Fokker F27 Mark 500, G-CEXG

AAIB Bulletin No: 10/2004	Ref: EW/C2004/05/02	Category: 1.1
INCIDENT		
Aircraft Type and Registration:	Fokker F27 Mark 500, G-CEXG	
No & Type of Engines:	2 Rolls-Royce Dart 532-7 turboprop engines	
Year of Manufacture:	1971	
Date & Time (UTC):	7 May 2004 at 0405 hrs	
Location:	Bournemouth Airport, Dorset	
Type of Flight:	Public Transport (Cargo)	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Nil	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	60 years	
Commander's Flying Experience:	6,568 hours (of which 1,838 were on type)	
	Last 90 days - 111 hours	
	Last 28 days - 52 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

History of the flight

The crew reported for duty at 0300 hrs expecting to operate a two-sector return freight flight to Jersey. As they approached the aircraft they noticed that the aircraft's pneumatic system was being charged; this was not the normal procedure. The engineers present explained to the commander, whilst outside the aircraft, that this was a fleet wide procedure following pneumatic problems on another aircraft. Meanwhile, the first officer entered the flight deck and asked the engineer there if there was a pneumatic leak. Although he was told there was not, he noted that the brake bottle pressure, though within limits, was slightly lower than normal. Suspecting the integrity of the pneumatic system, he decided to pull out the pneumatic isolating valve pin, contrary to the checklist requirement that was to push it in.

When the commander entered the cockpit, the first officer drew his attention to the brake pressure but did not inform him that the isolation pin had been pulled out. The engines were then started but although the after start checklist required a check of pneumatics, the isolation pin remained out. During the taxi, the crew noticed that the pneumatic pressures were abnormally low but still in the green acceptable band. Shortly afterwards, the aircraft veered to the left and, although full right steering wheel was used and right brake was applied, directional control was lost. At this stage,

realising that the pneumatic isolating valve pin was out, the commander pushed it back in but was unable to prevent the aircraft leaving the taxiway and travelling 50 metres along the grass before coming to a stop. There was no attempt to activate the emergency braking system. The commander commented that his left hand was fully engaged holding the steering wheel in an attempt to recover the loss of directional control and it would have been necessary to remove this hand to operate the emergency brakes.

The engines were shut down and engineering assistance obtained. An emergency was not declared but ATC subsequently alerted the emergency services who attended the aircraft. An unsuccessful attempt was made to tow the aircraft forwards with the engines running. This however, is not recommended due to possibility of nose landing gear damage. The aircraft was eventually recovered from the grass tail first.

Technical Description

There are two separate pneumatic systems in the F27, a main and an emergency. The main system supplies pressure to operate the landing gear, nose wheel steering and wheel brakes whilst the emergency system operates the alternate landing gear extension and emergency wheelbrakes. There are storage bottles in the systems with check valves to ensure pressure remains available in the event of compressor supply interruption. Pulling the pneumatic isolating valve pin isolates the main system and main system storage bottle from the main pneumatic supply, preserving stored pneumatic pressure in the event of a leak. In this isolated position however, neither the landing gear, nose wheel steering nor the wheelbrakes can be operated from the main system supply.

The emergency braking system is controlled by a knob on the left side panel of the cockpit. This delivers a pre-set pressure to the brakes without anti-skid control and with no means of differential braking.

Checklists

It is the commander's responsibility to start the engines and respond to the after start checklist. The normal 'AFTER START' checklist included the following item:

Pneumatics.....Checked

The expanded version of this check, detailed in the Operations Manual, revealed that the response *'Checked'* implies having checked that:

Check all 3 pneumatic gauges

Minimum pressures for take-off:

Brake 1500, Main 1500, Emergency 2500

The pneumatic isolating valve is IN, Both pneumatic low pressure warning lights should be out

Discussion

With no prior knowledge of the change to the pneumatic servicing procedures it is not surprising that, observing the abnormal system charging, the crew questioned the integrity of the aircraft's pneumatic system. Although the commander was subsequently informed of the reasons behind the procedure, doubt remained in the first officer's mind, leading him to isolate the main pneumatic system supply and storage bottle. The aircrew's concerns regarding the pneumatic charging may have been resolved had they received advance notice of the change to engineering procedures.

The after start check of *'pneumatics'* infers a check of the isolating valve pin along with a check of other system components located in different positions across the flight deck. Checklists, by their

very nature, are 'high level' documents often summarising expanded checks explained in more detail in Operations Manuals and used in conjunction with a sound knowledge of aircraft systems. This check was the crew's opportunity to rectify the situation and confirm the system status. The checking of the isolation valve pin on this occasion however, was overlooked.

Follow-up action

As a result of this incident, the company has changed its checklist procedure. In addition to the pneumatics check, the after start checklist now includes a separate specific check to confirm that the isolating valve pin is pushed in.

Safety Recommendation 2004-78

It is recommended that the UK Civil Aviation Authority consider bringing the circumstances of this incident to the attention of all UK operators of F27 aircraft.

Safety Recommendation 2004-79

It is recommended that the Director General of Civil Aviation of the Netherlands and the type certificate holders, Stork B.V., consider bringing the circumstances of this incident to the attention of all other operators of F27 aircraft.