No: 7/92 **Ref: EW/C92/4/7** **Category: 4**

Aircraft Type and Registration:	BAe ATP, G-BMYM	
No & Type of Engines:	2 Pratt and Whitney 126 turboprop engines	
Year of Manufacture:	1986	
Date & Time (UTC):	18 April at 0640 hrs	
Location:	London Heathrow Airport	
Type of Flight:	Public Transport	
Persons on Board:	Crew - 4	Passengers - 12
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Abrasions and minor dent to tip of left wing	
Commander's Licence:	Airline Transport Pilot's Licence (A)	
Commander's Age:	28 years	
Commander's Flying Experience:	3361 hours (of which 169 were on type) Last 90 days - 141 hours Last 28 days - 49 hours	
Information Source:	AAIB Field Investigation	

History of the flight

The aircraft arrived at Heathrow from East Midlands Airport and was allocated to stand D54. This stand is adjacent to the inner taxiway and remote from Terminal One. Arriving passengers have to disembark down steps and cross the stand on foot to a coach for transfer to the terminal. There is a service road on the north and east sides of D54 and a stand on its west side which was occupied by a large jet aircraft.

At the stand awaiting arrival of the aircraft were several eye-witnesses to the accident including a marshaller and a coach driver. The coach was parked on the west side of the stand within the inter-stand clear area which was delineated by white paint lines. As the aircraft turned left into the stand the marshaller beckoned it forward and gave suitable directions to keep it aligned with the yellow line marking the centreline of the stand. At much the same time, the commander, the marshaller and the bus driver all sensed that the aircraft's left wing tip was too close to the bus. The commander stopped the aircraft, the marshaller signalled to him to stop and the bus driver signalled to the

marshaller that he should move the bus. From a position mid-way between the bus and the flight deck, the marshaller signalled the bus driver to move forward. As the bus moved forward through about 20 feet, a roof mounted pod at the rear of the bus grazed the underside of the aircraft's wingtip fairing.

Examination of the stand

The aircraft was aligned with the centreline of the stand and witnesses all agreed that the bus had remained within the inter-stand clear area throughout the sequence of events. Critical dimensions of the stand were measured. The distance from the yellow centreline to the western edge of the aircraft's protected area varied from: 16.87 m at the entrance to the stand; 14.48 m abeam the mainwheels; and 12.70 m abeam the nosewheel. The wingtip of the ATP is 15.31 m from the fuselage centreline. Abeam the aircraft's mainwheels there was an angular change of direction of approximately 10° to the right along the white line which marked the the edge of white inter-stand clear area. This line was on the bus driver's right. It is probable that, when pulling forward, the act of following the direction of this line caused the bus to move slightly to the right and thus bring the pod into contact with the wing tip which was, prior to impact, in front of the bus pod.

Clearly stand D54 was too small for the ATP and the question arose as to how the aircraft had been allocated to an incompatible stand. Moreover, there was evidence that ATPs had been parked on this stand on several previous occasions.

Stand Allocation

Stands for Terminal One (T1) are allocated initially by staff in the terminal's operations centre. The staff are British Airways employees who allocate stands to all aircraft using T1 on behalf of Heathrow Airport Limited (HAL). Allocations are then confirmed or amended by staff in the HAL operations centre who are British Airports Authority employees. The staff in both control centres use a variety of computer driven displays for traffic management. One computer system called BASIS (British Airports Staff Information System) was installed in both the T1 and HAL control centres and also in the Heathrow traffic control office of British Midland Airways. The system is owned and managed by HAL and neither the British Airways nor the British Midland staff have facilities to input data.

Two other systems, FICO and FIND were installed in the T1 and HAL control rooms but not in the British Midland office. FICO and FIND are owned and managed by British Airways. FICO is used mainly for disseminating flight information (including the British Midland schedules) whereas FIND is

used as a stand allocation and activity aid for airport staff. Staff in the HAL control centre do not have the facility to amend data held in the FICO and FIND systems.

Interactions between these three computer systems are complex but the aircraft type and registration held in FIND reflects the data held in FICO at the time the data is transferred. Data transfer from FICO to FIND is normally transacted once a day during the early hours of the morning. Amendments to operator's intended schedules inevitably have to made after this data transfer. British Midland's amendments have to be input into BASIS, FICO and FIND by staff in the HAL and T1 control centres because the airline has no input keyboards for any of these systems.

The evening before the incident, British Midland produced their intended schedule which was copied on paper to several interested parties including the T1 and HAL operations centres. The BD221 service had been flown by the same ATP aircraft G-BMYM for the preceding 10 days and there was no requirement to change the aircraft type annotated against the service. BASIS and FICO printouts showed that both these systems displayed the correct registration and aircraft type for BD 221 on the morning of the accident. Moreover, when data was transferred from FICO to FIND at approximately 0200 hrs, the BD221 service was annotated as being an ATP in FIND. However, at some time after 0200 hrs the FIND database was manually altered to show BD221 as a Dash 7 service.

At 0526 hours on the morning of the incident, staff in the British Midland traffic office sent a telex message to the T1 control room asking for early allocation of a stand away from the terminal for the arriving BD221 flight. The message gave only the the last two letters of the aircraft registration (ie YM). The BA staff in the terminal control centre cross-referenced this request to the FIND display (which showed a Dash 7) and then sought agreement from the HAL control room to allocate stand D54. The HAL controller also checked only the FIND display (HAL's BASIS correctly displayed the BD221 service as an ATP) and the allocation was agreed between the control centres.and displayed on the BASIS and FIND systems. British Midland, who have a BASIS display in their traffic control office did not question the allocation of stand D54 to an ATP.

Neither BASIS nor FIND is programmed to monitor compatibility between aircraft type and stand. Staff in the HAL operations centre were expected to memorise any incompatibility but, should they be in doubt, a handbook was available for reference. This handbook listed stand D54 as a type 2 stand and gave it the capability to accept aircraft of up to 30 m in span. This width was suitable for the Dash 7 (span 28.35 m) but too small for the ATP (span 30.63 m). At the time of the incident, there was no mention in the handbook that the ATP was too big for stand D54.

The controllers in Terminal One (BA employees) were in the habit of using only the British Airways' FIND system when allocating stands. Although BASIS was displaying the correct aircraft type and registration, the FIND system page in use did not display the registration. Moreover, neither BASIS nor FIND is programmed to detect a mismatch between aircraft type and registration and, given the number and diversity of aircraft using Terminal One, it would be unreasonable to expect controllers to recognise all aircraft types by their registration.

HAL intend to introduce a new system called CASAM (Computer Allocation Stand and Management) in July and BA intend to replace FIND with ALLOGATOR later this year. Both systems will have facilities to detect a mismatch between stand and aircraft type although neither will be able to determine an aircraft type from its registration. It has therefore been recommended jointly to HAL and to BA that the software for both systems should be modified to enable automatic data capture of the aircraft type.