

## Metso mobile crushing plant and screens help Poortown Quarry deliver stone on cue

The Isle of Man's Poortown Quarry is well-known for the quality dolomite it produces for the island's roads. Now Metso Minerals is helping the 147-year-old quarry process stone more efficiently.

Poortown Quarry officially opened in 1880 as the German parish quarry, and is known locally for supplying the Isle of Man with roadstone and asphalt. Around US\$15m is being spent extending and modernising the site which will see it extract mineral deposits for at least another 80 years. Poortown Quarry has also been upgrading its processing plant with two Metso Lokotrack LT200HP mobile crushing plants and four mobile screens.

"The Island is not blessed with very many good deposits of igneous rock," says quarry manager Kevin Brookes, a former civil engineer at the quarry but who, since 1994, has been running the site for the Works Division of the Isle of Man Government's Department of Transport. "Poortown's granite-based stone is hard and durable with an excellent PSV (Polished Stone Value) and affinity to bitumen."

### Ramping up production

Creating small stones as high quality aggregates is a continuous reduction process. Metso's new mobile crushing plant and screens reshape Poortown's stone into 28mm, 20mm, 14mm, 10mm, 6mm and dust. The pieces are then sifted through a series of screen decks. The configuration of the decks is changed according to what needs screening off. Various products are produced for road building. The first bituminous 'roadbase' layer uses 28mm chippings. A road's top surface requires the 10mm, 6mm and dust. A 6mm product is also used for footpaths.

A Volvo EC360 excavator loads the raw stone into a Lokotrack LT105 jaw plant for crushing. The previous

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generation of static jaw crushers were positioned far away from the quarry face. The Lokotrack LT105 is

Below: Metso Lokotrack mobile crushing plant and screens at Poortown Quarry on the Isle of Man





Above: A Lokotrack LT200HP feeding the screens

track-mounted so can be moved right up to the blast face to process the extracted material and transport it directly to another machine in the line, significantly increasing plant efficiency.

The now smaller stones are then fed directly into a secondary Lokotrack LT200HP cone and passed via conveyor belt to a Lokotrack ST348 mobile screen, which removes stones larger than 20mm. This material

is then fed through a tertiary Lokotrack LT200HP cone and then Lokotrack ST352 mobile screen, which can produce three types of stone – 10mm, 6mm or dust. A second Lokotrack ST348 can produce 28mm, 20mm or 14mm. The chippings are then loaded into hoppers and added to bitumen in the quarry’s coating plant.

“The machinery is capable of producing 300t/hour all day long,” said Brookes. “The LT105 is a workhorse, and working with the LT200HPS provides the most efficient way of processing you can get. The Metso mobile screens are double-decked, so it is merely a question of juggling the screen mesh sizes to determine which product we want to make.”

### Production flexibility

As elsewhere in the industry, the real price of aggregate is falling at the same time as expectations of quality are rising. The market is increasingly coming to understand the economic impact that improved aggregate shape can play in significantly reducing the total cost of

concrete and asphalt, two of the main uses for aggregates.

Cubicity is therefore essential. “If you can’t make your stone cubical then no-one will want it because it will become flaky and breaks up faster under pressure than a non-cubical stone,” Brookes notes. “The Metso cones are ideal for this. The LT200HP mobile crushing plant produces a very good practical shape which is

Right: Metso Minerals’ Lokotrack LT105 working hard at the quarry face



exactly what we need.”

To operate cost-effectively, it is also important that the quarry produces the right product with the minimum possible waste. “If there are no orders in for

*“We are extracting a particularly hard igneous rock, which needs a well built machine.”*

28mm roadbase,” said Brookes, “we recycle the 28mm, 20mm and the 14mm we have already produced back through the tertiary, and produce the products our customers do want, which is often 10mm, 6mm and dust. The LT200HPs allow us to do this very efficiently,” he added.

Nordberg became part of Metso Minerals in 2001 and its core technologies form the heart of the quarry’s new Metso line of machines. “It was the reliability of our former Nordberg C110 which provided us with the incentive to replace it with our current LT105 in 2006,” said Brookes. “Our old Nordberg machines had a reputation for being built to last. We have had other makes of crushers in here on hire, but they struggle. We are extracting particularly hard igneous rocks, which need a well built machine.”

The Lokotrack LT105 is built around the Nordberg C105 jaw crusher and the quarry’s two Lokotrack LT200HP mobile crushing plants around the Nordberg HP200 cone crusher. Metso’s intelligent control (IC) system technology monitors and controls the crushing process to ensure continuous and stable material flow to the cone. The automation system can be linked to other mobile crushers so they can communicate with each other. The quarry’s two Lokotrack ST348 and twin ST352 mobile screens also use Metso’s SmartScreen technology to control the material feed rate, screen box performance, start-up and shutdown.

“The whole train of equipment monitors itself so just one person is required to run it,” said Brookes. “The ability of one unit to communicate with other units means that you do not need to have manpower on every machine watching what is happening. Surcharging (overloading) a screen can slow the whole process down, but the technology corrects this automatically by communicating with the primary to slow the feeder tray down.” All the Lokotracks are also powered individually, so no electric cables trail over the quarry floors to provide a tempting target for large quarry vehicles. “Being powered by their own diesel engines also removes the burden of having to factor in potentially huge electricity

costs,” added Brookes.

But the real beauty of having fully mobilised plants is that if a machine requires maintenance you can work around it. “If we needed to work on our old static tertiary, everything stopped. You could not feed anything else other than the tertiary. Now, you can build a stockpile of material that the secondary produces. Or you can move the screens in close to the secondary, which can then feed the screens. It does not have to feed the tertiary,” said Brookes.

It is the same when the plant breaks down. “When you had a fixed crushing plant with fixed conveyors, and element four went down in a chain of ten, all ten stopped, because the process relied on all these elements working in sequence properly. Now if our primary is out of action for a fortnight, you can hire in another machine on tracks.”

The mobile crushing plant has also improved health and safety at the quarry. The potential for accidents has been reduced on site as fewer dump trucks and manpower are required to move material from the quarry to the crusher.

#### Demand elasticity

Poortown Quarry’s future processing needs will be geared to demand and its investment in plant influenced by just how flexible it is, especially when demand is so unpredictable. “Just a few years ago everyone wanted 40mm chippings for railway ballast, incinerator sites, sewage treatment plant and where liners were laid out on stone chippings,” said Brookes. “Now everyone wants 6mm,” We may need another crusher and screen to accept these particles.”

Below: Keeping up with variable product demand requires a flexible crushing system

