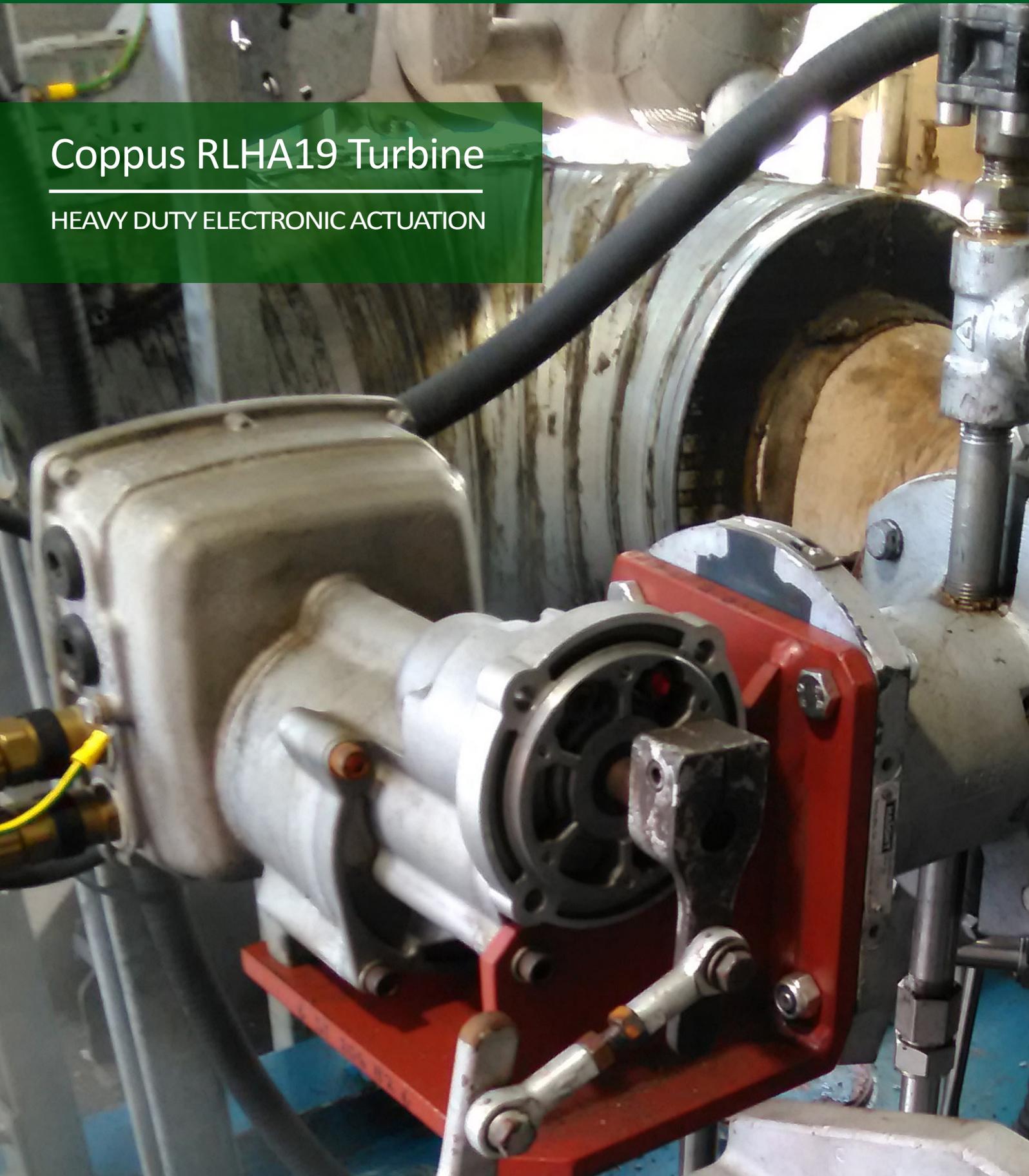
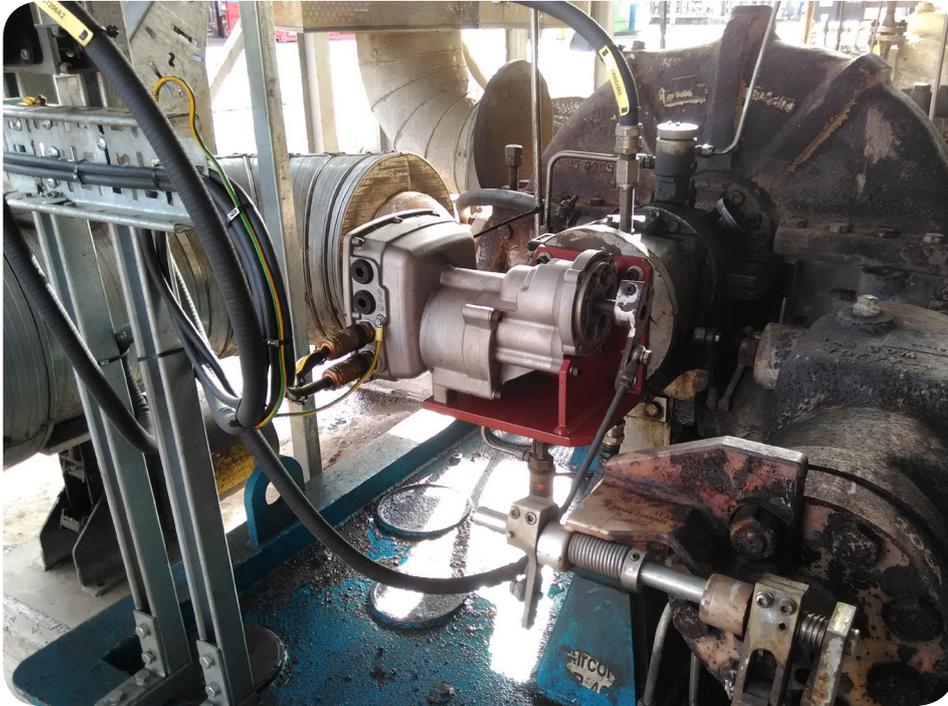


