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Big is good, smart is better

Mining and visualising industry data to improve asset performance.

Taking the high road

A complex planning and engineering task in the pipeline.

Bring the site to the office

New technology helps our experts get a better look at the problem, without leaving the office.

Welcome:

Inspiring innovation



We believe so strongly in the power of new ideas that we set up a dedicated team and seed fund to help drive innovation deeper into our business. Last year the fund sponsored 16 projects with over \$3.5m of financing. This is in addition to separate projects delivering specific service enhancements and leveraging new technologies across the various industries we support.

In the second issue of Inspired we have gathered a cross section of remarkable developments from around the business to showcase the many different ways we can be innovative; from implementing new technologies and driving cutting edge software developments to challenging our customers and making assets perform in unusual ways to maintain production.

You will read about how we are bringing new analytical techniques to several markets through our data analytics service, how we pioneered a new cutting technique to a riser without removing it, and how we made an old rig do things our customer never thought of to make repairs without going ashore.

We're using advanced Light Detection And Ranging (LIDAR) to improve the efficiency of wind farms and combining wireless cameras, touch screen devices, portable satellite and streaming technologies to give our customers unprecedented access to their sites in real time without needing to set foot outside their office.

And we are just scratching the surface still, naturally innovation is a leading activity and we can only showcase new developments that are proven and established. There are many more exciting ideas around the corner which you will certainly hear about in future issues! Several new developments missed the deadline for this issue so we can't wait to share the next successes with you.

If you have worked on an innovative project or delivered a game changing solution, get in touch so we can showcase your achievements. Our next edition will be released to coincide with Offshore Europe in September.

Steve Wayman
Executive President,
Strategy and Development



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News in brief

We're pioneering new ideas and technologies in many different markets, here are a few of our latest accomplishments...



When will virtual become reality?

Virtual Reality (VR) and Augmented Reality (AR) have hit the mainstream consumer markets hard over the last year as a result of reducing technology costs and improved ease of development. At Wood Group, we have been building our understanding of VR and AR, considering ways in which it might enhance our delivery of technical services.

We have some exciting thoughts on how to use this technology and think that the combination of the two – an Augmented Virtual Reality (AVR) - could be of great value to our customers.

Our Digital Solutions service line is a key enabler for success and our ability to produce everything in house is imperative to protecting our customer's data. We are matching up the in-depth skills and expertise of our Digital Solutions team to our technical experts and functional leaders, together identifying suitable use cases across the wider business. Across the sectors and locations in which we work, there is tremendous potential to exploit augmented and virtual reality to improve efficiency, provide training and support and showcase new ideas.

If you have an idea about how to use VR and AR in your business, whether you are a customer or an employee, get in touch at innovation@woodgroup.com to talk it through with our experts.

Cheaper repairs on order

Last issue we told you about a new service called 360° Repair Orders, offering a more efficient and dedicated service to reduce repair backlog. We've continued to enhance this service with more integration and even faster turnaround.

With more new work coming in, we are really proving the concept behind our production line, delivering quick turnaround and high quality repair orders for around half the cost of our original benchmark.

With the addition of our in-house fabrication service we can now offer a fully integrated service from survey to sign off with lower costs, faster turnaround and the same high quality and integrity we always deliver.

Recent work has seen us setting new benchmarks on execution time, taking a job from initial enquiry through design and delivery to a delighted customer the next day.

Need help with your backlog? Contact: 360@woodgroup.com



Well pad 3.0 design update

Wood Group has introduced its well pad design 3.0, providing Canada's SAGD enhanced heavy crude oil producers with continued improvements in cost, safety and fabrication flexibility.

Expanding on its innovative 2.0 solution, the current iteration further reduces well module size and places major equipment at the well head. The new design, incorporating our onshore and subsea fabrication technologies, has demonstrated tangible improvements; well pad footprint has decreased by 40%, triggering a 70% reduction in structural steel that lowers overall well pad costs by 20%.

The new 3.0 design has already been adopted by a major producer as standard and is currently being evaluated by other operators.

Get in touch with Scott Rempel, VP, Business Development, Canada for more information on well pad design:
scott.rempel@woodgroup.com

Competence is king

We have a major project ongoing to standardise competency across our business, the goal is not to make us more competent though...

Competence has always underpinned our capabilities; most of our business is built on selling skills and experience so competence is a core component. Across the landscape of our operations, that competence has spread into many areas and tracking our capabilities in a pool of thousands of technicians, tradesmen and discipline experts is a real challenge, especially when we have tailored many of our capabilities to suit the requirements of different customers.

As our industry matures, it is seeking to standardise competence and we are leading the way in developing the tools and processes to deliver a more comprehensive and flexible workforce with the right competence and certification to meet a wider range of requirements.

This allows us to offer a more flexible and portable pool of talent with scalable support for operations and greater variety for the employee.

Our rolling programme also brings greater consistency and efficiency to the process with a common toolset and a newly developed application which contract managers can use to accurately build budgets for training requirements and create a cost for competence, the benefits of which far outweigh the price.

