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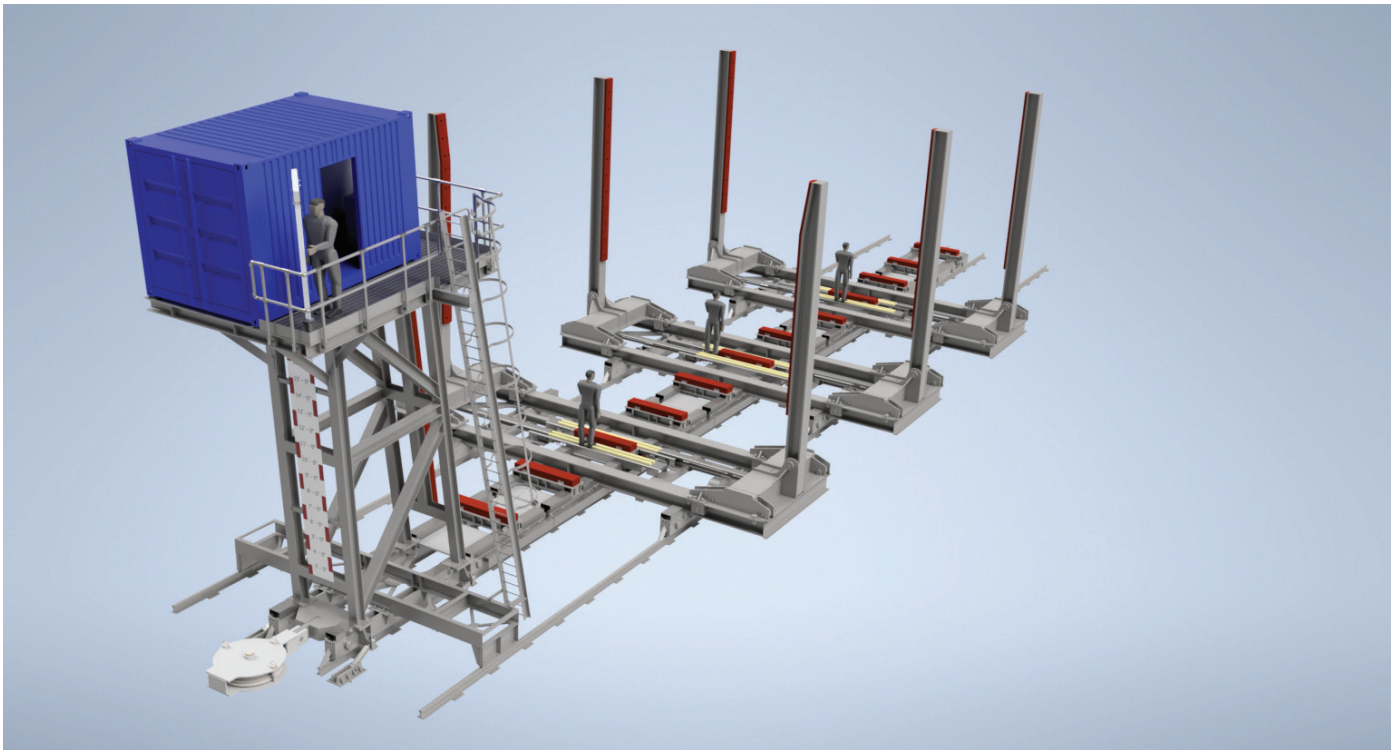
*Keeping you up to date with **KGAL Spring** | **Summer 2024***

It's been a busy start to 2024, with a mix of ongoing work and new projects. In this issue, we've selected a few varied projects to demonstrate our range of services and the type of problems we enjoy solving. ***Dave Griffiths** | **CEO***

New Slipway Cradle Design for Portavogie Harbour



Model of the new slipway cradle

Qualter Hall & Co Ltd has appointed **KGAL** to design a new slipway cradle arrangement for Portavogie Harbour in County Down, Northern Ireland on behalf of the ultimate Client, Northern Ireland Fishery Harbour Authority.

Site photo showing where the new cradle will be positioned

Portavogie is a busy fishing port that has become an important maritime centre because of its location and rich supply of seafood in local waters. The harbour has been the economic and social hub for the village since its construction in the 1800s.

Our scope is to design the **moving cradle arrangement**, complete with **hydraulic operated boat clamping carriages** and **operator tower**, with **Qualter Hall** designing the main winch equipment and hydraulic system. Construction and installation is to be performed by **Qualter Hall**.

The purpose of the cradle is to haul fishing vessels out of the harbour and, when berthed, perform refurbishment duties as well as the demolition of defunct vessels. The system is designed to accept an array of vessel sizes, from 3.5m to 9m beam, up to 30m long, and to accommodate a maximum vessel weight of 570 tonnes.

