



Case Study
30 MW rotor repair

Status report

- After start up in the process of opening extraction a transient surge took place and the plant tripped.
- On opening, major damage to the rotor, found damaged and one blade in row 5 broken.
- Consulted number of companies none of whom were able to give a concrete recommendation



Further inputs

- There was no consistent report of the reason for failure.
- First interaction with customer at SASTA 2013
- *OEM refused to repair rotor, classified the same as 'beyond repair'*
- Customer had explored many repair options by then including number of OEM's
- Based on sequence of failure, confirmed same rotor will work riding on our confidence of handling over 2500 turbines worldwide
- Inspected the turbine at the supplier works in Durban and reinforced our position
- Invited customer to visit our works and review our capabilities which they did.



Challenges

- To establish quickly RLA of rotor
- Ship in 3 months from order to enable customer save huge Insurance costs.
- Find special materials at short notice to match original rotor specs
- Review of root integrity to establish corrosion effect and ability to handle centrifugal stresses during operation
- Delay of 15 days in packing by our partner in South Africa further compounding time loss

Confidence building

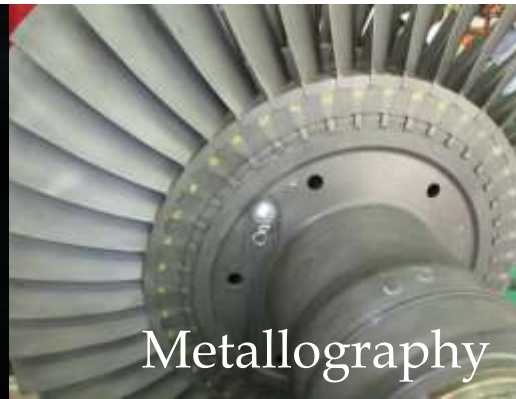
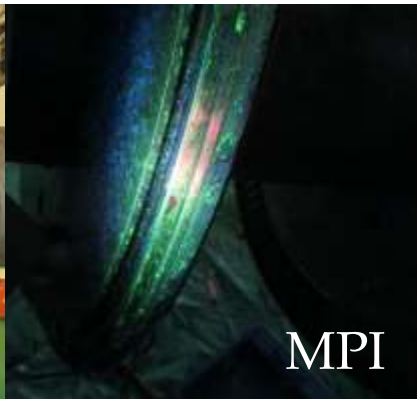
- Confidence by interaction with our Engineering team at Bangalore on procedures.
- Capability of RLA and NDT processes to establish the rotor life
- *Restructured the deal to allow for repair of rotor at no cost*
- *Provide our engineer at no cost during for commissioning*
- Support to partner for start up of TG Island under our supervision

Solution

- Detailed engineering study carried out to establish integrity of the rotor
- To carry out all the required tests to establish the life of the rotor. This would enable establish the way forward on the project

Steps

- RLA,NDT,MPI,DPT
- De-blading
- Shot peening
- Surface inspection
- Reverse engineering
- Blading
- Blade locking
- High speed balancing



Tests carried out to establish integrity and life of rotor

Project completion process



Rotor surface subject to rust and corrosion



Surface post cleaning cleared for processing



Blading in progress



Reverse engg. of blades on state of art Carl Zeiss CMM



Blade locking arrangement, a critical activity



HSB on Schenck pedestals

Post completion process

- Shipped out 10 days before the 31st Mar'14 deadline.
- Arrived at airport Joburg and caused serious panic due to lack of knowledge of international clearing processes of local partner
- *Detailed the complete process building confidence with the customer to ensure proper clearance*
- Confirmed to confidence that the turbine start up will happen on 31.03.14 under our guidance which did happen !



Plant after start up and synchronization

Customer speak

“This left just over 3 months to transport the TA rotor to the Triveni workshop in Bangalore, effect the repairs, transport the rotor back to Swaziland and commission the TA successfully. The fact that we were able to succeed in this very difficult task is testimony to the customer focus and professionalism, not to mention very high levels of competency, that exist in Triveni, as well as their partner in South Africa, RTS

I will admit that there were times when I doubted whether we could pull this effort off, but we did succeed and I am especially pleased because this validated our decision to award the contract to Triveni, in the face of some doubts. Triveni now has a good name at and we have not held back extolling the company's virtues to whoever will listen. What Triveni did in assisting in a very difficult situation

Current Status

- Due to continuous issues post commissioning, turbine has been running off and on
- There was a request from customer to depute our specialist to review the performance and train the operating team
- Senior Manager deputed at short notice.

WE CARE