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*Keeping you up to date with **KGAL Summer 2026***

Almost a year since our last issue of Fluid, is time moving faster or is it just me getting older? (Please don't answer that).

Some big milestones have been achieved this year; with the substantial completion of our Kariba Spillway works, for and with Gruner Stucky, and the completion of design works for the Luang Prabang HEPP on the Mekong River in Lao PDR, with circa 24,000 Tonnes of Hydraulic Steel Structures being manufactured and installed by our parent Company, Whessoe Sdn Bhd.

Whilst it's nice to speak about the large scale of some projects, technical challenges come in all shapes and sizes. We're currently working on some great projects and resolving unique challenges around the UK. It's what we do!!

Dave Griffiths | CEO

The Kariba Dam Rehabilitation Project comes to a close

A decade in the making. Now down to the final detail.

Two of the six sections of the emergency gate hang from the 510 tonne gantry crane. This gate comprises six sections that are assembled by the gantry crane in any one of the six spillway sluices. The gate is designed to close in unbalanced conditions against a flow of up to 1,500m^3/s.

The Kariba Dam 510 tonne gantry crane, designed and fabricated by Morris Material Handling in South Africa.

View towards Zambia - sluices 6, 5 and 4 are visible. Sluice 4 has a section of emergency gate stored, sluice 5 has the stop beam grappling beam stored, sluice 6 is empty. The 250 tonne mobile crane, supplied as part of the Spillway Rehabilitation Project, assisted in the final stages of the works.

Ten years in, and the Kariba Dam Rehabilitation Project has now reached its final stages.

All major installation works are complete, testing has been successfully carried out across the board, the six spillway sluices have been rewatered, and the 510-tonne gantry crane is now positioned on the upstream runway track, marking a significant step toward full operational readiness.

A key milestone was achieved in December 2025 with **Partial Taking Over** of a substantial portion of the works. This formal handover reflects the scale of progress made and the confidence in the systems now in place.

In March, we attended the **21st Joint Mission in Siavonga, Zambia**, presenting the current project status to the **Zambezi River Authority**, **the Panel of Experts**, **and project financiers**. At this stage, scrutiny is high and rightly so - every detail matters.

The final stages are in progress and **KGAL** continues to work closely with both the Contractor and Employer to close out the project fully. Precise, methodical delivery right through to the final detail.

Pintle base plate and quoin section, with positioning jig installed to ensure correct tolerances are achieved

Pintle base plate and quoin section

Teddington Lock, London

In the Summer issue of ***'fluid'*** last year we introduced the challenge at **Teddington Lock**; a complex, high-profile structure at the tidal limit of the River Thames. That early-stage investigation has now moved firmly into delivery.

Towards the end of 2025, the head and tail mitre gates from the **Launch Lock** were removed and transported to **Centregreat Ltd** for shot blasting, detailed inspection, and refurbishment. All works are being carried out in line with **KGAL's** design specifications, translating last year's recommendations into physical upgrades.

On site, progress has seen the **Launch Lock** fully dewatered and 3D scanned, allowing us to carry out precise dimensional verification. Datum levels, alignment, and positioning of key components are now being checked against design intent - a critical step where everything needs to be measured and confirmed.

Attention has now turned to the installation phase. The existing head gate quoins have been removed, making way for new **KGAL-designed** stainless steel pintles and quoins. These are currently being installed and we were recently on site supporting **BAM Nuttall** to ensure correct alignment with the existing sill and surrounding structure.

Work is also beginning on the removal of the tail gate quoins, continuing the sequence of upgrades across the lock.

View looking along sill at new lower quoin section

View looking downstream in dewatered lock

Hydro Progress in Scotland

Balancing legacy infrastructure with modern environmental demands

The challenge isn't building new infrastructure, it's adapting what already exists to meet today's environmental standards, without compromising the integrity of assets that have been in service for nearly a century.

Many of Scotland's hydro schemes, constructed between the 1930s and 1950s, rely on extensive aqueduct networks. These systems were designed to capture and transfer water across catchments into reservoirs, forming the backbone of hydroelectric generation that still operates today. At that time, provisions for fish passage, particularly for salmon, were built in, but expectations have moved on.

SSE and the **Scottish Environment Protection Agency (SEPA)** have been working together to add new controlled compensation flows into watercourses that would otherwise remain dry for much of the year.

This is where complexity starts to stack up.

KGAL has been working with **SSE** over the past year to develop and implement compliant solutions across multiple sites. On paper, it's about releasing and measuring water flows. On the ground, it's something else entirely. These are remote, often inaccessible locations, with some only accessible by foot. All sit within environmentally sensitive areas, one of which is located within **The Flow Country**, a **World Heritage Site**, where the margin for disruption is effectively zero.

