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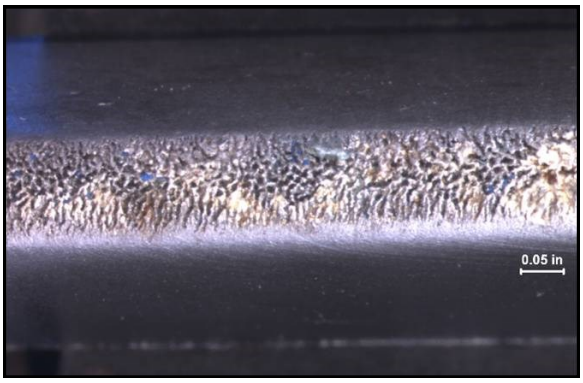
Combustion Turbine Compressor Condition Assessment



- Erosion Channeling Assessment
- Corrosion Pitting Assessment
- Deposit Analysis

Determining the condition of compressor components, with knowledge of fleet issues and risks, can provide valuable information on the suitability for continued service in its current condition. Typical mechanisms of degradation are erosion channeling and corrosion pitting, resulting in corrosion fatigue, and/or high cycle fatigue. Any of these conditions can progress to cause catastrophic failure. A tailored combination of appropriate replication, NDE, and visual examination can define the condition of the component and allow a planned approach to repair or replacement to avoid forced outages.

Mold Replication

GE TIL 1603, requires leading-edge dental molds for F-class R0 non-enhanced parts; however, dental molds are typically not required for enhanced R0s. Mold replication by a suitable NDE group, followed by the mold assessment, will provide an estimation of erosion channeling depth. Erosion channeling, if deep enough, can be a risk for fatigue crack initiation. Mold replications are also performed on other OEM compressor blades and vanes that operate in environments with water droplet impingement.

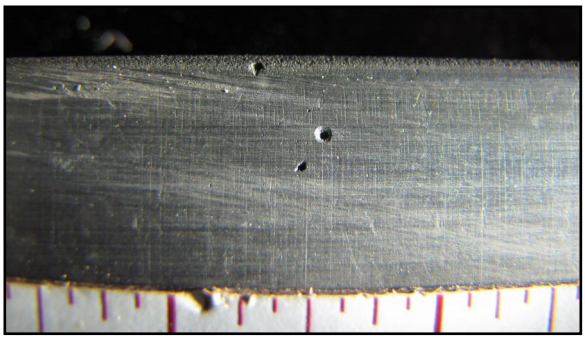
Corrosion Pitting Assessment

Corrosion pitting also creates localized blade and vane stress concentrations that can initiate cracking due to corrosion fatigue, particularly if the pitting occurs near a nodal point of known blade excitation. Corrosion pit depth can be estimated by the width of the pit and an assumed aspect ratio; however, accurate replication does not work with corrosion pits due to imbedded, tenacious deposits.

On compressors with erosion channeling or corrosion pitting, Fluorescent Penetrant Inspection (FPI) is also recommended for crack detection, if present.

Scale and Deposit Analysis

Scaling and deposit build-up can reduce efficiency by acting as barriers to heat transfer, promote corrosion by acting as concentration sites for corrosive species, or can result from corrosive attack. Samples are collected during on-site inspections and taken back to our laboratory for analysis. We employ energy dispersive X-ray spectroscopy and powder X-ray diffraction to identify constituents in a sample. Scale and deposit analysis can determine the nature, sources, and effects of deposits. We then suggest steps you can take to mitigate their formation.



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