

June 2019

Shell Moerdijk

Critical Steam Turbine Control and
Overspeed Protection Upgrade





Introduction

After several technical and commercial meetings Turner ECS was rewarded the order to design, deliver and commission the upgrade of four existing critical steam turbine controllers, overspeed systems and I/H convertors. The project was executed and successfully handed over during the TA in 2019 at Shell Moerdijk, one of the largest chemical plants in Europe.

Project Overview

The Woodward speed control and electronic overspeed protection cabinets were changed out for complete new cabinets for a total of four steam turbines. In addition, the mechanical governor on a fifth unit was upgraded to an electronic system, for which a new Woodward speed control and electronic overspeed protection cabinet was supplied separately. The existing seven current to pressure convertors were changed out with refurbished units from the Turner ECS workshop.

Complete Service

Turner ECS performed complete factory acceptance testing at their premises in The Netherlands followed by site acceptance testing, commissioning and start-up support of all five new systems as well as the overhauled I/H convertors on site.

RETROFIT PROJECT

HARDWARE IMPROVEMENTS

- Increased CPU horsepower
- Ethernet communication

SOFTWARE IMPROVEMENTS

- Advanced control algorithms
- High-speed data logging
- Network time synchronization

PROTECTION IMPROVEMENTS

- SIL-3 compliance
- Increased response time
- Over-acceleration protection
- Modbus communication

INTERFACING IMPROVEMENTS

- Engineering workstation with diagnostic tools
- Tailor made Human Machine

FACT SHEET

Turbines: Siemens

Compressors: Elliott

Customer: Shell

Industry: Petrochemical

Location: Moerdijk

Country: The Netherlands

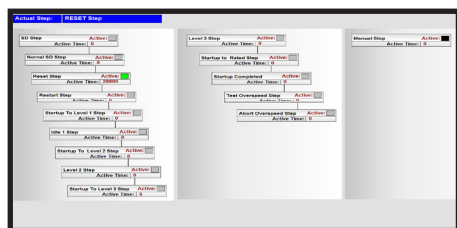
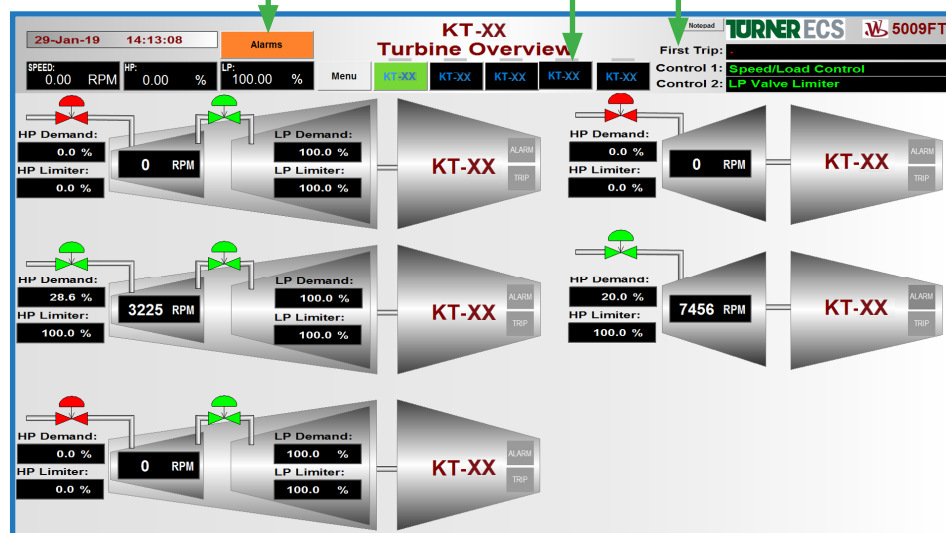
Human Machine Interface

An important aspect of the project was to improve the visualisation of the control system by designing a new human machine interface. The HMI/SCADA program iFix™ was used to create a clean and intuitive interface making it easy to navigate between steam turbines.

Alarm indication and button. On an active alarm the button will turn orange. Pressing the button will show the alarm screen.

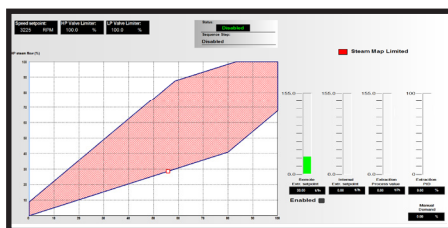
Turbine unacknowledged alarm indication. An orange bar will appear when there are unacknowledged alarms.

First Trip indication. On any trip this field will indicate the first trip cause.



Sequence View

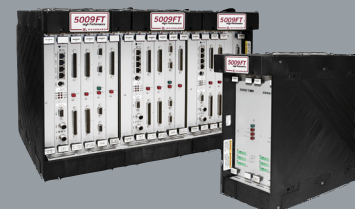
This screen allows the user to immediately see which part of a sequence the control is currently in, indicated by a green color. In addition to the elapsed time for any sequence step can be viewed in the bottom right corner of each sequence block.



Steam Map

This screen displays the actual steam map as configured in the control, showing the operating point as a live value. This allows operators to see the relation between valve positions, steam flows and to understand where the physical limits of the steam turbine lie.

HARDWARE USED



5009FT

- Turbine controller



ProTech GII

- Overspeed protection

HARDWARE REPLACED

5009

- Turbine controller

ProTech 203

- Overspeed protection

HARDWARE EXCHANGED



CPC-II

- Current to pressure converter

Turner Range of Services

LSTK Projects, Retrofits & Upgrades
Turner ECS delivers reliable retrofit solutions for a wide range of prime movers and other applications. This includes lump sum turnkey projects on turbines and compressors.

Genuine Parts & Service Exchange
Turner ECS has the largest stock of parts, service exchange governors and electronics in Europe and can provide a fast turnaround service.

Product Training
Turner ECS can provide official Woodward product training covering both theoretical and practical training on a wide range of Woodward products.

Electronic Repair & Mechanical Governor Overhaul Service
Turner ECS provides a comprehensive overhaul and repair service for electronic, mechanical and hydraulic governors.

World Wide Field Service
Turner ECS field service engineers and technicians provide comprehensive solutions for commissioning and on-site repair.

Service Contracts
Turner ECS provides long term service contracts to support users with Woodward governors and/or control products and electronic control systems.

ROTATING EQUIPMENT CONTROL SOLUTIONS DELIVERED ACROSS EUROPE & THE MIDDLE EAST

Turner ECS is an official Woodward Channel Partner with offices located in:

- The Netherlands
- England
- Germany
- Italy
- Abu Dhabi
- Qatar
- Saudi Arabia

Turner ECS also operates and manages an extensive network of official agents throughout Europe & the Middle East

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