



FAQ

What are the key advantages in moving from a conventional dry mining method to an excavator fed mobile mining unit?

ZERO HARM

The MMU reduces Zero Harm risk to operations by reducing the quantity of heavy mechanical equipment (HME) required to support the mining operation and eliminating the need for HME to tram long distances and perform complex maneuvers.

Having less equipment in the mining area lowers the risk of collisions between HME and reduces the risk of HME interactions with personnel and light vehicles.

EQUIPMENT REQUIREMENTS

The highly mobile nature of the MMU ensures that the unit is located as close to the mine face as practical. This ensures that tramping distances are minimised and the number of equipment required to support the operation is reduced.



RELOCATION DOWNTIME

Unlike other units, it is track-mounted and remotely operated, meaning minimal downtime. The unit moves in line with the excavator and the operator controls the unit via a handheld device.

PRODUCTION PROFILE

The low cycle time of an excavator, working in tandem with an MMU, together with the capacity of the MMU feed hopper, provides greater stability in feed tonnages than a typical loader fed operation.

OPERATING COSTS

Fuel utilisation is lower using an excavator as there is no tramping distance and minimal energy spent moving the resource to the mining unit.

RESOURCE RECOVERY

Due to the comparably compact and mobile nature of the MMU, it is possible to mine areas of reserves that are inaccessible by other mining methods, increasing resource recovery.

MINING AREA REQUIREMENTS

The MMU is able to operate with a comparably smaller disturbance area and minimal access road requirements.

Which feed material and applications are generally suited?

The MM750 is well suited to mineral and silica sands industry applications. With the on-board shredder, it is capable of handling other mineral ore materials with a soft-medium crushing work index and average abrasion index. They will readily replace existing dozer-push, truck and haul, or front-end loader fed dry mining units.

Our units will cope well with all types of sands including those with vegetation, roots and logs, soft or friable rocks and consolidated sands containing calcretes, ferricretes and reasonable amounts of clays.

Further, an excavator has a greater digging force than an front-end loader so can mine through harder materials easier.

How is it fed?

Fed via an excavator, with the unit specifically designed to be fed by a CAT 349 or equivalent.

What is the recommended bucket size?

A 4m³ bucket on a CAT 349 or equivalent.

What is the maximum feed size?

The maximum recommended hopper feed lump size is 400 mm (16") depending on the hardness of the consolidated material.

What is the maximum size of roots the unit can handle?

Capable of processing roots, stumps etc. up to a maximum size of 400 mm (16"), depending on the shredder arrangement selected.

Is there any limitation on the proportion of clay in the feed?

There should be no limitation on the proportion of clay in the feed as the shredder will shred the feed to a size suitable for pumping.

In some existing operations, the unit was occasionally fed with 30-40% clay material and there were no issues with the unit's operation. The unit is equipped with water pipes/sprays in the hopper to clear blockages.

What is the processing capacity of the unit?

The nominal capacity is 750tph with sustained peaks of 900tph of RoM. Variations will be seen due to inherent RoM characteristics, with higher amounts of root matter, clays and consolidated materials slowing down the unit, whilst free-flowing sands will pass through at higher rates.

Further, the capacity of the excavator feeding the unit and the experience of the driver will also impact on production rates.



What are its limitations?

Lack of routine inspection and regular maintenance will limit the performance and operability. Advanced mine planning and a regular inspection and maintenance schedule, will enable the unit to perform as per design specification.

Centrifugal slurry pumps aren't designed to pump high quantities of fibrous matter. When the shredder knives are allowed to wear too much, fibrous matter passes through to the pump and the frequency of bogging will increase over time.

Essentially roots will be processed by the shredder, but worn blades may allow too many roots to enter the unit at once, which can then bog the slurry pump.

Keeping the shredder blades lubricated with process water will increase their life.

Is there a maximum hardness value for the feed?

Current units generate 600 kN force at the cutting tip from around 170 kNm of torque. The ability to accept highly competent rocks can be designed for if needed or a grizzly can be fitted to the feed hopper.

What happens if large rock or tramp metal is caught up in the feed?

When tramp metal is encountered the knives will try and continue to rotate forward as usual, but hydraulic pressure will rise and torque will increase. If hydraulic pressure then exceeds a previously set upper limit, the shaft rotation will be reversed.

This shaft reversal juggles the feed along the cutting chamber to present a different cutting face. If feed is unable to be processed (the cycle being repeated 3 times), then the shredder will be shut down and tramp will need to be removed manually.

Operability questions

What is the energy supply (diesel or electrical)?

Powered by a high voltage trailing cable, the voltage is nominated by the customer, previous installations have utilised 13.9kVA or 22kVA (depending on country).

What is the energy consumption?