Risky business

The oil and gas industry carries many potential dangers but is it really the most dangerous industry to work in?

Harsh climates, deep waters, ice loading, high temperatures, low temperatures, huge pressures, corrosive materials, heavy equipment, flammable products, poisonous gases. The list of dangers in the oil and gas industry is a long one, which is why a key part of our operation is safety, and our record is a strong selling point.

Safe operations and our ability to manage and control risk bring better assurance for ourselves and our customers so we are always looking to improve. But how safe are we? We commissioned a report from RGU to help benchmark our risk control measures and were surprised at the results. A total of fourteen companies representing ten different sectors participated in the cross industry exchange of good practices. The report also captured theories from academia and focused the findings into a working model to establish relative standards and provide a basis for comparison. We expected to see sophisticated approaches from other industries; however our own rating was reassuring.

It was concluded that the methods we are adopting in technical assurance are trending towards 'excellent' and a number of areas were highlighted for us to further improve our performance. As Wood Group moves into new industries, the diversity of our operation will bring new ways of working and new requirements so a thorough and consistent approach to risk and assurance is essential for us to adapt and grow.



Big is good, smart is better

From big data to smart data.



The IT devices and systems used over the last two decades have built a mountain of data which, when used in the right way, can create new levels of operational insight. From exploration and production to refining and delivery, data offers us the potential to make significant gains. According to a McKinsey report, we have the ability to cut capital expenditure by up to 20% and operating costs in the upstream sector by 3-5% through the use of digital technologies and more effective analysis.

But big data is not smart data. A typical offshore rig has 30,000 sensors capturing millions of data points yet less than 1% of this data is used for decision making. Data is mainly used to detect and control anomalies rather than optimising performance; 40% of it is not even stored.

To make data smart, trends and patterns must be extracted and interpreted. Combining data analysis with our industry expertise helps us build new insight for our customers. By using analytics strategically, we can develop intelligence from new data sources and help our customers make profitable decisions with confidence.

Big data has existed for some time now, the next step is using it to drive tangible improvements in performance.

Time to go big

Our industry lacks the large scale data analytic capability with aligned expertise necessary to handle the complex nature of these data sets. Wood Group has married our existing engineering experience with advanced data techniques for the launch of our new data analytics centre. This state of the art centre supports enhanced data-based decision making, giving us the ability to better understand production loss on facilities and develop machine learning algorithms to predict equipment failures.

For example, predicting failure of subsea equipment using data analytics developed for one operator saved millions of dollars in unplanned intervention and deferred production costs, making a compelling case for our growth in this area.

Data visualisation represents a step change from the spreadsheet and manual manipulation previously carried out. This greater visibility and control of data provides insight into key issues so we can target resources in the areas that need it most.

Industry independence

We can assist any area in which large data sets are analysed – it is not limited to any industry or sector. This capability has a strong offering for customers across the oil and gas, utility and power generation sectors looking for greater cost and time efficiencies.

While the dedicated data analytics centre is new, our work in this field is well established, with more than 30 years' experience in some markets. The combination of data analysis with our deep operational understanding brings real advantage.

Data analysis can help manage production, pinpoint failures, identify bottlenecks and enhance reliability. We can use analysis to develop more accurate maintenance routines or find the true cause of system problems. In many cases the data is readily available and we simply need to plug in to this in order to monitor the health of an asset or create a solution.

Our capability currently supports North Sea operators in managing production efficiency and loss reporting, providing process safety reporting and management and enabling the transition to condition based monitoring. We are committed to providing innovative solutions to the technical challenges faced by customers.

Data analytics has the power to optimise performance, enhance efficiencies and maximise the productivity of assets. We are continually developing this technology; creating exciting opportunities that directly benefit our customers.

Want to bring the power of big data to your project? Contact Gavin Rogers: gavin.rogers@woodgroup.com

That's a cut...

Cutting a riser is quite a time consuming task, normally requiring the riser to be lifted and cut before further work is undertaken. So by cutting the riser in situ, the potential was there to significantly reduce the schedule time. But how to do it?

The current flexible riser was scheduled to be replaced with a new rigid riser. This would normally require the riser to be lifted from the caisson or the caisson itself cut away to gain access. By adopting the water cutting method we could lower the cutting tool inside the caisson and cut the riser head without lifting it. We were then able to pull the lower sections out from the subsea side through the bottom of the caisson.

The cutting tool uses a controlled stream of sand and water under extremely high pressure to make the cut; this is a safer, less intrusive process that allows greater control. Working under a suspended load is a high risk task which also carries additional dropped object potential once the head is separated. Using this technology removed this risk entirely as well as making a major reduction to the timescale. We were able to perform this without any downtime on the facility, saving approximately \$500k.

Using this new technique for the first time marked a significant milestone for the project. The planning and engineering involved to execute the work scope safely in such an environment is a credit both to Wood Group and our customer for supporting this innovative approach. By pioneering this method we are setting new standards for maintenance efficiency and safety.





...and that's a wrap.

Our improved annulus testing capability is enhancing integrity.

