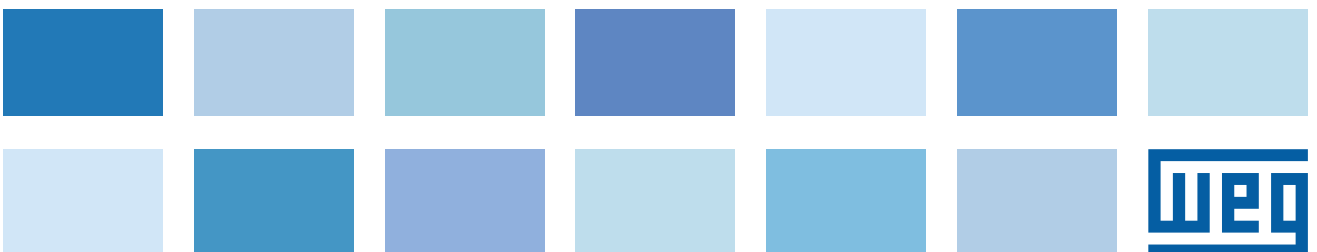




Energy efficient motors drive £1/2 million savings at water pumping station



Energy efficient motors drive up the savings at water pumping station to almost £1½ million in award winning project

A site upgrade at an historic Thames Water pumping station has given the 90 year old facility a new lease of life, improving performance and efficiency. Central to the success of the upgrade were the systems design and implementation capabilities of Boulting Pump Management, using energy efficient motors from WEG.

Energy savings expected from the project are close to five million kilowatt-hours per annum - with a correspondingly spectacular annual energy cost reduction of £500,000.

The Littleton facility was designed in the 1920s with four steam powered, 900mm discharge horizontal, double suction, axially split case pumps, together delivering 3.6m at the duty point and each capable of supplying 340 megalitres of water per day. In the 1950s, three pumps were modified with electric motor drives, but very little had been upgraded since.

Thames Water was keen to implement a project that would improve the efficiency of the station and reduce the energy costs. This long term project uses the financial savings made from improved efficiency to fund more work on other stations. In addition to the improved efficiency, Thames Water also wanted to increase average pump capacity up to 750 megalitres per day, simplify start-up, maintenance and control procedures and reduce operational costs.



In the heart of Surrey, the Littleton raw water pump station is one of Thames Water's largest abstraction facilities. Responsible for maintaining the water supply to one of the largest raw water reservoirs in the UK, it is relied upon for the provision of fresh water to London and some neighbouring counties.



In order to maximise the energy efficiency Boulting took a holistic approach to the project, looking at upgrades to the pumps, motors, gearboxes, drives and switchgear as a whole.

Remote facility operation

To meet these objectives, Thames Water turned to long-standing project upgrade partner the Boulting Group. Along with improved performance, some of the specific project requirements included remote operation through an automated control system – minimising on-site personnel time which was making operation of the facility time consuming and costly.

The Pump Management division of Boulting took a holistic approach to the project, looking at upgrades to the pumps, motors, gearboxes, drives and switchgear. A new control system would also be developed to simplify operation as well as reduce energy consumption and enable remote operation.

A key aspect of the project identified by Boulting was the upgrade of the existing motors and to address this aspect of the upgrade the company turned to WEG. Boulting has an excellent working relationship with WEG, having worked with the company for two years on various projects to replace older, less efficient motors with newer high efficiency models. In that time, WEG has supplied Boulting with over 100 motors, rated from 55 kW up to 900 kW.

Many of these have been from the W22 range, which covers frame sizes from IEC 63 to 355A/B and can deliver between 0.12 and 500 kW; offering high levels of productivity and reliability in an industry that requires minimal downtime. For more specialist applications, the W22 range can be supplied with increased levels of ingress protection, up to IP66, as well as being specified for operation in potentially explosive atmospheres.

For this particular project, WEG supplied three W50 IE4 super premium efficiency motors as the most efficient solution for the pump drives. Operating at 96.9% efficiency, they can play a key role in significantly reducing energy costs at water pumping facilities. At the same time, the robust, reliable design also helps to reduce operational costs, minimise downtime and drive up operational reliability.

WIMES Specification

For applications involving the water industry, WEG produces WIMES compliant models that ensure the build is designed to meet Water Industry Mechanical & Electrical Specifications. WEG manufactures a complete range of WIMES motors that can be specified to meet either IE2 or IE3 efficiency ratings. For motor requirements that are outside the more general usage range, WEG can customise a motor build to include WIMES requirements.



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Improved pump station performance

With new pump impellers, gearboxes, drives and the WEG motors – all being 900 kW motors with IP55 protection – the facility has been upgraded from its existing 400 megalitres per day capacity to 750 megalitres per day, with an efficiency increase from 80% to 86%. Suction lift capacity has also been increased from 3.6m to 3.9m.

Control of the plant is facilitated by new Boulting-designed pump system operation (PSOp) software, implemented on a SCADA system and local PLCs. The PSOp software continuously monitors and optimises pump speed to achieve

the required performance and greatest energy efficiency, running the number of pumps that are required at any given time and at the optimum speed.

