The Pile Drivers

"We pursue every contract with the same enthusiasm and vigour from a £100,000 to a £5M project."

Candidly honest, highly knowledgeable, thoughtful, pragmatic, sharp-witted and humorous. Rarely do you get an interview such as this, and some of his *off-record* quips had me in stitches - me knowing only full-well that our subject wasn't trying to be humorous, he was just being himself. *Andrew Cotton* - Director of Sheet Piling (UK).

One of the best shafts that I have ever seen sunk was up in Paisley where SPUK installed a circular cofferdam prior to its construction. It was nothing short of beautiful engineering. On a job such as that, who dictates the methodology? Do you work to the exact specification given to you by the client/contractor, or do you often get given parameters, and design the piling yourselves? If so, can you tell me how you deal with an inquiry such as that?

This scheme involved installing temporary sheet piles to a very tight diameter to allow construction of a segmental shaft. The design was undertaken by SPUK's in-house design team who

Photograph Above. Here's one we prepared earlier: A sheet piled shaft

The Project Manager up on the River Humber pipeline, Steve Ellison stated – and I quote: "Sheet Piling (UK) are 'among the best in the game'." How do you get to become 'among the best in the game'?

We have been established for over 20 years and are fortunate to employ highly competent and skilled management and site staff, most of whom have been involved in sheet piling all their careers. We therefore have probably the most experienced and dynamic workforce within the industry allowing us to offer an excellent service to all our clients in terms of Design and Value Engineering solutions, whilst ensuring key project deliverables including programme, Health & Safety, quality and cost controls are always achieved to the client's satisfaction. Without such an experienced, conscientious and committed team our position as the UK's leading sheet piling contractor would not be achievable nor maintained.

have considerable experience within the industry on all aspects of temporary and permanent works based around providing the client with a Value Engineered solution, whilst ensuring buildability for follow-on works is always maintained as a top priority. The tolerances on which the piles are installed to are provided for by Industry Standard Design Guides and Best Practice documents. However, the use of modern sheet piling equipment and techniques allows such tolerances

to be bettered on the majority of schemes, resulting in a finished solution installed to the highest quality.

The enabling works as part of the River Humber Pipeline. How did you get involved in that?

SPUK were invited to tender for the scheme following our successful completion of the M1 Cathorpe Viaduct project for Skanska on behalf of Highways England. The JV team on the River Humber project were fully aware of the complexities of the scheme, not only in terms of the on-site delivery of the design solution proposed, but also the technical challenges faced with obtaining the necessary approvals from the clients design team and the Environment Agency. For this reason, the JV were fully aware of the need for Early Engagement with a delivery partner who they could 100% rely on to not only delivery the scheme on-site, but provide expert specialist advise to the third party regulatory bodies involved with the project. The risks associated with not obtaining the approvals or delivering the scheme were significant, both in terms of programme and cost. To engage on such a project with a specialist sheet piling contractor who was not 100% committed and able to deliver the works in accordance with the client's (National Grid's) rigorous Health, Safety & Quality requirements would have left the JV extremely exposed on such a technically complex and prestigious project. SPUK were fortunately enough to satisfy all of the necessary criteria for the JV and were successful in securing the works.

Photograph Above. SPUK undertaking sheet piling in Blackpool

Did any aspect of dealing with the tender put you on tenterhooks? The ground, the design. Again, the project was a huge, high-profile contract for SPUK and to lose out on the work could have been seen as a blow?

As with all construction projects, whether large or small there is always an element of risk. The trick of a successful construction business is to manage these risks to an acceptable level, which aligns with the business risk profiles and KPI's. As a specialist sheet piling contractor, the main risks associated with a project are surrounding ground conditions, pile driveability and production rates. The experience and competency of staff within the organisation ensure that as a team SPUK are well-placed to ensure these risks are managed to an acceptable level, whilst ensuring the key deliverables for the client are achieved. As a company we have to back the technical and construction experience of all the team members to ensure this is achieved.

