



# Engine Borescope Practices

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# The role of engine borescope inspections

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## 20 years ago .....

- Aircraft owned, spare engines available, fleet utilization less optimized.
- More in-house maintenance - little use of HMP's and MRO's.
- Basic borescope equipment, experienced workforce, less fleet/engine types.

## Today .....

- Creative leasing programs, power-by-the-hour, fleets matched to route demands, more ETOPS.
- Cost-effective maintenance programs, minimized downtime, compete for work.
- Video borescopes, more service-limit information and demand for precise information.



# Does your operation currently perform any type of engine borescope inspections?

- a. Yes - **16**
  - Airline - 9
  - MRO - 5
  - Cargo - 2
- b. No - **0**
- c. Yes, but by an outside vendor - **0**
- d. Other - **0**



CFM56 LPT Vane Segment  
Older Borescope Resolution



# Approximately how many personnel do you employ that perform borescope inspections?

- a. 1-25 - **7**
  - Airline - 2
  - MRO - 5
- b. 26-75 - **1**
  - Cargo - 1
- c. 76-150 - **3**
  - Airline - 2
  - Cargo - 1
- d. Over 150 - **5**
  - Airline - 5



RB211 LPT Vane Segment

# Who performs your engine borescope inspections?

- a. In-house designated personnel - **9**
  - Airline - 4
  - Cargo - 1
  - MRO - 4
- b. Outside contractor or vendor - **0**
- c. Both of the above - **7**
  - Airline - 5
  - Cargo - 1
  - MRO - 1
- d. Other - **0**



PW4168 HPT NGV



# What types of engine borescope inspections are performed at or for your operation?

- a. Periodic (time/cycle controlled) condition monitoring - **16**
  - 1 MRO - periodic only
- b. FOD, birdstrike - **15**
- c. Reported overtemp - **15**
- d. Evaluation for lease return, receiving acceptance - **15**



CFM56 Turbine Shroud



# In what type of maintenance environment does your operation conduct borescope inspections?

- a. Line maintenance - **11**
  - Airline - 8
  - Cargo - 2
  - MRO - 1
- b. Aircraft base/overhaul maintenance - **13**
  - Airline - 8
  - Cargo - 2
  - MRO - 3
- c. Repair/overhaul shop - **10**
  - Airline - 5
  - Cargo - 2
  - MRO - 3
- d. Other



RR Trent 772



# Does your operation have a company written practice or standard procedure for performing borescope inspections?

- a. Yes - **14**
- Airline - 8
  - Cargo - 2
  - MRO - 4
- b. No - **2**
- Airline - 1
  - MRO - 1



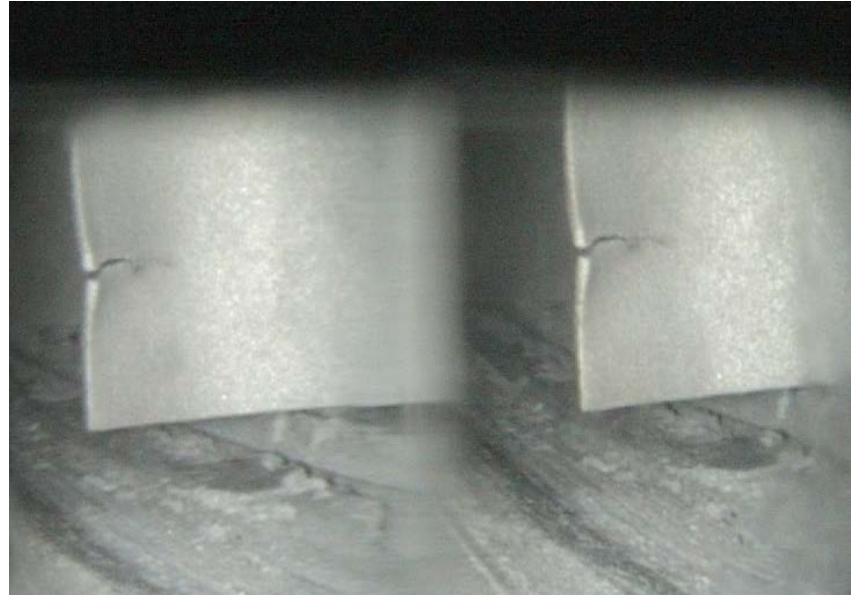
CFM56 Compressor Blade





Does your written practice or standard procedure require any training or qualification for those personnel performing borescope inspections?