The control software has improved operation of the plant significantly. For example, in conjunction with some mechanical modifications, the priming time has been reduced from a stately four hours to a significantly swifter five minutes. At the same time, the capability for remote operation means there is no longer the requirement to start up the system and operate the facility on site, eliminating a number of time consuming operations.



Innovative solution

With its improved efficiency and reliability, Littleton pumping station has been transformed into one of the most modern and innovative in the UK. At the same time, Boulting Pump Management was keen to address the aesthetics of the project, so that as much of the original character of the facility as possible was retained. This approach and the resulting improvements led to the company being awarded the Pump Centre Project of the Year award 2015.

Boulting was able to complete the upgrade in almost half the anticipated time scale, delivering what Thames Water had expected to be a two year upgrade in just 13 months.

Most importantly, thanks to Boulting's innovative design and WEG's energy efficient motors, the upgrade has delivered on all of the performance objectives, driving energy savings in excess of 4.9 million kilowatt hours with associated cost savings in the order of £1½ million, which will go towards the next round of refurbishment projects.

WEG Worldwide Operations

ARGENTINA

San Francisco - Cordoba
Phone: +54 3564 421484
info-ar@weg.net

Cordoba - Cordoba
Phone: +54 351 4641366
weg-morbe@weg.com.ar

Buenos Aires
Phone: +54 11 42998000
ventas@pulverlux.com.ar

AUSTRALIA

Scoresby - Victoria
Phone: +61 3 97654600
info-au@weg.net

AUSTRIA

Markt Piesting - Wiener
Neustadt-Land
Phone: +43 2633 4040
watt@wattdrive.com

BELGIUM

Nivelles - Belgium
Phone: +32 67 888420
info-be@weg.net

BRAZIL

Jaraguá do Sul - Santa Catarina
Phone: +55 47 32764000
info-br@weg.net

CHILE

La Reina - Santiago
Phone: +56 2 27848900
info-cl@weg.net

CHINA

Nantong - Jiangsu
Phone: +86 513 85989333
info-cn@weg.net

Changzhou - Jiangsu
Phone: +86 519 88067692
info-cn@weg.net

COLOMBIA

San Cayetano - Bogota
Phone: +57 1 4160166
info-co@weg.net

ECUADOR

El Batan - Quito
Phone: +593 2 5144339
ceccato@weg.net

FRANCE

Saint-Quentin-Fallavier - Isère
Phone: +33 4 74991135
info-fr@weg.net

GERMANY

Türnich - Kerpen
Phone: +49 2237 92910
info-de@weg.net

Balingen - Baden-Württemberg
Phone: +49 7433 90410
info@weg-antriebe.de

Homburg (Efze) - Hesse
Phone: +49 5681 99520
info@akh-antriebstechnik.de

GHANA

Accra
Phone: +233 30 2766490
info@zestghana.com.gh

INDIA

Bangalore - Karnataka
Phone: +91 80 41282007
info-in@weg.net

Hosur - Tamil Nadu
Phone: +91 4344 301577
info-in@weg.net

ITALY

Cinisello Balsamo - Milano
Phone: +39 2 61293535
info-it@weg.net

JAPAN

Yokohama - Kanagawa
Phone: +81 45 5503030
info-jp@weg.net

MALAYSIA

Shah Alam - Selangor
Phone: +60 3 78591626
info@wattdrive.com.my

MEXICO

Huehuetoca - Mexico
Phone: +52 55 53214275
info-mx@weg.net

Tizayuca - Hidalgo
Phone: +52 77 97963790

NETHERLANDS

Oldenzaal - Overijssel
Phone: +31 541 571080
info-nl@weg.net

PERU

La Victoria - Lima
Phone: +51 1 2097600
info-pe@weg.net

PORTUGAL

Maia - Porto
Phone: +351 22 9477700
info-pt@weg.net

RUSSIA and CIS

Saint Petersburg
Phone: +7 812 363 2172
sales-wes@weg.net

SOUTH AFRICA

Johannesburg
Phone: +27 11 7236000
info@zest.co.za

SPAIN

Coslada - Madrid
Phone: +34 91 6553008
wegiberia@wegiberia.es

SINGAPORE

Singapore
Phone: +65 68589081
info-sg@weg.net

Singapore
Phone: +65 68622220
watteuro@watteuro.com.sg

SCANDINAVIA

Mölnlycke - Sweden
Phone: +46 31 888000
info-se@weg.net

UK

Redditch - Worcestershire
Phone: +44 1527 513800
info-uk@weg.net

UNITED ARAB EMIRATES

Jebel Ali - Dubai
Phone: +971 4 8130800
info-ae@weg.net

USA

Duluth - Georgia
Phone: +1 678 2492000
info-us@weg.net

Minneapolis - Minnesota
Phone: +1 612 3788000

VENEZUELA

Valencia - Carabobo
Phone: +58 241 8210582
info-ve@weg.net

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WEG Group
Jaraguá do Sul - SC - Brazil
Phone: +55 47 3276 4000
info-br@weg.net
www.weg.net