Corrosion is a major hazard to flexible risers and ensuring the integrity of the flexible riser external sheath is important to mitigate underlying issues. A recent joint industry project concluded that sheath damage, annulus flooding, and corrosion failures accounted for around 45% of all industry damage and failure experience to date.

Riser annulus testing is a proven method which has saved operators millions of dollars over the years through the prioritisation of external inspection efforts and in the early identification of riser flooding.

Wood Group has developed riser annulus testing equipment and techniques to provide advanced capability and an innovative and cost effective approach for customers. The equipment is capable of both vacuum and positive pressure testing techniques and it is highly portable and can be deployed quickly by our experts via helicopter. We have previously mobilised within 24 hours to investigate urgent riser integrity issues.

Our riser testing equipment is versatile and can interface with existing platform systems or operate stand-alone and has a proven accuracy within a tolerance of 0.3% of a known volume in equipment trials.

We can alter testing techniques dependent on riser annulus behaviour to ensure the most accurate testing results are achieved. This has enabled Wood Group to achieve successful testing campaigns across the world, including several tests of risers where this had not previously been possible.

With riser integrity engineers on site, we provide efficient analysis and identify issues quickly. Wood Group is accredited as an ISO 17020 Category C inspection body; the only provider in the UKCS to be specifically accredited to this standard.

This enhanced offering means that customers can take a proactive approach for the ongoing health of their risers, supporting safety and maximising production.

Need your risers testing? Get in touch: raymond.duffy@woodgroup.com





Taking the high road

Wood Group assures quality of a unique Colombia pipeline project.

The vast majority of oil and natural gas pipelines are buried underground. Often the pipelines transport the hydrocarbons under roads, railroads and highway systems. One exception is the Alyeska pipeline across Alaska, which travels mainly above ground, parallel to transportation routes. In the case of a necessary modification to the Oleoducto Central (OCENSA) pipeline in the middle of Colombia we faced a number of distinct challenges.

The existing OCENSA system extends northward from the productive Cusiana-Cupiaga oilfields in the nation's mid-section to the marine terminal at Coveñas on the Caribbean. On its route, the 830 km (515 mile) pipeline must pass through the mountainous terrain of the Andean Cordillaris range. The pipeline is vital to the nation's economy, transporting more than 60% of Colombia's crude oil production for in-country consumption and export.

Colombia is currently engaged in construction plans for a fourth generation (4G) four-lane highway system project designed to vastly improve the country's commercial transport and infrastructure for development. A major part of its intended route will travel between the cities of Remedios and Zaragoza through the same tortuous topography and transect the existing OCENSA pipeline.

While most of the intersections between the planned highway and pipeline can accommodate both without interruption and with the roadway crossing above the pipeline route, there are four crossings that require the pipelines to cross over the intended highway's path. Assessing that feasibility is where the expertise of Wood Group comes in.

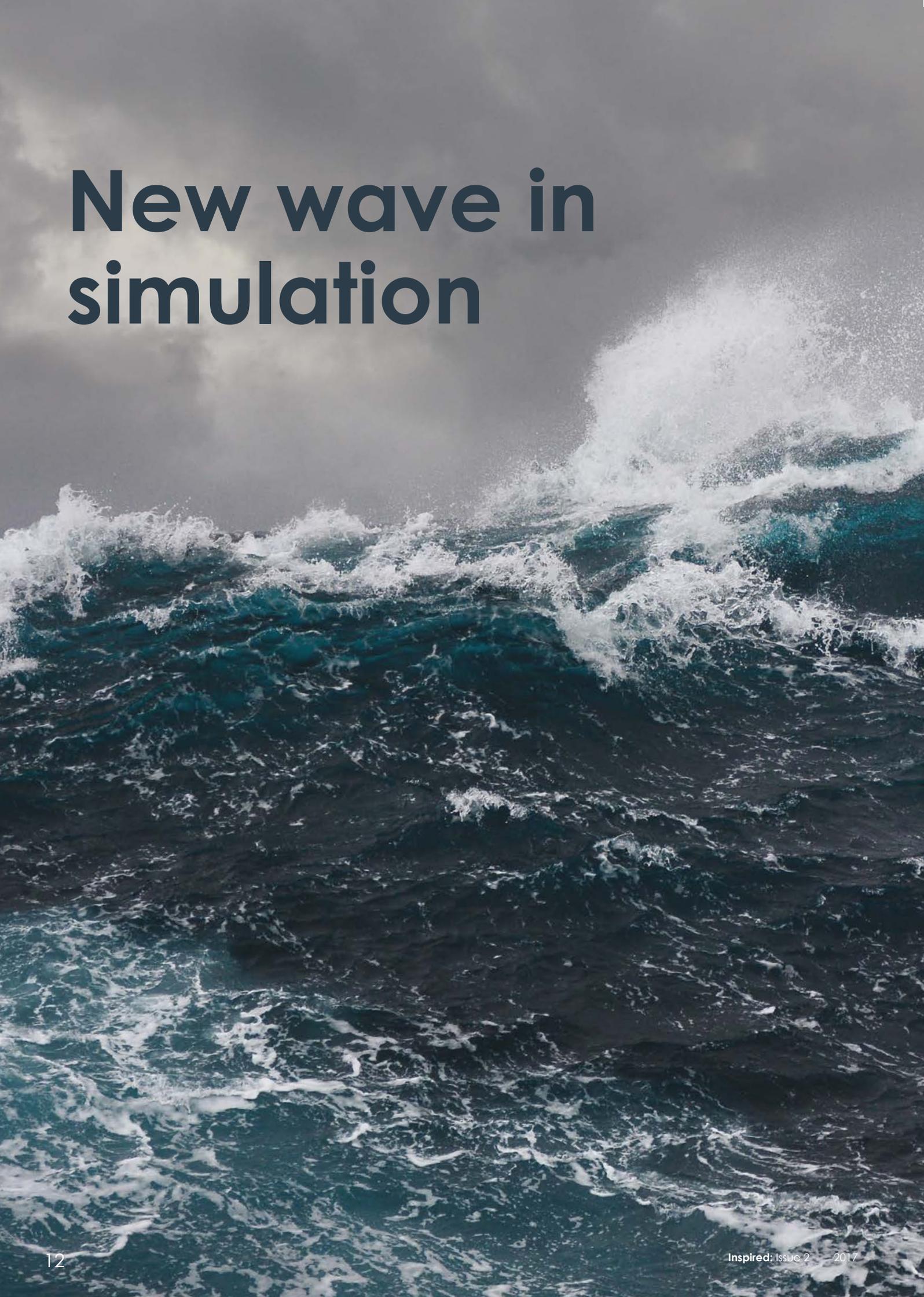
In each of those four instances, a section of the pipeline must be supported by a bridge. The dimensions of the four bridges vary from 20 meters (65 feet) to 46 meters (130 feet) in width and have an average span of 22 meters (70 feet). The mountainous slopes to which they abut can be as steep as 36 degrees, and the clearance is approximately seven meters (22 feet) above the roadway. The design and complexity of the project required significant planning and engineering. Wood Group was contracted to provide the necessary stress and technical analyses to assure the quality during the construction phase and for ongoing operations.

