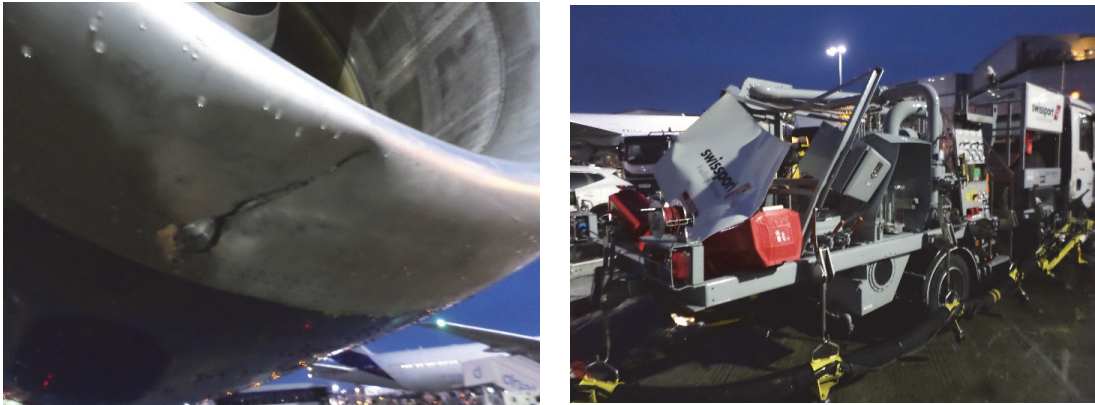
The driver of the FTV had been assigned to refuel the Airbus. He reported that having refuelled the Airbus he moved his vehicle forward a few meters but remained on the stand to complete his paperwork and to await confirmation that fuelling was complete from the flight crew. He reported that his tablet computer had frozen and he was trying to fix it when the collision occurred. The vehicle was positioned facing the terminal and the driver was wearing ear defenders so was not aware of the 747 approaching the stand. When the 747's engine collided with the back of the FTV, the vehicle was pushed forward. The driver immediately drove forward a few meters to move away from the aircraft then stopped to report the accident.

Aircraft and vehicle damage

Damage to the aircraft and FTV are shown in Figure 1. Both were repaired and returned to service.

Footnote

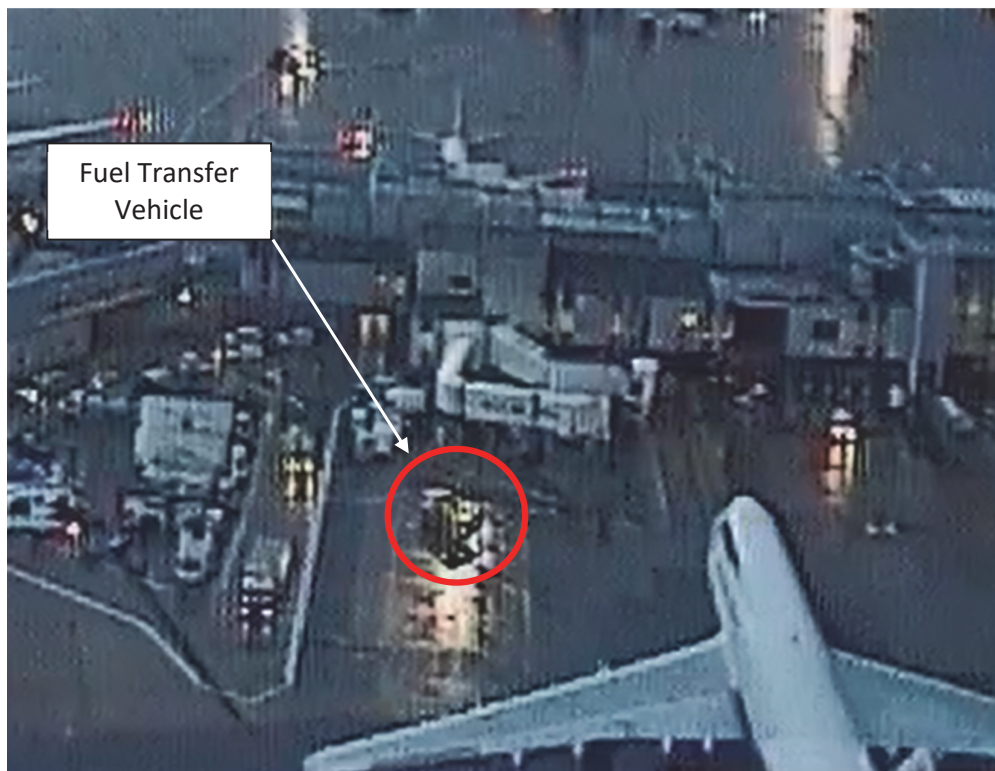
¹ FOD – Foreign Object Debris.

