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Staff shortages

It looks increasingly likely that the UK Government will severely restrict the entry of lower skilled foreign workers into the country. Coupled with continuing high rates of employment within the UK, staff shortages are only going to get worse.

In addition, the overall productivity of the construction industry remains stubbornly low. Economists point out that the main driver of this situation is that it is one of the last major sectors of the economy to fully embrace the digital revolution.



It is the plant sector of the construction industry that is bucking this trend, where labour-saving methods of working, such as tilt-rotators and machine guidance systems, appear to be flying off the shelves at the moment.

As it becomes increasingly difficult to recruit lower-skilled workers to the industry, wages will increase. This will result in further reductions to the payback period for what can be a hefty investment in a tilt with a selection of attachments and either a 2D or a full 3D machine guidance system.

One of the responses by the wider construction industry to increasing staff shortages and poor productivity will be to embrace off-site construction, the modern take on pre-fab houses. This will have an impact on the plant hire sector, in particular an increasing demand for compact access platforms and cranes.

Perhaps one of the key things that the Government can do to help the plant sector through these challenging times is to rethink the apprentice funding arrangements. The number of plant operator apprentices currently in training is so low that, for all practical purposes, the scheme is a complete failure.

Yours till next month
Graham Black, Editor

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Below and inset: Chinese manufacturer Carter offers a range of excavators, from 0.8 to 46 tonnes, using blue chip engines and hydraulic systems.

"CARTER EXCAVATORS ARE BEING IMPORTED INTO BRITAIN BY CARMARTHEN-BASED MD PLANT HIRE & MACHINERY"



ECONOMY EXCAVATING

Nick Drew reports on the latest Chinese manufacturer to target the British marketplace

The latest entrant to the UK market is the Carter range of excavators, manufactured in China by Carter Heavy Industry Machinery. Details are a bit sketchy, but Carter would appear to be part of the well-established and much larger Huasheng Zhongtian Machinery Group, all based in a high-tech development zone in Linyi City, Shandong Province. There is also talk of an American involvement, including a USA-based R&D centre.

NEW DEALER

Carter excavators are being imported into Britain by Mathew Davies of Carmarthen-based MD Plant Hire & Machinery. Mathew started his career in agriculture, then progressed into plant hire, before focusing on buying and selling used plant. He is now the dealer for the Solis range on Indian-built tractors.

He said, "Carter had been looking for a UK-based dealer for some time and had approached us on a number of occasions.

They had apparently been watching our activity on social media platforms promoting the Solis tractors and that inspired them to get in touch with us.

"We were really keen to be able to sell something alongside the tractors. I'll be honest with you, I was a bit wary to start with, as you never quite know what you're going to get from these companies. However, we did our research on them and we liked what we saw to be fair.

"We like to feel the machines are well



→ built and of good quality. It's a bit old fashioned, but for instance, there are very minimal electrics on the Carters, which we find a lot of people like. As an example, everything up to six tonnes has a cable-operated manual throttle, something that is cheaply and easily fixed if it breaks, not like some of the electric control dials that we see on a lot of the more well-known brands. In fact, one old-school boy who came to see them said that he was then delighted to see how simple and straightforward these machines are."

**"IT IS AN IDEAL MACHINE
FOR JOBBING BUILDERS,
LANDSCAPE GARDENERS,
AGRICULTURAL
CONTRACTORS AND
THE LIKE"**

COMPONENTS

Many will see an external resemblance to Komatsu machinery in the Carter designs, explained by the fact that the firm purchases many components from the Japanese-based manufacturer.

The mini-excavators also use Yanmar engines, mated to hydraulic pumps from KYB, Rexroth Bosch or Casappa. Their full-sized excavators feature Kawasaki pumps powered by Isuzu, all except the range-topping 46-tonner, which is Cummins-powered. Excavators produced in 2019 are Stage 3B emissions compliant, and Stage 5 engines are fitted to 2020 production units.

Mathew continued, "The hydraulic systems supplied with the Carter machines is very similar to other well-known brands and we feel the performance is on a par with them."

Right: Like other Chinese-made excavators marketed in the UK, there can be little doubt as to the quality of the driveline components.

There are also more well-known components that go into these machines. The booms and dipper arms for instance are supplied by Komatsu. And on the larger machines, from 15 tonnes up, the undercarriage frames are all produced by Komatsu too, so in our opinion it's all good gear.

"Then take the idlers and track rollers on our eight-tonner, they are exactly the same as you would find on an early Cat 308. It's probably fair to say that they are using parts that we may have seen on older machines and then assembling them in the factory. I would say that only around 15% of the product is actually built in-house, and the rest of the components are brought in for assembly."

Concerning the build quality of Carter excavators that are being sold in other European countries, Mathew said, "I've spoken to a lot of existing dealers across Europe and they have all said that you really don't need to worry once the digger goes out to the customer. Carter has been building them long enough to know what they are doing in terms of strength and durability. By using well-proven components all our machines are also CE marked for the European market. I will add that like all Chinese manufacturers, they do listen to our feedback and act on it accordingly."



WALK-AROUND

I opted to spend time in the 8.5-tonne CT85-9 midi-excavator. Initial impressions were that it looked to have some stylish bodywork, but with a rather old-fashioned looking cab.

The CT85-9 is powered by a four-cylinder 56.5kW Yanmar engine, accessible via the large rear lift-up panel.

Unlike many compact excavators, the Carter design places the cooling pack on the offside of the machine, and the hydraulic pump and exhaust on the nearside, right behind the cab. I did wonder if this orientation would have any impact on heat build-up within the cab during a long shift. Having said that, the pump is mounted a fair way back in the engine bay.



With a high capacity bucket and shorter than normal tracks, there is a tendency for the excavator to nod when pushed to the limit.



EXCAVATOR RANGE

The Carter range, which are all CE marked, starts with the sub-1t CT08 micro-excavator. This is a really basic machine with a fixed track frame and powered by a single-cylinder Yanmar engine.

The retail price of machinery is something that the plant industry rarely quotes in public, so it is refreshing to visit an importer who is open about this traditionally secretive subject. A CT08 complete with three buckets and a quick-hitch is being sold for £5000 & VAT, ideal for the jobbing builder or landscaper who wants a cheap digger.

For those that want a micro-excavator with a higher spec, the CT08S features expanding tracks, a three-cylinder Yanmar engine and a Rexroth pump for around £8000 + VAT. There are also three small mini-excavators in the range from 1.6 to nearly two tonnes: the CT16-9, the CT17-9 and the pick of the bunch, the CT18-9. The CT18-9 features a fully enclosed cab, expanding tracks and an offset boom. Before the end of this year, expect new 2.5- and 2.8-tonne models.

Larger mini-excavators in the range are the 4.5-tonne CT45-9 and the 6.5-tonne CT65-9, the latter being available with either an offset or a fixed boom. There are two midi-excavators models: the CT80-9 and the slightly larger CT85-9.

Talking about the CT85-9, Mathew said, "It's possibly the only dedicated eight-tonner on the market with a fixed boom, which a lot of people we deal with hanker after, so I think this will be a good seller for us. As a second-hand machine dealer, we find that buyers abroad will always go for the fixed boom machines like the old Hitachi EX60s. They were bomb proof and very popular overseas, and we feel this will be equally good for sales."

There is currently no 13/14-tonne offering in the Carter range, something the manufacturer is looking into. The current full-sized excavator range starts with the 16-tonne class CT150-9, followed by a number of 20- to 26-tonners. At the top of the range are the 36-tonne CT360-9 and the 46-tonne CT460-9 models.

a rotary throttle dial, the blade control lever and the ignition key. The left-hand console is home to the radio and its USB port, alongside a bank of five simple rocker switches for wiper/screen wash, working lights, two-speed tracking selection and the quick coupler switch.

A basic full-colour monitor provides temperature and fuel levels, and a simple menu to scroll through to adjust hydraulic flow to the attachments if required.



Left and above: The controls may be a little basic, but the speed and response to inputs are good, thanks to Japanese-inspired hydraulic systems.

that, in all honesty, is a bit on the short side. With a lot of rear overhang, it does look a bit odd and certainly you notice the impact of the short track footprint in the dig. This machine is crying out for longer track frames, a fairly standard European requirement. Likewise, the dipper arm also looks a bit on the short side, another difference between typical Asian market specs and the configurations demanded by UK users.

The cab is pretty spacious and it was nice to see a large storage shelf behind the seat for the operator's grub bag. However, the old-fashioned external look of the cab structure is mirrored by the interior. It is pretty basic and somewhat dated in design, but you do get everything you would expect, including air-conditioning.

Simplicity is the key and on the right-hand side console are the controls for the air con,

Behind the rear offside panel are the radiator, the air filter, a 12v battery and the hydraulic oil level sight tube, situated on the back of the 130-litre tank. The nearside rear panel provides access to the hydraulic pump and is also the home of the primary and main diesel filters and a screen-wash bottle.

The 8.5-tonner has a tailswing radius of 1870mm and a track length of just 2785mm



Below and inset: At £38k for an 8.5-tonne excavator, the Carter represents excellent value for money.



“THE CT85-9 IS A PRETTY LIVELY BEAST WITH FAST DIPPER AND BOOM MOVEMENTS AND PLENTY OF POKE IN THE DIG”

HITCH GUIDELINES

Carter machines are supplied by the factory in China with a locally sourced hydraulic quick coupler, which requires a pin to be manually inserted when changing attachments. We would suggest that these could be considered by many to fall within the definition of a semi-automatic hitch. As such they may not be allowed to work on many sites due to health and safety concerns. In any case, in this day and age, it should either be a fully automatic hydraulic coupler meeting all the current guidelines, or a simple manual quick-hitch.

→ IN THE DIG

I was invited to push and poke a bit of dirt around in Mathew's yard with the CT85-9. I really did find it difficult to get comfortable in the seat. I would probably have benefited from spending more time trying to adjust it, but the experience was not untypical of the first generation of any Chinese excavator imported into the UK.

I cranked up the throttle and dug in to grab a bucketful. The machine is supplied with Chinese-made buckets that, even with a short dipper, I felt were a bit on the large size for this 8.5-tonner. That extra bit of weight of a full large bucket coupled to a rather short undercarriage seemed to unsettle the midi, which became slightly 'noddy' on the front end.

Having said that, the controls were pleasantly smooth and precise, and movements were easily achieved thanks to the quality of the Japanese-derived hydraulic system. Overall the CT85-9 is a pretty lively beast with fast dipper and boom movements

and plenty of poke in the dig. It's not slow on the turn either, with a slew speed of 11rpm and a maximum tracking speed of 5.3kph.

In summary, I would say this midi is not going to appeal to mainstream users just yet, but I would also expect rapid development of the range. However, it is an ideal machine for jobbing builders, landscape gardeners, agricultural contractors and the like.

The dealer is offering the CT85-9 with a hitch (see panel) and three buckets for just £37,995 + VAT, complete with a two-year warranty. This is a great opportunity to purchase a relatively cheap 8.5-tonner that does exactly what it says on the tin.

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HIGH-VISIBILITY BACKHOE LOADER

Eoghan Daly reports on the first WB93R-8 Komatsu backhoe loader to enter service with an Irish customer

Having previewed a prototype of its new Dash 8 series of backhoe loaders at the Intermat 2017 show, Komatsu has now commenced production of the equal-wheel WB97S-8 and the conventional two-wheel steer WB93R-8 models.

The first example to go into service in Ireland is an 8.1-tonne WB93R-8, supplied to a civil engineering contractor who is a long established user of Komatsu excavators. It replaced a Terex machine and is the only backhoe loader on the fleet. The wide-ranging nature of the contractor's activities ensures there will always be role for a backhoe loader. The firm is also fortunate to have experienced operator Sean Bates on its books.

Standardisation on Komatsu machinery seemed a sensible move, encouraged by the package offered by dealer McHale Plant Sales for the new backhoe. It was delivered at the very end of 2019 and went straight to work early in the new year, on a storm water chamber and pipeline

upgrading project, in advance of a road resurfacing operation.

WALK-AROUND

The new backhoe is powered by a Stage 4 emissions-compliant four-cylinder Komatsu engine rated at 75kW (101hp). There is a reduced load on the engine as the cooling system is based on the use of a viscous fan clutch. This lowers the overall power demand on the engine, as the fan is not run until it is actually required. This feature also helps to reduce noise levels.

Komatsu makes significant claims concerning the fuel consumption of this backhoe loader, which appear to be standing up to reality

on site. During the machine's first 100 hours it has averaged around six to seven litres of diesel an hour, and insignificant consumption of AdBlue.

The clean-burning engine drives a 40kph power shuttle transmission with four forward and four reverse speeds, but without a torque lock facility. Operator comfort while roading is helped by the standard ride control system.

Operator Sean said, "It's very smooth and well balanced on the road."

Without a torque lock it may get a bit sluggish on steeper hills, but not any worse than any other →

Below and inset: Komatsu's latest generation of backhoe loaders feature a clean-burning, economical engine, better visibility and an excavator-style machine management system.



**"I WOULD CONSIDER THE
VISIBILITY TOWARDS THE
FRONT BUCKET AS BEING
MUCH BETTER THAN THE
PREVIOUS TEREX"**



**“STANDARDISATION ON
KOMATSU MACHINERY
SEEMED A SENSIBLE
MOVE, ENCOURAGED BY
THE PACKAGE OFFERED
BY DEALER MCHALE”**

→ manufacturer’s machine. It’s not something I would criticise it for, as it really is such a comfortable machine to drive, even over longer distances.”

The WB93R-8’s hydraulics centre around a closed loop load sensing system that offers Economy and Power operating modes. The system’s maximum flow is rated at 165 litres per minute, with a maximum operating pressure of 240bar. In addition to the two-mode hydraulic system, the main hydraulic valve is Komatsu’s Load Independent Flow Divider design, which allows the operator to speed up the operation of the front loader.

The machine’s backhoe features an outer telescopic extension, fitted in this case with a Geith hydraulic hitch, which offers a maximum reach of around 6.95 metres at ground level. As is common nowadays, the inner boom is curved to provide a little bit more clearance when loading trucks or when conducting deep digging.

However, over the machine’s first weeks in action the backhoe has been used almost exclusively with a large hydraulic breaker, which it handled with ease. The working range of the backhoe allowed the machine to remain sufficiently clear of the excavation to allow the accompanying mini-excavator to quickly clear the broken material from the working area.

The front loader arms provide a parallel lift, handy when using the forks on the



Below and inset: The sloping bonnet provides a decent view of the bucket on the ground, while the unique top glazing panel provides a great view when loading trucks.

supplied 4-in-1 bucket. When this bucket is close to the ground the loader arms, with their parallel linkages, sit below the level of the curved engine hood for good visibility.

Sean continued, “I would consider the visibility towards the front bucket as being



much better than the previous Terex. Even though the Terex has just the single hydraulic cylinder in the centre going to the bucket, the view with the Komatsu is better despite it having the self-levelling system.”

In addition to good visibility to the one-cubic-metre capacity bucket, these loader arms provide 2.58m of dump clearance and 725mm of dump reach. This translates into a good truck-loading capability that has already been noted on its first job, which involved frequently filling a high-capacity stoning cart. The use of heavy-duty axles also began to show its value when the new backhoe was engaged in load and carry work on its first project.

IN THE CAB

Externally the new Komatsu backhoe loader is not that different to its previous designs, but this all changes inside the cab.

Specifically, the visibility to the loader and backhoe and to both sides of the machine from the comfort of an air-suspension seat is better than most.

In addition to the sloping engine hood, immediately above the front windscreen there is a crescent-shaped central section of roof glazing, which dramatically improves upward visibility when loading trucks. This curved section of glass comes with its own sun visor.

The common control layout for backhoe loaders is to position the bulk of gauges and switches in a horizontal enclosure to the offside of the operator. Komatsu has taken a different approach, stacking these elements horizontally at the base of the cab's offside B-pillar. This provides a bit more visibility out of the left corner when operating the backhoe. Together with sloping rear mudguards and a large rear screen, such subtle design changes provide much more of a panoramic view round the back and rear three-quarters of the machine.

Another reason for Komatsu redesigning the layout of these controls is that they

KOMATSU WB97S-8

The other model in Komatsu's new Dash 8 series of backhoe loaders is the all-wheel steer WB97-8. This 8.75-tonne machine is powered by the same 75kW engine as used in the WB93R-8 and incorporates the same control package and operator-orientated benefits.



wanted to incorporate a 7in LCD main control screen, similar to that found on its full-sized excavators. This heralds the introduction of a full digital machine control, settings and monitoring system, which provides the operator with the



Above and inset: The vertically stacked main control console features a large LCD screen providing access to an excavator-style machine management system.

Right: The backhoe has primarily been used to host a large breaker, which the machine's oil flow is more than enough to handle with ease.





Left: Operator Sean Bates praises the overall performance of his new mount, particularly its smooth and precise control of both front and rear working equipment.

→ functionality usually found on a modern excavator, including the Komtrax telematics system and detailed service schedule data.

This large screen is situated at the top of the offside stack of controls, easily accessible from both operating positions. Below the screen are the main switch bank, air con controls, ignition switch, differential lock settings and the power mode switch. The radio is located out of the way at the bottom of this vertical offside enclosure.