December 2019

## Coppus RLHA19 Turbine

HEAVY DUTY ELECTRONIC ACTUATION





## Electronic Actuation

Turner ECS was approached by Petroineos to replace the hydraulic governors on two Coppus RLHA19 steam turbines by new electronic actuators and speed controllers at an oil refinery in Scotland. For this upgrade Woodward's robust R-Series actuator was chosen to comply with the site's demanding requirements such as the ATEX zone 2 hazardous location rating.

## Pump Flow Automation

The main purpose of the upgrade was to allow remote speed control of the steam turbine drive to the boiler feedwater pumps. This was achieved by adding the electronic actuator and electronic speed controller to allow the speed of the pump to be controlled from the DCS.

## Erosion Reduction

By (automatically) reducing the flow of the boiler feedwater pumps when the level in the reformer is high the flow through the spillback line is reduced leading to reductions in pipe erosion, control valve chattering and unintentional passing.

## RETROFIT PROJECT

### PROJECT HIGHLIGHTS

- Electronic actuation
- ATEX Zone 2 compliance
- Pump flow automation
- Erosion reduction

### IMPROVEMENTS

- Replaces hydraulic system to the governor
- Variable instead of fixed speed control
- Remote instead of local control
- Improved boiler feedwater spillback control

### FACT SHEET

Turbines:	D-R Coppus RLHA19
Pumps:	Boiler Feedwater
Customer:	Petroineos
Industry:	Refinery
Location:	Grangemouth
Country:	Scotland

## Upgrade details

To fit the R-Series actuator a mounting bracket was designed that could be bolted onto the existing coupling casing of the hydraulic governor while at the same time positioning the R-Series output shaft in such a way that it would easily fit onto the existing steam valve linkage.

The coupling casing was also used to internally fit a gearwheel and externally fit two magnetic pickups in order to sense the turbine speed.

The turbine speed sensor was wired to the 2301E-ST turbine speed control that in turn sends its output signal to the R-Series actuator, completing the control loop.

Woodward's standard 2301E-ST steam turbine controller was configured to receive a remote speed setpoint from the DCS, enabling remote control of the boiler feedwater pump flow driven by the steam turbine.

The mounting bracket design, linkage design actuator and controller configuration was all performed in-house by Turner ECS. After installation and commissioning by Turner ECS on site, the upgraded system was successfully handed over to the customer by means of a Site Acceptance Test.

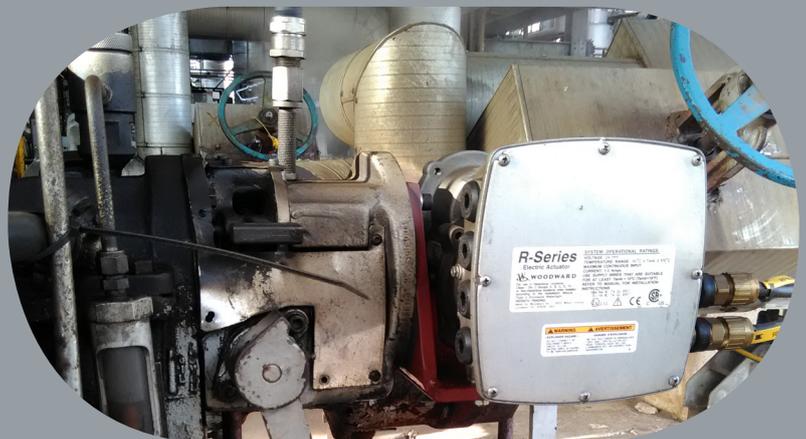
### ON-SKID HARDWARE REPLACED

- TG13 hydraulic (fixed speed) governor



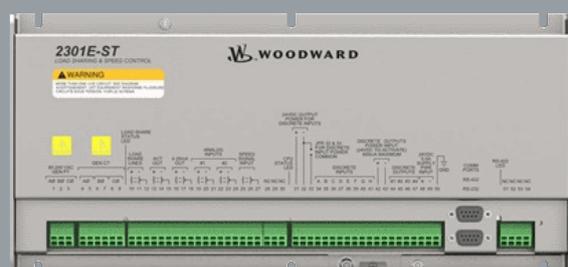
### ON-SKID HARDWARE USED

- R-Series Electric Actuator
- Mounting bracket to fit R-Series in place of TG13
- Gearwheel and explosion-proof magnetic pickups



### OFF-SKID HARDWARE USED

- 2301E-ST Turbine Speed Control



## 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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