# 737NG – ATA 78

## Possible Long Primary Exhaust Nozzle Departure Due to Fan Blade Failure

Presenter: Ying Zhao – Propulsion Service Engineer

**737NG/MAX Fleet Team Meeting, May 5-7, 2020**

# Panel Members

| Name | Organization |
| --- | --- |
| Patrick Foy | Boeing Nacelle Structures Engineering Unit Member |

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## Possible Long Primary Exhaust Nozzle Departure Due to Fan Blade Failure

**Affected Models:** 737NG with long (pre-PIP) primary exhaust nozzles
(aircraft prior to LN 3762)
**Part Numbers:** 314A2610-1/-62/-68
**SRP:** 737NG-SRP-78-0110
**FIX:** ISS-78-20-30510
**FTD:** 737NG-FTD-78-20001


### Issue/Background

- Two in-flight fan blade failure events resulted in damage to the primary exhaust nozzle structures. Nacelle structural components also departed the aircraft (parts of the inlet on both events, and parts of the fan cowl on one event).
  - August 27, 2016, a Boeing 737-700 experienced a left engine fan blade failure while climbing to flight altitude.
  - April 17, 2018, a Boeing 737-700 experienced a left engine fan blade failure while climbing to flight altitude.
- Departure of long (pre-PIP) primary exhaust nozzle is possible in combination with a fan blade failure event.
- This issue only affects 737NG with long (pre-PIP) primary exhaust nozzles, Part Numbers: 314A2610-1/-62/-68. This configuration was delivered on aircraft prior to LN 3762.

### Root Cause

- Boeing is currently undergoing root cause investigation and analysis.

### Interim/Mitigating Action

- The regulatory agencies issued airworthiness directive (AD) mandated inspections of the engine fan blades
  (FAA AD 2018-09-51, FAA AD 2018-09-10, EASA AD 2019-0018).

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**Background**

- This issue only affects 737NG with long pre-PIP primary exhaust nozzles, **Part Numbers: 314A2610-1/-62/-68.**
- Figures show the Engine 1 primary nozzle exhaust damages from the 2016 event.
- The primary exhaust nozzle exhibited 360º circumferential buckling and still remained attached to the engine.

Figure 1: Front View of Engine 1

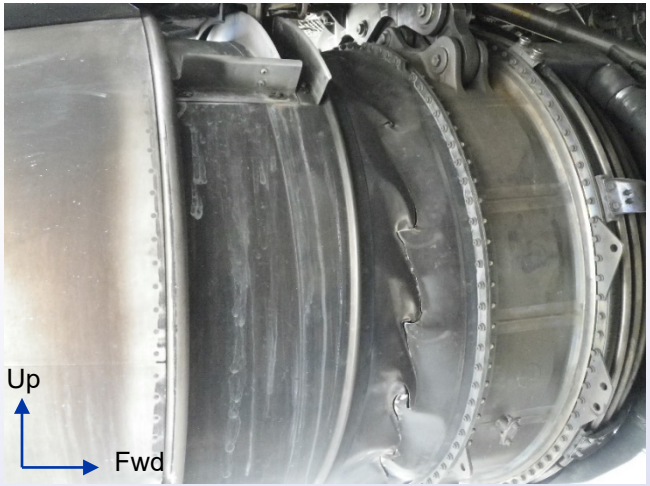


Figure 2: Right Side of Engine 1


Figure 3: Lower View of Right Side of Engine 1

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**Background**

- Figures show the Engine 1 primary nozzle exhaust damages from the 2018 event.
- The primary exhaust nozzle exhibited 360º circumferential buckling, was torn continuous from the 5:00 to 12:30 o'clock position and still remained attached to the engine.
- The nozzle also exhibited tears of about 1.00-inches at 1:00, 3:00, 4:00, and 4:40 o'clock positions.

