Genesis of a giant

Hitachi recently raised the bar in the world of hydraulic excavators with its introduction of the giant EX8000. On the eve of the machine's release,Charles Macdonald spoke exclusively to Mark Tatesaka of Hitachi on the new machine and the company's approach to the mining sector.

Mr Masatoshi (Mark) Tatesaka, director, marketing support, global mining center, Hitachi Construction Machinery.

Mining companies across the world know that the reliability of their loading tools is of paramount importance. Failure of a mining shovel or excavator, the vital first link in the production chain, can lead to parked up mining trucks and stilled crushers – anathema to mine management and accountants.

At the same time, a new generation of huge + 300 tonne capacity dump trucks is demanding ever larger loading solutions from manufacturers.

Currently lumbering into view is a huge new loading tool that manufacturer Hitachi hopes will satisfy mines' reliability and performance criteria.

The EX8000 will be the latest and largest in a range of shovels developed by Hitachi since 1979. The new machine is designed for four pass, two minute loading of 300 tonne trucks and is equipped with a 40m^3 bucket. Maximum hourly production is projected to be 8,000 tonnes/hour, with an average of around 6,000 tonnes/hour. Despite its greater size, the EX8000 will have an operating speed equivalent to Hitachi's smaller EX5500.

Recently, one of Hitachi's Tokyo top brass was in the country to present the EX8000 to a group of coal operators in Mackay, the first detailed unveiling of the machine globally. Masatoshi (Mark) Tatesaka, director, marketing support, global mining center, Hitachi Construction Machinery is a 30 year Hitachi veteran and a specialist in the company's dealings with the mining sector.

Last year Hitachi re-jigged its structure in a bid to bolster its mining business. According to Mr Tatesaka the creation of the global mining center in June 2003 reflected the desire of the super-major mining companies like BHP Billiton, Rio Tinto and Anglo American to deal with one central point, rather than a plethora of regional dealerships. At the same time, the technology-savvy mining center offers Hitachi's more slimly resourced dealers a useful back-up to call on in their dealings with customers.

Hitachi's shovel history commenced in 1979 with its UH801, a 157 tonne face shovel developed for the US market.

In 1987 the company replaced the UH801 with the EX1800, a 180 tonne machine, and added the 350 tonne EX3500. In 1995 Hitachi's cautious trend of continuous refinement was punctuated with a great leap forward. The company unveiled the EX2500 which included for the first time a single engine design concept. Until then all the company's machines had featured twin engines and dual hydraulic systems.

1998 saw the arrival of the EX5500, the company's largest machine to date, based on a doubled up EX2500. The increase in size of Hitachi's loading tools reflected a broader trend of 'bigger is better' across the mining industry. Mining truck manufacturers had been steadily outdoing each other in their quest to introduce ever larger trucks. Hitachi itself had developed the 320 tonne EH5000 AC drive truck.

In conversation with the AJM Mr Tatesaka endorsed a modified "bigger is better if bigger is better" philosophy. His major provisos related to reliability, running costs and fleet matching.

"If the equipment is bigger but isn't reliable and doesn't meet customer expectations, it doesn't make sense," he explained. "Similarly, if larger equipment costs more to operate and run, there is no advantage for customers."

In market share terms Hitachi is the strongest manufacturer in terms of mining shovels. According to independent, third party market research from the Parker Bay Company, Hitachi accounted for 36% of the

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Hitachi's EX8000 hydraulic excavator has a 40m³ bucket capacity and can load a 300 tonne dump truck with four passes in two minutes.

258 new mining excavator sales in Australia between 1990 and 2003, with Liebherr in runner-up spot on 25%. Globally, of 1,059 units sold worldwide in the same period, Hitachi accounted for 30%, leading Terex which claimed 25%. By way of contrast, Hitachi's far less mature trucks business, steadily built through its growing ownership of Euclid, only has a world market share of around 8%.

Planning and design for the EX8000 started in 2000, when a team from Hitachi's mining center went on a listening tour to mines in Australia, South Africa, Canada and the US. The concept behind the new machine was that it should be able to swiftly load the new generation of +300 tonne mining trucks in demanding surface mining environments such as copper, oil sands and coal. In the process, weighing in at 780 tonnes, the EX8000 would allow Hitachi to compete more effectively with certain electric cable shovels offered by manufacturers such as P & H.

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While Mr Tatesaka did not see the EX8000 broadly supplanting still larger rope shovels such as P&H's 4100, he did expect the new machine to offer miners an alternative lower-cost option in many applications. Mr Tatesaka pointed to the greater flexibility of hydraulic shovels, via face shovel and backhoe configurations, when compared to their electric rope shovel counterparts. Another benefit of hydraulics, as he saw it, included faster travel speed, of particular worth in mines engaging in blending operations.

The EX8000 is based around twin EX3600-5 engines and hydraulics with shovel-type tracks and triple-roller swing bearings. According to Mr Tatesaka, this emphasis on well-proven technology will boost the EX8000's reliability.

Other design priorities for Hitachi engineers were minimising maintenance and maximising trouble-shooting ease for the EX8000. Accordingly, Hitachi has boosted the machine's onboard condition monitoring and data logging electronics systems, with 60 different monitoring sensors on the EX8000. These markedly reduce the need for mechanical checking and facilitate servicing. Next on Hitachi's electronics' agenda is automatic failure prediction warning systems.

Electronics-aside, the EX8000 has a roomy comfortable cab with living space incorporating a table and microwave. Operator comfort and ergonomics are further assisted via an electronic wrist control that allows light, smooth manoeuvring over extended periods. The EX8000 has large access doors, wide open spaces and a flat floor around the engine – all designed for easy maintenance and inspection. One neat touch is an electric retractable ladder. To aid fire prevention, the new machine's engine is isolated from its hydraulics.

The first EX8000 is destined for Canada's demanding oil sands sector. That machine was tested for three months in Japan, before being dis-assembled and shipped to site, where it will undergo another six weeks testing before being handed over to its owners around October.

The first EX8000 is destined for Canada's oil sands.

So, as the market absorbs the arrival of a hydraulic shovel giant, it begs the question: how big can they go?

"We have a (size) limitation as a manufacturer for two reasons. Firstly, in undercarriage development and design. This becomes more crucial as you develop larger equipment," said Mr Tatesaka. "The challenge becomes how to provide enough traction power, and how to support the whole machine weight.

"Second, is transport limitations. This becomes more crucial with the increasing width and height of equipment, which makes it harder to fit machines into manufacturing and site facilities." ?