The solution needed to be robust, repeatable, and precise.

KGAL designed a series of stainless-steel V-notch weir boxes, tailored to handle a range of flow conditions while providing accurate, reportable data. These installations allow flows to be measured and verified, ensuring compliance with **SEPA** requirements without overcomplicating maintenance in challenging terrain.

Progress is steady. Three sites are currently under construction, with a fourth scheduled to commence in May. At one location, work has been temporarily paused due to nesting golden eagles. A reminder that on projects like this, engineering doesn't dictate the timeline. *The landscape does.*

Aulich Intake diverts water to Rannoch Power Station, before it passes through Tummel, Clunie and Pitlochry Power Stations en route to the River Tay.

Chuil Intake is one of three intakes feeding an aqueduct to Loch Shin and Shin Power Station, located within the Flow Country World Heritage Site in Sutherland.

Allt Bhran Intake feeds water to Loch Ericht via Loch an t-Seilich, Loch Cuaich and Cuaich Power Station, before it continues through the Rannoch, Tummel, Clunie and Pitlochry hydropower cascade to the River Tay.

Chronin Idir Intake feeds water to Loch Fannich, the upper reservoir for Grudie Bridge Power Station, before it continues through Luichart and Tor Achilty Power Stations to the River Conon

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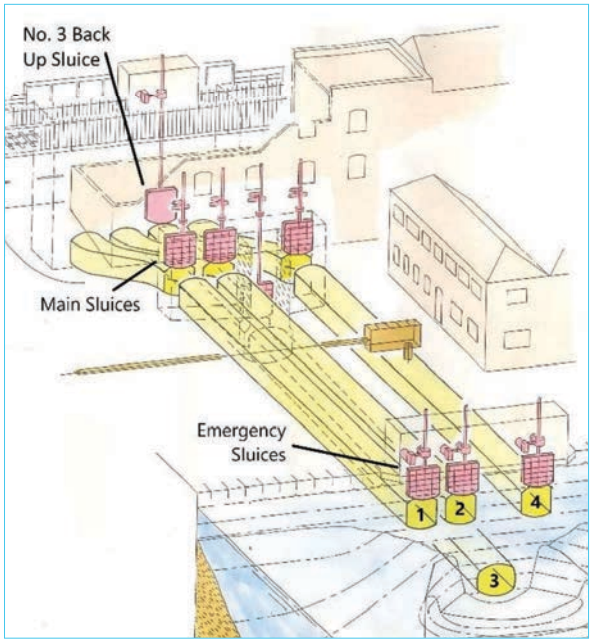
Bristol Underfall Sluices



Writing a specification is one thing. Making sure it's properly interpreted, engineered, and built is where successful projects are secured. At the **Bristol Underfall Sluices**, that transition is now underway and being managed through close collaboration between all parties.

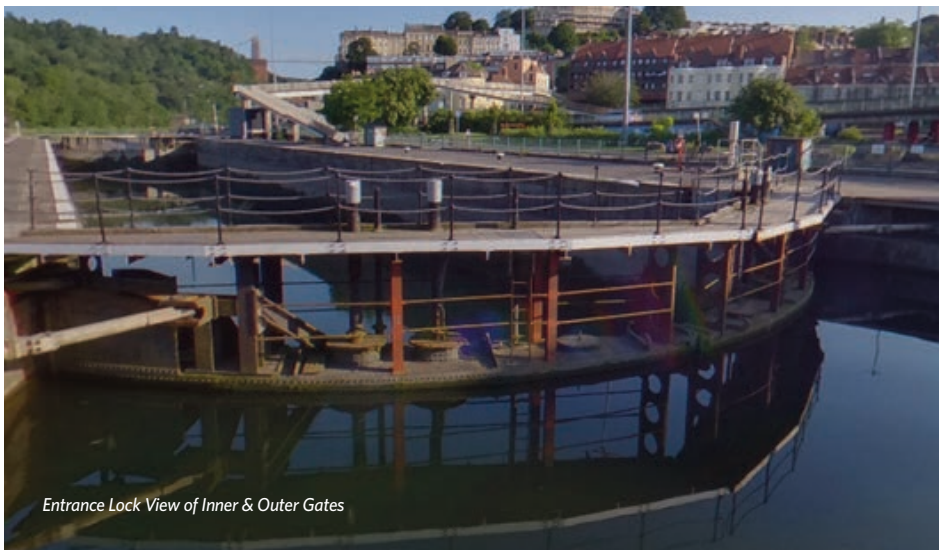
KGAL has worked closely alongside the **Bristol Harbour Authority** and **Bristol City Council** in developing the performance specifications for the refurbishment works, defining exactly how the upgraded system must operate. These sluices are central to maintaining water levels and flow within **Bristol's Floating Harbour**, and their performance is central to day to day harbour operations.