Photo Above. Andrew Cotton, Director, SPUK

Did you know which piling contractors you were up against, and if so, when did you actually learn that information – and as a part of the same question – Does knowing that information, ever put you under any extra pressure?

The technical and construction difficulties of this project meant there were only ever to be likely one or two contractors which the JV would consider under their due-diligence and PQQ process for this project. Consequently, competition on this project would have always been limited – however, at no stage as a business would compliancy ever become a factor. We pursue every contract with the same enthusiasm and vigour from a £100,000 to a £5M project and ultimately if our 'best is not good enough' for whatever reason (and there are numerous such reasons in the construction industry), then as a team we move on and strive to improve for the next project. SPUK do not tend to worry about competitors on individual projects since there will always be competition in whatever business you are in. We concentrate on winning the project with the best possible solution for the client.

Still on the River Humber job: "Such preconstruction issues were concerns from the Environment Agency regarding the penetration of the underlying aquifer contained in the Flambourgh Chalk formation and concerns from National Grid regarding the feasibility of achieving the required pile toe level in the competent Burnham Chalk formation" and "There were also concerns regarding pre-augering in the Cohesive Glacial Deposits along with reservations regarding the potential for vibratory sheet pile installation to adversely impact on the flow path of groundwater during the dewatering of the cofferdam, as well as the complex connection detail between the sheet piles and secant piles". This has me scratching my head as how would one go about appeasing everyone and still manage to do your job? This is probably the wrong wording but – How do you sell, or put your concept over during design, pre-contract?

Basically, the problem on this project was that the client wanted the piles to reach the design pile toe level to allow the de-watering of the cofferdam to work, whereas the regulatory bodies didn't want pre-augering or impact driving of the piles to achieve the pile toe level due to concerns about contaminating the underlying aquifers. To

manage the risk / concerns of all parties, a complex installation sequence flow chart was produced by Skanska and approved by all relevant parties, which set-out detailed hold points in the event of the installation works not proceeding as originally planned. This collaborative approach allowed all parties their input into the process and embraced a 'TEAM' approach to the construction project, whereby having the benefit of Early Contractor Involvement, all parties could understand each other's concerns and reservations.

Different piling contractors use different rigs. On the River Humber job, you used a Bauer RTG21T and a ABI TM14/17. I have a tunnelling background, and I am au fait with TBM v's ground conditions and what tends to suit what, but not so with piling. Could you tell me why you "ran" with these machines and was it always going to be the case, or did you offer a range of different scenarios/ methods to the client?

The difference in the rigs (apart from the different manufacturers which is very similar to Mercedes v's BMW – One prefers one, and the other another) is the length of sheet piles which they can install. The Bauer RTG21T will install a maximum 21m-long pile. Consequently, this had to be used for the 21m-long sheet piles and is actually the biggest telescopic leader rig currently available in the UK market. The ABI 14/17 will install a 17m-long pile and consequently, this could be utilised for the 11.5m long sheet piles. Apart from that I would just be bamboozling you with science on the difference between the two machines!!!

Photograph Above. A good construction site. It doesn't get much more picturesque than this.

"We opted to use a 'pitch & drive' method for the 21m-long sheet piles, which again would be considered as 'pushing the boundaries' of what has traditionally been undertaken in the UK market for sheet piles of such length." I know 21m is some length – but could you elaborate on this?

To my knowledge, such long sheet piles have not been installed using a 'pitch and drive method' in the UK previously. The reason for this are numerous but include limited availability of suitable leader rigs, extremely difficult to control tolerance – particularly verticality, since the pile is constantly wanting to lead forward under its own weight and manufacturing issues with such long sheet piles. The successful installation on this project was only possible by the quality and experience of SPUK site operatives installing the sheet piles without which, SPUK would never had considered such a technically challenging installation project. Also, improvements have recently been made in the rolling tolerances of steel sheet piles and in particular, the straightness tolerance which over a 21m length can be as much as 42mm .