- a. Documented training only - **2**
  - MRO - 2
- b. Documented training and qualification - **13**
  - Airline - 8
  - Cargo - 2
  - MRO - 3
- c. No - **1**
  - Airline - 1
- d. Other

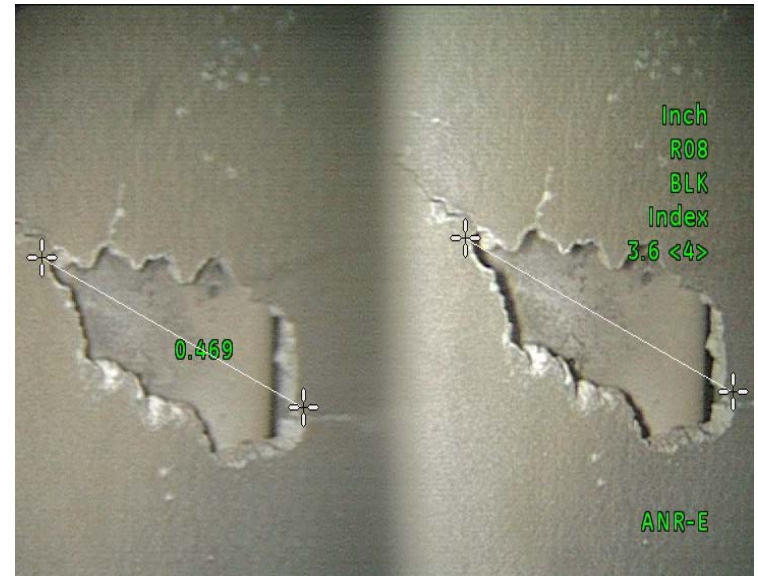


RB211 6<sup>th</sup> Stage TE & Shroud  
Stereo Tip - No Measurement



# Which of the following borescope inspection training best describes your operation?

- a. Factory/OEM or in-house training only - **3**
  - Airline - 2
  - Cargo - 1
- b. Combination of initial classroom, practical, OJT training - **7**
  - Airline - 4
  - MRO - 3
- c. OJT training only - **2**
  - Airline - 1
  - MRO - 1
- d. Other - Both a. & b. - **4**
  - Airline - 2
  - Cargo - 1
  - MRO - 1



CFM56 Combustor  
Stereo Measurement



# Does your borescope inspection training program require some type of recurrent training/qualification?

## a. If yes, how often:

- 1 Year – **1** (Airline)
- 2 Years – **3** (2 Airlines, 1 MRO)
- 3 Years – **3** (1 Airline, 2 Cargo)

