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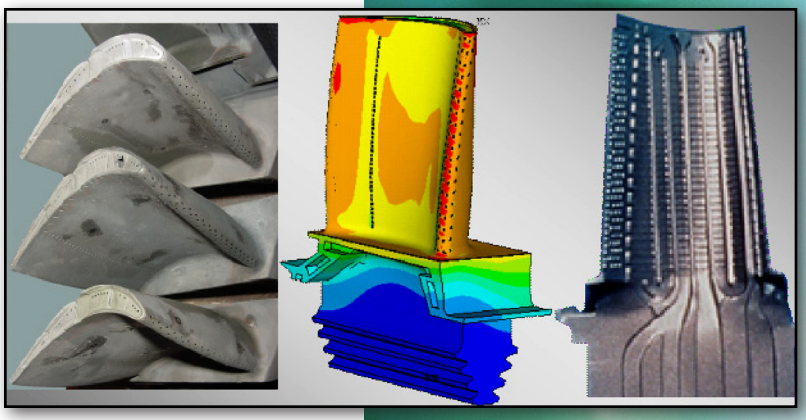
Success Story

Salt River Project Uses Combustion Turbine Repair Guidelines to Optimize O&M



Repair Guidelines Address the First Stage Blade Refurbishment to As-Designed Conditions.

Salt River Project (SRP) has used EPRI's model-specific Combustion Turbine Repair Guidelines to establish repair criteria for use in competitive bidding of O&M contracts and for evaluation of completed work. The Guidelines help SRP determine that repair procedures are sufficient to provide reliable duty and enable the utility to reduce O&M costs over the life of the turbines.

SRP – A 2009 Technology Transfer Award Recipient

"This is a great example of how EPRI products can help the bottom line."

Robert LaRoche,
Principal Engineer – Generation, SRP

Specialized Gas Turbine Technology

Gas turbine combustion components and the downstream hot-section vanes and blades are routinely inspected, refurbished, and replaced. The cost of extensive maintenance associated with the gas turbine life cycle can exceed the initial equipment cost by as much as a factor of three. Each model type has design-specific features that require specialized knowledge to effectively manage machine O&M. For instance, each turbine model has unique blade designs made of superalloy thin-walled castings, requiring complex internal cooling, oxidation, and thermal barrier coatings to survive in a high-temperature environment. Managing the O&M of these machines is made even more challenging by the durability issues brought on by extensive cycling service common in many units.

Faced with such specialized hardware, gas turbine owners, such as SRP, desire to reduce O&M expenses without increasing risk by optimizing all the activities and costs related to the inspect/repair/replace life cycle. To meet this goal, SRP seeks model-specific, objective knowledge of the component design, repair procedures, and degradation mechanisms encountered in their units.

EPRI Series of Repair Guidelines

For more than a decade, EPRI has been developing gas turbine hot-section component repair and coating guidelines to assist utilities in the refurbishment of these critical and expensive parts. Today, EPRI's 17-volume set of model-specific repair guidelines addresses the refurbishment processes for combustion system liners and transition pieces, and hot-section vanes and blades. Each year, new and updated volumes are added to the repair series, capturing advances in the refurbishment process and the evolution in design of component features. Guidelines now exist for a variety of conventional and advanced General Electric, Siemens/Westinghouse, Alstom, and Mitsubishi heavy-frame gas turbines.

The repair guidelines are all assembled in a standard format that includes scope, definitions, applicable documents, general requirements, technical requirements, processing requirements,

and quality requirements. Contained within these sections is detailed information on the minimum requirements for microstructural characterization, damage and dimensional inspection, stripping, mechanical properties, appearance, quality assurance, welding and coating procedures, and heat treatment. EPRI has worked closely with several repair vendors to develop and refine each guideline to ensure that the information contained in each is consistent with today's repair practices. The technical issues addressed in the Guidelines are equally relevant to both OEM and independent repair service providers.

O&M Sourcing across SRP's Fleet

Rather than depending solely on OEMs for the repair and refurbishment of its gas turbine fleet, SRP manages its own O&M by utilizing a variety of vendors. To aid them in specifying the scope of work and ensuring the quality of completed projects, SRP uses the EPRI Guidelines for the General Electric 7FA and Siemens 501F gas turbines in the company's fleet.

The Guidelines help the utility draft specifications for the competitive bidding process, establishing a uniform expectation of repair adequacy. The Guidelines, thereby, enable SRP to achieve the best quality of repair services, avoid unnecessary replacement, and minimize outage costs. The savings across the SRP fleet have been substantial.

According to SRP's Robert S. LaRoche, "Utilization of EPRI combustion turbine guidelines has provided a solid foundation for competitive bidding of advanced gas turbine components, saving SRP a significant amount of money, reducing repair turn times, and maintaining quality."

Related EPRI Work

Combustion Turbine Guidelines: Conventional and Advanced Machines, Volume 3: General Electric MS7001 Model F/FA. EPRI, Palo Alto, CA: March 2004 (1005034).

Combustion Turbine Repair Guidelines, Volume 6: Siemens 501FD2. EPRI, Palo Alto, CA: February 2008 (1016380).

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