

Fodded Engines

Each aircraft had foreign object damage to engines. FOD may have come from baggage compartment, other engine;s cowlings, or aircraft debris. Three of the engines usually fall together, while a fourth engine, engine number 3, the one closest to the cargo door, falls alone, and may have fire damage on it.

United Airlines Flight 811:

"The external surfaces of the No. 3 engine inlet cowl assembly exhibited foreign object damage including small tears, scuffs and a large outwardly directed hole. The entire circumference of all the acoustic (sound attenuator) panels installed on the inlet section of the cowl had been punctured, torn, or dented." "The leading edges of all fan blade airfoils on the No. 3 engine exhibited extensive foreign object damage."

"External damage to the No 4 engine inlet and core cowls was confined to the inboard side of the inlet cowl assembly." "The No. 4 engine fan blade airfoils had sustained both soft and hard object damage from foreign objects."

[NTSB/AAR 92/02 Page 7](#)

[NTSB/AAR 92/02 Page 8](#)

Air India Flight 182:

"The fan cowls of the number 4 engine had a series of five marks in a vertical line across the centre of the Air India logo on the inboard facing side of the fan cowl., These marks had the characteristic airfoil shape of a turbine blade tip."

[Canadian Aviation Safety Board Air India 23 June 1985, page 29](#)

"One of the operating engines was displaced 0.5 miles to the north of this area and it was also geographically separated from the wing structure. The number three engine nacelle strut was also separated from the rest of the engine components and was located about one nautical mile to the west-southwest at lat 51 02.87'N, long 12 48.05'W. The reasons for the displacement of the number 3 engine nacelle strut and one of the operating engines from the other engines are not known."

[Canadian Aviation Safety Board Air India 23 June 1985, page 32](#)

Pan Am Flight 103:

"The No 3 engine had fallen 1,100 metres north of the other three engines, striking the ground on its rear face, penetrating a road surface and coming to rest without any further change of orientation e.e. with the front face remaining uppermost. The intake area contained a number of loose items originating from within the cabin or baggage hold." "The interior of the (No 2) air intake contained paint smears and other evidence suggesting the passage of items of debris." "All 3 engines had evidence of blade tip rubs on the fan cases having a combination of circumference and depth greater than hitherto seen on any investigation witnessed on Boeing 747 aircraft by the Pratt and Whitney specialists. Subsequent examination of No 4 engine confirmed that it had a similar deep large circumference tip rub."

[UK AAIB Report 2/90 Page 29](#)

[UK AAIB Report 2/90 Page 30](#)

"Airflow disruption such as that presumed to have caused the shingling observed on No 2 engine fan blades was almost invariably the result of damage to the fan blade aerofoils, resulting from ingestion or blade failure."

[UK AAIB Report 2/90 Page 30](#)

Trans World Airlines Flight 800:

"Until the fourth engine has been brought ashore and examined, officials won't discuss their examination of the other engines, Francis said. He refused to disclose why they are focusing on the engine closest to the fuselage on the right wing." "The engines on the right side of the plane both suffered more damage than those on the left, but the recovery of all four diminished the possibility that a heat-seeking missile caused the crash by destroying an engine." " The right inboard engine was relatively intact but suffered ``foreign object damage" from debris sucked in while it was apparently still running." "Investigators completed a meticulous tear-down of the right inboard engine of TWA Flight 800 yesterday and sent debris that had been sucked into the apparently still running engine to FBI and National Transportation Safety Board labs in Washington. "

[News Reports from Associated Press, Reuters, major newspapers, press releases from NTSB, FBI](#)

Comment: The distinct crash similarities of aircraft type, radar returns, wreckage plot, sudden short loud sound, abrupt power cut, fodded engines, inflight damage, missing bodies, torn off noses, and start place of damage qualify three aircraft into one class from which the deduction may be made that one unifying cause had the same effects. Another accident with the same

similarities except for a torn off nose and less wreckage may also be included in that class. The unifying cause for all four accidents is the inadvertent opening of the forward cargo door inflight. 27 Mar 97

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