

Rotor Management Solutions

Service Solutions that Enhance Reliability and Operational Flexibility

PSM assists gas turbine power plant customers achieve their business and profitability objectives.

Rotor Management Solutions

Capitalizing on a portfolio of rotor and blading design upgrades and full 3D steady state and transient analysis models, PSM offers a comprehensive exchange rotor service. With a PSM Lifetime Extension (LTE) rotor, you can minimize downtime and optimize your capital investment.

Capabilities

- + Unstack and deblade.
- + Reblade and tip grinding of new blades.
- + R0 retention plug modification*.
- + Compressor clocking optimization.
- + Patch ring repairs.
- + Complete rotor structural analysis to support repairs.
- + Proprietary design flared and unflared compressor blading with reliability improvements*.
- + Seed rotor to support the rotor exchange program.

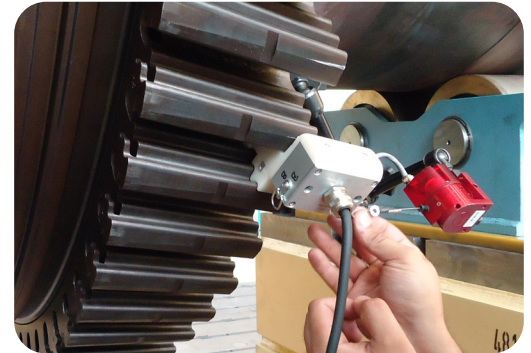
*F-Class Frames only

Rotor Lifetime Extension (LTE)

PSM's Rotor LTE program can significantly extend the useful life of your rotor. Advances in computing power, material properties, fracture mechanics methodologies, and inspection techniques now allow us to assess the potential to operate rotors beyond their original design limits. The LTE program is enabled by:

- + Advanced non-destructive inspection techniques to detect surface and volumetric flaws.
- + Full rotor material characterization.
- + Comprehensive 3D Finite Element Analysis (FEA) models for thermal and structural analysis.
- + Inspection results and operational history integrated back into the FEA Model.

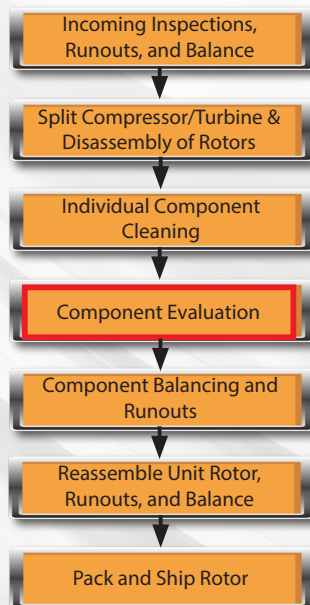
Any identified flaws are analyzed, and a detailed report on the predicted remaining rotor capability is generated, empowering owners to make informed decisions about their rotor assets. Optional rotor modifications designed to extend rotor life in known life-limiting areas are available.