**Figure 1**

Damage to G-CIVU No 1 engine cowl and rear of the Fuel Transfer Vehicle

Recorded information

CCTV showed the Airbus commence push back at 1539 hrs. The FTV can be seen parked by the Airbus's left wingtip. The supervisor can be seen walking the centreline behind the pushback tug. The collision occurred at 1543 hrs. Figure 2 shows an image from the CCTV just prior to the collision.

**Figure 2**

CCTV image showing the B747 approaching the stand and the parked FTV

Heathrow Stand 331

Figure 3 shows an aerial view of Stand 331 at Heathrow with a Boeing 747 superimposed on the image. The approximate position of the FTV when the collision occurred is shown.

Figure 4 is a photograph taken from the emergency stop button position at the head of the stand looking towards the right where the FTV was parked. The photograph shows the obscured view in that direction.

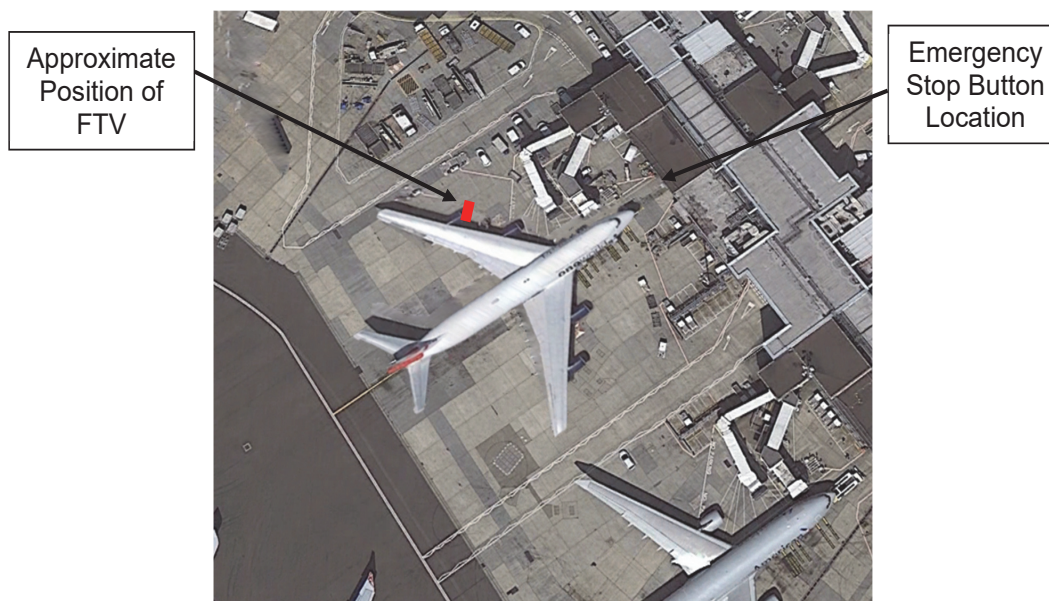


Figure 3

Aerial view of Stand 331 with B747 superimposed



Figure 4

View to the right of the stand from Emergency Stop Button Location

Heathrow procedures

The airport authority publish the following Operational Safety Instruction describing the required procedure for aircraft arrivals on stand².