In assessing the planned performance of the bridge structure itself, Wood Group incorporated industry codes for everything related to the project - highway construction, hazardous liquid pipelines specifications, cathodic protection and corrosion, and safety measures related to pipeline/highway crossings. In addition to compliance with Colombia regulations, Wood Group engineers relied on their vast pipeline and civil engineering experience with stringent U.S. requirements, generally considered to be the industry standards.

Supported by Wood Group's analysis and verification, the project is currently proceeding to schedule. The bridges are scheduled for completion later this year.

Can we support your pipeline project? Contact Arturo Portilla, Business Development Manager to discuss: arturo.portilla@woodgroup.com

New wave in simulation





Oil and gas software helps advance renewable energy technology.

Wind and solar systems are dominant in the renewable energy mix, with wave devices sometimes facing challenges in achieving the technical and commercial readiness levels to make this technology prolific.

Apart from the complex engineering factors, a key issue is the availability of suitable simulation packages. A variety of software products exist and while some are adequate for concept screening, many are not sophisticated enough to support detailed engineering design or can be costly and difficult to use.

Wood Group has spent more than 30 years developing software tools for the engineering analysis of offshore structures and to determine their long term suitability in the offshore environment.

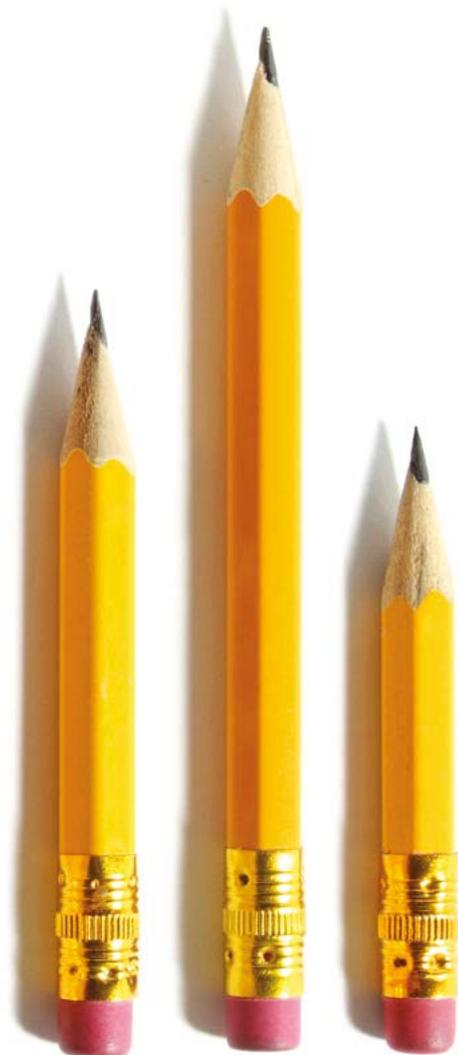
Our leading structural analysis product, Flexcom, has underpinned the engineering design on some of the world's most demanding offshore projects. Although traditionally used in oil and gas, Flexcom is now being adapted to the renewable energy sector.

