

Working wonders in difficult terrain: Dando's Multitec 4000 MK3

by **Thomas Way**, Dando Drilling International

In 2012, market pressures in the mineral sector changed significantly. Mineral prices, and especially of coal, took a dive, and amid the uncertainties many major miners and contractors sought to freeze capital expenditure. Sales of larger rigs began to slow throughout the industry. For Dando

Drilling International, this affected their highly powered larger rigs like the Mintec 12.8, which, until 2012, had been their best-selling versatile mineral exploration rig.

Exploration, of course, continued to be necessary, but for everybody in the industry good results now had to be obtained

while focusing on reducing initial outlay and running costs. In response to these straightened conditions, Dando designed the Multitec 4000, creating a versatile track-mounted drill rig with a small footprint. It proved to be a timely decision. Upon its launch in early 2015, the Multitec 4000 immediately caught the attention of the market and has since become the most significant new rig in Dando's mineral exploration range.

Dando Sales Director, Quentin Dulake comments that 'Our customers saw the Multitec 4000 as an opportunity to continue drilling while maintaining profit margins that had suffered due to mineral market conditions'. Capable of the full range of mineral exploration drilling techniques with penetration rates for wireline coring and open hole boring that matched much larger, more expensive equipment, the rig was a cost-effective solution to demanding mineral exploration programmes, but at a much lower price point.

Green benefits: low impact on flora in forest and jungle

After its launch in 2015, initial interest in the early Multitec 4000 came from international sales across Africa and South America for a range of mineral targets. The response from customers was positive with several key benefits quickly emerging.

Among these, the small footprint of the rig allowed access to forested or jungle environments with minimum disruption to flora. While able to load 3-m rods, the mast extension allowed tripping of 6-m lengths expediting a change of tooling or redeployment to a new drill pad. Efficient engine sizes coupled with small but powerful

rotary heads meant that customers were experiencing large reductions in fuel usage, with some reporting consumption as low as 5 L/h while meeting or exceeding target penetration rates.

Customer feedback influences design decisions

Strong customer relationships and feedback have played a key role in ensuring the development of the Multitec 4000. One such customer is UK-based Hughes Exploration and Environmental Drilling. With a diverse fleet of drill rigs catering to exploration drilling as well as units for water well, geothermal and sonic applications, they were looking for a rig to drill hard rock quarries around the UK and decided a Multitec 4000 would meet their requirements. The rig was set to work immediately, using N-Wireline and H-Wireline coring on a range of targets from dolerites to limestone.

Purchased to replace two older rigs in his fleet, owner Martin Hughes reported that the Multitec 4000 has 'done everything that

we have asked of it,' drilling in the 80–180 m range. 'The rig is already programmed on a number of exploration contracts, including H and P wireline, drilling both vertical and inclined boreholes, along with domestic GSHP and water borehole projects between jobs.'

The proximity of such an exploration company to the Dando factory, and the experience of Hughes, who has run the company for over 30 years, ensured direct and valuable feedback to Dando engineers and led to refinements in Hughes's own rig, which have been implemented directly into Dando's new models.

With increasing demand globally for the rig, it quickly became apparent that, while a multipurpose machine, the Multitec 4000 was filling a niche in the market for mineral exploration. In particular, a number of sales to customers drilling in equatorial jungle regions with difficult terrain and limited access along narrow tracks and between trees spurred the design team to focus on producing a fully fledged exploration version of the rig.

No track too small, no terrain too tricky

One such customer was exploring a challenging concession in the jungles of Central Kalimantan. The terrain was so inhospitable that previously it was considered only accessible by man- or heli-portable equipment. However, the scope of the project meant the customer wanted a rig that was more versatile than the portable equipment available. Wireline coring in P and H was essential, but so was the ability to drill RC either with a hammer or with air-core bits when required. The Multitec 4000 provided an obvious solution: the power and versatility to cater for the drilling needs of the program, but at a size that could navigate small paths through the jungle.

Since Dando was receiving many such enquiries, the company saw an opportunity for further development of the rig for these kinds of projects.

