Performance enhancement for steam turbines

A changing market
In a rapidly changing market, more and more customers are looking into cost-efficient upgrades for increasing the lifecycle of their capital equipment and meeting more challenging requirements in terms of performance, manoeuvrability and availability.

ABB’s solution, our customers’ benefits
The Turbotrol® concept for retrofitting power plants is a tailor-made solution, utilizing electrical and mechanical components as well as products of the ABB control system. It ensures a state-of-the-art turbine control system seamlessly integrated into the overall plant.

Situation
Due to phasing out I&C equipment or the wear on mechanical and hydraulic parts, older steam turbine sets often show a lack of reliability and availability, while the major turbine and generator components are still offering a substantial remaining lifetime.

The obsolete hydro-mechanical control and protection system is often inadequate for meeting the stringent demands on quality in the power network. Old fossil power plants accordingly run on base load with disproportionately high costs for operation and maintenance.

ABB can offer the complete range of services and equipment for retrofit jobs:
– Installation of a new turbine control system
– Replacement of the hydro-mechanical control by an electronic speed governor combined with Electro-Hydraulic Converters (EHC) for the actuators
– Implementation of electronic overspeed protection with a fail-safe two-out-of-three tripping device
– Replacement of the HP and/or IP valve actuator
– Turbine supervision equipment
– Renewing of electrical devices like power transmitter, Automatic Voltage Regulator, synchronizing device etc.
– Installation of a unit control system
– Complete services: site assessment including feasibility studies, design, engineering, installation and commissioning.

ABB has developed a modular package that can be put together to create any tailored solution reflecting the status of the current equipment and the performance required for the turbine:
– Handle peak load demands
– Handle primary frequency control
– Fast loading / unloading transients
– Island operation
– Minimized start-up time

State-of-the-art turbine control system
To achieve maximum availability and reliability, the turbine control makes use of a redundant, fault tolerant, fail-safe architecture with a master/slave configuration for closed loop control and up to two-out-of-three voting for turbine protection.

Competence in hydraulics
The ambient conditions inside steam turbines entail stringent demands on the surrounding equipment. We accordingly supply our customers only with field-proven devices improving the reliability of the system.

Our solutions, whether electrical servodrive, low pressure hydraulic or high pressure hydraulic with their own oil supply up to 200 bar, can be integrated in almost all mechanical systems.
Integration as a major task in system configuration

- Multiple available ABB hardware platforms allow optimized integration into existing or future installations of the overall plant DCS (common modules, common tools, common operator station, common spare parts, ...).
- ABB – ONE partner for all your needs, gives you the assurance that all interfaces, either for the mechanics or electronics will be integrated seamlessly and fit together as one – with no extra efforts for our customers.

Increase profitability

Considering the advantages obtained by retrofitting, there is no need to wait until the first malfunction occurs due to obsolete equipment:

- Meet requirements for the UCTE-market
- Produce power for the spot market
- Sell your power for the best price
- Reduce maintenance workload
- Enhance reliability and availability
- Lengthen the life cycle of the turbine to a maximum
- Enable smooth and efficient operation of the turbine at different operating conditions
- Avoid major and expensive damages of the system

Reducing the mechanical work to a minimum is not only a matter of investment costs. The main advantage of this solution will be a short installation time and good return on investment (ROI). This means our customers have an opportunity to deliver energy at higher quality and lower costs in a surprisingly short time-frame.

Based on experience

ABB can draw on more than 40 years of experience in developing, manufacturing, supplying and managing control systems for turbines and power plants with more than 1200 turbine control installations worldwide.

Around the turbine

Solutions for turbines and generators

- Instrumentation and actuators
- Electro-hydraulic solutions
- Control and protection systems
- Auxiliary controls
- Supervision and monitoring systems
- Unit control systems
- Plant management and optimization solutions
- Excitation systems
- Synchronization
- Generator and unit protection
- High current equipment
- Installation and commissioning
- Service and maintenance
- Technical consulting and studies
- Training simulators

ABB – One partner for all your needs
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