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First power intake gate, top section

More on the Mekong…

Following on from the **Xayaburi HEP** on the Mekong River, completed in 2019, **KGAL** was instructed early in 2023 by parent company **Whessoe Sdn Bhd** to provide designs for circa 25000 Tonnes of assorted hydraulic steel structures for another hydropower project on the Mekong, near Luang Prabang in Lao PDR.

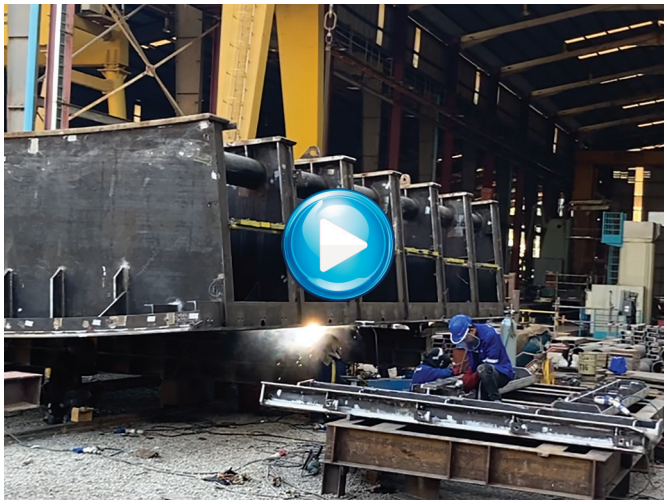
Whessoe Site Office

As with Xayaburi, our scope of work covers equipment on the spillway, powerhouse, fish pass and navigation lock, including 21 power intake wheel gates, five surface spillway radial gates, three low level spillway radial gates, three pairs of mitre lock gates, two fish crowders, two vertical fish lifts and numerous other bulkheads, stoplogs, trash screens, plus associated operating and controls systems.

Design work started in January last year as **Whessoe** began to construct an integrated site manufacturing facility. Now, 16 months in, heavy fabricated gate sections are taking shape and emerging from the workshop facilities. Our design and **Whessoe's** manufacturing programme follows the requirements of the main civils contractor, **CHK Lao**.

KGAL engineers make periodic site visits, attending design review/progress meetings and production engineering workshops with the manufacturing and installation teams. **Dave Griffiths** and **Stewart Wingrove** made the trip in February this year, both being pleasantly surprised at the level of progress made by our **Whessoe** colleagues.

The project design is fully BIM compliant, with our 3D models and drawings being produced in the UK, Manila and on site.



First low level spillway radial gate sections being welded

Whessoe heavy fabrication machining bay

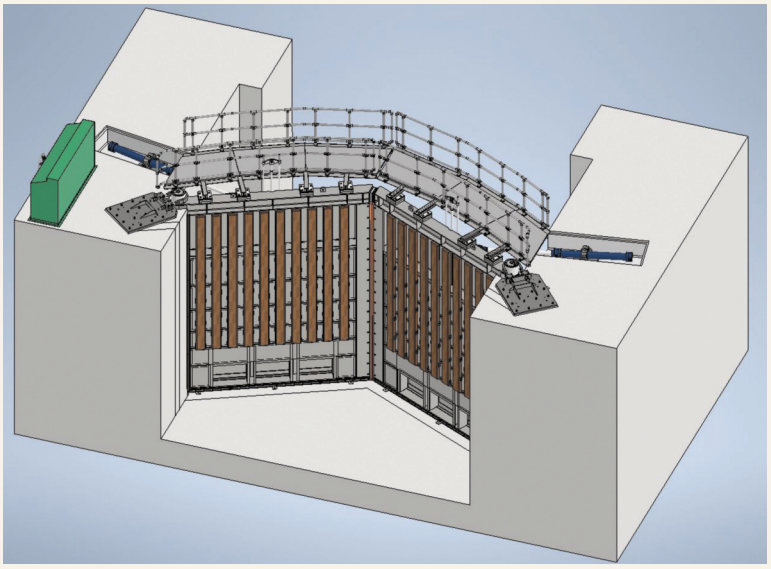
Refurbishing the tilting gate at Scotstoun

KGAL has been commissioned by **Arch Henderson** on behalf of **BAE Systems** to provide technical support and site inspections for the refurbishment work being carried out on the 30m wide x 12m high tilting gate used on dry dock number 3 at **BAE's** site at Scotstoun, at the heart of Glasgow's shipbuilding heritage.

