



Steam Turbine without insulation



Generator re-wedging.



Turbine without case

Overhaul of a 28 MW Austrian-Design Steam Turbine

In October 2003 PT Sulzer Hickham Indonesia received an order to perform an on-site steam turbine overhaul. This 30 Mw unit had been shut down since 1997. The scope of the work was to perform mechanical and electrical inspections, inspect and calibrate controls and get the unit ready to operate at load as soon as possible.

The 30 Mw European-manufactured steam turbine and generator set was shut down when the large pulp and paper plant was closed during the Asian economic crisis in 1997. At that time, the future of the plant was very uncertain so no steps were taken to preserve or otherwise protect the equipment during the closure. Recently, after receiving the go-ahead to resume operations, and with one generator unit already operating, the plant operators wanted to ramp up electrical generation capability to support increased production requirements.

Sulzer Hickham Indonesia developed a plan to accomplish the start-up goals of the customer. A team of local and international experts was assembled and sent to the site where they set about stripping down the unit,

cleaning, inspecting and testing the controls.

The turbine rotor was removed from the casing, cleaned and NDT inspected. Inspection tooling and equipment was delivered to the site in PT SHI's customized field service container. The equipment stored in the container provides for all typical inspection requirements, including full dimensional inspections and minor repairs. The rotor was found to be sound and was installed and assembled in the casing.

During testing of the generator it was found that the Polarization index (PI) was well below the standard and that the wedges in the stator were extremely loose. The loose wedges were replaced and the entire unit was cleaned and dried. Upon completion, inspections after the work confirmed that all readings were within specifications.

The generator rotor was reinstalled in the stator and the alignment process was performed. After the generator and turbine alignment, the exciter rotor was then aligned to the generator rotor and all the couplings were inspected. The unit had a history of severe generator vibration problems,

so extra care was taken during the alignment process to remove misalignment as a possible contributor to the vibration.

The turbine control panel and control oil system was commissioned for testing the operating valves, the generator protection devices, the circuit breakers and all the high voltage cables. With the generator and turbine completely reassembled and coupled together, functional testing of the valves, jacking oil and turning device was performed. Since the unit had been shut down for such a long period of time, considerable time and effort went into blowing down and cleaning all the steam and lube oil piping in order to avoid damage from a build-up rust and dirt.

The unit was started and operated without significant problems including testing of all safety devices. The load was gradually increased over a 24 hour period to 30 MW and is now in service operating at a base load of 20-24 MW.

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