



STEAM TURBINE CONTROL SYSTEMS

Governor and auxiliary
control systems for
steam turbine plant

High integrity steam turbine control systems to replace ageing mechanical and electronic equipment.



Turbine Controls Limited

Steam turbine control systems

Standard and bespoke control systems for steam turbines

Steam turbine governor control has in the past been achieved using mechanical devices connected directly to the output shaft. These systems suffer from a number of deficiencies:

- Wear in mechanical components causes drift in the operating setpoints and non-linearity of control
- Regular maintenance is required at high cost
- Low system visibility for fault finding

TCL have developed digital control systems to replace mechanical and analogue electronic equipment.

Typical hardware supplied will include:

- PLC controller, simplex, duty/standby or TMR hardware configuration. Programmed with:
 - Turbine speed control
 - Stress controlled run-up
 - Boiler and vacuum support functions
 - Alarm and trip protection
 - Temperature/pressure monitoring
- Hardwired and PC based HMI
- MPU or eddy current type speed probes
- I/H controllers to interface with existing steam valves

Systems are designed to interface seamlessly with the retained plant. The micro-processor based control provides the ability to provide a number of key improvements in plant operation including:

- Step change in reliability
- Enhanced functionality, additional control modes
- Vastly improved diagnostics, real time and historical archiving
- Improved maintainability, on-load and off-load valve testing, etc.

System design

Systems are designed using a number of key criteria:

- To minimise plant outage time
- High system integrity to ensure reliable operation
- Ease of plant operation

The design process also utilises extensive use of modelling software to validate and verify system design. This technique ensures minimum commissioning time.



Steam turbine auxiliary plant

Quality control

TCL have the following quality control accreditations:

- ISO 9001:2008
- TickIT Guide Issue 5 software production
- CSA Z299.2-85 Quality control developed for CANDU nuclear plant

The system software is produced using rigorous quality control procedures developed during TCL's experience with developing software for nuclear power plants.

Steam turbine auxiliary control

TCL have experience of replacing ageing C & I equipment on many of the auxiliary systems that support a typical steam turbine power plant, including:

- Water treatment systems
- Water cooling system control
- Boiler burner management and interlock systems

TC41-SG

TCL have developed a governor system for steam turbines up to 100MWe output. The TC41-SG includes the necessary inputs and outputs to interface with standard plant devices and provide the following functions:

- Turbine Speed Control
- Vacuum support
- Boiler pressure support
- MW load control
- Valve output control
- On-load valve test

The TC41-SG can be configured to control existing plant using setpoint changes only.



TC41-SG

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