The software has already been successfully used to optimise a highly innovative wave energy device concept, which was a finalist in the U.S. Department of Energy Wave Energy Prize. Data obtained from empirical tank tests, combined with an advanced coupled numerical simulation technique provided by Flexcom, is helping to enhance the design and further improve the industry-leading performance metrics demonstrated by the device.

We combine marine engineering expertise and software development skills to help wave energy device developers gain a deeper understanding of the structural response and energy generation potential of their designs; supporting from early concept validation to full scale modelling.

A Simpler way to innovate

Innovation is not just about bleeding edge technology and baffling science, it draws from people working and behaving differently, applying new methods and improving processes both incrementally and by stepping right back to first principles and rebuilding with new understanding.





Fiona McKie, UK Head of Project Management, has led the development of Simpler Solutions, a delivery model which operates differently to our standard contract setup. Some elements within the model are unique to us, some are older methods which have been reimaged, and others have required both our employees and our customers to think differently about how they approach their work. As Fiona explains, it has been a real challenge but the benefits are considerable...

We needed to bring about a major step change to prove to our customers we were working differently. Brownfield modifications work is one of our core services and going up against accepted practice was going to be a challenge from the start, so there was only one way to set the tone.

Challenge everything

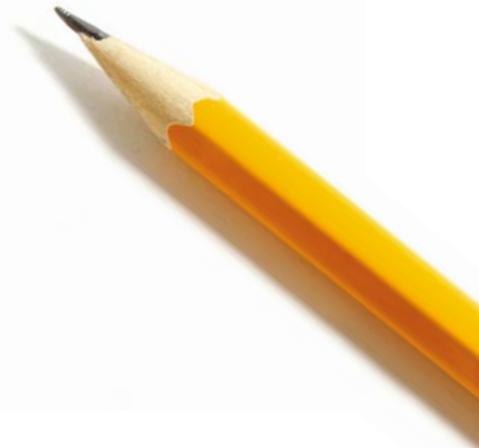
This became our motto during the development and remains in force with the delivery model. We've built our new model through rigorous challenge, removing accepted practice and questioning the need for everything. The result is a much more streamlined system which features a very open scalable approach driven by the requirements of the work. That challenge continues in the workflow, at key stages we stop and check if the direction we're taking is the right one – is it really necessary and is it the right way? It might not seem innovative but it has revolutionised our work. It's easy to assume the project should just go ahead because we're working on it, but sometimes it can be rejected or deferred. It's refreshing to be able to do this and builds trust with the customer. Just because they have asked for it still doesn't mean it really needs doing.

Captive collaboration

Decision making is always a bottleneck; we pull all the right people together to discuss the problem, we all go off to think about it some more before reconvening to catch up on the issue again. You can spend a lot of time going over old ground, recapping and bringing people up to speed and accounting for those that have missed a session. Our approach keeps the decision makers in the room until the decision is made, making us more productive and allowing us to move on at the point of a collective decision.

Real time visual management

There's a bit of humour behind this. It seems like a thousand miles from innovation; essentially it's a t-card system. An actual physical job board.



You could create an application to do the same thing but that would miss the real value of the piece which lies in bringing people physically together, working on tasks that are clearly connected to a larger project. The board shows progress and encourages collaboration across execution. Everyone rolls their eyes when they see it; it's such an old method, but once they get involved and experience the system in action they love it, so much so that we have extended the system to cover proposal development, detail design, construction, commissioning and closeout.

So where's the innovation?

What is unique about these methods is the way we've adopted and engaged them to enforce change. Using this model requires major commitment from all parties to learn new processes, and behave differently, to give and accept challenge, to remain more flexible with time, responsibility and procedures and to have confidence in everyone's ability to meet deliverables and stay on course. There are many more elements across the delivery model that make this a different approach, but they all have one thing in common; they are founded on people and behaviours. It doesn't look any different, it's still engineers behind desks, but it feels different.

Simple successes

The hard work has been maintaining this approach against the comfort of old habits, but the rewards are there. Customer feedback has been overwhelmingly positive, not just on our improved turnaround times but on the quality and consistency of our deliverables and we've secured well over £1m of new work.

Simpler Solutions boasts around 30% reductions in man hours and overall cost while estimating time has been cut by up to 80% - effectively from initial enquiry to estimate and proposal takes no more than 5 days, a major step forward in turnaround time and predictability. Our flexibility is also impressive – on one project we increased support from 20 to 300 people in just 6 weeks to deliver over 300,000 hours of engineering and another project delivered a 16 week programme in 6 weeks.

To find out how to make your project Simpler, get in touch with the team: simpler@woodgroup.com

Greener than green

Globally there is now almost 500 gigawatts (GW) of operational capacity in wind power. Out of this we have assessed more than 160GW of renewable energy developments, bringing unrivalled knowledge of the options for enhancing performance and efficiency.

