Total engine oil loss, Boeing 767-336, G-BNWT

Micro-summary: **This Boeing 767-336 experienced a total loss of oil in the #1 engine.**

Event Date: **1998-03-06 at 0620 UTC**

Investigative Body: **Aircraft Accident Investigation Board (AAIB), United Kingdom**

Investigative Body's Web Site: **http://www.aaib.dft.gov/uk/**

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1. Accident reports can be and sometimes are revised. Be sure to consult the investigative agency for the latest version before basing anything significant on content (e.g., thesis, research, etc).

2. Readers are advised that each report is a glimpse of events at specific points in time. While broad themes permeate the causal events leading up to crashes, and we can learn from those, the specific regulatory and technological environments can and do change. ***Your company's flight operations manual is the final authority as to the safe operation of your aircraft!***

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Boeing 767-336, G-BNWT

AAIB Bulletin No: 6/98 Ref: EW/G98/03/03 Category: 1.1

Aircraft Type and Registration:	Boeing 767-336, G-BNWT
No & Type of Engines:	2 Rolls Royce RB211-524H-36 turbofan engines
Year of Manufacture:	1992
Date & Time (UTC):	6 March 1998 at 0620 hrs
Location:	Tel Aviv Airport, Israel
Type of Flight:	Public Transport
Persons on Board:	Crew - 11 - Passengers - 238
Injuries:	Crew - None - Passengers - None
Nature of Damage:	Damage to left engine accessory gearbox and left hand fan cowl door
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	48 years
Commander's Flying Experience:	13,148 hours (of which 7,372 were on type) Last 90 days - 156 hours Last 28 days - 49 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and information supplied by the operator

Approximately 15 minutes after the aircraft had taken off from Tel Aviv (TLV) Airport, on a flight to London, the left engine suffered a total loss of oil. The aircraft returned to Tel Aviv and the crew carried out an overweight landing, on one engine. The right engine thrust reverser was not serviceable and consequently the brakes became very hot during the landing rollout. The aircraft taxied to a nearby gate where the passengers disembarked normally and, whilst there, the fusible plugs in the wheels of the left landing gear activated and all four tyres on that gear deflated. Initial examination found that the left engine accessory gearbox casing had been punctured, releasing all of the engine oil. The engine was replaced and later returned to London Heathrow for examination by the operator.

Subsequent strip examination of the engine high speed gearbox revealed that the starter driven bevel gear had failed, resulting in secondary damage to the casing and fan cowl door. It was determined that this failure had been precipitated by high engine starting torque, leading to a crack which had propagated in low cycle fatigue. This crack had extended through the gear diaphragm, resulting in the release of a section comprising 3 to 4 teeth. This failure was classified as being 'typical' of several experienced previously. As a result of these, the engine manufacturer had issued a Service Bulletin (SB) requiring bevel gear replacement with a more robust gear with a thicker diaphragm. The failed gear was of the earlier standard. The SB was being incorporated by the operator at every high speed gearbox overhaul shop visit, but a campaign is now in hand to remove all earlier standard gears; it is anticipated that all such gears will have been removed within 18 months. Meanwhile, the earlier standard gears that remain in service are subject to regular inspections based upon the manufacturer's current bevel gear reliability statistics. Engineering work is also in hand to lower the peak starting torque loads experienced by this gear through a modification to the start valve, which is expected to be cleared by August 1998.