

Boeing 777, AP-BGK

AAIB Bulletin No: 9/2004	Ref: EW/G2004/06/06	Category: 1.1
INCIDENT		
Aircraft Type and Registration:	Boeing 777, AP-BGK	
No & Type of Engines:	2 GE90-94B turbofan engines	
Year of Manufacture:	2004	
Date & Time (UTC):	8 June 2004 at 0850 hrs	
Location:	Stand 210, Manchester Airport, Manchester	
Type of Flight:	Public Transport (Passenger)	
Persons on Board:	Crew - 13	Passengers - 303
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to brake hydraulic lines	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	54 years	
Commander's Flying Experience:	13,909 hours (of which 145 were on type)	
	Last 90 days - 145 hours	
	Last 28 days - 60 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and investigation report submitted by the Operator.	

After the aircraft arrived on stand at Manchester Airport, the marshaller observed a fire originating from the left main landing gear. The Airport Fire Service attended the scene and the fire was extinguished. Subsequent examination of the brakes, axle and wheel bearings showed that they had been blackened by smoke. The hydraulic lines in the braking system had suffered heat damage.

A similar event was notified to AAIB the following day and the operator reported two previous events. The details of all the incidents are as follows:

Incident Date	Aircraft Registration	Location	Wheel Position	Installation Date
27 May 2004	AP-BGJ	Manchester	No 5	24 May 2004
4 June 2004	AP-BGJ	Toronto	No 12	24 May 2004

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8 June 2004	AP-BGK	Manchester	No 9	7 June 2004
9 June 2004	AP-BGJ	Manchester	No 6	7 June 2004

(Bold type denotes subject incident)

The Boeing 777 has two main landing gear, each with three pairs of wheels. Wheels are numbered from left to right; thus the front outboard left wheel is number 1 and the rear right outboard is number 12.

The operator had begun operating the Boeing 777 in March 2004. All the incidents occurred on wheel assemblies that had been replaced at Karachi, by the Operator's engineering department, using NYCO 22 grease. The Aircraft Maintenance Manual (AMM) specifies the use of general purpose wide temperature grease with the specification MIL-PRF-81322 for the wheel assembly. It specifically mentions three types: Mobil 28, Aeroshell 22 and Mobil Aviation Grease SHC100. NYCO 22 grease, which meets the MIL-PRF-81322 specification, was in general use by the operator for lubrication of wheel bearings and was specified as an alternative on other aircraft types. It was not however, specifically approved for use on the Boeing 777.

The aircraft manufacturer published a Maintenance Tip (777 MT 32-021 dated 29 May 2001) which states:

Wheel/brake-area fires are occasionally reported following normal operating brake temperature condition landings. Typically, the cause of the fires can be attributed to the ignition of excessive grease that has accumulated in the brake assembly cavity and/or on the axle. Also, residual cleaning fluids can be retained by some wheel heat shields after being saturated with flammable solvents during maintenance. Wheel/brake-area fires have also been reported due to ignition of hydraulic fluid associated with leaks or hydraulic system maintenance.

It recommends the following action:

During wheel and brake removal/installation, it is important to remove the old grease from the axle. Use of a dry rag is recommended since cleaning fluids and solvents can cause damage to carbon brakes and titanium components. While it is important to have adequate lubrication within the wheel bearings, only a thin layer of grease is necessary at the wheel/axle interface for wheel/tire installations. Similarly, a thin layer of grease is applied to the interface surfaces of the brake and axle sleeves during brake installation. (Note: When applying grease to the axle bushings on the brake assembly, it is important to completely fill the grooves in the bushings with grease.) Additionally, operators should assure that the brake axle bushing grease seal (on airplanes that have them) is not damaged prior to brake installation and is properly installed per the applicable AMM or Component Maintenance Manual (CMM) instructions.

Follow-up action

The operator has since discontinued the use of NYCO 22 and switched to Aeroshell 22 as specified in the AMM. All wheel assemblies previously fitted by the operator's engineering department have been replaced with items assembled using Aeroshell 22. All line stations have been instructed to use Aeroshell 22 on all fleets and discontinue the use of NYCO 22 grease. Additionally, the operator's engineering department has minimised the application of grease as recommended by the manufacturer.

No further incidents have been reported.