I'll get onto vibrationless and silent pilers in a bit. What rigs and hammers do SPUK have at their disposal?

SPUK currently own and operate six telescopic leader rigs (three ABI Rigs and three Bauer Rigs), four telescopic crawler cranes, one Movax excavator piling rig, three hydraulic impact hammers and two vibratory crane suspended hammers.

What is the biggest kit that you have ever had to utilise (if not the Humber) and why?

The biggest quantity of equipment that we have had to use is seven telescopic leader rigs / Movax excavator piling rigs, when completing a long sea outfall cofferdam in Blackpool. The works were tidal and the programme critical to achieve the required pipe pull date, and consequently the works had to be resourced accordingly to ensure the deadline was achieved. Getting seven items of plant tracked on and off the beach on each tide twice a day was a complex logistical and plant fitters nightmare, and again was only successfully achieved with the benefit of our own in house plant fitters.

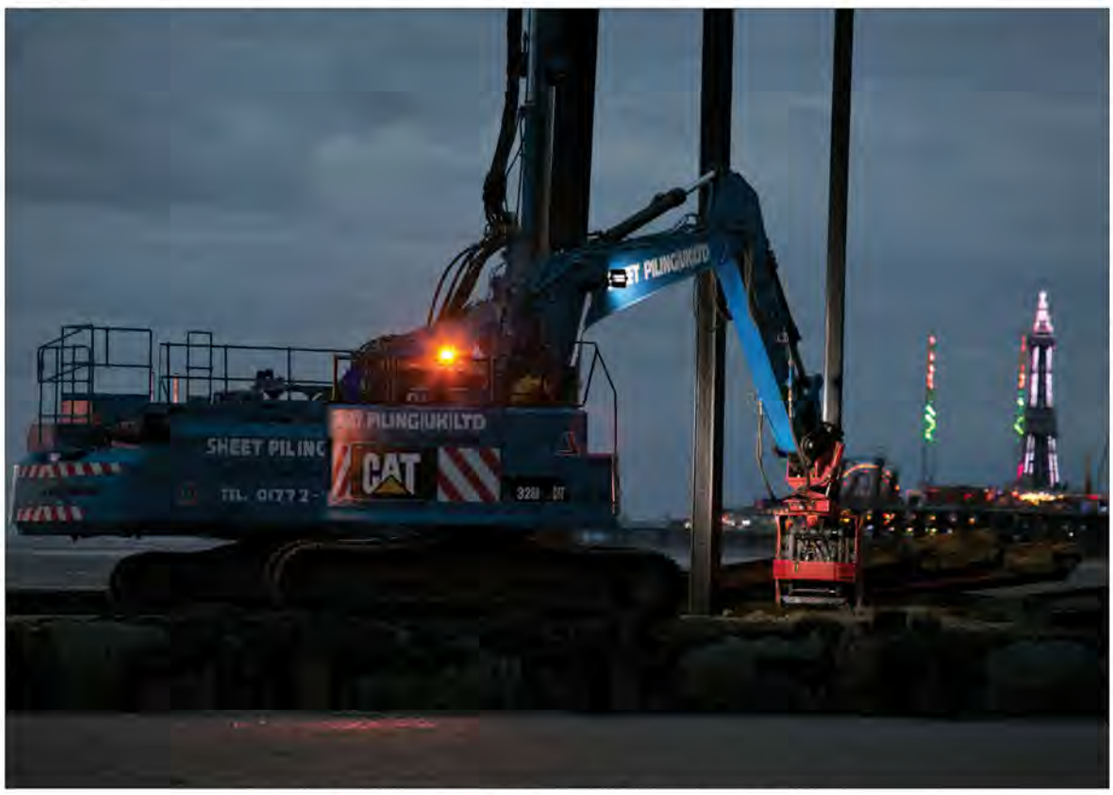
I was on site recently, whereby a contractor was running with several Banut and Junttan rigs, but had a Woltman in on hire from Watson & Hillhouse as a "trial". Could you explain your thoughts on all these thee rigs in comparison – with say your Bauer? I am asking the question – as I've said, my background is tunnelling/mining, therefore I would like a bit of education.

