CONTRACT : 4728

YEAR : 2006

Scheme : ELING TIDE MILL

Project 4728 – Eling Tide Mill, New Forest District Council

This specification concerns the Works to be carried out for the refurbishment and replacement of the sea gates at Eling. The work consists of the removal of the existing gates and framework, the replacement of the existing mechanical and electrical equipment by new equipment, the fabrication and installation of new framework and gates, and the installation of an access platform.

The sea gates are used to impound the flood tide in Bartley Water. This impounded water is then used on the following lowering tide to drive the water wheel of Eling Tide Mill: The flood tide opens the tidal flaps within the sea gates and allows the incoming tide to flow into Bartley Water. The tidal flaps then close when the tide starts to ebb. To prevent flooding upstream and to minimise silting up in front of the gates it is necessary to periodically lift the gates clear of the water. The gates are designed to take a maximum of 10 minutes to lift.

The sea gates consist of a galvanised steel structural framework, which has guides for the two sea gates and also supports the lifting machinery for the sea gates. The sea gates are made of galvanised steel framework with greenheart timber infill panels. The sea gates are lifted by means or rising spindles, which are operated by actuators sitting on the structural framework. To allow the flood tide to enter Bartley Water the tidal flap is hinged about the gate top bar.

The contract was for the design and installation of an access platform for the operation and maintenance of the Sea Gates. We also needed to repair and damage caused to the bridge in the removal of the existing sea gates. To carry out local repairs to the structure of the bridge, as directed by the Engineer, to ensure that the Structural Framework fits securely and is watertight.

The Mechanical and Electrical work consisted of the design, supply and installation of electrically driven actuation to the gates. Included was the installation of motorised actuators, lifting spindles, feeder pillar, lighting, power and a control system.

The current sea gates had experienced significant vandalism. We were to ensure that all work was resistant to vandalism as practical.

Eling Tide Mill
Eling Lane (Off Jacobs Lane)
Totton
Near Southampton.