The MM750 consumes around 850 kW.

How is it controlled? Can it be integrated with site DCS?

Utilising an onboard PLC, the mobile mining unit can be controlled via a tablet that is supplied with the unit or integrated into the plant DCS. Movements are performed via a remote control device.

How many operators are required?

Dedicated operators are not required under normal operation as it can be controlled and operated by the excavator driver. An operator can be at the unit to assist with pipe relocations and longer distance relocations.

How often does it need to be moved?

This is dependent upon the topography, mine plan and feed rate. However, it is expected that a mobile mining unit will move multiple times in one shift.

In a continuous mining face, the excavator may take an hour or two to mine at the current location before moving across the mine face. Moving in-line with the excavator, the time for a small move like this is negligible (25-50 seconds). There is no site preparation or heavy mining equipment required and no downstream disturbance for the small moves.

On the other hand, dry mining units are semi-mobilised and may need to relocate every couple of weeks, or one or two months subject to mine plan. The large moves may take up to a week or two, depending on groundwork, new RoM pad setup, pipe connection etc – this time can be reduced with advanced site preparation.

What is the travel speed of the unit?

The travel speed of the unit is 1-2 km/hr on flat surfaces. At 10% incline speed is ~0.20 km/hr.

How often do you need to extend the piping and trailing cables?

It depends on mine plan and the rate of face progression.

Nominally piping and trailing cables need to be extended / reduced every block mined. Both trailing cable and piping do need to be managed as part of ongoing operations. For instance, as mining moves across the face and the mobile mining unit moves it drags the trailing cable and pipe, the bulk of the length needs to be positioned prior to a move to reduce stress on the connection points. Disconnection or shutdown of the unit is not required for a move.

How much water is required to operate the MMU?

For a continuous slurry pumping operation, water to the sump under the shredder is added via sump level control. For example, an average throughput of 750t/h with a pulp density of 42% will require ~1057m³/h of water. A maximum water availability of 1600m³/h is required for the flushing of slurry lines.

What is the slurry pumping density (nominal, min and max)?

Nominally 42% solids. Over a period of 30 seconds the solids percentage will move from 0% to 60% solids and back again depending on the feed rate.

MT recommend using the Lyons Unit to regulate the density from the mobile mining unit, and provide highly stable feed to the downstream circuit. This is a unique technology designed to dampen significant variable feed inputs and assist in the classification of fine material and plant water management.

What distance can I pump with the onboard equipment (i.e. no external booster)?

The unit is capable of pumping 900m with 5-10m (nom. 8m) static head.

What is the expected capacity utilisation (i.e. Actual tonnes mined for month)?

The nominal rate is 750t/h. Utilisation can be calculated using minimum 85% machine availability at 750tph. The tonnage mined is also dependent upon the availability of the downstream process in the main plant.

Maintenance

How often are maintenance shuts / inspections required?

In typical applications, we recommend one minor shut per week for items such as inspecting/adjusting slurry pump packing and one major shut every three-months for addressing shredder shaft tension and knife wear. This is dependent upon the specific application and duty of the mobile mining unit.

How long are the shuts?

A weekly shut, takes 2-4hrs for the visual inspections.

A three-monthly, major shut takes 8hrs to complete a shredder change.

What is the warranty period?

The unit comes with a standard 12 months warranty.



Value proposition

What is the price of an MM750?

Contact your Mineral Technologies representative.

What is the delivery time?

Typically 12 months, but contact your Mineral Technologies representative to discuss.

Commissioning and ramp-up time?

Six weeks should be allowed for assembly, commissioning and ramp-up.

For current installations, what were clients' justifications for selecting the MMU over alternate options?

One client switched from a truck and loader fed semi-relocatable dry mining unit (DMU) to MM750 model, as they wanted to make a step change in their Zero Harm profile.

This came about by decreasing their HME count; reducing fatigue and by needing less people to operate and maintain their mining equipment.

Other benefits realised were lower operating costs via the HME and personnel reductions and increased production from the MMU due to its higher availability and utilisation compared to the DMU set-up.

What are its key dimension and specifications?

THE DIMENSION AND SPECIFICATION OF THE UNIT

Length, width and height	16m, 8.6m, 5.5m (10.0m approx. to top of light pole) respectively
Weight	Empty ~146t and operating ~185t
Ground bearing pressure	Empty ~95kPa Operating ~ 110kPa Sanded ~ 120kPa
Noise	85dB(A) at 1m distance, free field conditions
Ground clearance	500mm
Power	13.9kVA / 22kVA,, 3 phase 50/60* Hz max demand 50A * varies depending on country
Water	~1000m ³ /hr of process water with peaks of 1600m ³ /hr for flushing the slurry discharge line