## b. No - **8**

- Airline – 4
- MRO – 4

## c. Not applicable - **1**

- Airline - 1

## d. Other

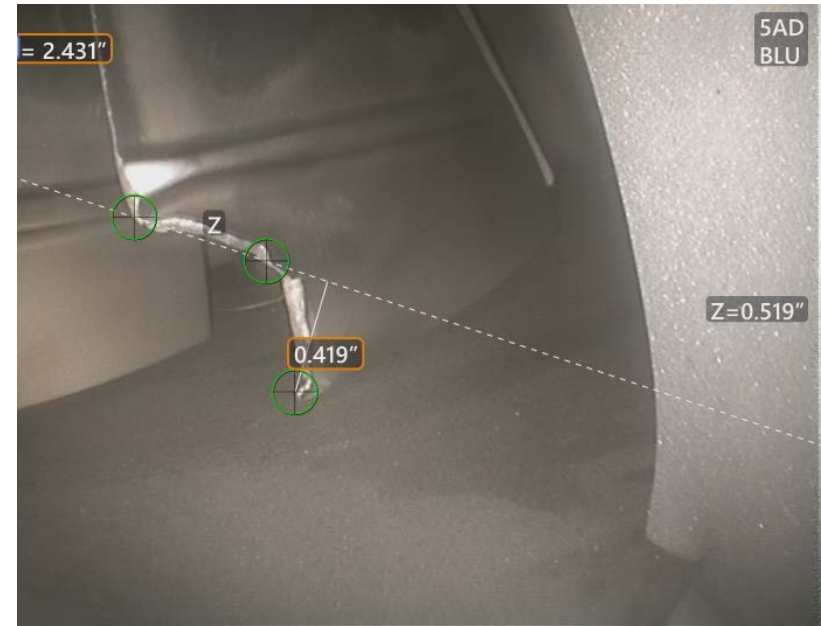


CFM56 Combustor



# Who is qualified to perform borescope inspections within your operation?

- a. Mechanics - **0**
- b. Inspectors - **5**
- c. Designated personnel - **4**
- d. Other - **7**
  - NDT personnel - 1
  - Mechanics & Inspectors - 1
  - Inspectors & Designated personnel - 5

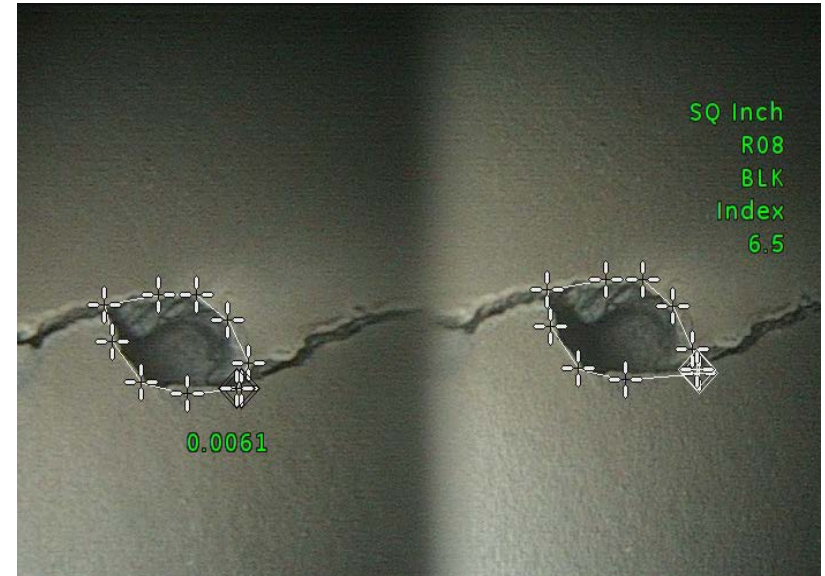


CFM56 Compressor Blade LE



# What type(s) of borescope inspection equipment is used within your operation?

- a. Rigid fiber-optics with separate light source - **6**
- b. Flexible fiber-optics with a separate light source - **5**
- c. Video borescope without measuring capabilities - **8**
- d. Video borescope with measuring capabilities - **15**



CFM56 Combustor  
Stereo Measurement



For borescope inspections with results beyond limits requiring engine removal; does your operation have a procedure for reviewing/confirming results?

- a. No – The person who performed the borescope makes the final determination - **2**
- b. Yes – results are reviewed/confirmed by a supervisor or manager - **3**
- c. Yes – results are reviewed/confirmed by engineering - **14**
- d. Yes – results are reviewed/confirmed by a designated committee - **0**



CFM56 Oil Wetting  
Cabin Odor



# The role of engine borescope inspections

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## Why borescope?

- Gain information at normal intervals for condition monitoring.
- Provide information to help determine serviceability after abnormal operations.
- Establish repair work scope, maintenance program adjustments, operation practices.

## What are the expectations?

- Inspectors must know the engine components, correct access, maintenance documents.
- Inspectors must practice proper borescope equipment care, handling and usage.
- Inspectors must be able to accurately document and communicate results.



Thank You!

Questions?