

Rotor Life Management

Advanced, OEM engineering assessment, inspection, and repairs to enable operation beyond original design life

Copyright 2022 Baker Hughes Company. All rights reserved. The information contained in this document is company confidential and proprietary property of Baker Hughes and its affiliates. It is to be used only for the benefit of Baker Hughes and may not be distributed, transmitted, reproduced, altered, or used for any purpose without the express written consent of Baker Hughes.

— OUR VALUE PROPOSITION

**We deliver advanced repairs
to maximize total lifecycle
for energy players.**

Add years to your rotor's life

Advanced condition-based solutions

Rotors are the highest-energy components in a gas turbine. They're critical to performance and subjected to extreme mechanical stresses and high temperatures over their operating life.

Their integrity can be negatively impacted by operating issues such as corrosion and undetected vibration. But even normal operation will gradually diminish their structural integrity over time.

Each rotor is designed for a finite lifespan measured in factored fired hours (FFH) and

Engineering assessment

factored fired starts (FFS). Exceeding the recommended design life, or not adhering to specified inspection intervals and maintenance activities, can put your turbine at risk of failure that could cause extensive damage to it and adjacent assets—and serious injury to your personnel.

But every turbine's operating life is unique, so it is possible for a rotor to safely and effectively operate beyond its original design life—if the proper assessments and preparations are performed.

Inspection and repair



Advanced, condition-based solution

The specialized Baker Hughes **Rotor Life Management** (RLM) service is the best way to determine if your rotor meets the requirements, or if specific repairs could enable extended operation. RLM combines inspection results with a dedicated design analysis based on the actual condition of the rotor, specific unit configuration, operating history, and prior maintenance history at the inspection interval.

Key benefits

- Possible life extension up to two
- major inspection cycles
- Reduced operating costs through
- proven life-extending repairs
- Reduced or postponed CAPEX by
- avoiding current rotor replacement

Components covered

- Turbine wheels
- Shafts
- Compressor disks

Compressor blades are typically removed to allow a complete analysis of the disks.

Turbine buckets, cover plates, and consumable parts (bolts, nuts, twist locks, tie rods, damper pins), will be maintained or replaced as determined by the RLM assessment.

Applicability

The RLM service can be performed on a range of gas turbine models, including:

- Frame 5/1 N-P-PA
- Frame 5/2 B-C
- Frame 3/2 J

Please contact us to verify its applicability to your machine or other frames.

Engineering assessment

We have robust knowledge of rotating equipment design and specification, and a strong technical heritage for machine maintenance. Connection to our iCenter analytics and other networked digital services feeds operational and condition-based data to continually improve our in-house, risk-assessment capabilities.

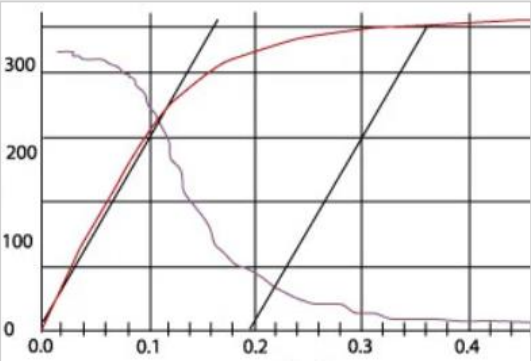
Operational history



Maintenance practices



Material properties



Model development



Inspection and repair

We will perform a rotor inspection, including disassembly and complete teardown of the rotor, in an authorized Baker Hughes service shop. This enables thorough analysis of all rotor components in both compressor and turbine sections. The analysis is performed by a fully certified and highly experienced OEM inspection team, using advanced algorithms and material data to identify potential subsurface defects that may have developed during operation.

Disassembly and nondestructive tests

- Dimensional inspection
- Fluorescent penetrant inspection
- Hardness test of turbine and compressor disks
- Magnetic particle testing
- Ultrasonic testing
- Boresonic testing of disk bores
- Eddy current testing
- Array eddy current testing
- Metallography/replication of turbine and compressor disks

Repair and assembly

- Servicing (coating)
- Manufacturing replacement parts
- Restacking
- Balancing

RLM Service Centers



How to request a RLM Service

We're available for any technical inquiry about rotor life.

Please contact us to verify its applicability to your machine or other frames.


Contact

Francesca Sonnuti – commercial focal point
 Florence, Italy
francesca.sonnuti@bakerhughes.com

RLM support team:
oilandgas.rotorlife@bakerhughes.com

The RLM service is based on specific rotor condition.

Please download and complete this spreadsheet and email it to us for review.

 Rotor life Management - Operating History
 Data request form

GENERAL DATA	VALUE	ADDITIONAL NOTES
GT model		
Customer name and site		
HP or LP rotor ?		
GT serial number (list all S/N where the rotor was installed)		
Field project engineer (contact person)		
Original job#		
Most recent service job number, if known		
Customer train code (list all trains, where the rotor was installed)		
Serial numbers of rotor and parts (e.g. shafts, disks, spacers, turbine wheels)		
Non-standard manufacturing details of rotor (e.g. non conformities, non-standard configuration, if any)		
Past repairs on the rotor, if any?		
Date of rotor commissioning (COD) / rotor's first run		
Can the Customer provide the past inspection reports?		
All rotor parts (exp. blades) original or replaced? (if yes, which ones?)		
What is the Customer's expectation from RLA / RLM?		
RLM or RLA or other ?		
Where RLM / RLA to be executed?		
Will the rotor be reinstated in same train or the other?		
Is the entire rotor under the RLM / RLA?		
What is the operational profile of this unit? (e.g. Baseload / partialload, peaker / continuous)		
Has the unit experienced the below conditions, when operating with this rotor		
-- Overfiring (beyond alarm)		
-- Overspeed (with the train trip)		
-- High vibration levels/peaks (beyond alarm)		
Planned or in progress any upgrades on the train?		
What is the unit combustion system? (e.g. SAC/OIL, if water injection add comment)		
Operating cycle		
Mechanical drive / generator drive ?		
Rated loading of the GT		
Fuel type (if non-standard natural gas, provide composition)		
Any non-IH or non-OI hardware has been used in the unit or is planned to be used in the unit?		
Applicable only to MS3002: What are the value of clearance at the bearing #2 labyrinth seal (Items XD, XE, XH, XJ as on SCM02806)?		
OPERATING DATA SINCE 1st INSTALLATION		
Total Fired hours		
Total starts		
Total trips		
Any 3S event reported (heavy overspeed) with control system locking?		
CYCLE AND CALIBRATION DATA-SET	Field data/IA	



Download and complete the Excel spreadsheet



Email the revised XLS containing your information

Follow our journey



bakerhughes.com/turbomachinery-services/advanced-repairs



@bakerhughesco



Baker Hughes

Baker Hughes 