The backhoe equipment on this example is controlled by fixed centre-mounted levers, not excavator-style joysticks. Having operated both systems in the past, Sean does not regard the Komatsu levers as a backward step and is impressed by the level of precision, sensitivity and smoothness that these traditional controls offer him.

The front loader is controlled by a multi-function joystick to the right of the operator, which Sean praises for its sensitivity and responsiveness. This joystick uses

the traditional cross pattern for loader arm and bucket movements, but also incorporates a four-button keypad. The left and right buttons are used to control any additional features on the front attachment, in this case a 4-in-1 bucket. The top button disengages the transmission, handy when loading trucks. The bottom button activates the differential lock.

The adjacent gear lever incorporates a clutch button, allowing gear changes to be made without depressing the clutch pedal. Forward and reverse directional changes are implemented by a power shuttle lever mounted on the steering column.

Sean concluded by saying, "In the short

"KOMATSU HAS MADE A BIG EFFORT IN TAKING THE BACKHOE LOADER FORWARD, WITHOUT MAKING IT TOO COMPLICATED"

time I've been operating the new Komatsu it has really impressed me and there are many nice design features I like about it. It's not just all about the new features though, as it is also bringing a different level of performance from what I've experienced with it so far. Komatsu has made a big effort in taking the backhoe loader forward, without making it too complicated. I really like what they have done with it as it really is a first class machine to use in every way." 



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NEWS

A round-up of news stories in the plant and machinery construction industry



UPGRADED JCB DUMPERS

Dash 2 versions of JCB's six- and nine-tonne capacity site dumpers now feature Stage 5 emissions-compliant engines. Rated at 55kW (74hp) they meet the highest European emissions standards without the need for AdBlue. The engine's diesel particulate filter (DPF) has been designed to self-regenerate within the typically low-duty cycles of a site dumper, without the need to stop work.

These two dumpers are available with either a full safety cab, or with a new canopy. In addition there is a new design of forward-tipping skip, with a reduced height spill board for better visibility.



UK SALES TRENDS

Retail sales of construction and earthmoving equipment in the UK market fell by 12.3% in the last quarter of 2019, compared with the same period in 2018.

This significant fall in sales in the final quarter of the year resulted in a 6% overall reduction in sales for the year, reaching just over 32,000 units.

Sales of equipment in 2019 were expected to decline after reaching a peak in 2018, but the fall was greater than expected. This is thought to be due to market uncertainty over Brexit in the final quarter of the year and continuing delays to the final approval of the HS2 project.

Early signs in 2020 are that confidence is returning to the market after Brexit, coupled with the recent decision by the UK Government to go ahead with the full HS2 rail project.

MINI BALE FEEDER

Aluminium recycling specialist Alutrade has bought a Yanmar SV60 midi-excavator from dealer Johnston Plant Sales to further improve the efficiencies of its baling process at its Oldbury site. Fitted with an extended dozer blade and a hydraulic grab, it loads loose cans into the in-feed hopper of the baling equipment.

Alutrade's Mike George said, "Running a 24/4 shift pattern and handling more than 3000 tonnes of scrap aluminium per month, we needed a reliable machine capable of faultlessly feeding our plant. With two Yanmar excavators already operational on site, both purchased within the past 18 months, investing in a new SV60 model was an easy decision."

"The SV60 not only delivers excellent reach and unmatched stability, but also has a spacious, highly-specified cabin to maximise operator comfort. Since taking delivery of



the new model, we've been thoroughly impressed with its performance. It keeps our line running at optimum throughput and continues to perform faultlessly.

"We have two other SV60 models on site, which have both totalled more than 5500 hours on the clock in less than 15 months. It's this reliability and ability to perform in tough conditions that keeps us coming back to Yanmar time and time again."

CORONAVIRUS IMPACTS PRODUCTION

JCB is the latest global manufacturer to reduce production levels due to anticipated component shortages from Chinese suppliers. Around 4000 employees and agency staff in the UK will have a shorter 34-hour working week and all overtime has been suspended. JCB employees will continue to be paid for a 39-hour week, working back the hours later in the year.

Chief operating officer Mark Turner said, "The disruption to the component supply chain in the UK comes at a time when demand for JCB products is very strong, so while this course of action is very unfortunate, it is absolutely necessary to protect the business and our skill base."

"Production in the UK has so far been unaffected by the situation in China. However, more than 25% of JCB's suppliers in China remain closed and those that have reopened are working at reduced capacity and are struggling to make shipments. It is therefore clear that the inbound supply of certain components from Chinese partners will be disrupted in the coming weeks as they seek to replenish their stocks. This inevitably means we will not have the required amount of parts needed to build our forecast number of machines in the short term."

"These measures will ensure that, while we will produce machines in lower than anticipated numbers, we will do so with the same number of employees, whose skills we will need to fulfil customers' orders when the situation returns to normal. We are keeping the situation under review and we anticipate a surge in production levels once this period of supply disruption has passed."

NEW BOBCAT DEALER

Bobcat has appointed Peterborough-based RTC Plant Services as its dealer for Cambridgeshire, Northamptonshire and Bedfordshire.

Director Tom Calton said, "As one of the region's largest independent sales, parts and service dealers, we bring a lot of local knowledge, expertise, experience and enthusiasm to selling and supporting the Bobcat range."

"We have four fully-equipped service vans that allow our service engineers to visit customers' premises and work sites throughout the region."



KOBELCO INTRODUCES SK140SR-7

Kobelco has introduced the 14-tonne class, short-tailswing radius SK140SR-7 excavator. These new Dash 7 machines are Stage 5 emissions compliant and feature a new hydraulic control system that, for

example, will reduce digging cycle time by 10% compared with the previous Dash 5 model. The cab features a 10in colour control monitor and the machine comes with three cameras and quick-hitch plumbing as standard.

BUY-BACK OPTION ON HITACHI WHEEL LOADERS



MJ Hickey Plant Hire and Contracts has two ZW310-6 wheel loaders for quarrying and bulk handling projects, purchased in 2018 and 2019 with a buy-back option from Hitachi. Anthony Hickey said, "If the work dries up and you've purchased an asset then you have to consider what to do with it. However, this kind of buy-back agreement lends a degree of flexibility and is suitable for short-term contracts."

"The buy-back was important in our decision to invest in the two wheel loaders, and it enables us to calculate our costs over three years. It's a good overall package, with a strong residual, and it proves to us that Hitachi has confidence in the reliability of its products."

As part of the buy-back arrangement, both wheel loaders are covered by a full 6000-hour/ three-year warranty and maintained by Hitachi.

The scheme applies to models from the ZW150-6 to the ZW550-6 in the Hitachi range and is limited to a maximum of 2000 working hours per year.

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THE DEVIL IS IN THE DETAIL

Paul Argent reports on Brad-Pave's latest high-spec Liebherr excavator



A tilt-rotator and a selection of attachments transform productivity, and therefore profitability of a single man and machine.



The Derbyshire-based civil engineering company Brad-Pave, run by Paul Bradshaw, undertakes infrastructure operations, including deep drainage and road building across the UK. We last met Paul two years ago when he had expanded his fleet with a Case CX300D excavator to undertake his larger and deeper drainage projects.

This 30-tonner was in addition to his 2015 Liebherr R914 Compact excavator, which is used for a wide variety of work, from drainage and backfilling operations to the final preparation of road surfaces prior to surfacing.

Helped by a strong trade-in value for his incredibly well maintained Liebherr, Paul has replaced it with

the latest version of the same model, but with a number of interesting options and third-party systems.

Paul stated, "I did have a price from Volvo, which was slightly less than the Liebherr. And while that machine is good, I couldn't be tempted away from Liebherr."

NEW EXCAVATOR

The new Stage 4 emissions-compliant Liebherr R914 Compact model would usually weigh around 14 to 15 tonnes, but due to its configuration Paul's new excavator left the factory at closer to 17 tonnes. The long track frames are shod with 700mm-wide pads, which Paul says will hold the machine up on some very soft ground indeed. In addition, the undercarriage is configured with

a substantial dozer blade, which Paul extensively uses to spread stone on road construction projects.

He said, "The blade has been fitted with a large cutting edge, which I have to keep an eye on, as it sits about 75mm below the back of the blade and can cut into the surface very quickly. The excavator's two-speed tracking allows me to push material out very quickly and smoothly."

The three-piece front end is equipped with an X18 Steelwrist tilt-rotator from the previous Liebherr, about which Paul commented, "I couldn't do without the Steelwrist, it makes life so much easier, safer and much more productive and therefore profitable. There is a big investment to be made in purchasing a system to start with, but once it's on, you find out just how quicker and easier it makes your job."

Prior to the X18 being fitted to his new excavator, it was shipped back to Steelwrist UK, where it was stripped down, inspected and rebuilt to as-new condition by Pat Bulcock and his team. It was also custom painted in grey and, after its rebuild, has plenty of life left in it.

Regarding machine guidance systems, Paul has opted for a Moba X-Site 3D GPS set-up for his new Liebherr and has also swapped his previous guidance system on the larger Case for a similar set-up.

He explained, "The Moba is a class system. It is very easy to use, intuitive and by far one of the most cost-effective on the market. I'm very pleased with the installation and the way it works. We've no base station on this site, so all the data and updates are sent via the internet. This may not be the best way to work, but we are operating within 5mm of the given dimensions. I'm more than happy with that."

As the excavator's blade is used to rapidly spread stone across road projects and the like, and a tilt-rotator is connected to a 3D GPS positioning system, a grading beam can be used to level the stone to within fine tolerances.

LIEBHERR R914 COMPACT

The new Liebherr is powered by a four-cylinder, 122hp Deutz engine mounted longitudinally on the offside of the upper-structure. Similar in design to Liebherr's material handler range, the R914 Compact's huge gull-wing canopy allows for simple and easy access to the engine, hydraulics and cooling systems.

Access to the upper-structure is through a panel door on the nearside, just behind the almost full-sized cab. The latter is kept absolutely spotless by Paul and is standard Liebherr fare. It's well laid out and comfortable with a high-spec Grammer seat. The standard Liebherr colour touch-screen allows simple and easy access to machine settings and is joined by the small Steelwrist hitch control screen and a large GPS system screen.

Externally, additional LED lights both front, rear and sides have been specified along with a heavy-duty step and similarly robust upper-structure light protectors. An additional dipper-mounted camera has been fitted to allow Paul to see into deep excavations while staying in the seat. The images are sent back to a separate screen, mounted next to the Liebherr control screen in the cab.

"I COULDN'T DO WITHOUT THE STEELWRIST, IT MAKES LIFE SO MUCH EASIER, SAFER AND MUCH MORE PRODUCTIVE"



On this compact rear swing design, access to the upper-structure is via a nearside panel door.



Note the cutting edge mounted below the dozer blade, ideal for quickly spreading stone on road projects.

→ The excavator was ordered in Liebherr's 'mining white' colour scheme, accented with highly reflective custom decals on the rear end from Vehicle Livery Systems. Paul originally wanted to cover the whole of the counterweight in this way, but stippled effect over the cast sections prevented it.

Perhaps the most innovative added extra on this machine cannot be seen. Every square inch of the excavator, apart from the track pads, has a ceramic coating that prevents muck and grease sticking to any surface.

Paul said, "Before the Christmas break the machine was up to the top of the tracks in mud at the far end of the site. A quick going over with a hose and most of the mud simply slipped off."

SITE VISIT

We met Paul on a project near Spalding in Lincolnshire where both the larger Case and the new Liebherr were working on the development of a new housing project. This site has been home to Paul and son Blake for a couple of months, and the work that this two-man team has undertaken in this time has been phenomenal. Particularly as the low-lying site is extremely wet, the situation not helped by a wet autumn and early winter weather.

The new road the pair are constructing comes off the main carriageway, loops round the large site and returns to the same access point. The build-up of the road has entailed over 1000 loads of imported material being laid and compacted to almost 2.5m above the existing surface of the greenfield site.

"THE MOBA IS A CLASS SYSTEM. IT IS VERY EASY TO USE, INTUITIVE AND BY FAR ONE OF THE MOST COST-EFFECTIVE ON THE MARKET"

In an ideal world, Paul would have preferred to install the deeper foul and surface water drainage elements before building up the road. However, the large number of chambers that are required would have made it extremely difficult effectively lay and compact the material.

Paul explained, "We went from potentially installing the deepest drains at less than a metre deep, to going down almost 4m through heavily compacted stone."

Despite this, he and Blake have made impressive progress, which he puts down to having the right kit for the job, as he stated, "I've got a variety of EMA and BMC buckets and attachments that make the job easier. The EMA buckets are simply the best pound for pound. They're made of lightweight but very strong Hardox with Borox cutting edges and, despite being worked hard over the last couple of years, they're all on the original edges and are almost like new."

Once the pipes are laid, compaction is undertaken by either a hydraulic compactor plate or by another new addition to the arsenal, a Pladdet compaction wheel, as Paul continued, "I'll look at anything that will help make our job quicker, easier and safer. This is why we've bought a Pladdet selector grab to move concrete pipe and chambers around and into position."

As an aside, Paul spotted an addition for the grab at last year's Bauma show, consisting of heavy-duty rubber balls fixed to the wear edges. When the grab – mounted on the tilt-rotator – is inserted into the manhole chambers and opened up, the rubber balls grip the concrete and allow the

grab to lift the heavy sections safely and securely. He is still in the development stages of this attachment, so we plan to bring you the results of this later in the year. We also understand that he is also considering replacing the Case later this year – watch this space for further news. **EM**



Above and below: Paul has equipped both front-line excavators with a Moba X-Site 3D machine guidance system, which he says is easy to use and cost-effective.



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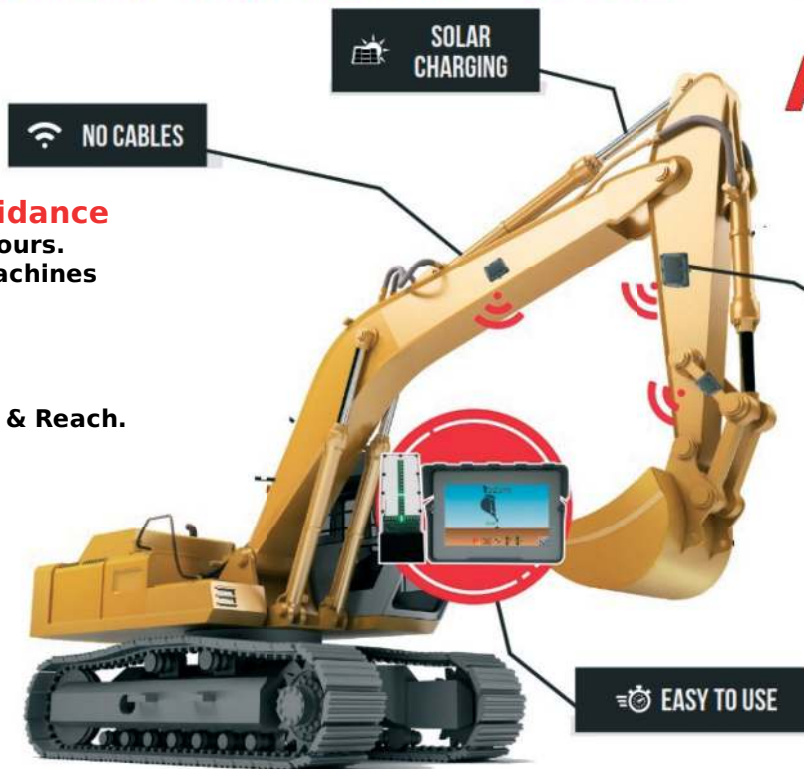
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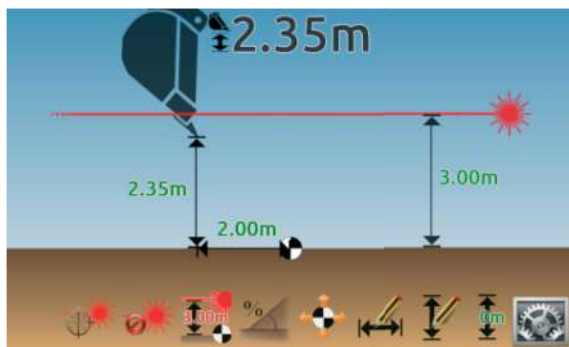
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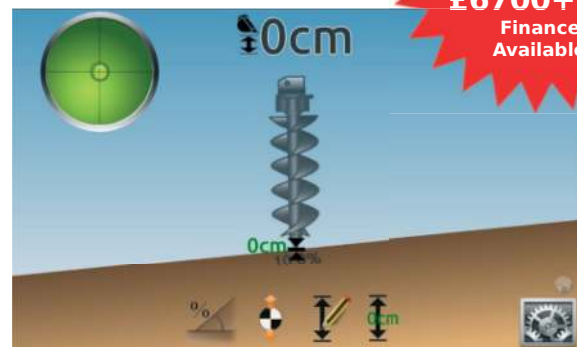
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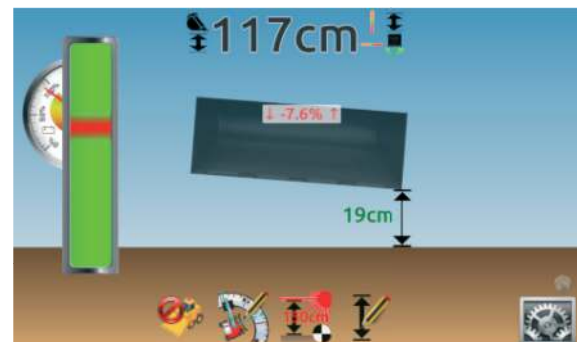
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"IT MADE ECONOMIC SENSE TO TRADE THE 8018CTS INTO SCOT JCB FOR A NEW ONE-TONNE CAPACITY JCB T1 SITE DUMPER"



Jim Anderson has added a midi-excavator and a small site dumper to his growing fleet of JCB compact machinery.