‘A member of the airline/handling agent staff will be nominated to carry out a safety check of the stand before the arrival of the aircraft. This safety check will include the following;

- a) Ensure that the stand is unobstructed by vehicles or equipment.*
- b) Ensure that the airbridge(s) is retracted and correctly parked.*
- c) Carry out a full Foreign Object Debris check.*
- d) Check the list of aircraft permitted to use the stand, by checking the notice displayed adjacent to the Visual Docking Guidance System activation switches.*

These actions should form part of the Airline or Handling Agents aircraft turnaround plan.’

Operator’s investigation

The operator’s investigation into this incident found that ground handling procedures had undergone significant change in recent years. The procedures referred to the need to check the stand for FOD but did not make specific reference to vehicles parked out of position. The procedures were not written for occasions when two supervisors were assigned to an arrival and did not account for joint responsibilities and communications. The investigation also found that two different versions of the procedure were available in different locations on its computer system.

The investigation found that an instruction had been published on 7 January 2019 stating that a routine centreline walk was not required for every arrival and that a visual check for FOD could be completed from the head of the stand. This change had not been incorporated into the standard operation procedures.

Refuelling process

Having refuelled the Airbus the refueller reported that he was trying to complete the electronic paperwork on his tablet when the accident occurred. The tablet sends refuelling information directly to the flight crew. The flight crew can then accept the fuel electronically. The refueler was also assigned his next task via the tablet. It was reported that the internet signal is poor around some stands at Terminal 3 and this can cause problems with the tablets.

The operator provided a copy of the log for the refuelling process. The times recorded are show in Table 1.

Footnote

- ² Operation Safety Instruction available at <https://www.heathrow.com/company/team-heathrow/airside/useful-publications/operational-safety-instructions> [accessed 27 January 2020].

TIME	ACTION
14:49	Operator started fuelling
15:09	Operator completed fuelling
15:09	'Fuelling complete' message sent to the pilot
15:09	Pilot accepted the final fuel figure
15:36	Operator completed the service order
15:43	Fuel order delay reason edited

Table 1

Airbus refuelling timings from the electronic log

Analysis

As the Boeing 747 approached its final parking position it collided with the FTV which had remained on the stand after refuelling the previous aircraft.

The flight crew did not see the FTV. It is likely that this was due to a combination of the dark conditions, the heavy rain and the glare from the terminal lights. The commander reported that it was hard to see the stand markings and that his attention was initially on the right side of the aircraft to ensure clearance from the Airbus. The stand guidance system had been switched on suggesting to the flight crew that the stand was clear.

The stand guidance system had been switched on by one for the operator's ground staff. Airport procedures required ground staff to ensure the stand is clear prior to switching on the guidance. However, on this occasion two supervisors were assigned to the arrival. The investigation found that the operator's procedures did not make it clear who was responsible for ensuring the stand was clear in this situation. The operator had published instructions stating that the ground staff could check the stand from the head of the stand, but on this stand it is not possible to see all of it from this position. The operator is taking the following safety action to resolve these issues:

The operator will conduct an independent review of the available standard operating procedures and associated documentation to ensure they are;

- clear and workable,
- the accountabilities and responsibilities are detailed and,
- there is a single source of information.

The ground staff remained near the emergency stop button during the arrival, but they could not see the FTV from this position. The jetty structure and parked vehicles obscured part of the stand from the stop button position. The operator will take the following safety action:

The operator will establish a procedure to ensure all visually restricted stands have a 'mid-man', in the line of sight, to act as an additional pair of eyes for the colleague manning the emergency stop button at the head of the stand.

The airport authority is taking the following safety action:

The airport authority has changed the parking arrangement on Stand 331 to prevent vehicles obscuring the view from the head of stand.

The airport authority is undertaking a review of the emergency stop button locations on all stands.

The FTV had remained on the stand following the refuelling of the previous aircraft. The fuelling log showed that the refuelling was completed and accepted at 1509 hrs but the vehicle was still on the stand at 1543 hrs when the collision occurred. The refueller reported that he was trying to complete his electronic paperwork but his tablet had frozen. He was trying to reset the tablet when the accident occurred. He was wearing ear defenders and facing away from the stand so did not hear or see the approaching aircraft.

Conclusion

The collision occurred because neither the flight crew nor the ground staff assigned to the arrival saw the vehicle on the stand. The adverse weather conditions are likely to have been a significant factor.