



Turbo Engineering Services

An ISO 9001, ISO 14001 & BS OHSAS 18001 Certified Company

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Bulletin-15

Scope: Repair & Reconditioning of TRT G-Blast Rotor 8MW SHAANGU, CHINA make.



Rotor as received condition



Rotor after repair with new blades in assembled

Rotor: Moving blades leading & trailing edges were badly damaged by solid particle erosion, mechanical hitting and zigzag bent condition. Front drum and carbon seal areas observed heavy rubbing condition and all front & rear sealing fins were bent condition. Old blades were removed by drilling taper pins in horizontal boring machine. Front drum removed by induction heating.



Blades removal by drilling Front drum removal by Induction heating

Moving blades: Raw material ingots were procured from reputed steel supplier and forged to required sizes followed by quality checks ultrasonic testing, chemical & mechanical properties, microstructure and hardness. Forged blades were undergone various manufacturing stages in CNC, wire cutting machines confirming to in-process inspection by QC. Special coating was carried out on profiles to withstand erosion resistance during operation.

Re-engineering of blades were carried by 3D scanning on best old blades, drawings were developed in AutoCAD&3D software. Again 3D scanning inspection was carried out on new manufactured blades and compared w.r.t designed profiles.



After Blades removed



Forged Blades



Blade profile milling in CNC



Blade root wire cutting



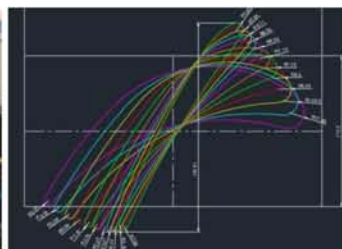
Coating on blades



Blades after coating



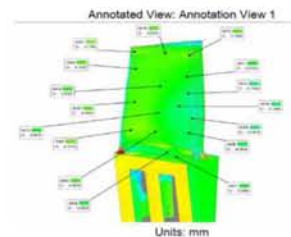
Old blades 3D scanning



Final Profile design



New blades 3D scanning



3D inspection of blades



Holes drilling & Reaming



Blades assembled



Pins assembled



Blades NFT checking

Blades assembly: The blades were assembled on rotor followed by tip grinding and NFT inspection. New Front drum, carbon seals & sealing fins were also assembled on rotor and final machining was carried out to maintain design values. High speed balancing was carried out at 3000rpm in vacuum tunnel including OST tripping.



Blades tip grinding, Journal burnishing



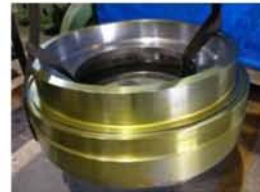
Regulating ring with Rollers & pins assembled



Old carrier inspection



Carrier with new blades



New front drum



Carbon glands inspection



Oil glands inspection

Carrier & Internals: Old carrier observed with erosion at blade passage areas and at stator blades location. The blades were drastically eroded and one blade broken at root portion. Carrier was thoroughly blue matched and assembled with new PP fasteners. Min. skim cut was taken at carrier inner surface and at holes location for bush fitment. Carrier was assembled with new stator blades and other accessories supplied by customer.

Other internal spares like front & rear sealing sleeves, Carbon glands, Oil glands, Thrust pads, Tripping lever were manufactured for site assembly. Repair of regulating ring with new rollers & pins were assembled.



Sealing sleeve casting



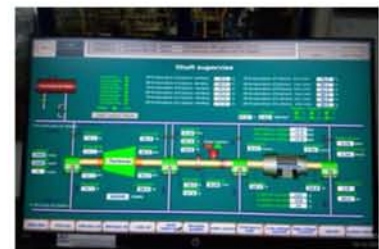
New sealing sleeve machining



Rotor assembly checks in casing



Turbine boxing up



Operating parameters

Site assembly: Refurbished TRT Rotor, Carrier and other manufactured components were assembled at site maintaining axial & radial clearances to design values. The turbine was commissioned and successfully running at full load, observing other parameters were within the limits. Customer is very much satisfied especially M/s TES executed above project without OEM support and provided appreciation letter.

Customer also awarded similar one more TRT rotor & carrier of H-blast for repair including supply of Blades.



Dt: 19.08.2020

APPRECIATION LETTER

M/s TATA Steel Ltd., Jamshedpur awarded orders for Overhauling, Repair & Reconditioning, Manufacturing & Supply of spares for G-Blast TRT turbine, Shaangu-China make to M/s Turbo Engineering Services, Hyderabad vide POs: 2100 570368 & 3000 128136.

TES has manufactured the moving blades R1 & R2 rows by developing the manufacturing drawings by Re-engineering method and assembled the same in their workshop. After refurbishment, the rated speed dynamic balancing of the rotor was carried out in vacuum tunnel.

The same was installed in the turbine by TES at site and successfully commissioned on 16.08.2020

We appreciate the efforts & initiative of entire team of TES involved in completing this prestigious project for making it successful.

During the execution of job, they have followed all the required standards including stringent quality control checks from the raw material stage to till completion of job.

M/s TATA Steel is very much satisfied with the job done by TES without any OEM support.

Regards


N Rajesh Kumar

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