

Investigating FOD Damage Session II

Case I – Uncontained Engine Failure

Uncontained Engine Failure

- B-727 had been airborne approximately 1 hour.
- The plane was cleared for a climb from FL 300 to FL 340.
- During the level off, the #2 engine disintegrated.
- The failure was sudden, with no prior warning of an engine problem.
- A blade fragment penetrated the fuselage in an unpressurized area.
- The flight crew declared an emergency, and landed the aircraft safely. No one was injured.
- You are looking at remaining fragments from the 1st stage fan.

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Case II – Engine Bang On Takeoff

Engine Failure on Takeoff Roll

- A loud bang was heard during the takeoff roll and the engine failed.
- The takeoff was aborted.
- The most forward location of damage was stage 7, the first stage of the HPC.
- You are viewing the 7th stage blades and the 7th stage stator, which is just aft of the blades.

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Case III - HPC-9 Blade Failure

HPC-9 Blade Is Broken



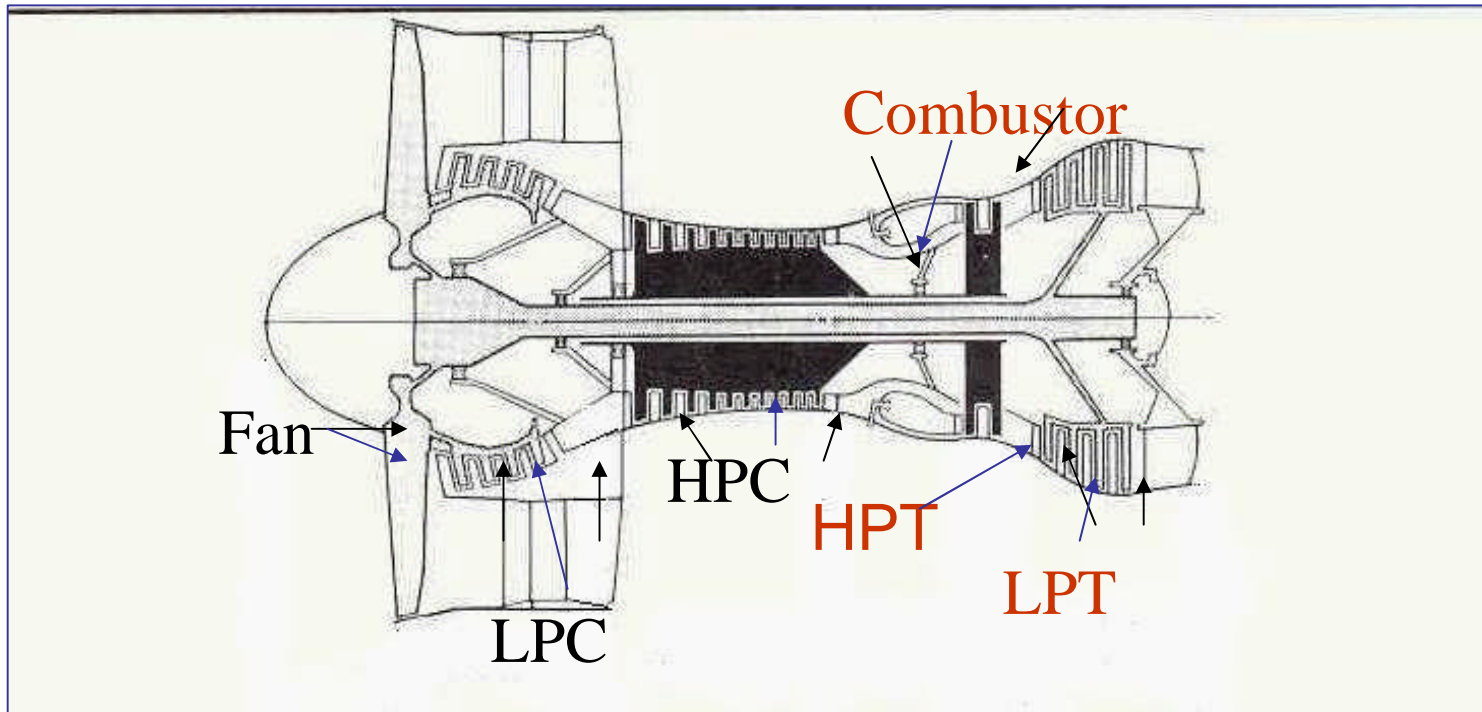
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HPC-9 Blade Failure

In-flight Engine Shutdown

- This was an in-flight engine failure.
- Engine teardown revealed a broken HPC-9 blade.
- There was no fan section damage.
- The most forward location of damage was reported to be at HPC stage 1.

Engine Terminology



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Case IV – DC-10 #2 Engine

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- Vibrations in #2 engine during take-off.
- Take-off aborted.
- Engine pulled for fan blade damage.
- You are looking at the 1st stage fan blades.

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Case V – JT8D FOA

Found On Arrival

- Damage found on arrival (FOA).
- Only three 1st stage fan blades were damaged.
- You are looking at the three blades.