

# Combustion Turbine Life Management Programs

## GE E-CLASS TURBINE ROTOR



### Applicability:

This life management program is for owners of all GE E-Class combustion turbines including models 6B, 7B/C/E/EA and 9B/E machines.

### Purpose:

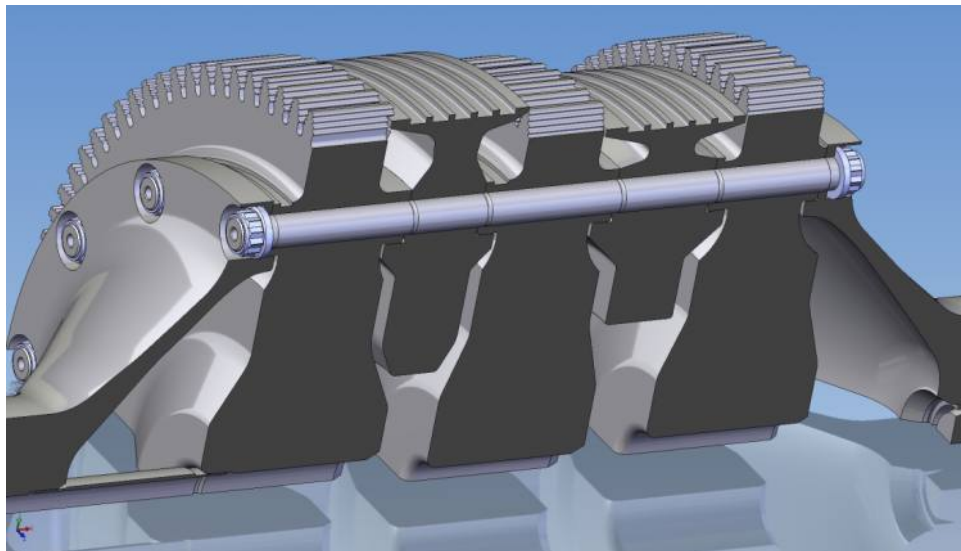
The E-Class Turbine Rotor Life Management Program provides owners with engineering facts with which to base maintenance decisions. This program is intended to address rotors with high number of starts and/or high number of hours of operation associated with mature rotors. This program is offered to owners as an alternative engineering evaluation option to the manufacturer's arbitrary replacement rules. It is expected that the engineering details available in this program will result in more cost effective solutions for E-Class rotor owners.

### Background:

Turbine rotors are highly stressed, safety critical systems. Exposure to the high temperatures and cyclic strain result in creep, embrittlement and fatigue material damage. The component material degradation may lead to a rotor burst, resulting in damage or injury to the turbine, facility and personnel.

The current published data by the manufacturer in GER3620, ETC068 and TIL 1576 indicate that the E-Class rotor life is 200,000 factored hours and 5,000 factored starts. The absence of manufacturer's maintenance factors for these rotors precludes calculations of factored life. The TIL also predispositions the rotors indicating that no additional life extensions are available from the manufacturer for starts based units.

The E-Class Turbine Rotor Turbine Life Management Program provides owners with maintenance factors and engineering assessments which reflect the specific operating profiles unique to their plant. This information supports maintenance risk decisions based on engineering knowledge of their components.



7EA Turbine Rotor Engineering

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### Deliverables:

- Critical component, location, stress, temperatures and life predictions
- Component material degradation rates and mechanisms
- Damage tolerance and consequences analysis
- Maintenance disassembly and inspection engineering support
- NDT options, requirements and recommendations
- Unit operating history impact on component life mechanisms
- Risk of continued operation and Insurance engineering support

### Methods:

The program methods are based on a phased approach to provide owners with a progressive increase in complexity to satisfy immediate and future needs. Early answers provide owners with information necessary to support rapid planning and scoping decisions. Later program phases increase the detail to support individual component recommendations and risk dispositions. The approach also provides owners with early access to a supplemental engineering team familiar with life management issues and solutions. Methods include:

- Correlate plant operating and component history with known life maintenance factors
- Dimensional and condition assessment of components
- Material evaluation of critical properties and service degradation analysis
- Stress and temperature analysis of system components identifying limiting locations
- Life analysis for components including risk, damage tolerance and consequences
- NDT recommendations for inspection methods and criteria to maximize life management

### Credentials:

The program team includes engineering experts in combustion turbine design, materials, service maintenance repair and inspection. The team has an extensive combined experience of over 100 years. Members include former OEM Chief Engineer, engineering managers, and metallurgists.

### Contact:

For additional program details on how we can improve your maintenance management

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