These are all impact driven rigs (basically a rig with a fixed leader to which is attached an impact hammer which goes up and down the leader hammering the concrete / tubular pile into the ground).

Banut rigs are produced by ABI in Germany. Junttan are produced by Junttan in Finland (I think). Both are very experienced machine manufacturers with years of experience in delivering what the customers need, and the product has consequently already undergone significant design development. Woltman, I have never heard of!!!

Do the hammers dictate the piling or the rig. Or is it just a combination of both? I would really love to hear your thoughts.

With telescopic leader rigs, the size of the base machine is just required to run the vibratory hammer in very simple terms. The bigger the vibratory hammer the bigger the base machine. Consequently, in terms of driveability of the sheet pile, this is dictated by the energy of the vibratory hammer. The base machine just has to follow along to power it!! However, on certain sites you then have practicality issues such as the size of base machine which will fit, manoeuvrability around site, restricted headroom, minimising piling platform depth. Consequently, it is not a simple case as 'one size fits all'!! The trick is to have a variety of rigs with a variety of hammers, which can cater for the majority of your customers' requirements thereby offering a 'one stop shop'.



Photograph Above. Illuminating. Sheet piling, with Blackpool Tower in the backdrop

Ground conditions. What is the most problematic job that SPUK have ever been on as re: bad geology? I am after a solution to the problem here.

One of the most problematical jobs I was involved with must have been around 10 years ago at Knostrop WwTW in Leeds. The scheme involved constructing a temporary anchored sheet pile retaining wall straight into a mudstone bedrock. All the text books and engineers stated that a sheet pile solution was not possible. To demonstrate this, we committed to undertake a trial installation, which whilst the client thought it was a success. I wasn't quite convinced!! For the main installation works, we had to overcome the problem associated with the pre-augered mudstone dust setting like concrete during vibratory pile installation to the sheet pile. This would cause significant pile damage during the pile extraction, but the client hadn't seen this as they had only witnessed the successful pile installation!!! To overcome the problem, we introduced a system for high pressure water jetting down the sheet pile to prevent the 'baking' of the auger arising to the sheet pile. Not a technique often used in the UK, but used extensively in Europe. Within a two-week period we managed to successfully implement and trial the use of water jetting for vibratory installation and avoid the problem which we knew existed during the trail.

Vibrationless pilers. I first saw one in 1998 – A Barhale/McNicholas JV – Nunhead to Deptford Trunk Main and strangely the piling was as part of a civils subcontract being undertaken by P Trant. Could you explain how this system has evolved and how much improved and powerful they have become – me full knowing that SPUK have to be in the top one of the installation of silent and vibrationless piling?

The original F3 Pile Pressing model was first launched into the UK market by Giken (Japan) in the late 1980's. Since then the machines have developed to include launching the UP150 in 1995, followed by the ZP100 in 2000. Both these models were market leaders for pressing both U and Z section sheet piles. The latest models include a F201 pile press, which is capable of pressing U section sheet piles at 150Te pressing force, with the added benefit of four leg clamps for increased efficiency and productivity along with the F301, which can press both U and Z section sheet piles with a maximum pressing force of 100Te.

Could you give me a story of a silent piling job that was different? Humorous would be good – as we all have them!