COMPACT EXCAVATING TO EXACTING STANDARDS

David Wylie returns to Royal Deeside to see the latest additions to the fleet operated by Jim Anderson, including a 2D iDig machine guidance system

Four years ago we visited Jim Anderson, owner of Wee Jim Landscapes, who undertakes a wide range of services in Royal Deeside, from firewood processing to snow clearance work. During that visit Jim was using his trusty 2011-built JCB 8018CTS mini-excavator to extract windblown trees from a local forest, which were fed into a Palax KS35 Ergo firewood processor in his yard.

A highlight for Jim in recent years was that he won a JCB social media competition, the prize for which was one year's free use of a new generation 19C-1 mini-excavator. Although he was delighted with a year's free hire, he doubted that he would give the

machine back, as it looked to be a great replacement for his existing mini.

Therefore, given his excellent relationship with Scot JCB, it was specified to a high standard from the outset and has subsequently been purchased by Jim. After two years on his fleet, he reports that he is still delighted with its performance and states that the cab and overall operator comfort are a big improvement over his old 8018CTS model.

He said, "Winning the JCB 19C-1 was a game changer, as I found over a short period of time having two mini-diggers was excessive. Having hired in a small site dumper for a few months on another

project, it made economic sense to trade the 8018CTS into Scot JCB for a new one-tonne capacity JCB T1 site dumper.

"The T1 is good match for the new 19C-1 digger and now with over 140 hours on the clock, I've found it to be one of the best site dumpers I've used. It's so easy to operate, and with an automatic handbrake, powerful hydrostatic transmission and the high-reach dump height it is outstanding for loading into skips and drop-side truck bodies.

"I like to buy UK-built machines. Coupled to the good level of support I've received over the years from Scot JCB, it means they are always my first port of call for new and used equipment."





“JIM WAS KEEN TO ACQUIRE HIS OWN MIDI-EXCAVATOR, SO PURCHASED A USED EIGHT-TONNE 8085ZTS FROM SCOT JCB”

NASCO LOAD INDICATORS

After decades of experience in the construction industry, Neil Smith set up Nasco Load Indicators in 1999. In addition to iDig machine guidance systems, the firm is also a dealer for Engcon tilt-rotators and GKD safety systems. The iDig systems have been in the UK market for about five years. Nasco has been their distributor for the past 12 months, during which time 100 units have been sold. The plan is to establish a dealer network for the iDig products.

The latest product from iDig is a combination sensor for the dipper arm that includes a large laser receiver. In addition, the firm has launched an angle sensor for fitment to an excavator's dozer blade, to carry out precision large-scale grading. The standard sensors can also be used with an auger drill to produce vertical or accurately angled holes.

For users of tilting buckets, there is a specific iDig angle sensor to suit this application. In addition, the iDig system will accept data from an Engcon tilt-rotator on a plug-n-play basis, with an interface for other tilt-rotators on the way.

Above left and above: Now with two JCB compact excavators on his fleet, a two- and eight-tonner, Jim can undertake a wider variety of work, and the iDig system is easily transferable between the two.

Above right: The three iDig position sensors for the front-end equipment are solar powered and wireless, allowing easy fitment and swapping between machines.

Right: The original JCB 8018CTS mini-excavator has been replaced by a new 19C-1 model, which is proving both comfortable and productive.

→ FURTHER EXPANSION

Wee Jim Landscapes has benefited from a steady increase in more intensive landscaping work. Early last summer he won a significant landscaping project in Ballater, where a large house and its gardens within the town are being transformed into a spectacular function and wedding venue.

With a large pond to construct within the gardens and other substantial landscaping work required, Jim needed larger kit and some help. He called upon another EARTHMOVERS reader, owner-operator Allan Scott, to help him out. Allan runs a 10-tonne JCB 100C-1 midi-excavator and carefully carved out the large and 5ft-deep pond.

However, Jim was keen to acquire his own midi-excavator, principally to undertake work on this significant landscaping project. So he purchased a used eight-tonne 8085ZTS from the Aberdeen branch of Scot JCB.

For his agricultural and forestry work Jim also replaced his tractor and trailer unit with a New Holland T6080 and a Humac Engineering Tuff Mac 17-tonne capacity tipping trailer, both of which are made in the UK. Together with his midi-excavator and his small site dumper, this equated to a total investment in machinery of over £100,000 in just six months.

In addition, for the past couple of years Jim has run a BAV screening bucket on his mini to reclaim good quality soil, and a Red Rhino portable jaw crusher to produce recycled aggregates. The use of these material processors, again both of which are made in the UK, reduces truck movements and provides his clients with cost-effective useable materials.

MACHINE GUIDANCE

Keen to improve his competitiveness and productivity, Jim has recently invested in a 2D iDig machine guidance system from Essex-based Nasco Load Indicators. He has only been using the system for a couple of months, mainly on grading duties to achieve the perfect level on lawns, footpaths and the like. However, he sees great potential for the



system, particularly to quickly achieve perfectly-angled drainage trenches and to ensure that he does not over- or under-excavate foundation trenches.

Neil Smith, owner of Nasco, was so confident about the iDig system that he offered to fly up to Aberdeen, install the system so that it could be used on both Jim's mini- and midi-excavators, provide training and, if Jim wasn't entirely satisfied, he could return it within two weeks. The cost of this popular 2D machine guidance system is £6700 for a standard mono-boom machine, plus £300 for the additional mounting plates for the second excavator.

Jim continued, "Neil Smith from Nasco Load Indicators was keen to visit Scotland and to offer a free demonstration of the iDig 2D dig guidance system. I have nothing

but praise for Neil and his team, as the installation was easy and the system is so intuitive it's not a long training session.

"Neil offers free fitting, a two-year warranty and zero percent finance over the same period, and since the 2D system helps to make you much more productive, saves time and setting out costs, it was an easy decision to buy it. With an attractive price you have an affordable 2D dig guidance system for under £10 per day to use on two machines. The cost to benefit ratio is fantastic over a two-year period and beyond."

Jim explained the iDig system is very easy to set up each day, as it has three solar powered sensors that just clip to rugged mounting plates on the boom, stick and bucket linkage. The fourth sensor clips into the cab to measure the excavator's



Above and below: The 2D iDig system is extremely powerful, providing the opportunity to work with dual grades and attachments such as tilting buckets and lasers.



The new venue is due to open in July 2020, so Jim is ahead of the game with the extensive landscaping works.



"AN AFFORDABLE 2D DIG GUIDANCE SYSTEM FOR UNDER £10 PER DAY TO USE ON TWO MACHINES, THE COST TO BENEFIT RATIO IS FANTASTIC"

→ rotation angle and how level the machine is. The 7in LCD touch-screen also clips into a mounting and attaches via two cables, one to feed the LED bar graph indicator and a power lead.

A few minutes to mount the system, select which excavator it is being used on, select the particular bucket and it is ready to go. At the end of the shift, best practice is to quickly dismount these components, which come with a custom storage case, and secure them overnight off-site.

This is a 2D machine guidance system, it does not use satellites or a local base station to pinpoint where on the surface of the globe the machine is. Rather, at the start of a shift, Jim touches the cutting edge of the bucket on a known or a key level and selects this point on the touch-screen.

The most basic function of the system is to ensure that Jim remains on this grade, by a combination of referring LED

indicators on the bar graph and to the more detailed data displayed on the iDig control screen. However, the iDig system provides far more sophistication than this, including the ability to input the angle or gradient of the required slope, handy when excavating drainage trenches. The system also includes a measuring function, so that the designed length of the trench can also be tracked by the system.

CONCLUSION

At the time of my visit to Jim's large landscaping project at Ballater he was putting the finishing touches to the area round the new pond. The venue opens in July of this year, when the turf that was laid in 2019 will be maturing nicely.

Jim was using the iDig system on his 19C-1 mini to tidy up some surrounding borders and footpaths. He is on Marshall's approved register of landscape and driveway installers,

so the next phase of this part of the project will be to lay decorative stone slabs round the pond. He was also using this combination to grade some land adjacent to the events building, which will be used as additional lawn area.

To the rear of the site there is sloping ground, which he had excavated with his 8085ZTS midi to create a walled garden area. The excavated soil from this part of the site contains a lot of large stones, which will be reused on-site. Jim used his new Strickland riddle bucket on the midi to quickly separate the stones from the sandy soil. They were loaded into his tractor/trailer unit for hauling the material round the site.

Jim rarely takes a day off work. It is great to see that the progress this hard working owner-operator has made over the years, by using UK-built machines with some of the latest muck-shifting technology.

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LOOKING TO THE DIGGING THE PAST

Chinese-built LiuGong excavators are making inroads into the UK demolition sector, as Paul Argent reports

Chinese-built LiuGong excavators are making good inroads into the UK demolition industry, a sector of the market that can be hard on machinery. However, early examples have stood up well to the work and, should they get damaged, components such as body panels seem easy to repair or cost effective to replace.

One of the latest firms to invest in a LiuGong is long-term JCB user Chelmsford-based Northeast Demolition, which recently invested in a 32-tonne 933E model. The firm remains extremely happy with its fleet of JCB machines and the back-up service it receives, but took the opportunity to see what another manufacturer had to offer.

Contracts manager Ross Harris said, “We wanted to see what all the fuss was about, and we haven’t been disappointed. The only real niggle we have had is being sorted out; it is too powerful!”

Operator Kevin Bundock explained that when grading, even at low revs, the big LiuGong just wants to dig and went on to say, “It really is a great tool for the demolition work we do. Bucket, breaker or muncher – it’s ideal.”

SITE VISIT

We encountered the new excavator at a project in Bow, in the heart of East London. The small site had been redeveloped in the 1980s, replacing Victorian terraced houses with a nursing home. It was this disused three-storey building on this tight urban site that Northeast had stripped-out and demolished, and the team was now focusing on removing the concrete footings.

Site manager Mick Davies said, “We ensured the local residents weren’t bothered by dust and noise throughout the work. The

demolition and crushing work went off without a hitch. What did surprise us was the depth of the concrete strip footings, almost 2m, totally clean of steel and no piles. They must have had a deal on the material when the building was built!”

The material from the main structure on the front of the site had been crushed and stockpiled, ready for use as a piling mat by the developers. Kevin and the new LiuGong were tasked with breaking up some of the larger lumps of concrete footings and then loading them on to eight-wheeled



FUTURE BY

LIUGONG 933E

The 32-tonne LiuGong 933E is powered by a Stage 4 emissions-compliant Cummins QSB6.7 engine rated at 175hp. The engine is said to be extremely fuel efficient in this application, partly down to there being no need to use its full power and LiuGong's Intelligent Power Control system, which manages the engine and the pump flow.

LiuGong supplied this excavator in full demolition spec, including side impact protection and a sturdy cab ROPS & FOPS guard. Hammer and rotation hydraulic lines are also included in the standard demo specification, as is a dipper cylinder ram guard.

As one of the latest generation of Chinese-made excavators, their rapid product development cycle is evident, including many improvements over the previous generation of excavator. Operator Kevin stated that the cab is extremely comfortable and well laid out.

The thick footings were quickly broken up; the LiuGong swapped its hammer for a bucket to load the material into eight-wheeler tipper trucks.



tippers for off-site processing. Northeast would usually crush these on site, but they just did not have the space.

The working area of this already compact site has been shrunk, as the team from Pre-Construct Archaeology (PCA) has made a number of unexpected finds towards the rear of the site. The planning permission called for a series of trial holes to be excavated as the nursing home was demolished, as the site was close to the route of a Roman road.

Ross stated, "We allow for a machine, supervisor and operator for a set period of time to undertake any work like this. We've worked in this area for too long not to include a sum for these works and have learnt from experience that something can often be found."

Considering the deep footings of the former nursing home, it came as a surprise

to all that Roman remains began to appear at just 500mm below the surface elsewhere on site. A ditch was then exposed, quickly followed by a number of post holes and then the most exciting find, Roman cremation urns.

Although this may impact the development schedule, Northeast Demolition has worked round such situations many times. They work diligently with the archaeologists to undertake any further stripping work they require, while taking every available opportunity to remove the last of the concrete footings.

Ross concluded by saying, "We have had to leave a number of the large strips in place until PCA has finished. We have been lucky that the front of the site hasn't been effected and we are able to install a piling mat to keep this side of the project pushing along."

EM

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BREAKING NEW GROUND

Eoghan Daly reports on the first Hidromek HMK390HD excavator to enter service in Ireland

The introduction of Hidromek machinery into the Irish market continues to gain pace, as new dealer Kellys of Borris supplied a 40-tonne class excavator into a quarry operation. Seen as a major vote of confidence in the brand by customer Dowling Quarries, the firm's management team had been keeping an eye on Hidromek excavators for some years.

An early introduction to the product range at a Hillhead show initially stimulated their interest, but without an Irish dealer Hidromek remained an interesting alternative for sometime in the future. This changed with the appointment Kellys and it was not long before their salesmen came knocking on the door.

Business owner Humphrey Dowling said, "I hadn't started to look seriously at buying a new excavator, but had it in mind for early 2020. It was probably going to be another Cat machine, but soon after their appointment as Hidromek dealers Billy Murphy called into the quarry.

"I DIDN'T NEED ANY INTRODUCTION TO THE MACHINES, ESPECIALLY THE HMK390, AS I HAD LOOKED AT IT IN DETAIL AT BAUMA 2019"

"I didn't need any introduction to the machines, especially the HMK390, as I had looked at it in detail at Bauma 2019 and was very impressed with it. Regardless of what angle I looked at the machine, I couldn't find fault with its build quality and its level of finish. Billy gave me a quote and based on the price in relation to the quality and specification of the machine, it was definitely something I couldn't overlook."

In addition to confidence in the product and the dealer, the availability of the machine was good, as the excavator arrived in the country 10 weeks later.

SITE VISIT

Dowling operates two quarries, a limestone operation and batching plant at Lisduff and a sand and gravel works at Granafallow. The new Hidromek excavator has been configured to perform well at both sites, but its initial work has been at the face of the Granafallow Quarry.

The deposits of sand and gravel here are in two distinct layers. The upper layer runs close to the surface, so little in the way of overburden stripping is required. This upper layer contains a significant stone content within the high quality sand. The quarry's working method is to extract this top layer from a given section, then work on the lower layer. This lower layer contains the same high quality sand, but without excessive stone content. Both layers of material are heavily packed, resulting in an extremely dense material, which is extracted by using an excavator's brute breakout force.

Humphrey continued, "This is very hard material and would test the digging power of any machine. The Hidromek is definitely well capable of working through it and →

"IT IS ALSO A FAST MACHINE EVEN THOUGH IT'S IN THE 40-TONNE CLASS AND IS PROVING ECONOMICAL TO RUN ALSO"

→ isn't finding it a challenge. It is also a fast machine even though it's in the 40-tonne class and is also proving economical to run."

This heavy-duty version of the HMK390 model has been configured with the shorter 6.1m mono boom option, coupled to a 3.2m dipper arm. The dipper hosts a low-profile Miller quick-hitch, which usually carries a 2.19-cubic-metre capacity Miller extreme rock bucket, which has been designed for use in extremely abrasive material. The bucket is 1.7m wide and is fitted with Esco teeth, as an indication of the level of armour protection it weighs just under 2.6 tonnes.



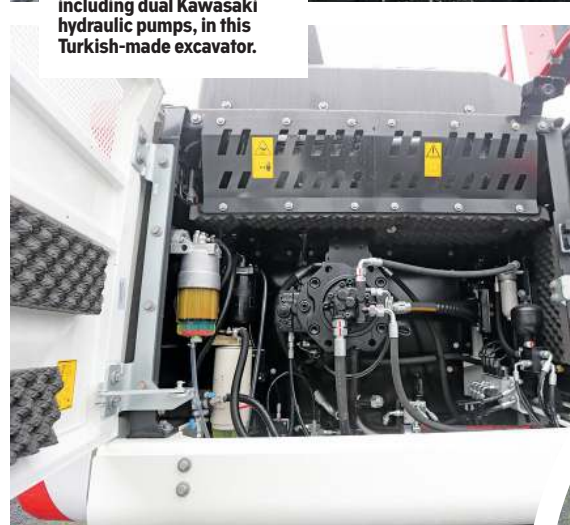
The 40-tonne excavator sits on 600mm double grouser track shoes, protected by full-length track guards. This shoe option was chosen to minimise any issues when tracking over the larger stones found in the upper layer of sand and gravel. Wider triple grouser pads have been used on machines performing this task in the past.

The undercarriage is 5.19m long, and the pads provide 4.24m of ground contact. On these narrower tracks the excavator is 3.3m wide, which eases the process of relocating the machine between the two quarries.