Wind energy technology has advanced significantly and our understanding of wind behaviour is ever evolving. We are using this to help owners and operators increase energy yield for greater return on investment.

SgurrOptimiser is an innovative suite of measurement techniques coupled with our unique analysis process that identifies areas for improvement. These measures can deliver between 5% and 12% enhancement at a typical wind farm.

Our solutions look at the facility in its entirety while factoring in adjustments to individual turbines, the relationships between them and the surrounding landscape. Even the position of forestry several kilometres away can have an effect on performance. Rigorous analysis helps identify all the areas which can be altered to improve performance.

At the heart of this system is an advanced Light Detection And Ranging (LIDAR) device which makes accurate laser measurements of wind data to identify and validate improvements. This innovative approach models the airflow across the site so our analysts can quickly target the best opportunities; aerodynamic improvements to the turbine blades, better alignment to air currents through yaw and offset adjustments or remodelling of surrounding forest to channel airflow more effectively.

It sounds obvious, but one way of improving performance is to point the turbine directly into the wind. Most turbines have a vane at the back, which acts like a rudder to face the turbine in the right direction. Unfortunately the turbine blades cause enough disruption to affect the precision of the steering vane.

With LIDAR we are able to determine best airflow across the whole swept area of the blades to ensure accurate alignment. This not only increases performance but reduces the kind of offset loading that adds wear to components. It's very much a win-win.

With competition for planning and energy demand showing no sign of slowing, it is common sense to do everything to maximise your asset. Even small gains can have a major impact over the life of a wind farm. Optimising is not just about immediate performance gains; these are long term investments and we look to reduce the loading on the turbines to increase lifespan and reduce operational costs.

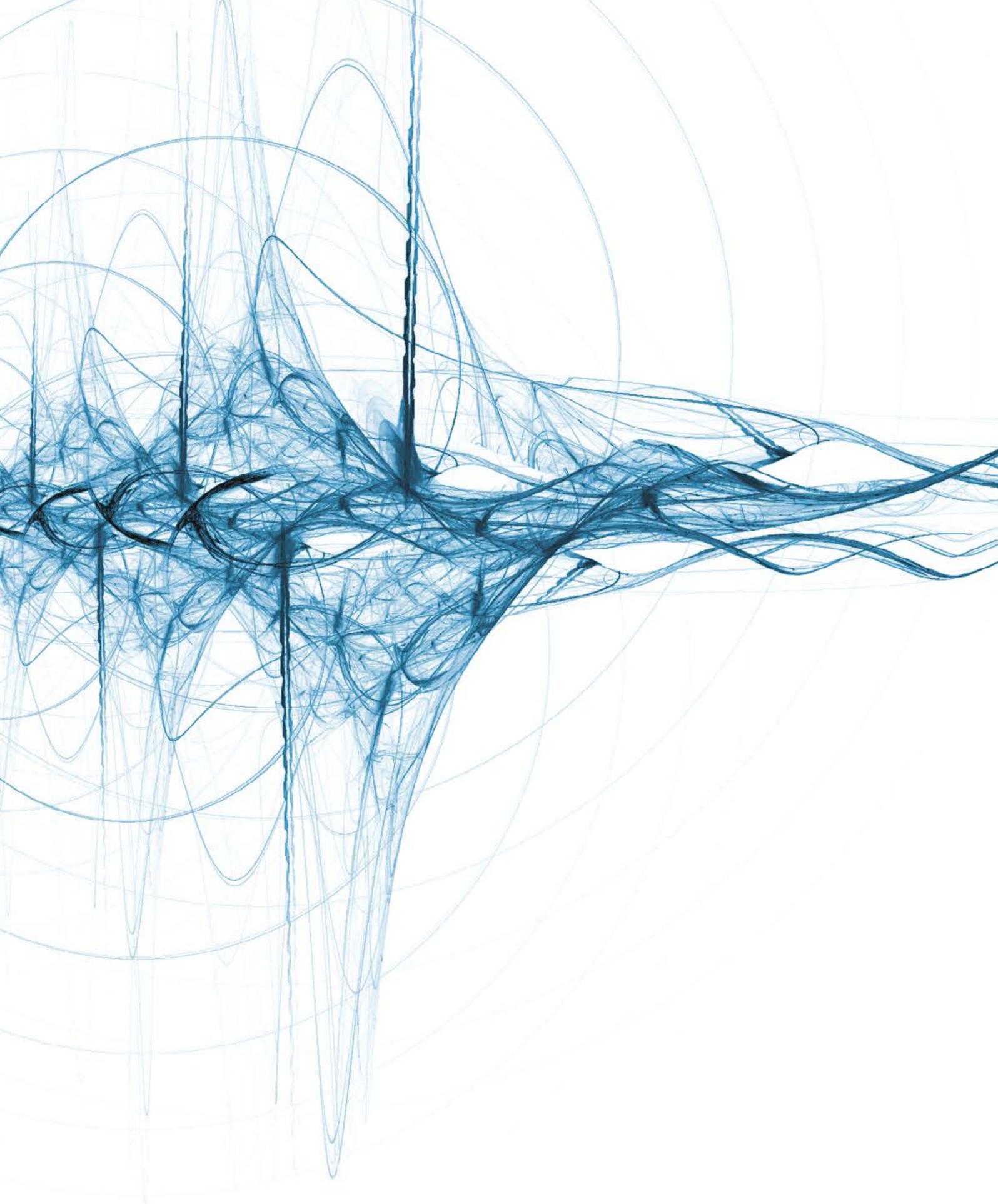
For more details on SgurrOptimiser contact: cleanenergy.enquiries@woodgroup.com

Many wind farms pre-date our SgurrOptimiser technology so most installations can benefit from the extra efficiencies this service brings.