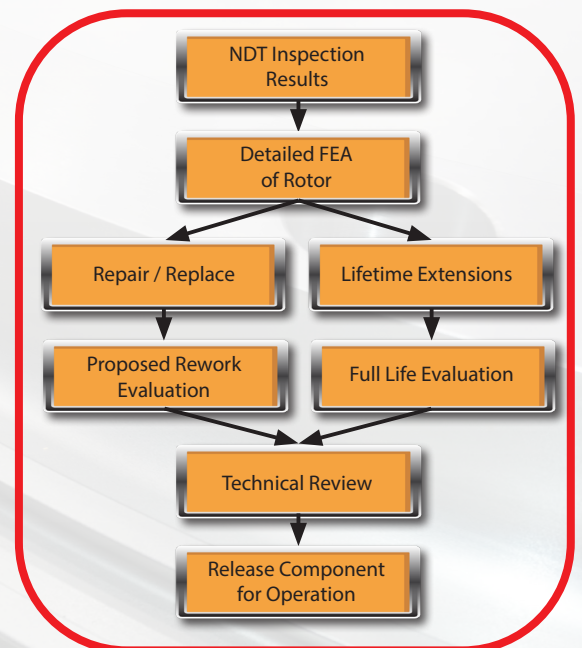
ROTOR BEING TESTED



PSM SEED ROTOR INSTALLED WITH NEW ROW 9-17 COMPRESSOR WHEELS



Component Evaluation



Rotor Exchange Program – ‘Seed’ Rotor Program

- + Designed to help manage customer’s inventory costs and hardware needs.
 - » Allows users to manage outage schedules without unnecessary inventory costs.
- + PSM exchanges the used rotor, regardless of condition, with our ‘seed’ rotor.
- + PSM is responsible for any replacement parts or repairs the used rotor may need.
- + Full unit rotor available for exchange.
- + Tailored to customer’s specific configuration.
- + New bolting, new compressor blades.
- + Optional anti-corrosion coating.
- + Offers 2x intervals of remaining life before the next rotor LTE is needed (baseload or peaking).

Example Design Solutions Available

PSM offers replacement spindle bolt designs that address observed failures in the 501F fleet. Our solution includes changes to both the bolt and nut, as well as an improved assembly procedure.

Belly band enhancements feature:

- + Material upgrades.
- + Wear coupling integration.
- + Refined installation procedures.
- + Redundancy measures against cooling air leakage.

PSM’s Compressor Wheel O (CWO) incorporates a new dovetail profile, reducing stresses in known crack-prone areas. This recontoured dovetail exemplifies a LifeMod solution applicable during repair for CWOs without existing cracks.

We provide in-situ blend, polish, and peen services for the first turbine disk cooling slot. Additional life-enhancing solutions are available upon full destack.

F-Class Frames Only:

New Turbine Components

PSM is a pioneer in the aftermarket with the new Stage 1 Turbine Wheel!

- + Features include an upgraded nickel alloy with a recontoured slot to address known field issues with OEM-style slots.
- + For existing OEM turbine wheels, PSM offers our CoolMod, which mitigates the risk of cracking and potentially extends life without replacement.

PSM’s Upgraded 1-2 Spacer

- + Features upgraded nickel alloy and an improved drop-in compatible design configuration to address limiting factors, particularly affecting starts-based units.

For additional rotor solutions, consult your PSM representative!



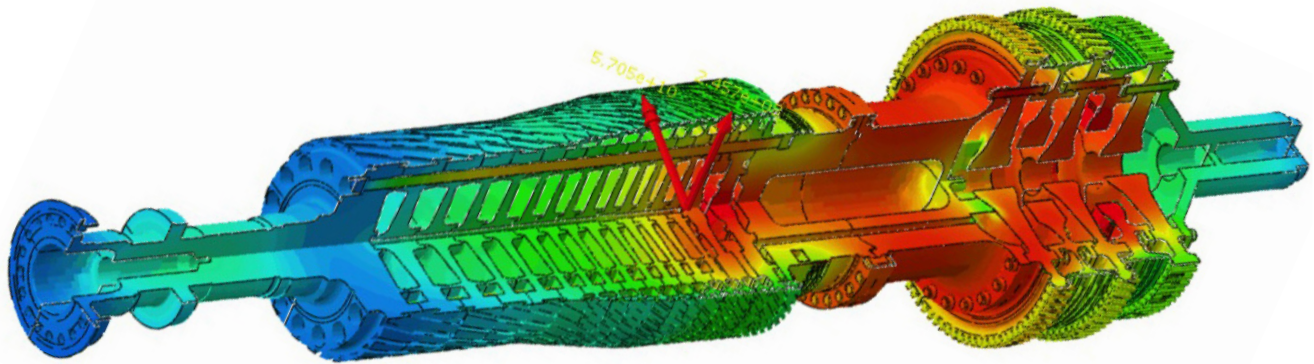
TURBINE ROTOR IN STACK

PSM - A Hanwha Company

The growing interest in the hydrogen economy is driven by the need to address climate change and transition to sustainable energy sources. However, challenges remain, including high production and storage costs, and extensive infrastructure requirements for distribution and transportation.

As a Hanwha subsidiary, PSM is uniquely positioned to leverage the expertise and resources of the Hanwha family to accelerate hydrogen development and adoption as a clean energy source. Hanwha's global presence and diverse business interests in areas like solar energy and defense provide PSM access to a wide array of technologies, markets, and partnerships.

Collaboration with Hanwha Q CELLS, a leader in large-scale solar projects, enables PSM to integrate hydrogen production with solar energy systems, fostering more sustainable and efficient energy solutions.



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