Operator Philip Bergin said, "When feeding the crusher and digging at the face a lot of the excavator's work involves reach, which is a test of how well balanced the machine really is and I have to say it is excellent. With a full bucket it stays firmly planted on the ground, which shows how well designed it is."

WALK-AROUND

Downing specified a number of safety-orientated additions to their new prime mover, including colour coding all the grab rails, hand rails and steps bright red, in addition to red chevrons on the counterweight. The fall-from-height protection to the upper-structure also hosts a fire extinguisher cabinet. A self-cleaning gripped step



Above and inset: The HMK390HD has been configured with a short 6.1m boom and a 3.2m dipper, carrying a Miller quick-hitch and a 2.19cu.m Miller extreme rock bucket.



was added below the cab door and, to supplement the standard rear view camera, an offside camera was added to the package.

A roof guard was added to protect the cab from falling objects, alongside a grid-type front windscreen guard, the lower section of which also protects the windscreen wiper. This guarding also incorporates a front-facing LED light bar and additional LED lights to illuminate both sides of the excavator.

While the layout of the principal components follows the same as we have seen on smaller Hidromek excavators, there is far more space around them in this 40-tonner. This is particularly noticeable within the large nearside cooling pack

compartment, where the various radiators are spread across the large space available, providing good air flow.

Also housed in the large nearside compartment are the batteries, the air filter and the screen wash bottle, plus the Graco G3 auto-greaser system.

The lower step on the front offside of the excavator opens to reveal a large storage area and is also home to the refuelling pump. The upper step also provides lots of storage capacity and is home to the AdBlue fill point.

Stepping up to the top of the excavator, the slewing mechanism is easily accessible and, after raising the low-profile engine cover, so are the engine oil dipstick, fill point and the coolant expansion tank. Back at ground level, the offside compartment hosts the hydraulic pump and the machine's filters.

The cab and controls are the same as found on the latest generation of the more common smaller Hidromek excavators and provides an extremely high quality working environment.

Operator Philip continued, "Looking at the Hidromek from the outside, it is very well built and is very strong in all the areas where it's needed most. They have also combined this with a very well thought-out design, which is shown in the layout of the cab and control system. Everything is exactly where an operator would want it." →

HMK390HD DRIVELINE

Like the other excavators in the Hidromek range, the HMK390HD is powered by an Isuzu engine. In this case a Stage 4 emissions-compliant six-cylinder powerpack rated at 210kW, which produces its maximum torque of 1080Nm at just 1500rpm. In this application the excavator's 570-litre diesel tank last for two days at the face, which is considered to be good.

Humphrey said, "We have already noticed how efficient the new Hidromek is and can say it represents a worthwhile saving on fuel cost. When the total fuel consumption for the excavator, the three plants and two loaders is calculated, the saving in fuel brought by the Hidromek is very noticeable at the end of a working week."

Although the clean-burning Hidromek is economical, this does not compromise its performance, as a large volume of difficult to excavate material is recovered each day. Much of this is down to the Hidromek's engine management system, which optimises performance in relation to fuel consumption.

At the heart of the excavator's hydraulic system are Kawasaki twin variable displacement axial piston pumps, each delivering a flow of 300 litres per minute. Coupled to the Hidromek's management system, this set-up provides Japanese levels of hydraulic responsiveness.



“WITH A FULL BUCKET IT STAYS FIRMLY PLANTED ON THE GROUND, WHICH SHOWS HOW WELL DESIGNED IT IS”

➔ MATERIAL PROCESSING

The new Hidromek excavator feeds a Terex Pegson MaxTrak primary jaw crusher at the face. Despite this mobile crusher being one of the longer running items of equipment at Granafallow, it remains highly effective. It discharges directly into a new McCloskey tracked R155 screener.

Humphrey said, “I looked at a number of options when in the market for a screener and McCloskey was the only one that could supply a machine like this, with an apron feeder, without a long delivery time. The others I looked at all had delivery times of four months and greater, which was not an option. Alan Fallon of Dungannon Plant Sales had this machine supplied and set up without delay and from what I’ve seen of it to date it works very well.”

The R155 screener provides a three-way split, and over-sized material is discharged via its front conveyor to a Tesab 1200TC tracked cone crusher. This crusher was the first unit of its kind to enter service in Ireland.

Humphrey commented, “We have always used Tesab equipment and when it came to buying a new cone, their new 1200TC

model looked like the ideal solution. It has since proved to be exactly as was expected and has very high capacity with a 1.2 metre cone diameter.”

Even though this mobile crushing and screening train is a vital part of the production process, when it comes to secondary screening and washing operations Downing uses a dedicated static plant. It’s seen as the only realistic option if large volumes of sand and gravel are to be produced to a consistently high standard.

A Terex sand and gravel washing and screening plant was erected on site a number of years ago. Following the launch of the Terex Aggresand transportable system in 2013, Downing became the first customer for this new generation of processing plant. It has delivered higher levels of performance and product consistency to the operation, while it also provides a high degree of flexibility for the future. If required, the entire plant can be relocated and subsequent assembly can be undertaken within the course of a long working day.

The production cycle for the Aggresand begins with it being fed by one of the wheel

The new excavator is used to dig out material at the face and feed a train of primary crushers and screeners.



WHEEL LOADERS

Even though Dowling is clearly willing to explore new options for excavators and processing plant, when it comes to wheel loaders fairly conventional choices have been made over the years. Two loaders serve the needs of the sand and gravel operation including stockpiling, feeding the central screening and washing plant and truck loading, a Volvo L180F and a Cat 966M, the latter model being a fairly recent purchase.

Humphrey stated, "We have been running Cat loaders for many years and have always been very impressed by their quality and performance. This new 966M is no different and has been very successful over its first year of operation and no problems have been experienced."



loaders on site with material from the mobile plant or directly excavated at the face. The primary screening grid removes any oversize material, and the material drops down into an in-feed hopper. The hopper discharges on to a conveyor that transports the material to the screening and washing section of the plant. The plant produces three washed aggregate products, comprising 16-14mm, 14-22mm and 22-40mm. Each of these products exist the plant on its own 9m stockpiling conveyor.

In addition, the plant produces two grades of sand. The sand production

element features two heavy-duty, rubber-lined cyclones that remove any silt down to a level less than 75 microns. The purified sand then passes over a 12x5 split screen to produce the two grades of dewatered sand, which by this stage of the process is rated as having a mere 12% moisture content level.

The classifications of the sand produced are 0-3mm for use in plaster and sold on for block production, while the 0-5mm material is used to produce concrete. Stockpiling from both sand discharge conveyors is enhanced by radial conveyors driven by electric wheel stations.

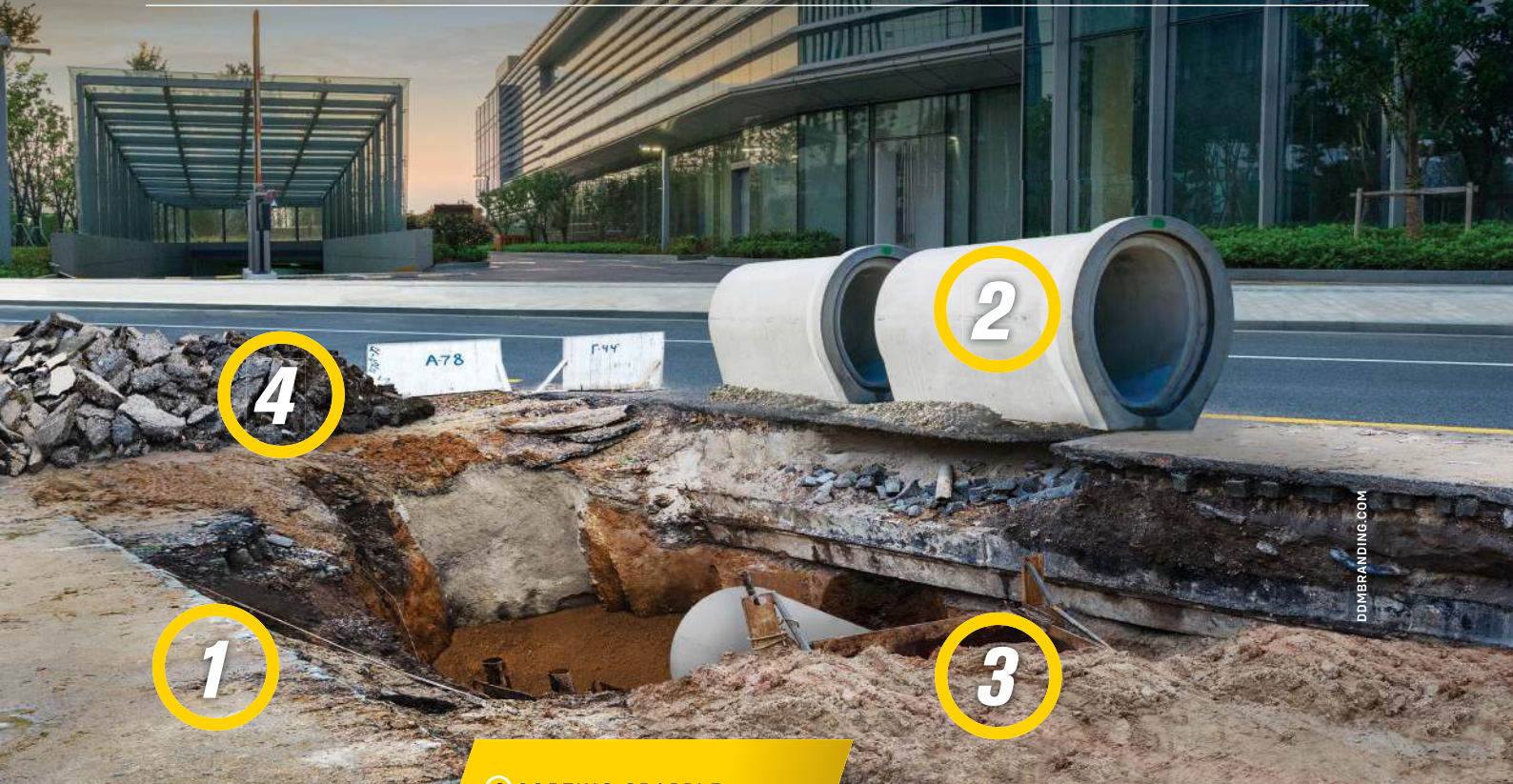
Humphrey commented, "The performance and reliability of the Terex Aggresand plant has been first class since it was commissioned here. It achieves very good product consistency and I have always been impressed by the low moisture content of the washed sand after coming through the production process."



Left and above: The Operator Philip Bergin is impressed with the layout of the cab and the machine's control system; there is even a cooler compartment behind the seat.

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LOOSE MATERIAL UP FOR GRABS

**Peter Anderson reviews
rotating grapple attachments
for small and medium-sized
excavators**

Digbits designs and builds its RG Series of rotating grabs in the UK, which feature the extensive use of Hardox 450 wear plates.



Giving a small excavator the ability to easily pick, place and stack a wide variety of loose materials increases the machine's versatility and leads to productivity gains on site.

At a very basic level, the American market is dominated by the use of either fixed or hydraulically-operated thumbs, which work in conjunction with the bucket to provide a clamping function.

At the other end of the scale, throughout northern Europe tilt-rotator operators are increasingly finding that a grab is an essential part of their growing arsenal of attachments.

Left: Sorting grabs, like this example produced in the UK by Northern Track, have long been used in the demolition sector and have proved durable over the long term.

Between these two extremes, 360-degree rotating grab attachments are commonly used across a wide variety of industry sectors – from demolition to recycling – and can handle a bewildering range of loose materials, from large pipes to green waste.

DIGBITS

Rugeley-based firm can supply several different ranges and systems of rotating grab to suit a variety of specifications and job requirements. The in-house designed and built RG Series combine quality hydraulic rotation units with the extensive use of Hardox 450 wear plates for strength and durability. Four models make up the range suitable for excavators between 2.5 and 16 tonnes: RG3, RG5, RG8 and RG13 models. All units are hydraulic ram powered with continuous rotation and featuring Hardox wear plates in the shells and chassis.

Right: Kinshofer's HPX system does away with hydraulic cylinders to open and close the jaws, the mechanism being fully included in an oil bath.



The latest models also feature a marginally reduced hydraulic cylinder stroke, to provide a longer service life to the grab's jaws. This slight change prevents the bolt-on wear edges being completely worn away and then wearing the jaw edge itself. The grabs also now feature high quality M+S hydraulic motors, as well as precision cylinders with Hallite oil seals, offering good long-term reliability and durability.

JCB ATTACHMENTS

A range of selector and demolition grabs is available for the midi and smaller full-sized ranges of excavators. With chambered and integrated lubrication and dust seals contained in bearing houses, the grabs are designed to keep lubrication in and dust out. This and the heavy-duty oversized slewing ring extend life of the attachment. Large diameter pins and bushes have reduced maintenance requirements and extended the lifespan while the double-walled housing is made from high wear-resistant steel, ensuring reliability and fully enclosing the hydraulic slew motor. Grabs boast a high clamping force, adjustable rotation speed and a large jaw opening,

Left: Epiroc's MG range of grabs can be equipped with a range of jaw configurations, including plates to convert them into clam shell buckets.



→ EPIROC

Six models from its MG range of multi-grapples, the MG100 to the MG800, are suitable for excavators from 700kg to 16 tonnes. The weights of these attachments range from 90 to 825kg, while volumes extend from 0.02 to 0.35 cubic metres. The structure of the grapples comprises a rigid main body with two moving jaws mounted on both ends of the frame. The jaws are powered by one or two hydraulic cylinders and are connected by a steel bar so that they move simultaneously. For heavy applications these excavator grapples are equipped with a powerful hydraulic rotator. To make grapples more versatile they can be equipped with various accessories for different applications, typically steel plates to make a clam shell bucket, equipping the jaws with teeth for rock handling,

tonnes. Attachment weights depend on the type of jaw version being used and extend from 380kg to 425kg for the IMG400 and between 570kg and 640kg for the IMG600 model. Features include protection valves for hydraulic rotation circuit, a high-pressure cylinder that provides better gripping force and demolition performance. Synchronised jaws enable smooth movement and handling of thin materials, in addition to interchangeable and reversible blades.

together with the extra-long stroke of the hydraulic cylinder to ensure the shells close fully – even when the toe plates are worn. With safety a key consideration, hose burst check valves protect against sudden losses of hydraulic oil pressure. The shells are mounted using high-quality stainless steel bearings, internal dust seals and heavy-duty pins, all of which help to further extend service life.

INDECO

The new IMG range of rotating grabs, an upgrade from the previous IDG range, are made in five different versions: IMG S sorting jaws; IMG D demolition sorting jaws; IMG H 3+2 material handling jaws; IMG L loading jaws; and IMG T timber jaws. The two smaller units, the IMG400 and IMG600, are designed for excavators from three to 16

JB EQUIPMENT

Berkhamsted-based firm manufactures a complete range of rotating selector and fixed two-way selector grabs to fit excavators from 2.5 tonnes upwards. All grabs are held in stock and feature an in-house CNC plasma table for the rapid manufacture of headstocks to suit any machine. The JB series of grabs have a complete Hardox lower body, shells and bolt-on wear edges.

KINSHOFER

The new D-Series of demolition and sorting grabs are suitable for handling all kinds of building materials and waste. The five models offered for smaller excavators up to 16 tonnes range from the 115kg DO2H model with a load capacity of 1.25t, up to the D12H model that weighs 470kg and has a capacity of 3.0t. Two models, the DO4HPX and DO6HPX incorporate the →

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Right: BPH
Equipment sells and supports the Prodem range of grabs, which feature a low build height, a low weight and come with reversible wear blades.

In addition, a grip improvement kit will provide more grip and precision, which can be installed on the internal side of the grapple. Alternatively, a tilting lift rubber protection kit can also be mounted on the inside of the grapple. This kit is fitted with rubber edges to pick up and move linear and frail material as it has the ability to adapt to the shape of the material being handled. On the top part of the grapple a rotation power extender kit is available that is said to increase the rotation strength, allowing the excavator to handle heavy material more easily.

MOUNT MACHINERY

This Leeds-based hire and sales firm offers an impressive line-up of German manufactured 4TÉ CapStone demolition attachments that includes rotating selector grabs. There are four models in the range – the FSG541, FSG491, FSG1441 and FSG1841 – that are suitable for excavators from two to 16 tonnes. These attachments weigh from just 210 to 920kg, feature jaw openings between 1.14m and 1.86m and provide closing forces from 12kN through to 42kN. Features include a reinforced rotation motor with integrated shock valve, rotating coupling seals that can withstand pressures up to 500bar, reversible Hardox 500 blades and an in-built check valve to

Left: Indego's new IMG
range of grabs are available in five versions, including various sorting jaws, materials handling jaws, loading jaws and timber jaws.



→ firm's innovative HPX jaw drive system. Jaw movements are generated by two opposed-running hollow shafts that have a helix thread. They are hydraulically driven by a single piston with no need for a hydraulic cylinder. This drive unit runs in a permanent oil bath with no lubrication required, and Kinshofer claims a 50% improvement in the grab's working life. Different applications can be tackled thanks to the easy shell exchange system and the durable, replaceable and indexable wear blades enable the grabs to pinch with their edges without incurring excessive wear.