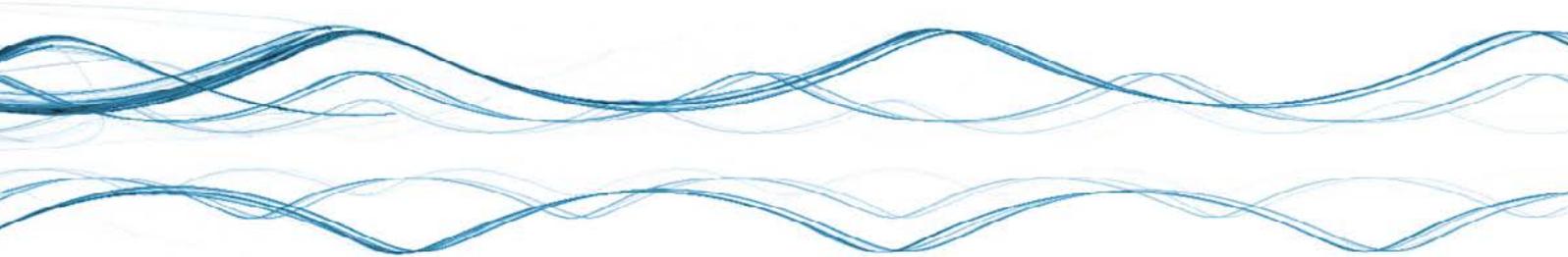
Improving wind farm performance

- Fully independent advice
- Optimise operational performance of individual units and across the whole farm
- Reduce the load on assets to increase lifespan and reduce OPEX costs
- LIDAR visualises wind flow, speed and direction to optimise output
- Services can be applied individually or as a package
- Analytical techniques are unique to Wood Group





Good Vibrations



Our innovative range of damping products prevent piping failures and machinery downtime.

Problems due to piping vibration are common at production facilities and solving them can be challenging. Wood Group's vibration experts have applied technology from the aerospace and automotive industries to the industrial market with fantastic results.

Industry studies identify vibration as a leading cause of hydrocarbon release and mechanical failure. Vibration problems are costly and common near compressors and pumps, as well as in the piping system.

Engineering companies and operators are looking for effective and cost efficient solutions to mitigate vibration. They also want solutions that are easy to implement and permit wide operational flexibility.

When vibration forces occur, piping systems can become highly responsive, leading to shaking equipment and fatigue failures. To prevent this, design engineers can stabilise a shaking piece of pipe by clamping or bracing it to the ground. However, traditional clamps and supports are often not effective in preventing failures in the long run. U-bolts and conventional clamps do not provide the required stiffness, resulting in wear and flexibility. In addition, conventional restraints are not effective in all conditions, limiting operations and creating further repair costs and failure risks.

In response to this, we have applied technology used in the automotive, aerospace and electronics industries: damping. Based on an extensive research and testing programme, we developed a family of damping products, including clamps, braces and supports called DamperXTM. Field tests showed that vibration on main process piping and vessels was reduced by up to 80% compared to conventional supports.

The vast majority of vibration problems are due to mechanical resonance. Rather than simply adding stiffness to a vibrating system, our DamperXTM products contain a specialized viscoelastic element that absorbs resonant vibration energy that would normally be transmitted to the supporting structure.

A traditional steel brace is resonant at specific frequencies resulting in excessive vibration. Damping has been proven to absorb energy across all frequencies and due to its reduced size; our damping design is convenient for applications with limited space or other construction restrictions.

Vibration problems frequently occur during operations when conditions have changed or vibration was not fully considered during design. The DamperXTM braces and clamps can be retrofitted with ease, even while equipment is running and at operating temperatures.

Based on advanced simulation and modelling techniques, Wood Group also provides custom solutions for specific design or troubleshooting problems, realizing significant savings for operators by avoiding structural modifications.

For more information on our DamperXTM products contact Jordan Grose, Service Leader: jordan.grose@woodgroup.com

Portable expertise

Bring the site to the office. This is the revolution that our eXpert system offers. We have combined cutting edge technologies to deliver a practical, portable solution that allows you to connect office based expertise with site issues to discuss and solve problems in real time.

Remote sites present one of the greatest logistical challenges in our industry. Getting access to the worksite to identify and support problems is difficult when many sites are far away, the issue is compounded when the facility is offshore and you have to contend with restricted space and changing travel windows.

