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Alleviating the Effects of Corrosion Pitting

Fatigue Crack and Failure Prevention in Pitted Components

Supported by:

LAMBDA Technologies Group

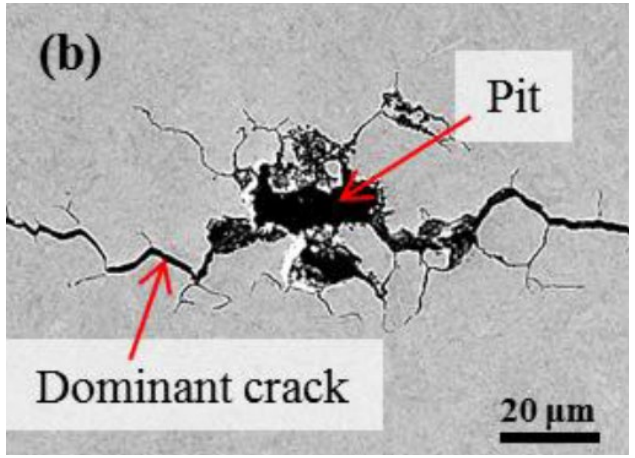
Detrimental Effects of Corrosion Pitting Damage

- Caused by corrosive gases or acidic steam
- Typical limiting corrosion damage: <0.01 inch (0.25 mm)
- Appears as pits or grooves
- Fatigue cracks initiate and grow out of these corrosion pits

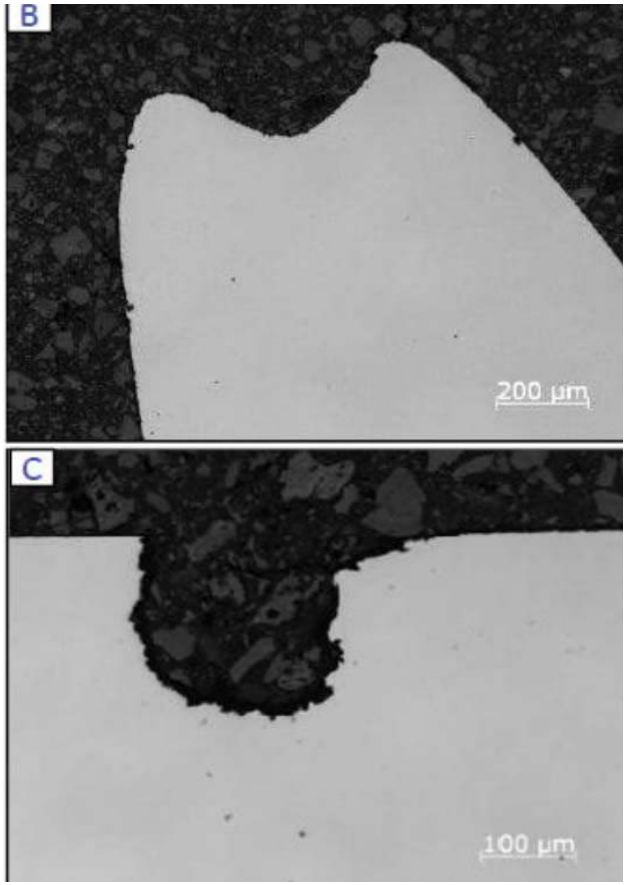
Consequences

- Potential catastrophic failure
- Premature retirement from service
- Frequent Inspection

Corrosion Pits on the Leading Edge of Compressor



Cross-sectional View



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Common Treatments

- **Avoid/Minimize corrosive gas and fumes ingested into the turbine engine through changes in design or operations – changing engine design or operations could be cost-prohibitive**
- **Frequent inspection for pitting corrosion damage – very difficult for components with low damage tolerance; limitations on frequency of inspection and difficult methods of inspection**
- **Blending the corrosion damage to remove stress concentration – Engine downtime, also loss of engine operation efficiency**
- **Use of corrosion protection coatings – local breakdown of coatings would exacerbate the problem**
- **Replace parts frequently – Increases total ownership costs**

These treatment methods aim to minimize effects of corrosion pitting damage, with varying degrees of success.