MECCANICA BREGANZESE (MB)

These grapples can be reconfigured for various applications with different jaw types. This includes a multi-function blade

kit, in which the jaws are toothed on one side and smooth on the other. These jaws can be simply and easily inverted on site, allowing the grab to handle large objects and oddly-shaped

materials by providing more grip and increasing safety and control. The grapples can also be equipped with the firm's claw containment cover kit, converting the attachment into a clam shell grab, to collect and handle small-sized material, to dig and dredge natural soils, to load earth, gravel and sand and to lift any kind of objects.

prevent load dropping. There is no requirement to bleed the ram, as the cylinders feature a cushioning function when shells are opened to their fullest. The firm says that the innovative chassis design of the grab prevents twisting or fracture.

NORTHERN TRACK

Offers a six-model range of rotating grapples suitable for mounting on excavators from 500kg to 16 tonnes. The Leeds-based company's NTSG selector grapples are equipped with 360-degree hydraulic rotation

Right: Driven by the demands of the demolition sector, grabs are incredibly durable and made from exceptionally high quality steel.

for accurate positioning and ease of operation. Reversible bolt-on cutting edges are fitted as standard while the grapple shells are all constructed from 400HB wear-resistant steel for durability and performance.

Grapples can also be customised to suit individual applications and enclosed or plate style baskets are also available as well as heavy-duty reinforced ribbed baskets for more arduous operations. The smallest model in the range is the NTSG-01P, which weighs 75kg and has a maximum opening of 600mm and a shell width of 300mm. The NTSG-09P model weighs 750kg, has a maximum opening of 1.75m and a shell width of 700mm.

PRODEM

These selector grabs are sold through Billingshurst-based BPH Equipment, and 12 models are suitable for excavators from 700kg to 16 tonnes. The smallest model, the PSG75-D, weighs 75kg, has a maximum opening of 500mm and closing force of 6kN. Although larger models in the range can be fitted to 16

tonne excavators, a popular choice for this size of base machine is the 840kg PSG603-D, which has a maximum opening of 1.8m and 35kN of closing force. Each grab comprises one-piece perforated shells, manufactured using Hardox steel to increase strength while maintaining a low operating weight. The protected horizontal hydraulic cylinder provides excellent closing forces and all pivot points are protected from dust and other

site debris. With a low weight and short height, the grabs have reversible and changeable wear blades. Motionless cylinders prevent hose wear while cylinders with end damping and long hinge arms provide greater closing power. The heavy-duty turning joint seals and grease nipples are easy to reach and with two rotate motors give increased rotating power.

Below: Leeds-based Mount Machinery hires and sells the German-made 4TÉ CapStone range of rotating selector grabs.





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Right: Meccanica Breganzese (MB) produces a wide variety of adaptable grabs, including reversible smooth/toothed wear plates and clam shell conversions.



Above: MB offers a rotation power extender kit, which is said to increase the strength of the rotational movement to better cope with heavy objects.

→ VTN GROUP

Marketed and serviced in the UK by ECY Haulmark, products include the MD range of 360-degree materials handling grapples for excavators from 1.5 tonnes upwards. The Italian manufacturer has recently improved the MD range of grabs by adding oversized bump stops, hydraulic damping on opening and closing, twin rams and an oversized slew ring. In addition, the pivot pins and bosses are now bigger and stronger, and the grab has a larger capacity and gripping strength for handling material. Under-blades are reversible and interchangeable. Also, five jaw configurations are available designed for

different applications, further improving the versatility of the grab.

WORSLEY PLANT

The sole UK dealer for Rotar, the Dutch manufacturer of demolition attachments, including the RG Series of rotating gabs. There are four models in this range that are suitable for excavators from two to 18 tonnes. Weighing 210kg, the RG5-N model has a width of 500mm and is suitable for excavators up to five tonnes. At the other end of the scale, the RG15-N weighs 1015kg, has a width of 900mm and is designed for excavators from 14 tonnes upwards. The RG

Series is fitted with a strong rotating upper head and a heavy-duty double-row slew ring. The hydraulic motors in the upper head generate a high torque, suited for heavy loading in any position. All the hydraulic cylinders are fitted with a load control valve to protect against unexpected opening of the shells. Additionally, the cylinder has an extra-long stroke to close the shells. The wear-resistant shells are made of Hardox steel and equipped with easily replaceable and rotatable cutting edges. The shells are mounted within the long bearing pivot points of the double-walled construction body with hardened, oversized pins. EM



Worsley Plant is the sole UK dealer for Rotar, the Dutch manufacturer of demolition attachments, including the RG Series of rotating gabs.





**“OPERATOR PETE JACQUES
CONFIRMED THAT IT IS BY FAR
THE SMOOTHEST MACHINE HE
HAS OPERATED FOR A GOOD
NUMBER OF YEARS”**

Above: Equipped with a 1.5cu.m grab on a 10.6m boom and a 7.75m stick, the Atlas 350MH carries out the majority of stacking, sorting and loading at the yard.

Inset and below: The low-profile upper-structure provides easy access to the major components, as both sides of the big Deutz engine are accessible from the top of the machine.

SORTING SCRAP STEEL

Paul Argent reports from Sheffield on a new Atlas materials handler

Operating from a yard on the outskirts of Killamarsh, where they process over 12,000 tonnes of metal each year, Norwood Metals has taken delivery of its first new Atlas materials handler. The 36-tonne 350MH model was supplied by TDL Equipment and replaced a similar sized Liebherr machine.

MD Jamie Hull said, “We keep our cranes on front-line duties for up to ten years and wanted a reliable, productive and economical loader. The specification of the Atlas along with testimonials from other users and a very comprehensive package put forward by TDL Equipment gave us the confidence in changing brands.”

The new Atlas carries out the majority of stacking, sorting and loading operations in the yard, assisted by a number of smaller materials handlers on sorting duties. This 350MH has been configured with a 10.6m straight boom and a 7.75m stick, carrying a 1.5-cubic-metre capacity Atlas five-tine grab.

In this type of application the availability of the primary materials handler is of

critical importance. A key factor in the buying decision was seeking feedback from existing Atlas users, who vouched for the longevity and reliability of the Deutz-powered design. This generation of 350MH features a six-cylinder, 6.1-litre engine rated at 245hp.

The engine is located under a cover in the middle of the upper-structure, while the low height bodywork provides the operator with a relatively unimpeded view across the rear of the machine. A large gull-wing panel door on the offside opens to reveal the cooling pack and the main hydraulic components. The cooling pack features an auto-reversing fan, a key requirement on such sites where dust and debris can soon block a radiator.

The hydraulically elevating cab raises the operator’s eye-line from just under 3m to 5.5m for better visibility. The 5m-long undercarriage is fitted with heavy-duty axles, both rated at 56 tonnes, together with stabilisers at

each end to ensure the materials handler remains stable, even under full load and working cross-carriage.

The new Atlas has impressed the team at Norwood, as regular operator Pete Jacques confirmed that it is by far the smoothest machine he has operated for a good number of years.

His boss Jamie concluded by saying, “It’s proving to be a reliable and productive machine. We believe we have made the best purchase for our company with the Atlas.”

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HIGH FLOW HYUNDAI

Weeks Forestry has taken delivery of a Jas P. Wilson Harvadig conversion of a Hyundai HX145LCR excavator.

Nick Drew reports on the conversion of a Hyundai excavator into a versatile forestry machine.



"WE HAD BEEN LOOKING FOR SOMETHING SMALLER TO ADD TO THE LINE-UP FOR A WHILE"



The North Devon-based family business of Weeks Forestry runs a Komatsu 931XC timber harvester and has recently added a converted 15-tonne class Hyundai excavator-based forestry machine to its fleet.

Although Joe Weeks is still a big fan of the dedicated Komatsu harvester, he decided to opt for an excavator-based machine to carry another harvesting head in a much more compact package. It would be a lot easier to move around on the smaller jobs, leaving the big Komatsu to focus on the much larger, clear fell jobs.

Joe said, "We had been looking for something smaller to add to the line-up for a while and, to be perfectly honest, the Hyundai was a lot cheaper to buy than other brands we looked at. As we see it, it will now become a universal tool in our arsenal, thanks to the fact that we can put a wide range of attachments on the end of it. In addition, we can fit a bucket and use it as a conventional excavator, enabling us to put in access tracks for the Komatsu and our forwarder if needed. The rake attachment will enable us to clean up after ourselves too, so it's going to be a great addition for us.

"We find now that we aren't under so much pressure to find two constant jobs all the time, so this machine gives us more flexibility all round."

CONVERSION

The decision to opt for the reduced-tailswing Hyundai HX145LCR was based on advice received from Iain Wilson of forestry machinery specialists Jas P. Wilson, who was commissioned to undertake the conversion. The view was based on Hyundai's superior hydraulic oil flow rates compared to competitive brands, ideally suited to running high-flow attachments like harvester heads and flail mulchers.

The base machine was supplied to Weeks by Hyundai dealer Molson, and the conversion carried out at Jas P. Wilson's Scottish premises in Dalbeattie. Their in-house designed and built forestry protective package is branded Harvadig,

Iain said, "Over the years we have worked with most of the recognised machine makes and models, but we have discovered that the Hyundai's cost, reliability and excellent delivery of oil stand out from many of the rest. This, together with the excellent



The windscreen is designed to protect the operator in the event of high velocity impact damage, for instance from a flying link from a broken chainsaw chain.



service we have received from Molson as our partner, we feel it is a clear winner. We have been left high and dry by many suppliers in the past when dealing with problems, but Molson has always been great, stood beside us and worked with us to find solutions to any problems our customers have had to face. We look forward to a long, continuing working relationship with them.

"The substantial forest guarding we fit is the result of many years of working closely with our customers. It provides a solution that is first of all effective in its basic job of protecting the base machine from the demanding conditions found in the forest. In addition to this, it does not add too much weight to the machine and also looks the part.

"We normally supply these machines with a Finnish-built Kitto harvester head. In this case we opted for the Swedish built SP head. Manufactured by Ljungby-based SP Maskiner, the low friction SP561LF is a great quality all-round harvesting head. Its 60cm maximum cut diameter makes for a very capable piece of kit that can be deployed for

"THE HYUNDAI'S COST, RELIABILITY AND EXCELLENT DELIVERY OF OIL STAND OUT FROM MANY OF THE REST"



Above: For harvesting work the Hyundai is equipped with a Swedish-built Maskiner SP561LF all-round harvesting head that provides a cutting diameter of 60cm.

Below left and right: The extensive upper-structure cage includes heavy-duty rear doors to protect the excavator's original service access panels.

first thinning up to medium final cut.

"Of course, these base machines are great tool carriers for a wide range of other forestry-related attachments such as tree shears, rotating grapples, cone splitters, mulchers, flails and winches – just some of the many uses that the machine is ready for."



HYUNDAI HX 145LCR

The HX145LCR is powered by a well-proven, four-cylinder 1243hp Perkins engine that meets Stage 4 of the emissions regulations. In operation it just seems to purr away and is reported to be very good on fuel, thanks in part to it reaching its maximum torque at just 1400rpm.

It drives twin variable displacement tandem-axis piston hydraulic pumps, each of which offers an oil flow of 126.8 litres per minute. With over 250lit/min available, this makes the base machine an ideal candidate to run attachments that require high hydraulic flows.



On this ground with these track pads, it is essential to have heavy-duty, full-length track guards.



The bottom of the excavator is protected by an angled belly plate, which aids tracking over stumps.



Joe Weeks (standing) with operator Simon Keenor: both are pleased with the initial performance of their new compact forestry machine.



"IT IS A NICE, SMOOTH MACHINE TO OPERATE AND I AM WELL CATERED FOR INSIDE THE CAB."

→ OPERATOR FEEDBACK

We came across this forestry excavator on a private woodland job on the outskirts of Cullompton in Devon. Operator Simon Keenor showed me round his new mount, pointing out the many built-in design features. One thing you notice straight away is the one-piece front windscreen that is made from 12mm-thick impact-resistant glass and is capable of taking a direct hit from a broken saw chain.

Extensive cab guarding is fitted using high strength metal tubing, while the lower quarter of the front screen gets a protective grille. The roof guard includes protection for the additional LED lights that are fitted. The bottom of the excavator is protected by angled deflector belly guards, which assist when tracking over stumps and rough

ground. The undercarriage itself features heavy-duty, full-length track guards.

The rear of the tubular framework guarding system includes lockable heavy-duty secondary doors, which protect the original panels behind them.

These supplementary panel doors are well capable of withstanding the day-to-day impacts that are unavoidable in the forestry sector.

At the business end of the machine, the dipper is fitted with the Harvadig quick-release hose system, which enables the operator to change sophisticated forestry attachments in just a few minutes. On the end of the dipper the standard Geith fully automatic hydraulic quick-hitch was, on the day of our visit, hosting a hanger for the Swedish-built harvesting head.

Simon said, "It is a nice, smooth machine to operate and I am well catered for inside the cab. It has all the usual creature comforts that you could ask for and I believe the cab interior space is some 13% larger than the previous models, which is a bonus on a compact radius machine. The conversion work that's been done to the machine is top-drawer stuff and it's reassuring to have the vital components of the machine so well protected. It's just a great piece of kit!"

In conclusion Joe said, "We are delighted with this new machine. It's early days yet, but it's already proving its worth on these smaller projects. It's definitely something different for us, but it's easy to see how beneficial it's going to be to our business going forward."

EN



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A SUSTAINABLE APPROACH?

Peter Haddock interviews Chris Matthew, a director of Flannery Plant Hire, on their focus on a project's total fuel consumption



There is much talk in the industry about adopting a sustainable approach and focusing on carbon reduction. As Flannery's Chris Matthew states, in the real world contractors should focus on fuel consumption to drive their sustainability agenda.

He said, "For me, the subject of sustainability can become very complex and difficult to determine. But when you simplify out what we do in earthworks on construction sites and target the biggest single variable carbon emitter on site, which is diesel fuel, you soon realise the practical steps you can take to reduce carbon emissions and their associated impacts.

"This is why at Flannery we are now having different conversations with our clients, talking to them about what is best for their project in sustainability terms, using the direct and measurable impact on fuel consumption.

"In doing this, we can look at a project in different ways and communicate why we would recommend actions, like standing down equipment in bad weather. This is because through the data we gather we can explain to clients the different levels of fuel consumed to do the work in these poor conditions and that in some cases doesn't add up to the value of the outcome it will produce.

"When you take a fuel-based project overview in this way, you are looking at the big numbers over the lifecycle of a project. You can then set targets as a total project team of say 15% on fuel savings. From this total project viewpoint, it is then clearer how to plan to achieve these, by drilling down to the people, plant, and technology to be used onsite.

"For example, a lot can be achieved from fleet matching, integrating with the design team by using 3D machine control and planning out the programme to remove bottlenecks. Other simple things like the selection of buckets and attachments can also make a difference. So too can the identification of operator excellence, training, mentoring and dealing with the psychology of turning machines off, to reduce idle time fuel burn, for example.

"By carrying through lessons learnt from other projects, like how different equipment performs in different situations, you can also create a sharing team culture that understands the importance of fuel. Yes, of course, the productivity, quality and efficiencies are important, but when you focus on the fuel everyone can input. You can even reduce fleet numbers on site in some cases.

"For me, a classic example that has come out of this approach is when we looked beyond the machines on site to the fleet supporting them. Take refuelling trucks and bowzers, if a site isn't set up well, trucks that have to travel long distances on poorly maintained haul roads will naturally use more fuel. Equally, having the road-based refuelling trucks travelling shorter distances by seeking out closer supplies also has an impact.

"By understanding how fuel is used and then looking at empowering staff to find ways to reduce it, while still delivering on the project goals, what you end up with is a more sustainable project, which saves carbon and cash."

"BY UNDERSTANDING HOW FUEL IS USED, WHAT YOU END UP WITH IS A MORE SUSTAINABLE PROJECT, WHICH SAVES CARBON AND CASH"



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Right and inset: The Lomy Morina limestone quarry is now using a Volvo L350H to load trucks at the face.

ECONOMICAL LOADING

Eoghan Daly reports from a Czech quarry on their latest wheel loader, a 50-tonne class Volvo L350H

The Morina Quarry, located near the village of Bubovice south-west of Prague, is in the heart of the Czech Republic's historic limestone extraction area. Best known for the former 'Big America' quarry, the geology of the area results in huge canyon-like pits with multiple benches. Around one million tonnes of limestone are extracted each year from Morina, including the highest quality chemical grades of material.

Feeding their adjacent concrete plant, this is the largest quarry operated by Lomy Morina, which is owned by industrial giant CEZ and Ceskomoravsky Cement. A key part

of the operation is to load blasted rock at the face with a large wheel loader. This duty was undertaken by a Cat 988H, which was then replaced in 1997 by a Komatsu WA600. Over the years the big Komatsu has proved to be an exceptionally reliable and productive loader, but it was getting to that stage in life where it was better suited to a less demanding role on site. Its replacement is a Volvo L350H.