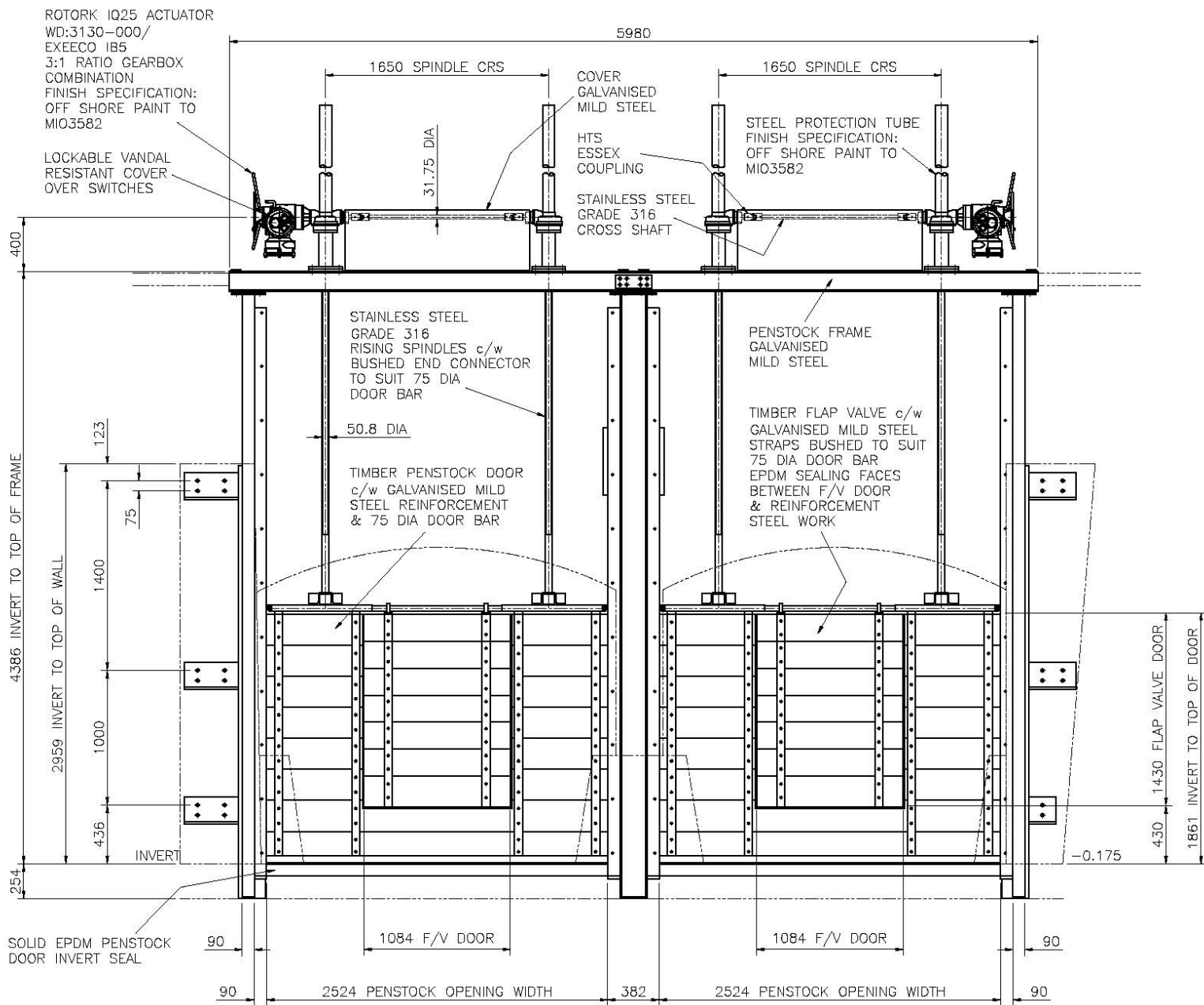# ELING TIDE MILL

EXISTING OLD GATES ON SITE

GATES DURING MANUFACTURE IN OUR WORKS

NEW PENSTOCKS INSTALLED ON SITE

Project 4728 – Eling Tide Mill, New Forest District Council

ROTORK IQ25 ACTUATOR
WD:3130-000/
EXEECO IB5
3:1 RATIO GEARBOX
COMBINATION
FINISH SPECIFICATION:
OFF SHORE PAINT TO
MIO3582

LOCKABLE VANDAL
RESISTANT COVER
OVER SWITCHES

5980

1650 SPINDLE CRS

1650 SPINDLE CRS

COVER
GALVANISED
MILD STEEL

HTS
ESSEX
COUPLING

STEEL PROTECTION TUBE
FINISH SPECIFICATION:
OFF SHORE PAINT TO
MIO3582

STAINLESS STEEL
GRADE 316
CROSS SHAFT

31.75 DIA

400

STAINLESS STEEL
GRADE 316
RISING SPINDLES c/w
BUSHED END CONNECTOR
TO SUIT 75 DIA
DOOR BAR

PENSTOCK FRAME
GALVANISED
MILD STEEL

TIMBER FLAP VALVE c/w
GALVANISED MILD STEEL
STRAPS BUSHED TO SUIT
75 DIA DOOR BAR
EPDM SEALING FACES
BETWEEN F/V DOOR
& REINFORCEMENT
STEEL WORK

