Boeing 747-236B, G-BDXP, 3 June 1996

AAIB Bulletin No: 12/1996

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Aircraft Type and Registration:	Boeing 747-236B, G-BDXP
No & Type of Engines:	4 Rolls Royce RB211-524D-19 turbofan engines
Year of Manufacture:	1988
Date & Time (UTC):	3 June 1996 at 2300 hrs
Location:	Miami Airport, Florida, USA
Type of Flight:	Public Transport
Persons on Board:	Crew - 18 - Passengers - 364
Injuries:	Crew - Nil - Passengers - Nil
Nature of Damage:	Approximately half of the No. 16 leading edge Krueger flap missing
Commander's Licence:	N/A
Commander's Age:	N/A
Commander's Flying Experience:	N/A
Information Source:	AAIB Field Investigation

Following an uneventful flight from Miami, the operator's engineeringstaff carried out a turn-around maintenance check on the aircraftduring which it was found that a large section of the No 16 leadingedge Krueger flap was missing. Following a request from the AAIB,the Miami Airport authorities conducted a search of the areasaround Runway 09L, the runway in use at the time this aircraftdeparted. Following this search, the missing part of the flapwas found and despatched to the AAIB. Examination of the aircraftindicated that during the last third of the flap's deploymenttravel the outboard end of the flap had been contacting the inboardside of the No 3 engine pylon.

Examination of the detached section of flap indicated that thefailure had been progressive and had resulted from repetitiveflexural bending loads introduced as a result of contact betweenthe forward outer end of the flap and the No 3 engine pylon, whenthe flap was deployed and retracted in service.

The aircraft manufacturer had issued Service Bulletin (SB) 747-57-2268in July 1992, entitled 'Wings - leading edge Krueger flaps - paneltrim and seal replacement on outboard side of Krueger flaps 11and 16', revision three of which was issued in September 1994.The background to this

Service Bulletin was that operators hadreported instances of damage to the outboard ends of the Kruegerflaps, with sections detaching from some aircraft. The damageoccurred on Krueger flaps Nos 11 and 16 where the flap sealscontacted the inboard sides of the Nos 2 and 3 engine struts.The damage was caused by flap-to-strut interference due to insufficientclearance. The Krueger flap-to-strut gap introduced at productionwas 1.35 inches. Most of the damaged flaps had a gap which wasless than 1.35 inches. As engine thrust was increased on Boeing747 aircraft, increased inboard/outboard engine displacement resultedin the need for increased clearance. This SB increased the gapto 1.70 inches between the Krueger flap and the engine strut.The operator's technical records indicated that this Service Bulletinhad been implemented on this aircraft in August 1995. Due to thedamage sustained by this No 16 Krueger flap it was not possibleto measure the gap which had existed between the flap and theengine strut. However, the gap measured between the No 11 Kruegerflap and the No 2 engine strut confirmed that the Service Bulletinhad been carried out on that flap.

In May 1996, the aircraft manufacturer issued Service Bulletin747-57-2299 which introduced reinforcement of the Nos 11 and 16Krueger flaps by the addition of three fibreglass layers to decreasethe possibility of flap damage. At the time of this incident,the operator was assessing and planning the action required bythis latest Service Bulletin.