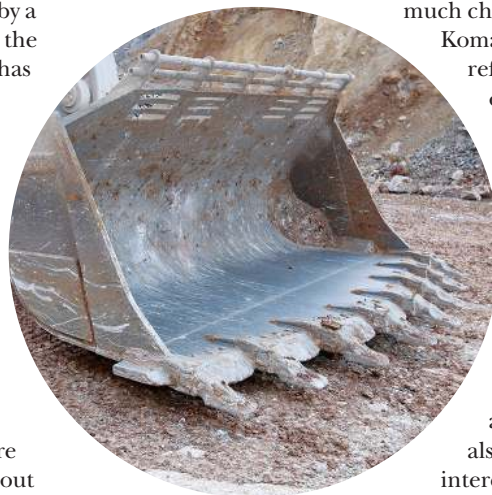
Quarry manager Lukas Potys said, "There were many positives about the Komatsu WA600, as it offered a much higher build cab than the Cat 988H. It was also very reliable and only had one big repair in its 27,000 hours, which was a turbo replacement plus EGR valve

replaced at the same time.

"Despite this, we looked at all of the options and found Volvo to be much cheaper than Cat and Komatsu. With very good references from users of two existing L350s in Moravia, it was decided to take this option over the others. Volvo was also offering a much greater range of options on the machine, which made it even more attractive and also seemed more interested in connecting with the customer."

The L350H went into service in summer 2019 and clocked up 1100 hours before the end of the year in the hands of experienced operator Lubos Petrsek. ➔

"THE VOLVO IS A STABLE MACHINE EVEN THOUGH IT HAS HIGH-REACH LOADER ARMS, WHICH GIVE GOOD DUMP CLEARANCE"





**“CONSUMPTION IS
TYPICALLY 22 LITRES
PER HOUR, WHICH
REPRESENTS A MAJOR
SAVING OVER THE 30
LITRES PER HOUR OF
THE 988H AND WA600”**



Access to the cab is up and over the rear wheels, the fenders of which swing away to provide good access to the engine compartment.

→ He has worked at this site for 12 years and also operated the Cat and the Komatsu at the face.

He said, “The Volvo is a much more stable machine even though it has high-reach loader arms, which give good dump clearance when loading the trucks. It also fills the bucket from the face with very little effort and never seems to be under any pressure doing the job.”

DRIVELINE

The machine’s performance has met all expectations, however it provided the management team with a welcome surprise, as it far exceeded Volvo’s claims on fuel economy.

Lukas said, “We are very happy with how

economical the new L350H is. We were expecting it to be lighter on fuel than our Cat and Komatsu, but never expected so much of a saving in the same application. Consumption is typically 22 litres per hour, which represents a major saving over the 30 litres per hour of the 988H and WA600 loaders.”

With an average fuel economy of 22lit/hr, the driveline of this 56-tonner shows what is possible using the latest technology. At the heart of the L350H is a Stage 5 emissions-compliant Volvo D16J straight-six engine rated at 397kW, but delivering its maximum torque of 2550Nm at just 1400rpm. This engine drives a four-speed Volvo automatic powershift transmission, which features auto-shifting and a lock-up function in third and fourth.



Below and left: The big Volvo is living up to expectations, and fuel economy and manoeuvrability are better than expected.

HAUL FLEET

There are nine quarry trucks serving the site, including a 6x6 Tatra Jamal, which also works at the adjacent concrete plant.

The Morina Quarry is a long-term user of Russian-built Belaz rigid trucks, of which four 40-tonne capacity units and one 28-tonner remain in the fleet. Apparently, the early Belaz trucks provided rock solid reliability and are much missed.

The driveline, including axles and suspension, of the more recent Belaz haulers shares the reliability of their predecessors, but their engines appear to be quite fragile. Apart from the cost and time of engine repairs, the Belaz fleet is returning good levels of performance and fuel economy.

More recent additions to the haul fleet are three Komatsu HD405 rigid dumpers. As you would expect, these haulers tick all the relevant boxes in terms of performance, economy, reliability, availability and operator comfort.



The hydraulic system is a three-pump load sensing, variable displacement affair, to ensure adequate oil flow for simultaneous operation of various functions. A 256lit/min pump is dedicated to the front-end equipment, while a 354lit/min pump serves machine functions such as steering, braking and pilot hydraulic services, while also contributing to the demands of the front end. The 84lit/min pump powers the cooling fan and also assists with the braking function.

One of the things that has impressed the team is the speed of the big Volvo's front end. A complete loading cycle of raise the arms, dump its load, curling the bucket back and lowering the arms is averaging out at 14.6 seconds; many wheel loaders of this size take nearer 19 seconds.

WALK-AROUND

Like all loaders working at the face at this quarry, the L350H has been fitted with wheel chains on all four corners to enhance traction and also considerably extend tyre life. The high-lift loader arms carry a 6.2-cubic-metre rock bucket with a profile designed to aid penetration of a pile of blasted rock. Due to the abrasive nature of

Below and inset: The cab provides a great view of the working area and is equipped with joystick steering and a two-lever front-end control system.



the material it is heavily armoured, particularly between its teeth.

Another surprise for the team was how manoeuvrable the 50-tonne class machine is, thanks to its 37-degree steering angle, as Lukas confirmed, "We see the L350H as being a very manoeuvrable loader in relation to its size class, which helps operation on truck loading cycles in the more confined parts of the quarry. Its steering angle is excellent and is one of the biggest contributors to this manoeuvrability."

The new L350H has been



GEOLOGY & SITE LAYOUT

“AROUND ONE MILLION TONNES OF LIMESTONE ARE EXTRACTED EACH YEAR, INCLUDING THE HIGHEST QUALITY CHEMICAL GRADES”



Left: The distinctive nature of the huge limestone deposits in this area results in canyon-like pits, without vertical sides to the benches or high wall.

The canyon-like layout of the Morina Quarry is typical of the area, in which the limestone deposits run at a sharp angle across the width of the quarry. The composition of the deposit means that, irrespective of what drilling and blasting technique is used, it is not possible to maintain a vertical rock face with any degree of stability. Instead there are distinctive slopes on all bench faces, and a sloping high wall. This results in very little space at the quarry floor level.

The long thin footprint of the quarry and a winding network of haul roads result in long cycle times. When the haulers do get out of the pit, there is a 2km drive to the central crushing and screen plant, hence a greater than the normal number of trucks are run on the hauling operation.

Typically two separate production teams work the site, operating on different levels of the quarry, while a third team removes and tips the overburden. Together they shift around 1.2 million tonnes a year, about 10% of which is overburden.

→ configured with a comprehensive set of handrails over the rear walkways on both sides of the machine. To gain access to the engine compartment the entire rear mudguard assembly, incorporating steps and handrails, swings out of the way. To do this a holding latch is unlocked and the main front pin removed. This pin must be reinserted to hold the assembly in the open position. As the pin is located so high on the machine, it is described by the Czech team as only being reachable from ground level by operators of a ‘tall Scandinavian stature’.

With the mudguards out of the way, opening the engine compartment’s side panels provides good access to all filters and maintenance points. The rear grille swings out to reveal the cooling pack, while the

diesel and AdBlue refill points are all easily accessible from ground level. Maintenance is simplified, thanks to the use of a Volvo automatic greasing system.

The cab is the same structure and layout as other large loaders in the Volvo range. It provides particularly good forward visibility through the low-set front screen, while the commanding seating position aids visibility and therefore awareness of the whole work area.

The Volvo has joystick steering in addition to a conventional steering wheel. To provide greater control and precision of the movements of the loader arms and the bucket, this example has been configured with a two-lever working equipment control system.

In addition to the standard Volvo front dashboard, complete with easy-reach switches on its left, a host of machine control switches are located on the cab’s offside A-post. In addition, there are two supplementary screens, one for the rear-view camera monitor and the other for the loader’s Loadrite on-board weighing system.



CONCLUSION

Lomy Morina bought this high-tech loader with an extended maintenance contract from the local Volvo dealer Ascendum, which is located just 30km from the quarry.

Lukas concluded by saying, “We have included a long-term service contract in the deal for the machine and with the local presence of the Volvo dealer we would hope that a strong level of support will be provided. There has been no reason to test this so far, as the machine has been completely reliable, but their proximity is still a major benefit over extended use.”



Left and inset above: The site is a long-term user of Belaz quarry trucks, but more recent purchases have been from the Komatsu stable.

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ADDED VALUE FROM MODERN PRACTICES



Peter Haddock reports on the survey of underground utilities at the Plantworx showground

Ducks enjoyed Plantworx 2019, particularly after a water pipe was struck creating a pond on one of the demonstration stands, leading to an iconic social media moment for the show. Just like a real site, such utility strikes are not supposed to happen. The digging area had been carefully chosen, as all the records indicated that there were no underground services in the area, certainly none that were live.

Following positive feedback on the all-weather facilities of Peterborough's East of England Arena received both from exhibitors and visitors, show organiser Construction Equipment Association (CEA) confirmed that Plantworx 2021 will be held at the same venue.

However, clearly there was work to be done to ensure the safety of those working or visiting the show. The Plantworx team, led by event director Simon Frere-Cook, therefore commissioned MK Surveys to undertake a survey of the entire site.

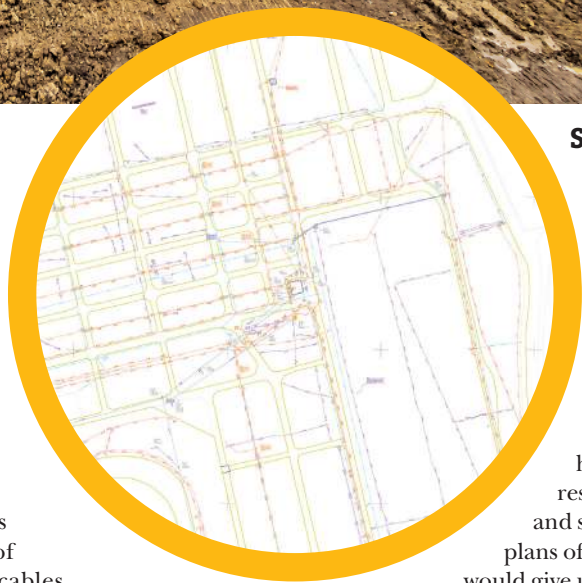
Simon explained, "With the plans showing where the underground utilities were on the site, we decided to locate the dig zone into one area, which was free from any of these pipes or cables.

Of course, we discovered at the show that the site plans were not up to date or accurate.

"We also recognised that concentrating all of the live demos into one area was not ideal for how people visited the show. This was because the flow of visitors tended to focus on these areas.

Following a review of the 2019 show, we wanted to change this and of course avoid any potential incidents in the future, by investigating what was underground and where.

"In doing this we knew we could use the information to reshape the show by opening up areas for demonstrations and distributing them more widely around the showground. This, in turn, would help us to improve the experience for visitors and exhibitors alike."



SURVEYING

Gordon Livie, MK Surveys' team leader for the project, said, "When it came to planning the project, before we even got to site with our equipment, we had to do a lot of research to collate and study the existing plans of the site, which would give us a guide of what

to expect. This process included collecting plans from the East of England Showground and the statutory undertakers.

"On looking at the plans, it became clear that over time they had been altered with varying degrees of accuracy, from pencilled-in lines to more detailed drawings.

But as we got on to site surveying, we soon learnt that although these documents showed some of the utilities, there were many more hidden below ground that hadn't made it on to the plans. →

"THE RECORDS INDICATED THAT THERE WERE NO UNDERGROUND SERVICES IN THE AREA, CERTAINLY NONE THAT WERE LIVE"

Above and inset: Following an underground utility strike at the 2019 event, the site of the Plantworx show has undergone a comprehensive survey.

“WE COULD USE THE INFORMATION TO RESHAPE THE SHOW, BY OPENING UP AREAS FOR DEMONSTRATIONS AND DISTRIBUTING THEM MORE WIDELY”

Below and inset: Ground penetrating radar can detect plastic and metal pipes together with other buried objects, with a high degree of accuracy.



→ “Of course, the problem comes with this type of site when you have both historic utilities like metal pipework and then newer utilities like plastic pipes. This is because the standard metal detection systems don’t work with plastic utilities.

To ensure we captured everything accurately, we had to combine the use of the Leica Ultra Electromagnetic Locator metal detection system together with the Leica DS2000 ground penetrating radar and its larger cousin, the Leica Stream C ground penetrating radar.”

Ground penetrating radar emits electromagnetic pulses into the ground, the return signal changes if a buried object or a boundary between materials is encountered. The Leica kit processes this data in real time, creating a visual model on the machine’s tablet control screen and digitally recording all the data, including a highly accurate GPS location. This process can also determine the size and shape of an object, including plastic pipes.

Gordon continued, “By working in a grid formation to initially detect utilities, we are then able to follow them with the radar. This means we can collect accurate depth and size information of the utilities. That is then put together by our software modelling experts. This, in turn, allows them to build an accurate model of what is underground, creating a 2D and 3D version of this.”

PLANTWORX 2021

Armed with a state-of-the-art underground survey of the site, Plantworx’s operations director Stuart Favill has been working with the showground’s management team on a new layout for the event. In particular, opening up more areas of the site for digging demonstrations, allowing him to reshape the entire layout of the show.

Stuart said, “With plot sales for the 2021 show being released, we will now see a much more even spread of digging activity across the event.

I am also sure there will be some exhibitors using this show to demonstrate how they are making the best use of 3D models and the technologies they enable to support the industry.”



MK Surveys has already booked its stand at the show and will continue to support the industry event by conducting further surveys across all the designated digging plots. The new layout of Plantworx will be a winner for both visitors and exhibitors alike; the only losers will be the ducks.

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OPERATOR-ORIENTATED WASTE LOADER

Paul Argent reports on a high-spec waste-handling Liebherr loader

Much of North Yorkshire's commercial and household waste is handled by Yorwaste, which operates from 29 centres across the county. Comprising over 300 staff, the teams run a diverse range of machinery to handle almost 600,000 tonnes of waste each year.

In the last year, Yorwaste diverted over 77% of the incoming material away from landfill. This includes almost 7500 tonnes of metals, 6100 tonnes of plastics and the composting of close to 175,000 tonnes of green waste. The company also generated over 40,000 megawatt hours of green electricity through its recycling operations.

Yorwaste's Chris Tomlinson said, "Our machines are key to our operations functioning smoothly and efficiently. If we suffer any downtime it creates a backlog in our system, stopping trucks both leaving and entering the site. We can become blocked with waste very quickly."

NEW LOADER

One of the latest additions to the Yorwaste fleet is an 18-tonne Liebherr L550 XPower wheel loader, replacing another manufacturer's machine that suffered from poor reliability. The new Liebherr features a ZF-derived continuously →

The combination of 3m high-lift arms and a large capacity high-tip bucket provides over 4.6m of clearance to the pivot points.

"ANY DOWNTIME CREATES A BACKLOG IN OUR SYSTEM, STOPPING TRUCKS BOTH LEAVING AND ENTERING"



A substantial front grille has been fitted to protect against items falling from the back of the bucket, particularly when working at height.



The engine is located at the rear of the machine: note the additional quarry-spec bumper fitted for added protection.



The loaders are expected to be capable of working with a variety of materials; the new Liebherr is usually tasked with household or green waste jobs.

→ variable transmission (CVT), which improves fuel consumption and is more relaxing to operate.

Chris continued, “We expect our operators to be able to work to the best of their ability from the start to the finish of their shifts. A comfortable, clean cab with easy-to-use controls and excellent all-round vision allows them to do this.

“We are always looking to reduce operating costs without lowering our equipment quality, and the Liebherr has done just that for us on both fronts. We have found that it uses less fuel than the equivalent size loader it replaced. In fact, we have noticed a saving compared to all the other brands we use and, while we have to factor in the use of AdBlue, we are still making savings on the running costs of equivalent size machines. It’s also more productive and will fill a bulk trailer more quickly than most loading shovels on our fleet.

“Although the change from a standard transmission to the XPower has taken the company’s operators a little time to get used to, once they have spent a couple of days operating the L550, they don’t want to change back, because the power delivery and driveability are such an improvement on other shovels in the fleet.”

The L550 has started work at the firm’s busy Seamer waste transfer station, located on the outskirts of Scarborough, as Chris continued, “We have a number of waste streams coming into the site and all of our machines are expected to be able to handle them sufficiently. The Liebherr will spend the majority of its time handling household waste in the shed and the wood and green waste on the yard.”

The smallest model in the XPower range, the 194hp L550 has been configured with a 3m high-lift industrial front end, complete with a quick coupler and a substantial steel guard for the tipping cylinder. The attachment is a four-cubic-metre high-tip bucket, the combination providing over 4.6m of vertical clearance to the pivot points on the arms. The Liebherr is more than capable of loading the almost constant stream of high-sided, walking-floor trailers that transport the sorted material from the site to the firm’s recycling facilities.

ADDED PROTECTION

To further protect the operator in this potentially hazardous environment, the cab has been fitted with a substantial front guard to stop any rogue items dropping over the back of the bucket and hitting the front screen. The cab roof has also been

“WE HAVE FOUND THAT THE LIEBHERR USES LESS FUEL THAN THE EQUIVALENT SIZE LOADER IT REPLACED”

Inset above right: A supplementary cab air filtration system has been fitted, so the loader is always worked with the door and windows closed.

Inset above far right: The loader is also equipped with an Ardent fire suppression system, which is a necessity when working with highly combustible materials.

Below: The configuration of the arms and attachment provides over 4.6m of vertical clearance to the pivot points.



fitted with a lightweight steel cover to deflect any falling material and to stop any fine material from building up in the contours of the cab top.

