

ON SITE CRUSHING OPERATIONS

ON SITE CRUSHING

All hardcore and concrete will be crushed in a designated segregated crushing position which will be demarked on site.

Consideration will be given to ensure that the crushing operations take place at the greatest distance possible from any other nearby buildings/users of the area to minimise disruption and ensuring the risk of being exposed to any dust is reduced further. The hardcore/concrete material will be crushed to a 6F2 Specification initially to be stockpiled and/or cleared from site.

Prior to any crushing operations taking place, Metro operatives will proceed to saturate the stockpile with water using hoses on site. Metro have a standpipe that will be used in order to manage/monitor the usage. This process will be repeated as required and at the beginning of each shift before crushing commences. Further to this, the mobile crushing plant will also be fitted with spray nozzles that will produce a mist over the crushed material as it leaves the discharge belt.

The works will consist of the loading of material from the stockpile with a 360 excavator into a mobile crusher, crushing the material to the specification as agreed. The materials crushed will then be stockpiled in the designated crushing area.

Wherever possible, material should be selected from the stockpile in sizes that will pass through the crusher. In the event of a blockage occurring, wherever possible, it should be cleared by using the probe method. This being; to use a 360 excavator to redirect blocked material to allow it to be crushed. Excavator operators may require direction from the crusher operator. In this case extreme caution should be exercised and the crusher operator should stand in a safe place whilst probe is in contact with material.

At no time should the crusher operator attempt to climb or remove any items from the moving jaws of the crusher.

Direction from operator will not be required if excavator is in an elevated position allowing view into jaw area of crusher.

Once all crushed material has been processed on site, it will be left in the stock pile on site ready to be utilised during the construction phase.

Scope of Guidance

The scope of this guidance is to define the roles, safe working practices and acceptable levels of control needed to use a mobile crusher in a demolition environment. For the purposes of this guidance, a mobile crusher is defined as a wheel or track-mounted machine incorporating a jaw or impact type crusher that allows it to crush concrete, bricks, blocks and other forms of construction and demolition waste. Mobile crushers are not designed as shredders and are generally unsuitable for the processing of timber, plastics or any materials in which asbestos may be present. For the purposes of these guidance notes, no other type of equipment is considered. This document is not intended to replace the equipment operators' or instruction manual but to supplement them and to aid in the planning, evaluation and utilisation of mobile crushers.

Keys Risks

- Machinery Guarding
- Clearing blocked or stalled crushers
- Slips and trips
- Transport – Coming into contact with excavators loading the crusher

Typical Layouts

Mobile crushers are normally fed from loading shovels, backhoe excavators or from other processing machinery; a conveyor, for example. In its simplest form it will be a stand-alone machine, fed directly with the material to be crushed and discharged into a stockpile. If the material to be crushed is reinforced concrete, a magnetic separator will often be positioned over the discharge conveyor to remove the metal and prevent it from contaminating the production run material.

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Feeding

If the mobile crusher is to be fed directly by a loading shovel or excavator, then:

- Excavator standing pads should be suitable (stable) and should be high enough for the operator to be able to monitor the feed hopper from the cab. Safe access to the excavator must be provided for the operator.
- Where wheeled loading shovels are used, then the ramp should be wide enough to allow for adequate edge protection (min 1.5m high) on either side of the ramp as well as for the tracking of the machine.
- The maximum gradient of the ramp should be within the capacity of the loader (a maximum gradient of 1:10 is recommended)
- The last few metres of the ramp should be level so that the machine is not discharging uphill, thus enabling operators to more easily monitor the feed. The loading shovel will also be more stable. Ensure pedestrians and obstructions are excluded from the working area. If the crusher is to be fed directly by a conveyor;
- All dangerous moving parts of machinery should be suitably guarded.

Failure to replace guards (on crushers and conveyors) after cleaning or maintenance work is a major cause of injury on these machines.

Blocked Crusher

Causes of crusher blockages can be grouped under two main headings:

- Stalling due to:
 - Electrical or mechanical failure
 - Material jammed in the chamber causing an overload
 - Overfeeding material
 - Entry of tramp metal or wood
 - Excessive clay or other fines in the crushing cavity preventing small material passing through the crusher
- Bridging due to:
 - Oversize feed material

A foreign body in the crusher feed or discharge chamber obstructing the feed material

Rectifying Crusher blockages

Whichever method is used there should be clear procedures in place that are followed and personnel should not enter the area of the blockage unless the stored energy has been released and precautions should be in place so that the sudden release of the blocked material does not place persons at risk of injury. Occasionally personnel may need to enter the blockage area to place lifting chains or straps on the oversize rock so that it can be lifted out and in such circumstances the crusher plant must be isolated and kinetic energy released (where possible), personnel must move to a position of safety before lifting takes place .