Communicating accurately between the office and the worksite is a crucial part of any job and access to the site is often necessary for experts to identify issues, diagnose problems and develop solutions.

Many jobs require several different experts, teams of specialists and decision makers to reach a conclusion. Getting these experts to the site can involve special permits, training, inductions, extended travel, accommodation, scheduling and escort arrangements.

Our eXpert solution is a set of collaboration tools in a portable case that can be sent to any site so operatives there can establish real time links to office based experts and discuss site problems. The hardware is specially developed to work in hazardous zones and satellite technology allows you to connect from anywhere in the world, on or off grid. We have developed the tools and software to be completely intuitive and offer round the clock support for setting up and troubleshooting the connection.

Advanced devices connected through the latest software allow not only audio and visual feeds but live mark up and connectivity with other monitoring devices. You can draw on screen to highlight areas, direct the site operative to capture the imagery you need and connect multiple users through a dedicated hub. Experts and decision makers don't even need to gather in the same room to collaborate; you can connect individuals by phone, laptop or meeting facility to interface with the work site.

The benefit goes far beyond saving on travel and downtime though. By opening up the collaborative possibilities we are able to connect more experts to the problem, giving you direct access to a much larger pool of expertise.

For more information or to arrange a demonstration contact David Millar, Innovation Manager:
eworking@woodgroup.com





A customer's technical authority who used eXpert recently to collaborate real time with site had this to say:

“eXpert provided us with real time enhanced decision making capabilities to fix a leak at one of our sites. Using eXpert we connected live to a colleague at site and were able to identify and document the root cause without having to leave the office. The speed at which we were able to help solve this has never been available to us before. This solution will enable technical authorities to provide fast real time support not only in critical instances, but for routine situations as well.”



There are many improvement initiatives underway around our business. eXpert is part of a suite of tools and software under development to streamline workflow and increase efficiency. This piece has been developed by Innovation 4 Growth, a team who help identify and develop new ideas to improve our business by using innovative technologies and new concepts to bring about radical change.



Do not adjust your set!

The picture opposite shows the Balmoral Floating Production Vessel (FPV) raised by over seven metres from its operational draught and leaning over at 2.5 degrees. This unprecedented move was undertaken to allow access for replacing the gypsy wheel, a crucial part of the vessel's mooring system which urgently needed repairing.

The Balmoral FPV has been operating in the North Sea for over 30 years. Wood Group plays a key role in maintaining the Balmoral to the exacting standards required for the classification of mobile offshore units, a certification which enables such vessels to continue operating. Renewing this Class Certificate involves over a thousand inspection activities including examination of the mooring system where the fault with the gypsy wheel was identified.

The vessel is anchored in place by eight anchor chains and 'fairleads'; a device that routes the chain around a pulley called a gypsy wheel before connecting to the anchors on the seabed. These chains hold the vessel against its own ballast allowing it to remain around a fixed point in the sea but still move with the ocean swell.

A crack was found on one of the gypsy wheels and because of the importance of these anchor points the wheel had to be repaired within a tight timescale.

The perfect storm

Replacing the gypsy wheel created a number of major challenges for the team. In normal operations the wheel sits below the water level and for a job of this size the vessel would typically be brought into harbour, putting it out of operation for a potentially significant time. Winter weather conditions normally prohibit over side work, with both wind and wave height making the work too dangerous. Raising the vessel to expose the wheel also reduces its stability so using the deck cranes would not be possible, and doing so in winter once again places the vessel at greater risk from bad weather. In addition to the challenging conditions, the timescale to complete the work was tight in order to reduce the chance of the crack worsening.

The team meticulously planned the work, preparing a test fairlead onshore to practice fitting the new wheel and setting up heavy lift rigging and access baskets on the Balmoral ready for installation. The design team created detailed storyboards for every step of the process and all aspects were rigorously drilled to make the operation as smooth and efficient as possible.

'Heeling' or tilting a platform up to replace a 5.7 tonne pulley wheel is a first for Balmoral and as far as we know the first time this has ever been done with a floating production vessel in open water. Pushing into new territory in pursuit of the best solution is part of what makes Wood Group unique and we are proud of our continuing association with the Balmoral facility.

In this case, innovation was simply a matter of remaining open to all possibilities and evaluating all options no matter how unlikely they might seem. Replacing the gypsy wheel in this way prevented a major shutdown and overhaul, retained the recently extended Class Certificate and preserved our customer's reputation in the North Sea. It also pushed the boundaries for the engineering, access, project management and asset teams involved.

In thirty years of hard fought experience, it is exciting to continue exploring new techniques on these assets.

Wood Group is a leading independent provider of turnkey automation and control solutions from early design through to complete commissioning and start-up.

No.1 Systems Integrator

(System Integrator Giants Listing)

1100+ automation and control engineers

20 years consecutive growth / operation

In the last 20 years, the business has grown into a global service provider with 27 offices located in 15 countries.

Inspired is written, edited and produced in house by the Wood Group marketing team. Submissions and feedback are welcome and can be sent to: inspired@woodgroup.com

www.woodgroup.com