To help to ensure that the operators are as safe and comfortable as possible, this example has also been fitted with an additional cab air filtration system. It supplies a steady stream of fresh, filtered air into the pressurised cab, which in turn means that the standard working practice for the Liebherr is to keep the door and windows tightly shut to prevent the ingress of smells and harmful dust.

The layout of the XPower range sees

the engine placed at the rear of the machine and the cooling pack located between engine and cab. As the engine acts as ballast, there is less need for a heavy counterweight, and results in a relatively short rear overhang. This particular example has been configured with the Liebherr quarry-spec additional rear bumper for added protection to the rear of the machine. It also has a radar system fitted to the rear end, to warn the operator should they be getting close to an object or person.

Another feature is an Ardent fire suppression system, on which Chris commented, "We hope never to use the

system, but it is an option we cannot do without. If the machine should catch fire, the type of material it works in would spread the flames extremely quickly."

The standard working practice on this site is that every vehicle entering or working in the giant sorting and storage shed is required to have lights on at all times. To supplement the standard LED lighting package, this loader has also been fitted with an LED light bar on top of the cab.

This is the first Liebherr machine in the Yorwaste fleet. Judging by the initial impressions of both management and operators, it is unlikely to be the last.

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MINE-SCALING MASTER

Eoghan Daly reports on one of the latest conversions of a Gradall wheeled excavator into an underground mining scaling unit

"THE BOOM ROTATES AND VERTICALLY PIVOTS ON THE SLEWING UPPER-STRUCTURE, REACHING INTO THE CORNERS OF A TUNNEL"



A converted Gradall XL3300 excavator is being used as an underground mining roof scaler by Finnish limestone producer Nordkalk.



Above: The Gradall's telescopic rotating boom has the reach for this application, without having to worry about headroom.

Left, below left and below: In addition to the roof scaler attachment, the Gradall is equipped with a special profile bucket and a hammer; the mount for the hammer includes a pair of teeth.



The removal of loose rocks by 'roof scaling' is a vital safety element in the underground mining process. Dedicated mining machinery manufacturers produce specialist machines for this task, but around the world converted Gradall excavators are also used to perform this application, with much success.

The Gradall's standard telescopic boom provides all the reach required for scaling operations, but unlike a conventional excavator, can do so within a low headroom environment. As the complete boom also rotates and vertically pivots on the slewing upper-structure, such a scaler can reach right into the corners of a tunnel.

Running three underground limestone mines in Finland, Nordkalk (see panel) has recently put its first Gradall-based scaling unit into active service at its Tytyri Mine near Lohja. The machine also serves the Kalkkiranta Mine in the Sipoo area. The scaler, based on an XL3300 V Series wheeled model, was supplied and modified by European Gradall dealer Tieluiska.

This Finnish firm has years of experience converting Gradall excavators for specialist roles within the steel milling and



underground mining industries. However, Nordkalk's detailed requirements for its new scaler resulted in one of the most comprehensive special builds that the dealer has ever undertaken.

SCALING CONVERSION

At just under 18 tonnes, the XL3300 base machine is the smallest model in Gradall's wheeled excavator range. It meets the EU Stage 4 emissions regulations with a four-cylinder Volvo engine rated at 128kW. The unique Gradall telescopic and rotating boom is ideal for scaling operations as it can exert upward pressure while retracting the boom to scrape the roof of a freshly blasted tunnel.

Operating such a machine underground pushes the standard cooling packs to their limits. Therefore Tieluiska plumbed in two additional hydraulic oil coolers, mounted on top of the upper-structure. One of these packs includes an additional filtration system, part of the three-stage filtering of every drop of hydraulic oil circulating within this machine.

One of the main requirements of the conversion was to turn the fixed cab into a 20-degree hydraulically tilting structure, to improve operator comfort while looking up at the tunnel roof. Far from a simple process, this element of the conversion also included protecting the exposed components under the front of the cab when it tilts upwards. Naturally on this underground application, additional LED lights have been added to the upper-structure, all encased within heavy-duty guarding.

The operator is protected within the cab by a robust roof and screen guard, the two-piece front guard being easily opened to clean the screen. Also included in the

Above left: The sides and the rear corners of this underground excavator are protected by 32mm-thick steel guards welded on to the structure.

Above right: The Gradall's cab interior is much like any other modern excavator, but with the structure mounted on a hydraulically tilting mechanism.

Right: The heavy-duty blade is used to clear the arisings from scaling and features a Hardox wear plate and mechanism guarding.

specification was cab suspension system based on a hydraulic accumulator to prevent shock loads impacting upon the operator. The boom is also fitted with a ride control suspension system for added operator comfort.

Side and rear corner impact protection comes from massive 32mm-thick steel plates welded to the skirt of the upper-structure and to the corners of the counterweight. The driveline is also protected by heavy-duty belly guarding, which has been designed to preserve ground clearance and to provide access to service and maintenance items.

Standard muck-shifting tyres have been changed for non-pneumatic 10x20 solid rubber duals, and a steel ring fitted in the void between them. The dozer blade has reinforced mountings, a Hardox cutting edge and a debris protection plate, all designed for the heavy job of pushing the arisings from the scaling operation. In addition, the

control of the blade has been re-engineered so that it works from buttons on the joysticks.

This underground mine operates to the highest of Scandinavian safety standards, which include an in-cab breath analysis system. The only way that this machine will start is if the operator blows a zero percent alcohol level!

In addition to in-cab screen showing the output of the machine's night vision →



**"OPERATING TO
THE HIGHEST OF
SCANDINAVIAN SAFETY
STANDARDS, WHICH
INCLUDE AN IN-CAB
BREATH ANALYSIS
SYSTEM"**

NORDKALK BACKGROUND

Nordkalk is a leading European producer of a wide range of limestone products, including agricultural inputs. It employs around 1000 people, has a turnover of €300m and operates from 30 sites in ten countries.

The firm traces its history back to the late 19th century and an operation in the Finnish town of Pargas, which is still the location of its HQ. In its current formation, the firm was formally founded in 1991 and then became part of the Rettig Group in 2010. However, Nordkalk has retained its own individual identity while benefiting from the greater stability afforded by being part of a large multi-national company.



Operator Mikko Hänninen is well pleased with the Gradall, particularly its ability to place the attachment exactly where it is needed without having to move the base machine.

→ cameras, there is also a control panel for the Fogmaker fire suppression system. All the fuel lines are also protected against fire and the red box mounted on the rear of the chassis carries two 12kg fire extinguishers.

As they come from the factory, Gradalls offer good service access. However, for this application the dealer modified the machine to better suit an underground environment, including the fitment of an SKF automatic greaser system. However, the normal access to a Gradall's electrical system is via the inside of the cab. Tieluiska changed this for this application, so that now the mine's service team can directly access the components from outside the machine via a panel on the offside of the cab.

ATTACHMENTS

While roof scaling is critical from a safety perspective, it is also essential in allowing the drilling team to maintain the desired tunnel profile. The converted Gradall achieves this through both the use of a scaling hook attachment and by swapping this for a Rammer 555 hydraulic breaker to remove any protruding hard lumps of rock.

It can also be equipped with a special profiled bucket, which allows the excavator

to clear arisings from the scraping operation that have landed close to the tunnel walls. Normally this material would be inaccessible to underground wheel loaders, but the Gradall places the material in the centre of the tunnel headwall for easy collection. Equipped with this bucket, the Gradall can also ensure that the haul roadside drains are kept clear.

Tieluiska has undertaken a number of these conversions and understands that there is no off-the-shelf quick-hitch that can meet the requirements of both the

application and underground mining safety standards. This led to the creation of their own quick-hitch system that meets these needs.

Unlike many other underground sites, Nordkalk mines work on a

single-shift arrangement, which results in the same operator usually being assigned to the machine. Since the converted Gradall started working some nine months ago, its usual operator is Mikko Hänninen, who confirmed, "The Gradall-based scaler is working very well since it went to service. We used excavator-based scalers in the past

"THE GRADALL-BASED SCALER IS WORKING VERY WELL. WE USED EXCAVATOR-BASED SCALERS AND THE DIFFERENCE WITH THIS IS MAJOR"

and the difference with this is major. The design of the boom is a big part of why it is so well suited to working underground, as it is possible to place the tool exactly where you need to, without having to reposition the machine or move in close to tunnel walls."

As part of the initial tender process it was made clear that the supplying dealer would not only have to guarantee the machine's base level of availability, but that they would be fined if it did not. Tieluiska is confident of the underlying capabilities of the Gradall in this regard and of their conversion, which has been supplied on the basis of a seven-year full service contract.

Although the economics and cost base of underground mining machinery are miles apart from construction machinery, this is an interesting business model that takes full advantage of the capabilities of both the machine and the dealer.

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AMERICA: HOME OF GIANTS

Ritchie Bros' Rupert Craven discusses the availability of large earthmoving equipment for the HS2 project

With the green light given for the HS2 project, the work to secure the huge fleets of equipment that will be required really gets into gear. The current thinking is that hundreds of articulated dump trucks and heavyweight construction excavators will be required, but there are challenges with this approach. Not least is the availability of such high volumes of large equipment and the impact on the wider industry of manufacturers meeting these demands.

What we are not likely to see on this project is older machines, particularly those that do not meet modern emissions standards and drink diesel as if someone else is paying for it.

ALTERNATIVES

The HS2 project has been described as a 'mine in a line', but a more practical description is that it is dozens of long thin surface mines, the individual sites being

separated by rivers, roads, railways and the like. The work is going to be managed to the best industry practices, which includes minimising the haul distances and moving the material only once.

In these circumstances, large dozers and motor scrapers offer the most efficient method to move large volumes of earth and perhaps should be included in the overall mix of machinery that will undertake this project.

There are a small number of such machines working in the UK, although the few manufacturers that offer such kit are typically quoting long lead times for the next production slot. In addition, potential buyers would appear to have already identified suitable used machines available in Europe.

An alternative is to look at high quality pre-owned equipment from the North American market, particularly Caterpillar and Komatsu. Such machinery is likely to

have engines certified to both European and American emissions standards. In addition, dealers such as Finning and Marubeni-Komatsu are probably in a good position to advise what is required to bring such machines up to European safety standards.

If contractors are looking for such machines, it would pay to explore the global used equipment market. Ritchie Bros' online reserved auctions and Marketplace E platforms regularly feature large dozers and the like. For those worrying about shipping to the UK, equipment is always going back and forth between these markets, so transportation can easily be sorted. Outline costs for shipping can also be worked out beforehand for potential buyers to factor into their decisions.

EM

Above: Well-maintained, used large products may be rare in the UK, but are often freely available from the North American market.



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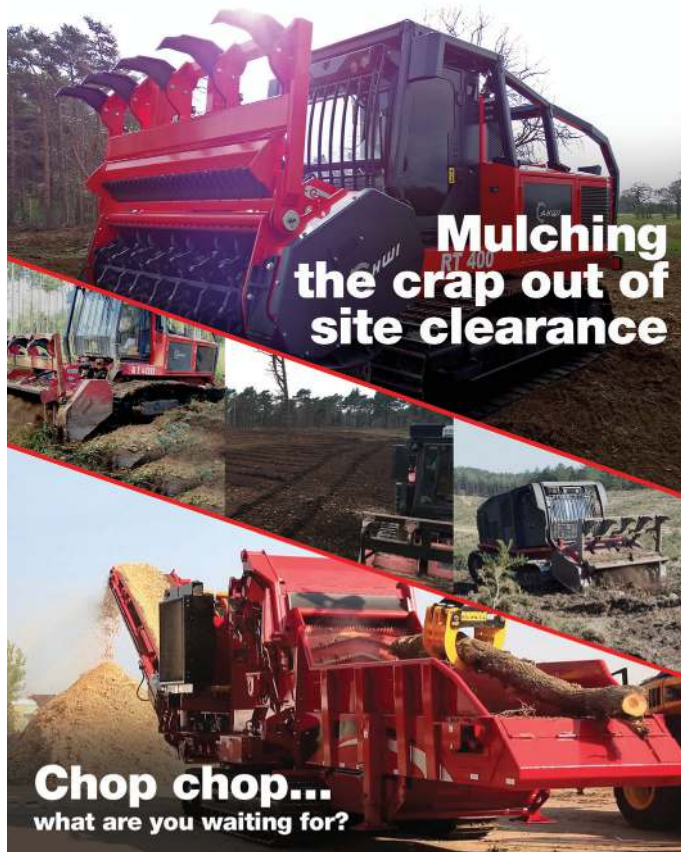
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Left and inset: Hyundai construction machines destined for dealers in the UK and Ireland are imported from South Korea via Tilbury Docks.



"EACH YEAR AROUND 1000 HYUNDAI CONSTRUCTION MACHINES ARE IMPORTED THROUGH TILBURY DOCKS IN ESSEX"

HYUNDAI'S HIGH-SEA ADVENTURES

As Nick Drew reports, Hyundai is the latest manufacturer to adopt the CESAR security-marking scheme for construction equipment

Each year around 1000 Hyundai construction machines are imported into the British Isles, all coming through Tilbury Docks in Essex. From now on all of these machines will be protected from plant theft by the fitment of a CESAR identification and recovery kit at the port of entry.

The tracked and wheeled excavators, together with wheel loaders, are manufactured in Hyundai's state-of-the-art factory at Ulsan in South Korea. They then embark on an epic 5700-mile sea voyage, which takes almost a month. Typically the specialised vessels pass through the Suez Canal, before stopping off in Germany, Holland and Belgium to pick up additional

cargo, then on to Tilbury before heading back east.

The vessels that transport these machines are gargantuan and some weigh in the region of 100,000 tonnes gross. In fact, they are that big that they can carry a staggering 6000 cars in addition to a good sprinkling of construction machines. The number of diggers on each shipment varies, but it's not uncommon to see around 50 bright yellow machines roll off the ramp.

One of the most recent ships to have docked in Tilbury was the Morning Lily vehicle carrier, owned by Wallenius Wilhelmsen and chartered by Eukor Car Carriers. Coincidentally, this vessel, which is 232m long and 32m wide and has a gross

capacity of 70,687 tonnes, was built by Hyundai Heavy Industries in Ulsan in 2011.

OFF-LOADING

When these giant vessels dock, they become the responsibility of a local family-run business MK Shipping. In the case of the Morning Lily, Rhys Hymas, who has been with the firm for 13 years, had the responsibility for its crew and cargo during its stay in port. Understandably, and without going into any detail, security is incredibly tight. Once the initial checks are completed Rhys goes aboard to ensure everything is as it should be and that all listed items are present and correct. ➔

Right: All Hyundai construction machinery imported into the British Isles will now be CESAR security-marked at the port of entry.



“REDUCING THE LIKELIHOOD OF THEFT, THERE’S ALSO THE ADDED BENEFIT OF REDUCED INSURANCE PREMIUMS”

➔ MK Shipping has been running since 1995 and has been working with Hyundai for more than a decade to handle its inbound UK cargo, the volumes of which have dramatically increased over the years. Watching the cargo roll off the vessel is an impressive sight.

The construction machines generally come off one or two at a time, as there is only a limited number of staff that are qualified to operate them. They are first tracked into a holding area on the docks to enable the bulk of the cargo, thousands of cars, to be offloaded at a rate of 100 per hour. It is all about getting the ship emptied as fast and effectively as possible, so it can begin the next leg of its continuous journey round the globe.

The next day, to avoid damage to the tarmac roads, the construction machinery is moved by low-loaders to MK Shipping’s dedicated yard within the port area. The machines get a basic PDI in this yard and, from now on, will be fitted with a full CESAR package at the same time. UK and Irish Hyundai dealers then arrange for the collection of their machines from these premises.

CESAR PROTECTION

A fundamental problem with trying to combat plant theft is that the police and other law enforcement organisations cannot identify an individual item of construction

equipment. Without identifying what the machine is and who is its registered owner, it is exceptionally difficult for the authorities to effect any action.

The Construction Equipment Security And Registration (CESAR) scheme was introduced in 2007, initially to allow the forces of law and order to identify all the machines on the London Olympics construction site. It was later extended to cover agricultural and other off-road machinery.

This is a front-line deterrent against plant theft and a highly valuable aid to the recovery of stolen goods. At a very basic level, non-CESAR machines are a better bet to steal from site. The reason is that only 8% of these are ever recovered, partly due to those outside of the industry tending to classify everything as a ‘yellow JCB-type digger’.

The visible part of a CESAR registration is the small white triangular ID stickers, which

are designed to immediately show if they have been tampered with.

However, the package also includes a number of security technologies from specialist Datatag. They include hidden transponders and microscopic Datadots, together with a unique forensic DNA product.

The upshot of this is that it is virtually impossible to remove all these high-tech identification sources. Information on the machine and its registered owner is maintained on a secure database, accessible to the police 24/7, enabling them to identify any machine at the side of the road.

Hyundai’s regional sales manager Tony Reeves said, “We are delighted to announce the adoption of the CESAR Scheme on all of our excavators and wheeled loaders distributed in the UK and Ireland. Our network of UK and Irish dealers also sees the adoption of the identification scheme as the obvious step for Hyundai in the fight against machinery theft and protecting customers’ assets.

“Our customers’ investment is instantly protected from would-be thieves by the CESAR anti-theft ID. The scheme is a proven crime prevention product, reducing the likelihood of theft in the region of 10 times. There’s also the added benefit of reduced insurance premiums.”