Once SPUK were working on a railway project adjacent to an existing railway station platform installing sheet piles for a permanent retaining wall to extend the existing platform. For one reason or another the project had 'stalled' on numerous occasions and was proving very problematic to 'get going'. Anyway, we were now going installing piles and all was good. The piles were being installed with a Giken Z pile press and to assist the driving of the sheet piles, we were water lubricating the piles with a 'glorified' hosepipe. Anyway, just as a train pulled onto the platform and thousands of smartly dressed business professionals were preparing to disembark the train, a connection 'blew' on the hose and started spraying water in the direction of the platform the very same second the train doors opened. The water sprayed directly onto the platform and into one of the open carriage doors. Everyone in the vicinity of the free spraying hosepipe got sprayed in the ensuing seconds before the supply could be shut off. It was very akin of a wet winters day in Preston!!!

You always seem to have tonnes of steel sheet piles in stock. How does this work? Do you buy and sell? I am asking not to be pre-empting or nosey, but because I don't know. Basically, how does it work?

SPUK have an exclusivity agreement with Emirates Steel, based in Abu Dhabi, to import

hot rolled Z section sheet piles into the UK for the next 10 years. These piles are imported to provide the company with a large stock of piles to enable us to react promptly and efficiently to our client's requirements therefore eliminating lengthy lead-in time from ex-mill rolling and also providing cost certainty of the product in a market place, where costs are continuing to rise. We also have a pile sales department to enable these piles to be sold directly to end users. Currently the company has in excess of 8000Te of Emirates Steel Z section sheet piles in stock for immediate delivery. This provides a significant benefit to the company in the market place to ensure we remain at the forefront of not only a commercially driven market, but can be reactive to suit client's programmes.

A forecast for 2018?

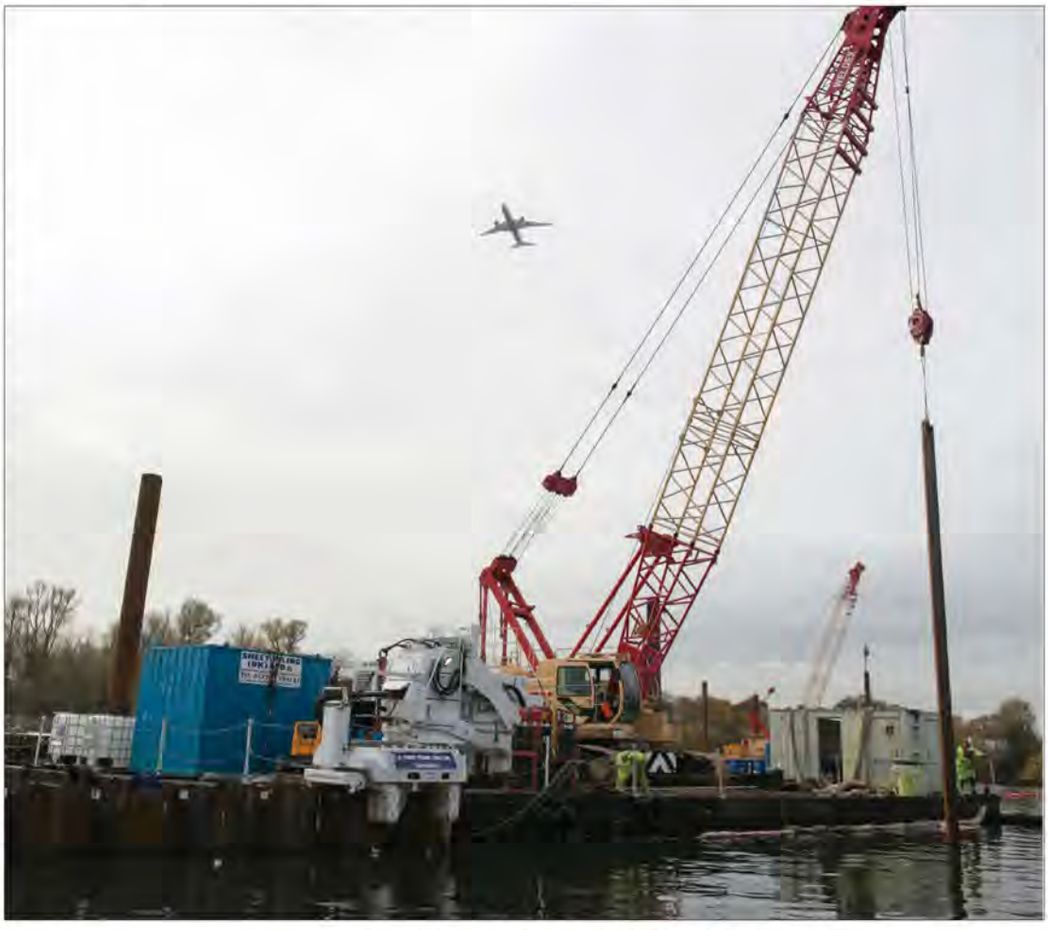
The company remains positive for 2018 despite all the 'doom and gloom' associated with the political uncertainty surrounding Brexit. The company aims to protect our position within the market place by continued investment not only in sheet pile stocks, but also significant plant purchases. In 2018, Emirates Steel will launch a new range of sheet piles which will increase our ability to be cost and programme efficient across a wider range of projects. Also, SPUK have recently ordered a new long reach telescopic leader rig from one of the world leading rig manufacturers. The machine has been developed between SPUK and the machine manufacture and is under an exclusivity agreement. The benefit of the machine is the extended reach over those currently offered in the market place. It is designed to reach 6m from track edge to pile line without any compromise on power or driveable pile length. The machine will significantly improve the construction methodology currently adopted for retaining wall construction on-sites and offer clients significant cost and programme savings in respect of reducing enabling earthworks requirements, reducing wagon movements, reducing piling platform construction requirements. However, the quality and productivity of installation will be maintained by virtue of the machines innovative design characteristics. The machine is aimed at providing improvements within the infrastructure widening sector and has been developed in conjunction with Highways England steering groups.