The work is currently being undertaken by a specialist contractor in accordance with the mechanical, hydraulic and electrical works specification produced by **KGAL** in 2023, following a thorough gate and operating gear site inspection.

The refurbishment includes the redesign and installation of the **hydraulic gate latch operating equipment**, refurbishment of the **wire rope operating drum** and **winch motor**, refurbishment of the **wire rope sheaves, axles and replacement of the wire rope**. The electrical controls are also being updated and will include **wireless pendant controllers** for local gate operation.

The tilting gate at DD3



***KGAL** model of the modified gates, top anchors, cylinders and control pedestals looking upstream*

View looking upstream at the existing tailgates and Launch Lock

View of existing gate, top anchor and cylinder pit

Launch Lock, Teddington Lock, London

KGAL has been commissioned by **Jacobs**, on behalf of the **Environment Agency**, initially to carry out investigation work to determine the reasons for various mechanical failures on the head and tail mitre gates located in **Launch Lock**, **Teddington Lock**, **London**.

Teddington Lock is the first lock encountered on the River Thames from the City of London and is a complex arrangement of locks and weirs. It is the highest tidal point on the River Thames, and the point at which the control of the rivers passes from the Port of London Authority to the Thames River Authority.

The preliminary investigation has led on to **KGAL** detailing various modifications and refurbishment requirements to the gate structures, the detailed **design of modified top anchor arrangements**, the revised location and design of new **gimbal mounted hydraulic cylinders**, and the detailed design of **new pintles** and **stainless steel quoins**.

The construction and installation of stainless steel quoins is dependent on forthcoming dewatered lock investigations of the existing stone quoins. The **KGAL** design also includes the outline **design of all the associated electrical and hydraulic components**, such as **PLCs**, **operating pedestals** and **hydraulic power units (HPUs)** with associated pipework and components.

The design work has been carried out to a tight deadline in order to ensure that the lock is back in operation in 2025.

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Abington Barrage


Abington Barrage

KGAL supporting Jackson Civil Engineering

In addition to the design work provided on the recently completed Colwick Sluice Fish Pass facility, **KGAL** has been pleased to support **Jackson Civil Engineering** on their EA CDF Framework, providing structural checks of existing equipment and designs for new gates and stoplogs on numerous sites over the past 18-24 months, including the following **JCE** projects:

- **Abington Barrage** - Retained to check the design of existing stoplogs, provide designs for additional lifting lugs, an extra stoplog section and technical support with repair works on the tilting gate
- **Brampton Mill Lock** - Retained to design upstream and downstream stoplogs plus a storage rack
- **Cardington Lock** - Retained to automate the mitre gates and integral paddle gates
- **Nene Storage Racks** - Retained to design a generic storage rack that can be used by all the river Nene area stoplogs
- **Upper Barnwell Lock** - Retained to switch the operating gear for the guillotine gate from the lock side of the gate to the road side
- **Wansford Lock Stoplogs** - Retained to design new stoplogs and storage rack
- **Woodford Lock** - Retained to automate the guillotine gate

New equipment for Cliff Dam on the River Erne

KGAL has been commissioned by the **Electricity Supply Board** (ESB) in Ireland to carry out two scopes of work relating to the spillway gates and associated operating equipment at Cliff Dam on the River Erne near Ballyshannon.

The first scope is to prepare **retrospective engineering calculations** to determine the capacity of the existing drive trains to operate the top and bottom spillway gates originally installed in 1948. The second scope is to prepare a **Performance Specification** for a replacement drive train using modern gearboxes and drives.

This will enable **ESB** to go out to the market and ultimately engage with a competent design and build Contractor, who will design, supply, install and commission the new gearboxes and drives.


The spillway gates at Cliff Dam

Ipswich Wet Dock Flood Gates


The existing gates at Ipswich Wet Dock

KGAL has been retained by **Red7 Diving Services**, on behalf of **BAM**, to carry out the condition assessment of the Ipswich Wet Dock Flood Gates for the **Environment Agency**, the asset owner.

The current gates, designed by **KGAL**, were installed in 2008 as part of the overall upgrade of the flood defences for the Ipswich Wet Dock Entrance. The same team, **KGAL** and **Red7 Diving Services**, also undertook the previous conditional assessment of the asset back in 2017.

A comprehensive dive, mechanical, electrical and hydraulic survey has been undertaken and the assessment report is currently being prepared, which will inform the **Environment Agency** of any required maintenance to ensure the long-term reliable operation of these critical flood defence gates.

Sharing expertise with new CEATI best practice guidelines

KGAL is contributing to **CEATI's** new guidelines for power industry professionals.