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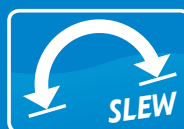
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“TAMPERE IS A 3D OPEN SOURCE CITY, THE ENTIRE CONURBATION HAS BEEN COMPREHENSIVELY DIGITALLY SURVEYED”

Below and inset: All the parties involved with the construction of the new Tampere tram system use the same cloud-based model of the site, including a constant feed of as-dug data.

DIGITAL TWIN CITY

Peter Haddock reports from Finland on the smooth implementation of a mass transit tram system in the city of Tampere

Any major inner-city infrastructure project has the capacity to cause chaos, and that is before the first bucket enters the ground to find all manner of unknown issues. At the best, such strategic projects tend to cause years of disruption, leaving the local community largely in the dark about the day-to-day impact of the project on their daily life.

Imagine what the 235,000 residents of the Finnish city of Tampere thought when a €238.8m project was announced to construct a new tram system, running throughout the compact city centre and out to the residential suburbs?

Well actually, it has not really been that stressful. Tampere is a 3D open source city, which means that the entire conurbation has been comprehensively digitally surveyed. The resulting 3D

model of the entire city is publicly available – in effect a digital twin of Tampere. It is available for a wide range of uses, including an app that tracks in real time any road or footpath closures, so that pedestrians and motorists can plan their travels with the minimum of disruption.

Think of this in the context of the UK's Building Information Modelling (BIM) protocols for large construction or civil engineering projects, but at a city-wide level with a wide variety of stakeholders accessing and using the 3D smart digital model.

PROJECT BACKGROUND

The tramline construction project started in early 2017, the first phase being due for completion in 2021. This initial phase includes an 11.53km north-south route from Pyyntikintori to Hervantajärvi with 19 stops, plus a further 4.74km eastward branch with four stops serving the Tampere University Hospital.

Machine guidance and control specialist Novatron, part of the Moba Group, is based at Pirkkala, close to Tampere. Its kit is being used exclusively throughout the project, particularly the Xsite Pro 3D →



Right and inset: All the excavators working on site have a 3D GPS guidance system, and the vast majority also use this in conjunction with a tilt-rotator.

“WHEN THE DATA STARTED COMING IN, WE WERE TAKEN BY SURPRISE WITH THE AMOUNT WE WERE ABLE TO COLLECT AND HOW DETAILED THIS WAS”



→ machine guidance and control system. Understandably, in such an advanced city such projects are undertaken as a fully connected site, in which every excavator has this 3D system, linked to an open source project management cloud-based platform called Infrakit.

Novatron's Miika Kostamo said, “Tampere is a growing city, welcoming over 4000 new inhabitants a year, in which 1900 new apartments are being built annually, which represents 1.4% growth. In order to deliver a more sustainable environment for its residents, in 2015 the city looked at its transport infrastructure and proposed the construction of a new transit system. It would see a total of 25 trams replacing the equivalent of 225 buses to provide the same service.”

The project is being delivered through the Tramway Alliance, formed by the City of Tampere, construction companies YIT Construction Services and the NRC Group, and energy consultant Pöyry. The business model that the Alliance is working to is full and open collaboration between all the parties, designed to deliver a more flexible way of managing a large construction project.

The level of collaboration has already gone beyond the initial scope of the project works. For example, some road upgrades were integrated into the project, as it seemed sensible and cost effective to perform such work with the team on site, as opposed to tendering separately for the work after the tramlines had been installed.

DATA MANAGEMENT

Based at the main office of Tampere Transit, Teppo Viinikka is the surveying and data guru for the project, who stated, “For this project, we are dealing with two main areas, which are both very different: the congested city environment and then the areas outside the city. We have a great deal of work to do to capture data and create an as-built model of the project. In time this will also lead to a completed final 3D model for the client to support maintenance and a data asset that the city

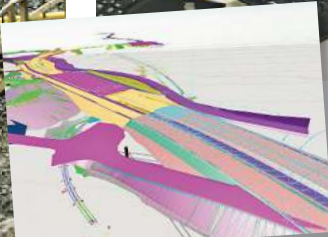


can use to update its overall 3D model.

“In order to ensure the project runs smoothly, our construction models are drafted by a designer and placed into the project bank, where surveyors can review them. The information is then transferred to the Infrakit cloud service, which synchronises the models automatically into



Surveyor Teppo Viinikka is responsible for managing all the data from this large project, which will eventually be used to upgrade the city's 3D digital twin.



the data started coming in, we were taken by surprise with the amount we were able to collect and how detailed it was, which enabled us to pull together as-built models as the project progressed.

"Unlike the

UK, Finland has a lot of bedrock, clay and softer ground to contend with, all of which can be within metres of each other. One of the more common examples of real-time changes in action was when one of our surveyors went on to the site to check ground conditions of a section completed by an excavator.

"The surveyor knew all of the section was completed to the required 3D model levels, as the machine had already sent this information to the cloud and they could access this data on their tablet using the Xsite PAD technology. Because Xsite PAD basically gives the surveyor the same view as the operator, both individuals could understand how the model was changed.

"The surveyor in question observed that

NOVATRON/MOBA XSITE PRO 3D

The Xsite Pro 3D system has an 8.4in colour touch-screen in the cab and next-generation sensors mounted on the boom, stick and bucket linkage. This being Finland, these sensors have an internal heating unit due to the cold weather and the system picks up additional bucket position data from tilt-rotators.

The system uses the Xsite Pro software, allowing users to download models over the GPS network. The operator can easily select different models with the quick selection icons, while changing the profile view by swiping the screen.

On a practical level, the control screen shows how far the bucket is from the desired levels. This is supported by the bucket corner indicators, which give the operator constant information about the height difference between the bucket and the

model. For example, when using a tilt-rotator – universally used across the whole of Scandinavia – the system guides the operators to ensure they are tilting their bucket to the correct angle.

In addition, touch-screen buttons allow the operator to programme in their most used functions. In the case of the Tampere Transit system, one of these will be to constantly save an as-built point.



the Xsite PRO 3D machine control system. In addition to the model files, dozens of background maps and digital assets are added to a concise folder structure in the Infrakit software.

"This means that if there are any changes to the plan, the surveyor can transfer the updated model into the cloud service, from where it is transferred in real time to the machine control systems of the desired operator, eliminating any unnecessary waiting periods."

In order to ensure the proper collection of data throughout the project, the Novatron team used their in-house simulators to train the project's excavator operators on the Xsite system. This included how to take GPS readings of the finished work with their excavator. At the same time, the team worked with surveyors who used waterproof tablets powered by Xsite PAD, to record GPS located data and take imagery.

USING THE DATA

The challenge for Teppo and his team was not just managing the collection of data, but also manipulating it and turning it into useful information, as he continued, "When



“THIS APPROACH HAS CUT DOWN THE MOVEMENTS OF THE EXCAVATORS, REDUCING FUEL BURN AND MAINTENANCE COSTS”



Above: Counter-intuitively, pre-planning as much as possible makes it easier to change as a result of site conditions, for example encountering wet peaty ground within a few metres of hard rock.

→ this particular area under the tramway was particularly soft and needed more material to reinforce it. They took the imagery of the location and made notes on the tablet with the relevant GPS co-ordinates. This was uploaded to Infrakit and the relevant designer was notified. They then altered the model accordingly from their desktop, adjusting levels and material needs.

“This was then uploaded back into the cloud, making it visible to the surveyor, who checked the changes and called the excavator operator, who had moved to the next part of the job. By authorising the changes the surveyor then enabled the operator to download the new model and on their return, they were then able to complete the additional work required.

“This approach has cut down the movements of the excavators, reducing fuel burn and maintenance costs, while solving problems quickly.”



Above: Operators are trained on simulators to collect as-dug data points. Surveyors and operators work to the same digital model, delivered either on the in-cab screen or on tablet.

THE FUTURE

According to Teppo the instantaneous movement of digital data in this way has

had a massive impact on the overall efficiency of the project. There are now 70% fewer phone calls on-site and together the operators and surveyors recorded 10 times the number of expected GPS reference points.

Teppo then explained that in Finland the whole country is now working on a clear activity classification structure, what we would understand as standards and responsibilities. This classifies all actions taken, all types of material used and the roles of all the people working on a project. This initiative is part of making sure that every detail is agreed to before the first machine comes off a low loader. This is part of a much larger strategic initiative in Finland that will see the eventual introduction of autonomous, remote-controlled and co-operative construction machines.

In the meantime, the 3000 people working on this project have increased their skills level and will continue to learn on the job, particularly as the aspiration is to expand the new Tampere tram network across the neighbouring municipalities, to perhaps as much as 43km.

There is therefore a lot of work ahead for this group; perhaps we will see automation coming through at the end of this line. 



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TOUGH JOB FOR NEW RIG

**"THE NEW KOMATSU AND REGULAR
OPERATOR COLIN WILLIAMS SET
ABOUT BRINGING THE STRUCTURE
DOWN TO THE GROUND"**

**Paul Argent reports from
Sheffield on a demolition
job undertaken by
Cawarden's new high-
reach Komatsu excavator**

Derbyshire-based Cawarden has recently been involved in a major re-development project in Sheffield city centre. The site on Hoyle Street required a number of structures to be demolished, including the former office block of HSBC Bank. As with many city centre locations, the site was earmarked for a mixed use, including 620 student accommodation places, 250 residential properties in addition to retail and office space.

The sprawling site contained a number of three-, four- and five-storey structures built in the 1960s, which had fallen into a state of disrepair and generally lowered the tone of the area that had undergone a programme of regeneration over the last few years. The large areas of car parking space were possibly the only part of the site being used to their full extent, as overflow parking on match days for Sheffield United and Sheffield Wednesday football teams. →





**“CONSTRUCTED FROM A STEEL
FRAME CLAD IN CONCRETE
WITH A BRICKWORK OUTER
SKIN, THE BUILDING WAS
EXTREMELY WELL BUILT”**

Left, right and inset:
The tallest building
on site was the
five-storey former
office block of HSBC
Bank. The reinforced
concrete in the
structure was
tackled by a VTN
pulveriser
attachment.

→ While the site contained a host of 60s concrete and brick structures, there was also part of Sheffield's rich industrial heritage in the form of a large brick kiln situated on one corner. One of the first jobs for the Cawarden team was to protect this listed structure, ensuring it stayed free from damage throughout the demolition and reconstruction phases of the project.

The mixture of structures, all refurbished at some point over the years, saw the Cawarden team undertake a large programme of asbestos removal and soft strip works prior to any demolition work commencing. After the buildings had been suitably stripped, the smaller structures were then demolished and their foundations removed and crushed.



The tallest building on site formerly housed office accommodation for the HSBC Bank. Standing at five storeys plus a plant room, the building stood right on the frontage of Hoyle Street, one of the busiest streets leading into Sheffield city centre. After appropriate consultation with the local authority for road closures, the team set about planning night shift working to safely bring down part of the structure closest to the road. William Crooks, MD of Cawarden said; “We could have brought the Hoyle Street elevation down during normal working hours, but the client and the council decided it was better all round to close the road off and undertake the work at night.”

To help undertake the demolition of the larger building Cawarden returned to Komatsu and purchased a new PC490-10HRD high-reach demolition excavator. Following

a number of years of excellent service from their previous Dash 10 machine, the decision to upgrade to the new model was a relatively easy one.

Having a similar working range and equipment specification to that of the older machine, the new arrival benefits from the latest clean burning Komatsu engine technology thanks to the fitment of an AdBlue system. Capable of carrying a 2.5-tonne tool to a maximum working height of 32m, the new Komatsu and regular operator Colin Williams set about bringing the structure down to the ground.

Constructed from a steel frame clad in concrete with a brickwork outer skin, the building was extremely well built and in a strong and stable condition despite its age. The sloping site, road frontage and limited access to the lower section of the building meant that Colin needed to

commence the demolition operation from the tallest part of the structure.

The brickwork skin was relatively easy to remove and Colin dropped the elevations to the ground quickly and safely. The concrete floors and steel columns proved to be a more difficult job. The heavily reinforced concrete slabs took their fair share of attention from the VTN pulveriser attachment, while the steel beams forming the backbone of the structure were manufactured not only from thick steel but the riveted design and double gusseting made them exceptionally difficult to cut.

Patience and a good eye from Colin saw the structure dropping steadily. Working gradually up the slope of the site, the hardest part of the structure, the stair cores were unfortunately situated at one of the first elevations to be tackled. This meant that some of the inherent strength in the structure

was removed early on. Thankfully the construction of the building meant that its stability while being demolished was not compromised.

The resulting material from the demolition phase of the contract was processed on site in readiness to install pile mats and temporary roadways throughout the construction phase of the project.

EM



Left, right and below left inset:
The thick steel beams of the structure took a lot of work to cut, not helped by their riveted double gusset design.



“IT WILL BOOST THE LOCAL ECONOMY BY DOUBLING THE WORKABLE QUAY SPACE AT THE PORT COMPLEX”



Left and inset: A new BSP CX579 impact piling hammer was hired in to drive all the piles, including the main 1016mm-diameter round structures.

FISHING PORT EXTENSION

Peter Anderson reports on the development of a new wharf on Dinish Island in Co Cork, focusing on the extensive piling works

Around the British Isles substantial funds are being invested to upgrade commercial ports and harbours, to cater for both an increase in traffic and to accommodate larger vessels. One of the latest developments is a new wharf on Dinish Island, located adjacent to Castletownbere on the Beara Peninsula in south-west Co Cork.

The town of Castletownbere is built round the inner harbour of the port complex, and Dinish Island lies just offshore. The outer harbour is the old navy port of Berehaven, which is one of the safest large natural anchorages in the world. Castletownbere is also the largest white fish port in Ireland, where approximately 70 local fishing boats are based, in addition to other European ships landing their catch.

The contract for the development of a new fish-landing quay on Dinish Island, co-funded by the Irish Government and the European Union, was signed in August 2018. It will boost the local economy by

doubling the workable quay space at the port complex, enabling another significant expansion in fish landings, on-shore processing and general marine activity.

CONTRACTORS

To carry out the construction of the new wharf and associated works, the contract was awarded to Co Clare-based civil and marine engineering contractor Keating. It has a strong track record in the marine sector, including a joint venture with Roadbridge on the €120m project at Dublin Port.

Keating mobilised its team in September 2018 and the construction programme is scheduled for completion in March this year. The heavy plant brought on site included a Kobelco and a Liebherr crane with lift capacities of 110t and 160t respectively, and long-reach Hitachi and Komatsu excavators.

Dublin-based Gavin and Doherty Geosolutions, a specialist geotechnical engineering consultancy firm, worked closely with Keating on the design for the

wharf. It comprises a 168m suspended quay wall supported on 39 tubular steel piles, which are 1016mm in diameter and mostly 20m in length. These piles are connected by a suspended concrete deck, which in turn is supported by an inner retaining wall constructed using 32 sheet piles 21m in length, which were driven to depths of between 4m and 14m. The southern section of the wharf comprises a 48m-long berth with three suspended deck spans. This layout has been designed to dissipate wave energy, minimising wave propagation along the quay wall.

To install these piles, Keating hired in a BSP CX579 impact piling hammer from Watson & Hillhouse. This crane-mounted hydraulic attachment features a five-tonne drop-weight and is powered by a self-contained BSP 250kW Hydropack.

Manufactured by BSP near Ipswich, The CX579 is a new model that has been designed to drive a wide variety of pile types. In addition to this versatility, it can be easily reconfigured with a seven- or nine-tonne drop-weight. **EM**

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EASTERN PROMISE

Steven Downes previews a new range of 1:50-scale Belaz models, which will be distributed throughout Europe by USK Scalemodels

Last year two new Belaz mining truck models appeared, manufactured at the same factory in China where the Diecast Masters range of Caterpillar models are produced. Scale models of Eastern European equipment are fairly rare and tend to be in 1:43 scale. It was a welcome surprise that these new haulers, the 160-tonne 75170 model and the 180t 75180, were in the recognised 1:50 collectors scale.

During the international Toyfair held at the end of January this year, another surprise announcement indicated that a full range of Belaz mining and construction equipment would be produced in model form. No fewer than six prototypes were on display, which are due for release towards the end of 2020.

The 1:50-scale model of the 160-tonne Belaz 75170 haul truck is an indication of what is to come, and a wide range of mining and construction vehicles is promised.



First of the new models will be based on the Belaz 45- and 130-tonne rigid dump truck chassis. Looking at the pre-production prototypes, the finish and build quality are high, including metal safety railings, functional suspension of the rear axle and a steering front axle, not to mention the multi-stage cylinders to tip the dump body.





Made in the Republic of Belarus, Belaz also produces its own design of water tankers and recovery vehicles. Matching scale models of water tankers and recovery vehicles are built on the same sub-chassis, while the smaller machines based on the 45-tonner are shown.



Based on the chassis of the larger 130-tonne capacity rigid dump truck are scale models of a recovery vehicle and a 119-cubic-metre capacity water bowser. The rather interesting colour combination of blue and white over the base yellow ensures the models will be noticed on the shelf. With a number of other Belaz products including articulated haulers, wheel loaders, wheel dozers, underground equipment and specialist haulers for the steelworks industry, there is plenty of scope for further interesting models to be produced.



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