The Hammers

Sheet Piling at Upton Park

Sheet Piling (UK) recently completed installation of sheet piles to form a 135m x 85m permanent steel intensive sheet pile basement at Upton Park Gardens

The specialist were approached in early January 2017 by Barratt London (tel. 020 8326 7100) and their engineers AECOM (tel. 020 7061 7000), to provide a contractor designed scheme for the permanent basement.



Photograph Above. SPUK undertaking silent and vibrationless piling

They proposed a solution utilising heavy 'Z' section sheet piles to take benefit of the superior structural properties and weight efficiencies in providing a predominately cantilever design solution. The solution offered significant benefits over traditional 'U' section sheet piles which would have required temporary propping throughout to comply with the deflection limits required in the performance specification.

Due to ongoing demolition works, the scheme was divided into two phases. Phase 1 was sheet pile installation for the Energy Centre and Phase 2 was a permanent basement car park for the development.

The sheet piling package on the project was awarded around March 2017 and Phase 1 commenced in early April 2017, and involved the supply and installation of approximately 323 Nr. 12m-14m long 'Z' section sheet piles.

"We were able to offer a very short preconstruction period by utilising our extensive stock of Emirates Steel 'Z' section sheet piles,

which offers programme savings against alternative procurement solutions," explained SPUK's Director, Andrew Cotton.

Due to the nature of the prevailing ground conditions (i.e. predominately London Clay from approximately 5.0m below ground level); the pile line was pre-augered in advance to within 2-3m of the proposed pile toe level.

Emirates Steel EZ26-700 sheet piles were then installed using an ABI telescopic leader rig complete with resonance free vibratory hammer and serviced by a 40T Sennebogen telescopic leader rig.

To assist with installation of the 'Z' section sheet piles, the vibratory hammer was fitted with an ABI MZK1250 double-jaw clamp assembly which provided significant benefits for installing the piles.

The Phase 2 sheet pile installation commenced in early September 2017, and involved the supply and installation of approximately 390 Nr. 11m-12m long 'Z' section sheet piles.