CEATI is a solution-driven network for power industry professionals, supporting the work of its electric utility members with relevant research, actionable resources, and forums for knowledge exchange. With active participation from more than 155 member utilities worldwide, **CEATI's** network provides access to industry-leading intelligence and offers members a cost-effective approach to inform and improve their decision-making.

KGAL is contributing to the new guidance document by sharing our expertise on control systems for gate control. Our expert, **Paul Jones**, is the Technical Lead on the project, which will provide clear guidance on how to determine what instrumentation is required to support the operation of flow control devices (gates). The project will consider intake gates and non-power release gates, and will be split into two phases; the first will produce the draft guidance document, with phase two testing the methodology developed by carrying out two worked examples.

The guidance will include:

- How to define water conveyance functional requirements
- How to define the configuration of the water conveyance system and the analysis boundaries
- How to prepare and carry out a HAZID/HAZOP on the water conveyance system
- Guidance on instrumentation types, including the pros and cons of the different types
- How to carry out an FMEA on the water conveyance system, considering the pros and cons of adding criticality and redundancy to the FMEA
- How to determine and specify the instrumentation needs highlighted in previous tasks

KGAL has been carrying out **reliability studies on dam gates** for over 15 years, and the guidance document will draw on our wealth of experience.

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News in brief

Boston Grand Sluice

We're pleased to announce that we've been appointed by **Arup** to support them on the **MEICA** aspects of a scoping exercise and options appraisal for upgrading Boston Grand Sluice on behalf of the **Environment Agency**. This follows on from other recent appointments under **Arup's** EA NGSA Framework and adds to our growing working relationship.

Bermuda Bascule Bridge CAT 3 check

The Bermuda Bascule Bridge is a new structure replacing an existing swing bridge spanning the channel between Ferry Reach and Stocks Harbour, providing pedestrian and vehicular connectivity between St David's Island and St George's.

KGAL has been appointed by **COWI** to undertake the stage 1 and stage 2 CAT 3 check in accordance with highways standard CG300 of the mechanical, hydraulic and electrical aspects of the design, which has been undertaken by **Knights Architects**, **Ramboll and Eden Consultants** on behalf of the **Government of Bermuda**.

Exposure

BDS Conference 2024

KGAL Risk Assessment Techniques for M&E Equipment

KGAL will be delivering a workshop at the forthcoming **British Dam Society's 2024 Conference** at Keele University in September.

The '**Risk Assessment Techniques for M&E Equipment**' workshop, created and hosted by **KGAL's Russ Digby** and **Paul Jones**, will provide an overview of the specific risk assessment techniques employed to risk assess MEICA equipment on dams, incorporating an introduction to tools such as HAZOP (Hazard & Operability Study) and FMEA (Failure Modes & Effects Analysis).

This will be followed by a group exercise (based on a given dam related MEICA scenario) using these risk assessment tools to enable attendees to obtain practical experience in their use and application. Furthermore, it will highlight the benefit of using these techniques to identify issues that might otherwise impact negatively on equipment reliability.

HYDRO 2024

18-20 November 2024 Graz, Austria

KGAL will be exhibiting alongside **Whessoe Sdn Bhd** at **HYDRO 2024**, which is being held in Graz, Austria, from the 18th to 20th November.

We're looking forward to meeting friends, colleagues and partners, both old and new, at this important annual event in the international hydropower community calendar.

Come and say hello - we're next to the entrance so you can't miss us!

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Congratulations!

Chartered Engineer status for George!

We'd like to congratulate **George Stacey**, one of our Engineers based in our Poole office, on achieving his Chartered Engineer status (CEng) with the Institution of Mechanical Engineers.

George has spent several years working hard to obtain this acknowledgement and we hope that it will encourage him to continue to advance in his career.

New faces...

...adding more engineering talent to the KGAL team

Mayowa Milburn

Poole Office

Mayowa Milburn has joined our Poole office as a Graduate Engineer

Mayowa graduated from the London South Bank University with a First Class Honours BEng degree in Mechanical Engineering and Design. He also has post graduate experience in steel design, Mathcad calculations, 3D modelling, FEA and offshore/subsea applications. Welcome on board, Mayowa!

And a sad goodbye!

Julie Dore

We bid farewell in March to **Julie Dore**, our Financial Controller, after almost eight years of excellent service. Julie joined **KGAL** at the time we were transitioning to an online digital software platform and she oversaw this process seamlessly in her typical efficient and professional manner.

We're sorry to see her go and will miss her caring and inclusive approach but wish her every happiness in her well-deserved retirement.

As a result of Julies' departure, our Financial Administrator and Poole Office Manager, **Dawn Lewer**, *has taken on some of the tasks previously handled by Julie. We have no doubt that Dawn will flourish with these new responsibilities.*

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