Following joint technical support during the tender process, a specialist contractor has now been appointed to deliver the scheme.

The project has entered the design review phase, and the Contractor submissions are currently being assessed collaboratively by **KGAL's** and the **Dock Engineering teams** to confirm full alignment with the specified performance and operational requirements. As the design progresses, the project is moving from planning into physical intervention on a structure of significant operational and historic importance. The co-ordinated involvement of the **Harbour Authority**, **Dock Engineering**, **Bristol City Council** and **KGAL** is providing continuity from specification through to delivery, helping to manage risk and maintain confidence as the site works approach.

Bristol Entrance Lock Surveys

The risks associated with ageing lock infrastructure aren't always obvious. The real issues often sit below the waterline, out of sight, quietly dictating performance. At the **Bristol Entrance Lock**, this has been a shared challenge requiring coordinated technical input.


Entrance Lock View of Inner & Outer Gates

KGAL, working closely with **Bristol City Council**, the **Bristol Harbour Authority** and their **Dock Engineering Team**, has recently completed a full set of dive subcontractor specifications to enable detailed condition surveys of the lock gates and associated sluices. The tightly defined scope is designed to extract meaningful, usable data, obtained from a complex and constrained (including underwater) environment.

Throughout the procurement phase, **KGAL** supported **Bristol City Council**, working alongside the **Harbour Authority** and **Dock Engineering** colleagues, to inform technical evaluation and subcontractor selection.

This collaborative approach ensured technical expectations, operational priorities and practical delivery solutions were fully aligned.

With the tender process now complete, the project moves into delivery. Dive operations are nearing completion, covering both entrance lock gates and the associated sluice structures. The surveys will provide a comprehensive assessment of condition, identifying wear, damage, and any emerging risks that need to be addressed.

By combining technical expertise, operational knowledge and engineering oversight, the project team is ensuring that future decisions on maintenance, repair, or replacement are grounded in fact. On complex maritime structures such as this, what lies unseen is usually what matters most.

Boston Grand Sluice Refurbishment

Where heritage engineering meets modern flood control

The 260 years old **Grand Sluice** on the River Witham, at the heart of Boston, Lincolnshire, has been managing tidal flow for over two centuries. Originally constructed with three channels, each fitted with twin sets of mitre gates to prevent seawater moving upstream, the structure has evolved over time. During a major upgrade in the 1980s, the upstream gates were replaced with vertical lift gates, along with new mitre gates on the downstream side. Consequently, elements of the current installation are now reaching the end of their operational life.

A multi-million pound phased refurbishment programme, delivered for **The Environment Agency** and **Arup**, is now underway to bring the structure up to modern standards while maintaining its critical flood management role.

KGAL's involvement sits at the core of that upgrade.

The scope covers both outline and detailed design for three new vertical lift gate systems, complete with embedded parts and gantry-mounted electric actuators for reliable operation, with additional capability to pass surface weed via an integral tilting gate. Alongside these, new upstream and downstream stoplog systems are being introduced across all three channels, including lifting beams and monorail gantries to allow safe handling and maintenance.

The last timber mitre gates installed in 1980 are also being replaced. Three new sets, designed with counterweight closing systems, will maintain the traditional function while improving longevity.

Working collaboratively with **Arup** and the **Environment Agency**, **KGAL** has developed an intelligent control philosophy that builds upon the existing control system with significant enhancements. A key feature is pre-emptive flood control using early warning data from upstream monitoring stations. The design incorporates multiple resilience layers including dual control modes (PLC automatic with hard-wired backup), triple-redundant sensing, and a manual hand wind facility that can accept a battery powered operating device. The design also includes a smart fish and eels pass facility to support salmonids and other fish migration during tidal events.

Following successful stakeholder engagement, the **Control Philosophy** is now under final review before progressing to the detailed **Performance Specification**.

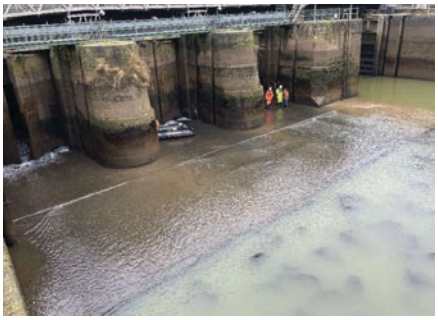
Work on site began in 2025, led by **Jackson Civil Engineering**, focusing initially on downstream civil works, stoplog liners, and installation of a new electrical supply and distribution kiosk. As expected with a tidal limit of a fluvial river flow control structure, construction paused over the winter period and has now resumed.

