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**A LOOK AT LEAP-1A  
ENGINE HIGH-PRESSURE  
TURBINE BLADES**

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# A Look at LEAP-1A Engine High-Pressure Turbine Blades

## INTRODUCTION

The LEAP-1A engine family has exhibited HPT stage 1 blade premature degradation in harsh operating environments, which the engine manufacturer has addressed through a redesign of the blade to improve the thermal barrier coating (TBC), improve blade cooling, and enhance the cooling air supply.

While the improved hardware configurations are being implemented, there are nevertheless some concerns about the existing configurations regarding possible blade cracks and the increased likelihood of engine damage or in-flight shutdown. These concerns have prompted EASA to issue an Airworthiness Directive (AD) to require targeted inspections that are designed to (a) determine blade condition, and (b) minimize the likelihood of an in-flight engine shutdown.

## BACKGROUND

EASA issued AD 2025-0171 on August 4 (becoming effective on August 11) requiring initial and recurring borescope inspections of certain CFM LEAP-1A engines:

- ➔ Engines fitted with HPT stage 1 blades PNs: 2747M92P01, 2553M91G03, 2553M91G05, 2553M91G06, 2553M91G07, or 2553M91G08
- ➔ Engines that have reached or will reach a threshold of 1,100 takeoffs within India, Sri Lanka, Nepal, Bhutan, Bangladesh, or the Maldives

The AD was issued in response to HPT stage 1 blade degradation, which could lead to engine damage and a possible in-flight shutdown.

The AD does not affect engines having the latest HPT stage 1 blade PN 2825M11G02.

- ➔ The redesigned blade was released to production engines during the second quarter of 2025 and to the field during the fourth quarter of 2024
- ➔ A relatively low number of engines will have the latest blade incorporated

Borescope inspection threshold and interval are dependent on:

- ➔ The number of takeoffs within the region as of August 11, 2025
- ➔ Engine Thrust:
  - High thrust: LEAP-1A29, 29CJ, 30, 32, 33, 33B2, 35 (defined as Group 1 engines)
  - Low thrust: LEAP-1A23, 24, 24E1, 26, 26CJ, 26E1 (defined as Group 2 engines)

## SCALE

mba estimates that there are approximately 345 LEAP-1A-powered A320neo and A321neo aircraft operating predominantly within the region and another 200 aircraft that operate sporadically into and out of the region from proximate countries.

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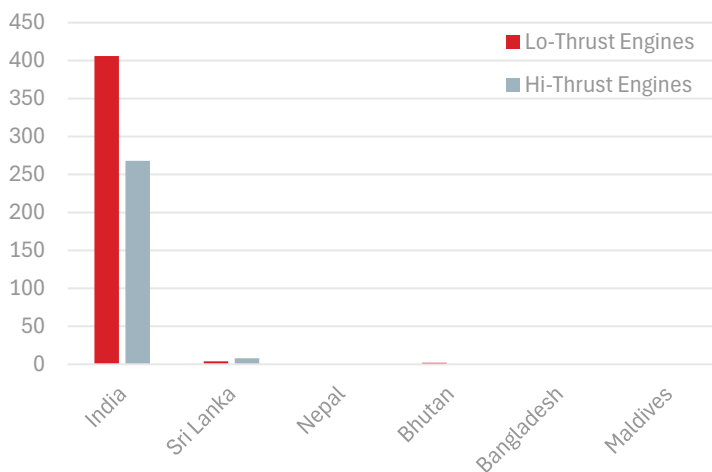
Indian, Sri Lankan, and Bhutanese airlines are most affected (a very high percentage of takeoffs within the region).

- ➔ Approximately 276 low-thrust engines
- ➔ Approximately 688 high-thrust engines

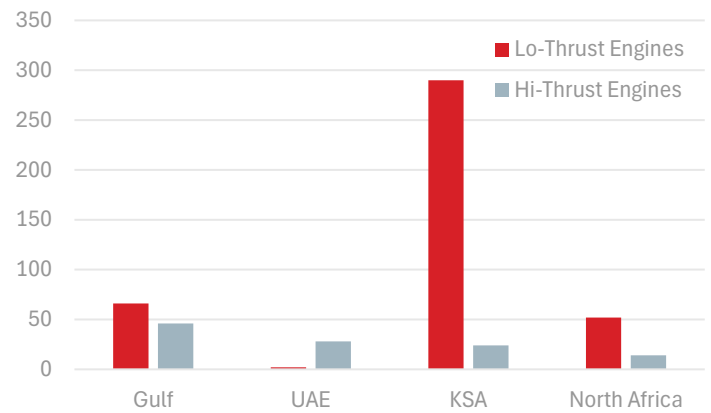
Airlines based in the Gulf, UAE, Saudi Arabia, and North Africa regions are affected to a lesser degree (a moderate percentage of takeoffs within the region).

- ➔ Approximately 294 low-thrust engines
- ➔ Approximately 112 high-thrust engines

**Estimated Number of Engines Affected—India, Sri Lanka & Bhutan**



**Estimated Number of Engines Affected—Gulf, UAE, KSA & North Africa**



## CHALLENGES

AD tracking and accomplishment will present some challenges related to:

- ➔ Retro-tracking engines to determine the number of takeoffs accomplished in the region
- ➔ A high number of engines requiring initial borescope inspection within a short time frame
- ➔ The short recurring inspection interval (150 cycles for high-thrust engines; 300 cycles for low-thrust engines)
- ➔ Engines with previous operation at different thrust ratings
- ➔ Additional inspection requirements in the event of findings
- ➔ The possibility of unplanned engine removals and the temporary reduction of available spare engines
- ➔ (Although not mentioned in the AD) ETOPS capability could be affected at an aircraft level

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