'Although we knew the Multitec 4000 was an exciting new product in the market, the level of adoption from the mineral sector was probably greater than we had anticipated,' explained Dulake. 'With enthusiastic reports from existing and new customers, and plenty of feedback, our design team had a very strong picture of where we wanted to take the design.' Rupert Coler, a design-engineer at Dando, describes the criteria for the new model: 'The Multitec 4000 was frequently being used in uneven, sometimes steep, forested terrain with muddy, sticky or slippery surface conditions. Our first target was to ensure the rig could navigate these types of ground conditions quickly and with maximum safety to the operator.' As a result, the Dando engineers focussed on designing the chassis and component layout of the new Multitec 4000 MK3 to achieve a low and central centre of gravity.

Stronger, greater and safer: the MK3

Wider 400 mm tracks were selected over the standard 300 mm versions, with options including steel single-bar grousers to provide good clearance of mud in wet environments, or rubber tracks for gentler surfaces. The track-base was also widened slightly to 1.55 m, which markedly increased the tilt angle of the rig with a view to increasing safety while traversing slopes or other uneven terrain. A high-power hydraulic



The Multitec 4000 MK3 outside the Dando Drilling International factory in West Sussex, where the company has been building rigs for 150 years.



Core drilling in Bolivia. The MK3 has a 74Hp Tier 4 final engine or 111Hp Tier 3 options and rotary head spec of 6000Nm torque and 750 rpm. High speed motors can take this to 1100 rpm.

climbing winch was designed-in as an option to provide additional security when navigating steep and slippery terrain.

In standard form, the rig is supplied with a 74 hp Tier 4 Final engine to meet regulations in European and North American markets, and a 111 hp Tier 3 has been chosen for the rest of the world, although other options are available. With most customers for the rig exploring to depths in the 50–250 m range and in core sizes between N and P, the compact but powerful RH6 rotary head – usually used on the larger Multitec 9000 rig – was selected as a high-performance option. To ensure sufficient oil was supplied to the 6000 Nm/750 rpm head and uprated-crawler motors, a high efficiency hydraulics system was specially designed by UK-based Hydraulic Alliance around Bosch-Rexroth pumps and motors.

Two mast options are available for 2.6 m and 3.6 m working strokes and both have deployable mast extensions to allow two rods to be pulled at a time. The folding mast extension ensures that, when tracking, the mass is kept firmly at the middle of the rig, providing a stable base. Double-acting hydraulic break-out clamps at the foot of the mast make and break joints, while an optional floating sub ensures the longevity of wireline rods and sub adapter threads to meet the demands of an intensive exploration program.

A new console has been designed on a swing arm so the driller can choose a position that affords him the clearest and safest view of the borehole. With safety being taken seriously not only in the west, but also increasingly in the developing world, the rig conforms to all new UK and EU regulations and standards, such as BS EN 16228. The opening of guards leads to an immediate decrease in rotation speed, while power units meet the rigorous



The control panel is mounted on a sturdy swing-out arm to give the operator a clear view of the borehole. Controls are clearly laid out and well spaced for easy operation.

emissions standards and have noise-attenuated canopies. For the most difficult terrain, a robust radio remote control option (supplied by Scanreco) enables this machine to crawl up steep inclines in muddy and slippery conditions, thus ensuring the safety of the operator.

Sales account manager, Callum Mee believes the Multitec 4000 MK3 is already capturing the market for versatile, powerful, ultra-compact exploration rigs: 'The mineral market is showing signs of revival. We've already delivered rigs and received impressive reports from every continent.

'And we are receiving a stream of enquiries and orders for the rig. We currently have another four in build, two for coring, and two for reverse circulation and

RAB drilling with an accompanying track mounted compressor. Our sales figures show it is our best-selling rig over the last 12 months with several sales already confirmed for the coming year.'

Sales Director, Quentin Dulake is buoyant about what he considers to be Dando's best small rig to date: 'I think we've nailed it with the Multitec 4000 MK3. This is not just an excellent multipurpose machine. We have the performance of a dedicated wireline rig, or a dedicated RC Aircore rig, or a dedicated RAB rig, all from one ultra-versatile platform. In response to the demand, we've added the model to our forecast build schedule to keep lead-times down and get rigs to our customers as quickly as possible.' 

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