



Australian Government

Australian Transport Safety Bureau

Aircraft preparation occurrence involving BAe 146-300, VH-NJZ

Sydney Airport, New South Wales, on 22 January 2019

ATSB Transport Safety Report
Aviation Occurrence Investigation
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Addendum

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Safety summary

What happened

On the morning of 22 January 2019, a British Aerospace (BAe) 146-300, registered VH-NJZ, landed in Sydney, New South Wales, en route from Melbourne, Victoria, to Brisbane, Queensland on a scheduled freight operation.

Before commencing the cargo-unloading process, a tail strut was attached to the rear of the aircraft. After completion of the cargo-unloading and loading process, the aircraft was taxied for departure to Brisbane with the tail strut still attached. During the take-off roll, the tail strut detached, resulting in the runway being contaminated with foreign object debris.

The complete tail strut was recovered from the runway and the aircraft continued to Brisbane, where it landed without further incident.

What the ATSB found

The ATSB found that pre-departure checklist items, required to be performed by the captain and engineer in a challenge-and-response manner, were not completed. This negated the value of the checklist as a risk control, and resulted in a missed opportunity to detect the tail strut's presence prior to departure.

The ATSB also found that the engineer performing the aircraft turn-around had no effective means or procedure to contact the aircraft while it was taxiing. As a result, and despite attempting various methods, the engineer was unable to alert the flight crew that the tail strut was still attached to the aircraft.

What's been done as a result

Following the occurrence, the operator disseminated Safety Alerts to relevant staff highlighting the despatch procedure, including the challenge-and-response requirement for the relevant cockpit to ground checklist.

The operator also provided appropriate control tower telephone numbers to engineering staff at all operating bases, allowing them to contact the tower immediately if required.

Finally, the operator emailed all company pilots, further highlighting the despatch procedure. This included the requirement that when the aircraft's tail strut was not used, the local ground support equipment tail strut was to be visible to the flight crew prior to aircraft despatch.

Safety message

Checklists are an essential tool for overcoming limitations with memory, and ensuring that action items are completed in sequence and without omission. While their value may not be obvious for routinely performed tasks, the incomplete use of checklists has been cited as a factor in previous aircraft accidents.

The occurrence

What happened

On 22 January 2019, a British Aerospace 146-300, registered VH-NJZ (NJZ), was being operated by National Jet Express on a scheduled freight service between Melbourne, Victoria and Brisbane, Queensland via Sydney, New South Wales. At about 0415 Eastern Daylight-saving Time,¹ NJZ landed in Sydney and exited the runway for freight-loading operations.

A licenced aircraft maintenance engineer employed by Cobham Aviation Services reported marshalling NJZ in, and the flight crew subsequently shut down the aircraft's engines. The engineer placed chocks at the nose wheels and instructed the flight crew to release the parking brake. The engineer positioned boarding stairs at the forward left cabin door and attached a tail strut² to the rear of the aircraft (Figure 1). The tail strut was part of the Sydney Airport ground support equipment. The engineer also had the option of using a tail strut that was carried on board the aircraft.

The engineer reported opening the aft lower cargo hold door, on the rear right side of the aircraft to retrieve the sill protectors.³ The engineer waited for the aircraft freight door to be opened remotely by the captain, installed the sill protectors, and conducted an external visual inspection of NJZ. After the inspection, the engineer engaged in a brief conversation with the flight crew, and returned to the line hut to await completion of loading by the loading team.

The captain reported completing an external visual inspection of the aircraft then returned to the cockpit to plan the next sector to Brisbane with the first officer. Upon completion of loading by the loading team, the captain positioned himself at the top of the boarding stairs and the engineer returned to the aircraft. The engineer removed the freight door sill protectors and signalled the captain to commence lowering the freight door. After the freight door was closed, the engineer visually checked that it was flush with the aircraft skin and that the locks had correctly engaged. The engineer then signalled the captain that the freight door had locked correctly. The captain replied with a thumbs-up, entered the aircraft and closed the cabin door behind him.

The engineer proceeded to the aft lower cargo hold door on the right side of the aircraft, stowed the sill protectors, closed and locked the cargo hold door. The engineer then walked back around towards the front of the aircraft and positioned the boarding stairs clear. The engineer connected a headset to the nose of the aircraft for communications with the flight crew and removed chocks from the

¹ Eastern Daylight-saving Time (EDT): Coordinated Universal Time (UTC) + 11 hours.

² A tail strut supports the rear of an aircraft while cargo is loaded and unloaded.

³ The sill protectors are metal guards to protect the sill of the freight door area from damage during loading and unloading.

nose landing gear wheels. The engineer then took up a position at the nose of the aircraft to commence communications with the flight crew for engine start.

The captain confirmed communications with the engineer, and the engineer responded 'stowed and closed, you are clear all four'. The flight crew proceeded to start all four engines. After the engines were all started successfully, the engineer disconnected the headset, closed the communications panel, and proceeded into the line hut to put away the headset and torch. At 0451, NJZ taxied forward out of the bay and then toward holding point Golf for take-off on runway 16R.⁴

Figure 1: Example of a tail strut fitted to NJZ and showing opened freight door



Source: Cobham Aviation Services Australia

At that time, a ground staff member from a different company arrived at the line hut on a tug and informed the engineer that NJZ had commenced taxiing with the tail strut still in place. Leaving the line hut, the engineer proceeded outside and saw that NJZ had commenced taxiing towards the runway. The engineer began pursuing the aircraft on foot, and attempted to attract the captain's attention by waving his arms and shouting. The engineer, realising he wouldn't be able to get the pilots' attention, joined the ground staff member on the tug and proceeded after NJZ.