Following sheet pile installation, localised areas of clutch welding and shear studs were undertaken to complete basement construction.

The overall works, which are part of the development of West Ham United's former home by the developer, are due to be completed in December 2017.

Local authority, Plymouth City Council (tel. 01752 668000 *att: Chris King / Ruth Wilcox*) should be about ready to give the heads up for a major redevelopment at Plymouth Argyle's Home Park stadium and surrounding site – part of which involves major piling works to facilitate the construction of a modern new grandstand – aptly labelled the Mayflower Stand along with a 13,865m² ice rink and 1100-seat auditorium.

The club, together with HHP Nominee (tel. 01752 562561 *att: James Brent*), submitted a hybrid application to the local authority in August 2017. This covered the development on two sites located either side of the Life Centre within Central Park – part of which will involve the construction of a mixed-use development including food and drink units, offices, gymnasium, a 107-room hotel and a veterinary surgery.

Photograph Above. A Piletec attachment used for driving sheet piles in Dundee

Top of the Props

On track for another great year

Groundforce offer Total Solutions to the construction industry dealing in shoring equipment, piling equipment, pipe stoppers, air pressure testing, pump hire and sale, trenchless technology, temporary bridges, and excavation training. With 30 years of experience Groundforce have an enviable portfolio of products and services developed to meet the stringent safety requirements of today's market, operating in the UK, Ireland and mainland Europe.

Journalist *Dan Betts* speaks with the company's Managing Director, *Dan Coen*.

VP Plc reported a 19% increase on group revenue from 2016-17. With such a large rise, how do you scope the next year? Are you on track?

Growth is a driver for the VP Group across all of the divisions / businesses. Groundforce is certainly aligned with that ambition and our year to date performance suggests we are on track for another pleasing full year result.

VP Plc cover a wide base of expertise, and Groundforce is the widest of all of VP's arms. With such a lot of offered services, is recruitment for the correct personnel the most important facet to facet to successfully spinning these plates?

I think we could generate some healthy internal debate on who's 'widest', but I believe that our 'people agenda' (succession, retention and empowerment etc…) is the most critical element of our longer-term success. Whether, it's apprenticeship / graduate programs, new senior talent or looking after established members of the team, we can only expand our potential if we create the right platform for our people. I want committed and engaged teams at all levels of the business, who enjoy what they do and are prepared to share their failures as well as their successes.

Dan Coen, Managing Director, Groundforce

You recently joined VP Groundforce as MD from Tarmac RMX. What challenges do you face switching between these positions, and what can you bring to the table?

I enjoyed 14 years at Tarmac across several disciplines. The scale of the two business is different but the professionalism, customer base and the elevated levels of expertise (albeit in slightly different areas) are all very similar. Tarmac certainly relied on a more deliberate approach to 'process' which was often driven by high transactional / complex activity. As well as my own passion for teamwork and leadership, I hope to also implement some efficiency improvements across our end-to-end service offering.

Health and Safety is paramount in civil engineering and has become far stricter in the last decade.

We rent safety equipment, so my expectation is that we should be leading by example. It is really encouraging to see that the industry is starting to apply the same level of rigor to digging down as building up… but if I examine our business and drill down into the injury statistics, the root cause rarely deviates. It is highly likely that all of these injuries could have been avoided and the underlying causation often links back to a lack of 'interdependency' at local levels. My frustration is that we (as an industry) sometimes concentrate on enforcing rules rather than addressing mind-sets and behaviours. I would like to see more emphasis on training, interactions (conversations) on site and encouraging an environment where we learn, share and avoid repeats.

Research and Development is a necessary department for any forward thinking company, will you be continuing to push the envelope in your new position? How important is offering the best facilities and products to your customers?

It's very important, and fortunately I have inherited a fantastic technical team with a proven track record of introducing innovative new products. Groundforce also has a long and established reputation for investing in and attracting new and talented engineers into the sector. This has now