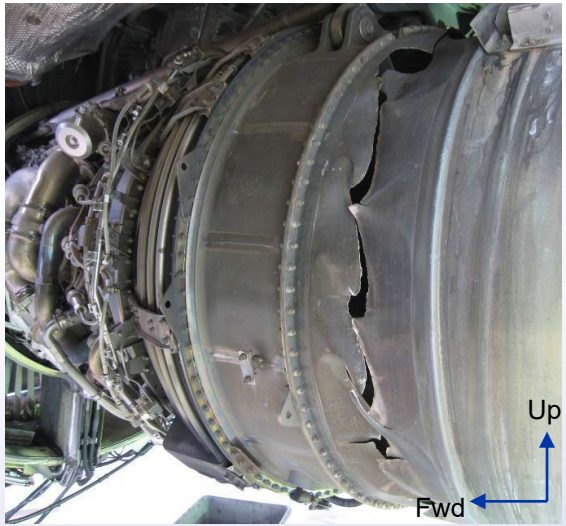


Figure 4: Left Side of Engine 1

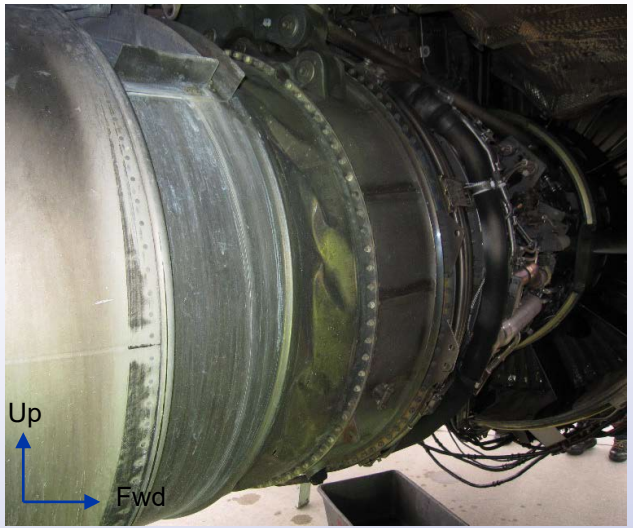


Figure 5: Right Side of Engine 1

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**Final Action/Resolution**

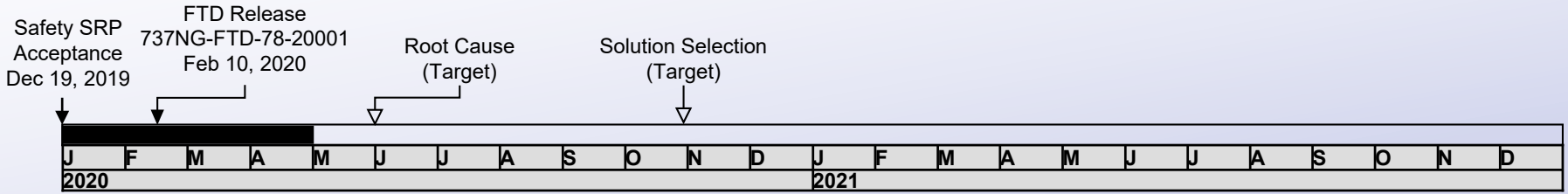
- TBD

**Regulatory Action/Activity**

- Boeing understands that the FAA is reviewing this issue for possible regulatory action. We will advise further on this as soon as more information becomes available.

**Status**

- Boeing is actively working to determine root cause.
- The fleet will be kept informed of status via 737NG-FTD-78-20001 and fleet team calls/meetings.





# Questions?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# Back Up Slides

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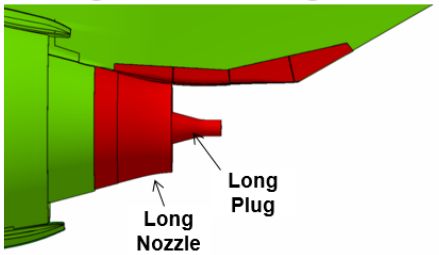
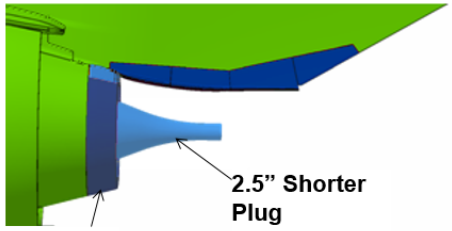
### 737NG Exhaust Nozzle
Delivery Configuration Overview

**Long Nozzle Configuration**




**PIP Exhaust Nozzle**




| 314A2610 (EIS) (-1, -62, -68) | 314A2630 (PIP) (-100 to -105) |
|---|---|
| Long Nozzle | PIP Nozzle with honeycomb acoustic liner |
| Line #s: 1-3611, 3613-3701, 3703-3761 | Line #s: 3612, 3702 & 3762 and on<br>1st Del= 9/06/2011<br>PRR 38918 |
| (A/Ps = ~3750) **Units: ~7500** | (A/Ps = ~3330) **Units: ~6660** |