⁴ Runway name: the number represents the magnetic heading of the runway. The letter designates the qualifier for multiple runways (left/right) if necessary.

The engineer did not have a contact number for the Sydney Control Tower and was therefore unable to inform them of the situation quickly. Instead, he telephoned National Jet Express Maintenance Watch⁵ and asked them to contact the flight crew to inform them of the situation. National Jet Express Maintenance Watch relayed the message to National Jet Express Operations,⁶ who in turn attempted unsuccessfully to contact both pilots by mobile phone.

The engineer, realising that he was not going to catch NJZ prior to it entering the runway, approached a nearby works safety officer. As the engineer was asking the safety officer to immediately contact the tower via radio, to prevent NJZ from taking off, the aircraft turned onto runway 16R, powered up and departed.

The captain reported that during the take-off roll, he felt his phone vibrating in his pocket but did not answer as he was concentrating on the departure.

Following the aircraft's departure, Sydney Tower closed Taxiway Bravo and runway 16R to allow a visual inspection to take place. A Sydney Airport ground safety worker subsequently located the tail strut, took photographs, and recovered the multiple components (Figure 2). The photographs of the recovered tail strut components were sent to the engineer's mobile phone and the engineer confirmed that the entirety of the tail strut had been recovered. The engineer relayed this information to National Jet Express Maintenance Watch, who passed it on to the captain. The captain, satisfied that the entire tail strut had departed the aircraft, continued the flight to Brisbane.

On arrival at Brisbane, air traffic control requested that NJZ land on a secondary runway in case there was any residual part of the tail strut still attached to the aircraft. The aircraft landed and stopped on the runway without incident, and the rear of the aircraft was inspected by a Brisbane Airport ground safety officer. NJZ was then permitted to taxi to its bay. Engineers subsequently inspected the rear of the aircraft and no damage was evident.

⁵ National Jet Express Maintenance Watch is an internal company department that provides engineering advice to the operating fleet.

⁶ National Jet Express Operations is an internal company department that monitors the operating fleet.

Figure 2: Tail strut as found on Sydney runway 16R post NJZ departure



Source: Sydney Airport

Operator despatch procedure

The operator’s Bae146 Aircraft Ground Operations manual detailed the cockpit to ground communication requirement as listed in Table 1.

Table 1: Stand-Off Bay Despatch Using Intercom Checklist

Captain	Ground Crew
“Cockpit to Ground”	“Ground”
“Confirm all doors and access panels closed and locked, (<i>and where applicable</i>) tail strut removed and sill protectors stowed”	“All doors and panels closed and locked, (<i>and where applicable</i>) tail strut removed and sill protectors stowed”
“Brakes parked, clear to remove chocks”	“Chocks removed”
“Ready to start all engines or Engines 3 & 4, 1 & 2 “ as appropriate”	“Clear to start” as appropriate
“Start completed clear to disconnect”	“Disconnecting”

The engineer stated that during the turnaround of NJZ, prior to stowing the sill protectors, he walked past the tail strut and did not remove it. The captain and engineer commenced the required checklist prior to engine start. During this verbal exchange the challenge-and-response checklist was shortened to 'We are stowed and closed you are clear for all four'. Immediately after the engineer disconnected communications from the aircraft the engineer proceeded into the line hut. He reported that this did not allow him an opportunity to view the tail strut as the aircraft taxied past.

Safety analysis

During pre-departure checks, the verbal exchange between the captain and engineer was not performed in accordance with the Stand-Off Bay Despatch Using Intercom challenge-and-response checklist. While that was possibly the result of it being a routinely performed task, it negated the value of the checklist as a risk control, and presented a missed opportunity to detect the tail strut prior to departure.

The engineer had no effective means or procedure to contact the aircraft while it was taxiing. Despite that, he attempted various methods to contact the flight crew but was unable to alert them to the tail strut still being attached to the aircraft prior to take-off.

Findings

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

- During pre-departure checks, the full checklist between the captain and engineer was not completed. This negated the value of the checklist as a risk control and resulted in a missed opportunity to identify that the tail strut was still attached to the aircraft prior to it departing the bay.
- The engineer had no effective means or procedure to contact the flight crew while the aircraft was taxiing. As a result, the flight crew were not alerted to the error prior to take-off.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Following this occurrence, on 23 January 2019, Cobham Aviation Services issued a Safety Alert to relevant staff that highlighted the despatch procedure including the cockpit to ground checklist requirements.

Cobham also provided appropriate control tower telephone numbers to engineering staff at all operating bases. This allows staff to immediately contact the tower if a need arises.

Cobham also emailed all company pilots, further highlighting the despatch procedure. This included the requirement that when the aircraft's tail strut was not used, the local ground support equipment tail strut was to be visible to the flight crew prior to aircraft despatch.

General details

Occurrence details

Date and time:	22 January 2019 – 0451 EDT	
Occurrence category:	Incident	
Primary occurrence type:	Aircraft preparation	
Location:	Sydney Airport	
	Latitude: 33° 56.77' S	Longitude: 151° 10.63' E

Aircraft details

Manufacturer and model:	British Aerospace PLC BAe 146-300	
Registration:	VH-NJZ	
Operator:	National Jet Express Pty. Ltd.	
Serial number:	E3126	
Type of operation:	Freight	
Departure:	Sydney	
Destination:	Brisbane	
Persons on board:	Crew – 2	Passengers – nil
Injuries:	Crew – nil	Passengers – nil
Aircraft damage:	none	

About the ATSB

The ATSB is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within the ATSB's jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to operations involving the travelling public.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.