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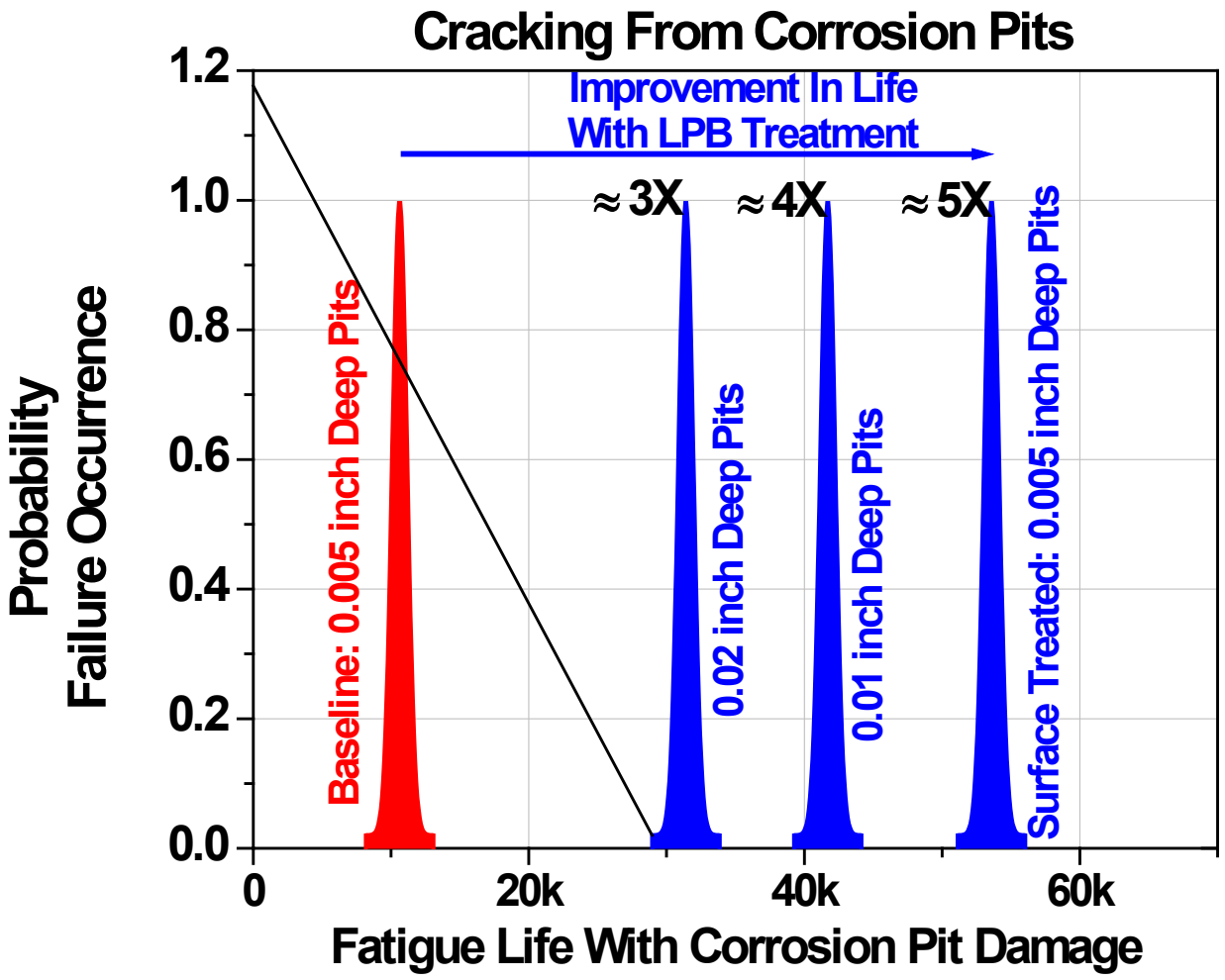
Designed Compression



Benefits

- Extend Component Life
- No Material Replacement
- No Redesign
- Improve Damage Tolerance
- Reduce Risk of Failure
- Improve Cost Savings

Improve Damage Tolerance with Designed Compression

A Cost-Effective Solution to Mitigate the Effects of Corrosion Pitting

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