50.8 DIA

TIMBER PENSTOCK DOOR
c/w GALVANISED MILD
STEEL REINFORCEMENT
& 75 DIA DOOR BAR

123

75

1400

4386 INVERT TO TOP OF FRAME

2959 INVERT TO TOP OF WALL

1000

436

INVERT

254

SOLID EPDM PENSTOCK
DOOR INVERT SEAL

1430 FLAP VALVE DOOR

1861 INVERT TO TOP OF DOOR

430

-0.175

90

1084 F/V DOOR

1084 F/V DOOR

90

90

2524 PENSTOCK OPENING WIDTH

382

2524 PENSTOCK OPENING WIDTH

90

Specification

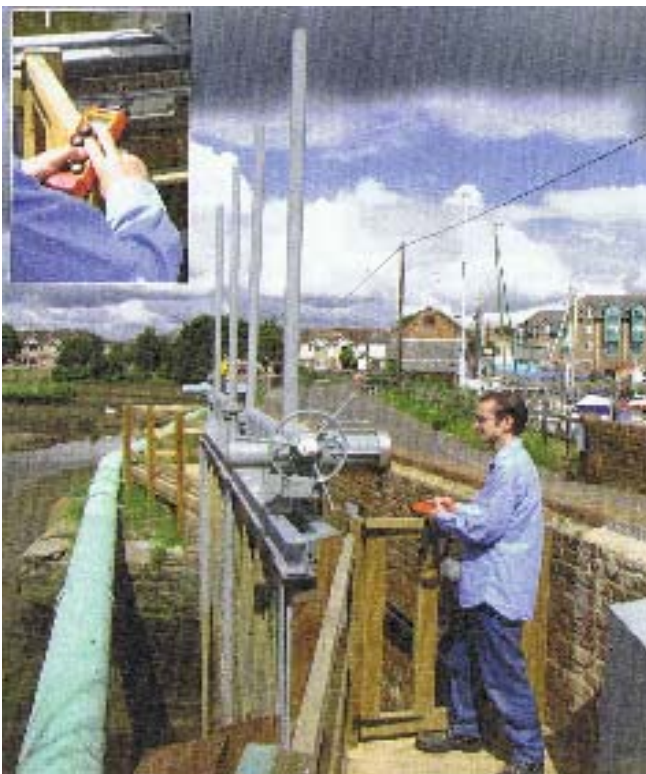|		
Frame	:	Galvanised Mild Steel
Penstock Gates	:	Timber. c/w GMS Internal Ribs
Flap Valve Gates	:	Timber c/w GMS Internal Ribs
Pillars	:	GMS
Spindles	:	Grade 316 Stainless Steel
Gearbox	:	Rotork Gears Limited
Electric Motor	:	Rotork Controls Limited

Project 4728 – Eling Tide Mill, New Forest District Council

Combining ancient with modern

Renewable energy is nothing new, but when an ancient tide mill needed a refit, a high-tech solution was called for.

ROTORK'S LATEST IQ Pro intelligent electric valve actuators have been used to modernise "an ingenious renewable energy scheme" on the south coast of England. The scheme will generate power from the rise and fall of the tides. However, unlike the much-publicised proposed Severn Barrier, tidal energy has been harnessed on this site for nearly 1000 years, and this kind of technology has been used by mankind since pre-Roman times.

The Eling Tide Mill, located at Totton, Southampton, has been grinding grain into flour for at least the past 940 years. It is now the only remaining working and productive tide mill in Britain. The current building dates back to the 18th century. It is owned by New Forest District Council, and run by the Eling Tide Mill Trust.

The Rotork IQ control and instrumentation enables The Actuators to be operated by hand-held wireless controller that was specially designed for the installation. (Inset) The controller's push-to-run buttons can operate the actuators either individually or together.

Built on an inlet branching off a tidal estuary, the mill has a dam incorporating a special type of sluice gate known as a sea hatch. The sea hatch comprises two penstocks with flaps that open with the incoming tide and close automatically at high tide, trapping the water in the mill's pond. This water is then used to operate the mill wheel, enabling a period of about four hours working between each tide.

The penstocks are raised if:

- The mill pond needs to be empted in order to carry out maintenance.
- If the river that feeds into the mill pond is in flood after heavy rainfall.
- If debris accumulates in the pond and needs to be released.

The old gates and electric motors, which had worn out after many years service, have now been replaced with a brand new installation, incorporating two IQPro Model 25 actuators.

Project 4728 – Eling Tide Mill, New Forest District Council

Water has been used to power the tide mill for almost 1000 years

The specification for the new installation was written with the help of Dave Plunkett and John Christmas, two of the mill's trustees. With more than 40 years experience of the UK water industry, Christmas was particularly well qualified for the task. His previous experience with Rotork actuators enabled him to recommend them for this application. Dean & Dyball was appointed the main contractor with the new gates being designed and fabricated by Treble R Fabrications.

Because the installation is situated next to the public road that crosses the dam, the actuators local control switches are protected with vandal-proof covers, as a precaution against unauthorised operation.

The functionality built in to Rotork IQ control and instrumentation enables the actuators to be operated without removing these covers, by means of a dedicated hand held wireless controller that was specially designed for the installation.
The push-to-run buttons on the controller can be used to operate the actuators either individually or together. The completion of the new sea hatch project has secured the continued operation of Eying Tide Mill well into the 21st century.

Tidal energy has been harnessed on this site for nearly 1000 years and the technology has been used since pre-Roman times.