# RMS TOTAL TEAM EFFORT SAVES DR61 POWER TURBINE USER MONTHS OF DOWN TIME

*By Robert J. Klova, P.E.*

A North American Dresser-Rand DR61 power turbine user experienced an unexpected turbine failure. Rotating Machinery Services was called in to get the turbine back on-line as quickly as possible. On an emergency breakdown basis, RMS manufactured a replacement for the failed part, mobilized a field crew, performed a shop repair and overhaul of their rotor, and reinstalled it in less than three weeks' time. The DR61 was restarted successfully at very low vibration levels. It took a complete team effort on RMS' part – field service, purchasing, shop and engineering, working closely with the customer's experienced maintenance team.

*Figure 1*

*Figure 2*

The problem was caused by a heat shield that came free from its mounting point behind the second stage disk, heavily rubbing the disk and blades, and destroying the heat shield. The customer needed a new heat shield in the shortest possible timeframe. With our strong supplier relationships, RMS' seasoned Purchasing department was able to source a new Inconel 600 fabricated heat shield in one weeks' time.

This would have been just in time to reassemble the power turbine – but that was not to be. Inspection of the removed rotor by RMS' on-site engineer revealed that the blade lockwire tabs were rubbed so heavily that blade fixity in the disk could not be guaranteed. RMS recommended a partial shop overhaul of the rotor, including the repair and use of second stage blades from a damaged rotor stored on-site. Based

upon site inspection of both rotors, RMS put together a plan and estimate to perform a four day repair in our shop, working around the clock.

The rotor was completed in the promised eight shifts, and shipped back to the field, in spite of several unanticipated findings. Primary among these was the extensive work required to remove the rub damage from, and save, the Waspaloy second stage disk – an expensive and long-lead part. Hardness readings revealed a softening of the disk material along nearly the entire disk aft surface. Without experienced engineering review, and working hand-in-hand with skilled shop personnel to carefully remove material and monitor hardness levels, this disk would not have been suitable for re-use. A company with less experience at dealing with this type of damage might have declared this disk scrap, or returned it to service in an unfit condition. After repairs and assembly, the rotor was precision balanced by RMS specialists, each with over 30 years of experience. The end result is that the rotor was re-assembled into the power turbine, and started with 0.6 mils of vibration at both ends. Most helpful in the field efforts was a highly experienced customer maintenance group, whom worked very closely with the RMS field crew.

As a follow-up, RMS has developed an innovative mechanical repair for the damaged second stage blades, which should save our customer the high cost

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