Centregreat Ltd is fabricating the stoplogs and liners, while **IMAC (Installation Maintenance and Controls Ltd)** handles the detailed design and manufacture of the DNO kiosk.

Pointing door

Sluice gate

View downstream



View of the pointing doors

View from upstream looking downstream at sluice gates

Bedford Lock Mitre Gate

In the 2024 Winter issue of ***'fluid'***, we introduced the challenge at **Bedford Lock**; replacing ageing timber components on a historic navigation structure while maintaining its traditional operation and appearance.

*View looking downstream at the newly installed Mitre gate and associated parts in the dewatered Lock. **KGAL** designed stoplogs downstream of the gate*

View of the right-hand side Mitre gate leaf in the open position in a dewatered lock, showing the new Sill, Quoin and Top Anchor assemblies.

That work has now reached a major milestone.

On 30 April 2026, the new **KGAL-designed** mitre gate was successfully opened and is now fully operational, allowing navigation to resume through **Bedford Lock** on the River Great Ouse.

Delivered for **Jackson Civil Engineering** on behalf of the **Environment Agency**, the project centred on replacing the downstream mitre gate and associated built-in parts. The new design combines a steel gate structure with stainless steel heel posts and traditional timber mitre posts, preserving the lock's visual character while significantly improving durability. Our design also included new stainless steel quoins, pintles, sill, and top anchor arrangements, replacing the original timber and steel components that had deteriorated over time.

Careful attention was given to retaining the lock's historic operation. The original manually operated penstock paddles on each gate leaf were replaced, while the existing gearboxes were refurbished and reused to maintain the structure's traditional look and feel.

One key engineering challenge was operational balance. Unlike the original timber arrangement, the new gate structure is steel, yet still needed to be manually operated within a constrained space. To achieve this, **KGAL** incorporated buoyancy sections within the gate structure and shortened balance beam arms, allowing steel ballast plates to be introduced and finely adjusted to meet the required operating balance.

The gate and all built-in parts were manufactured by **Centregreat Ltd** in Wales. To minimise installation risk and avoid on-site delays, the entire assembly was fully trial-fitted and dry tested in the workshop before being transported for installation in 2026.

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The People Behind the Projects

Jasper Taylor

Achieves Fellowship with IMechE

We are delighted to announce that **Jasper Taylor, Regional Manager of our Poole office and Associate Director**, has been awarded the prestigious title of **Fellow of the Institution of Mechanical Engineers (FIMechE)**.

Jasper received the certificate in April this year and described the achievement as representing '*a significant personal and professional milestone for me*'. He explained that the Fellowship '*reflects not only the breadth and depth of my technical experience, but also the responsibility I have taken on in leading teams, shaping strategy, and making sound engineering judgments with real-world impact*'.

Furthermore, Jasper noted that '*FIMechE affirms my commitment to the wider engineering profession*'. He said the recognition '*acknowledges my contribution to developing others through mentoring, promoting high engineering standards, and supporting innovation that delivers safe, sustainable, and practical solutions*'.

For Jasper, '*Achieving Fellowship is both a recognition of the journey so far and a motivation to continue giving back to the profession and leading by example*'.

And finally...

Not Your Typical Project Risks!

Most project meetings begin with discussions about programme, budget, safety, and technical challenges.

At Kariba Dam, things can be a little different. During a recent site visit by Nick Crosby, the project progress meeting opened with a rather unusual set of updates. **First, a crocodile** had taken up residence beneath the diving pontoon, providing an unwelcome surprise for the dive team.

Next came reports of a leopard visiting the office compound overnight and attacking the site dogs.

Then there was the matter of the baboons and monkeys, who had been climbing the electricity poles and successfully triggering a power outage across the offices.

Only after these issues had been discussed did the meeting move on to the engineering works.

Working in remote locations brings challenges that are rarely encountered on more conventional projects.

Logistics can be complex, operating conditions demanding, and sometimes the risk register includes wildlife with sharp teeth, sharp claws, and an apparent interest in electrical infrastructure.

Yet these are often the projects that leave the strongest impression. They require flexibility, practical problem-solving, and teams that can adapt quickly to whatever the day decides to bring.

Life on site at Kariba is never predictable. And it is certainly never boring.

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