



## Greener mining from MMD – a case study

### Introduction

Global mining is changing: rising costs, environmental pressures and health & safety have called time on traditional truck and shovel methods. As the industry becomes increasingly aware of the need for “sustainable mining”, the ecological benefits derived from the elimination of dust and reduction of harmful greenhouse emissions caused by truck and shovel methods are self-evident.

“Green” has never been a new word or a passing fad for MMD: recognised as global leaders in in-pit sizing and conveying technology (IPSC), the company have been providing greener and more cost-effective solutions for operators worldwide for over 35 years.

After five years’ development, MMD have designed and built the world’s most advanced Fully Mobile Sizer. The rig is the third generation in a series of high-capacity mobile units that eliminate the need for trucks altogether by processing and delivering material onto conveyors. What’s more, ‘sizing’ is the only breaking system specifically designed for semi or fully mobile installation.

Historically, the very first mobile crushers, commonly used gyratory and jaw crushers, suffered one major drawback: the bulk weight of the equipment made them ‘moveable’ rather than ‘mobile’. The physical size of the crushing equipment (originally designed for static installations) generally resulted

in structural constraints for mobile applications. As a result, nearly all of the early mobile crushers became expensive, practically static installations.

### 9000 Tonnes per hour

Perfected in China, the technologically advanced fully mobile sizer can process 9000 tonnes per hour of overburden – with instantaneous peaks of 14,000 tph demonstrated. Commencing operation in 2013 to process abrasive overburden consisting of siltstone, sandstone and mudstone up to a hardness of 120mPa, the rig has already generated significant waves in the industry.

#### MATERIAL CHARACTERISTICS

Infeed size: 2,500mm × 2,500mm × 2,000mm  
 Product size: –400mm (>400mm less than 2%)  
 Bank density: 2.5 t/m<sup>3</sup>  
 Bulk density: 1.85 t/m<sup>3</sup>  
 Material hardness: 120 mPa  
 Moisture content: TBA

Working closely with a shovel, the rig remains in position to receive material into the hopper for processing and discharge onto a conveyor for returning to ground. To match the production capabilities of MMD’s IPSC system, approximately two shovels and 34 trucks would be required to work at maximum efficiency, operated by over 60 workers (based on 1.8km mine face, 13km round trip).

At the heart of the fully mobile sizer sits the patented Twin Shaft MINERAL SIZER™, fed by a short, heavy-duty apron plate feeder capable of accepting more than 100 tonnes of

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material dumped directly onto its plates. MMD's mineral sizers can handle any combination of wet, sticky or dry material, breaking oversized material through stress, bending, tension and shear forces before delivering a consistent, three-dimensional product size.

Mobility is provided by a single pair of rough terrain crawler tracks, reducing the need for ground preparation and enabling the fully mobile sizer to go wherever the shovel is. Three or four track configurations require a larger turning circle, whereas twin tracks can turn on the spot, giving unparalleled manoeuvrability.

Track positioning – one directly under the loading point and the remainder spaced at the front of the rig – eliminates any issues with the centre of gravity, offering unique stability without the need for stabiliser jacks whilst loading, which is a problem with in-line track units. Additionally, with the feeder tail end clear of the ground at all times, the need for a lifting feeder or rear foot when changing from operation mode to re-location mode is done away with.

The mobile sizer – with its tracks positioned parallel to the face conveyor belt – allows for continuous, uninterrupted operation as the shovel and sizer travel efficiently together along the mine face with continuous synchronised movement. MMD's rig thus provides the possibility to move and process material at the same time, enabling truly continuous material handling with maximum operating efficiency.

### Operation and maintenance

The low profile mobile sizer has been designed for ease of operation and maintenance, and complies with international safety standards. The operator's cab on the top level forms the nerve centre of the rig: a central hub where all operational processes are safely controlled and monitored 24 hours a day.

An automated safety start-up system via a PLC (programmable logic controller) unit operates in sequence – the discharge conveyor, transfer conveyor, sizer then the feeder (the reverse order of operation), ensuring safe initialisation and eliminating human error, which could result in damage to equipment.

Meanwhile, the latest automated GPS guidance technology

guarantees accurate tracking and production efficiency, with automatic or manual control of the discharge conveyor enabled from the operator's cabin. During spotting, remote control joysticks control the propel of the crawler tracks, which can be configured to operate in synchronous or asynchronous mode via a touch screen interface.

The feeder is fixed in position, providing a constant loading and discharge height; it does not luff, thereby eliminating centre of gravity movement and the need for complicated hydraulic lifting systems.

The low height of the sizer, allows the feeder to be both shorter in length and inclined at only 15 degrees for optimum material bed depth transport.

Full production utilises, along with the low profile fully mobile sizer, an 80m bridge conveyor for a 2x15m high bench (1700m long), 4x20m pass mining system with a face conveyor advance of 80m. Fed by a P&H4100 XPC 60m.cu bucket shovel, the swing has been optimised to reduce cycle times and maximise throughput. Availability of the mobile sizer under testing in China is recorded at a very respectable 95%.

Put simply, MMD's fully mobile sizer delivers continuous higher production rates, lower energy and labour costs with increased safety – plus reduced emissions for a greener future.

### MMD EQUIPMENT

#### Mobile sizer:

- MMD D9 Apron Plate Feeder ~ 10.5m Pulley Crs
- MMD 1500 Centres 3 Tooth x 9 Ring Sizer, Twin R630 60:1
- MMD 425 Pitch Crawler Assemblies
- 2.4m Wide Transfer Conveyor
- 2.4m Wide Discharge Conveyor c/w Luffing & Slewing Facility (+/- 75° Rig CL, Horizontal to +15°)
- Estimated Mass: 1150T

#### Bridge conveyor:

- Track Mounted Bridge Conveyor ~ 80m Pulley Crs
- 2.4m Wide Conveyor, Steel Cord Belt
- Estimated Mass: 360T

#### Hopper car cable car:

- Track Mounted Hopper Car
- 6.6kV Incoming Cable Reeler
- Estimated Mass: 165T