Action when a crusher becomes blocked.

- Have a nominated person supervise the activity and call for assistance as necessary.
- Stop the feed to the crusher at the earliest opportunity.
- Remove excess material by mechanical means where possible before the cause of the blockage can be dealt with, where an amount of removal by hand is necessary the crusher and associated plant must be isolated, the power to the crusher does not necessarily need to be turned off, as long as the individual systems such as the jaws, hopper, magnet belt and material drive belts have been isolated.
- Manual removal should only be carried out by suitably trained and competent persons (normal the crusher operator)

Prevention

Working on the premise that prevention is better than cure, every effort should be made to prevent oversize material or tramp metal entering into the crusher feed hopper by:

- Reducing oversize material by drop ball, hydraulic breaker, pulveriser or other means
- Training and instructing the loader driver not to load oversize material
- Following the manufacturers recommendations on the rate, presentation of feed and crusher settings
- Instituting a programme of good housekeeping to prevent scrap steel entering shovel buckets
- Ensuring the size of buckets are appropriate to the capacity of the crusher
- Regular inspections of metal parts (e.g., bucket teeth and dumper wear plates etc) to ensure they are unlikely to break off and enter the crusher feed
- The strategic placing of electrical magnets and/or the installation of metal detectors to prevent tramp metal from entering the crusher
- The use of level indicators for feed control

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- Maintenance of drive systems

A properly designed mobile crusher operation should not need any person to be present on the crushed access platform during normal crushing operations. Being on the access platform during normal operation present the following risks:

- Struck by objects ejected from the crusher, such as pieces of stone or metal
- Being pulled into the crushing chamber when attempting to pull out contaminants (e.g. reinforcing bar)
- Struck by the loader bucket if the access platform is within the working radius of the loading machine (for 360-degree excavators)
- Falling if adequate guardrails and access arrangements are not provided
- Noise. Process noise at this level can cause deafness
- Dust, especially in the case of crushing concrete or bricks or any other high silica content material. Breathing silica dust can cause serious respiratory diseases.

Whole body vibration. Anyone on the platform could be subjected to constant low frequency vibration. It may be necessary for a person equipped with the appropriate PPE (e.g. ear defenders, dust mask, eye protection, hard hat, protective footwear, high visibility outer garment) to spend a few minutes setting the feed speed initially if there is no remote facility. The feed should then be controlled from the machine feeding the crusher by varying the loading rate into the feed hopper.

Stalled Crusher

A stalled crusher should be treated as possibly being jammed with tramp metal, which could be ejected with fatal consequences. Written instructions should be issued to plant operators. This should detail the procedures to follow in the event of a crusher stalling. These instructions should include the following:

- Isolation of motive power to the crusher and associated plant procedure in operation at the site
- Clear the area of all personnel
- Notify the site manager of the stalled crusher, if after careful examination, there appears to be no electrical or mechanical reason why the crusher has stalled, it may indicate that the crusher is jammed by tramp metal or oversize material. A “stalled crusher permits to work” system should be implemented. This work should only be carried out by person/s that are suitable trained and competent. Wherever possible any inspection of the crushing cavity of a jaw crusher or crushing chamber of an impact crusher should be carried out with great care.

REMEMBER

Fatal accidents (due to material being ejected) have occurred to people who have examined the crushed cavity of a stalled crusher from above when the crusher is still operating.

Slips & Trips – Spillages

Keeping working areas clear of spillages improves operational efficiency and also reduces the risk of slips and trips – a major cause of accidents.

Minimise spillages by:

- Maintaining conveyor skirts
- Maintaining the correct adjustment and condition of belt scrapers. Ensure that any feed conveyor discharges centrally into the feed hopper
- Designing loading shovel ramps to minimise the amount of material that will spill from the ramp itself. Never remove guards to clean up whilst the machine is in operation. If guards need to be removed, shut off and lock off in accordance with manufacturers/suppliers' instructions and safe working practice.

Transport

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To minimise the transport risks on site, a risk assessment should address:

- A safe site
- Safe equipment
- A safe worker

It is essential where possible to segregate pedestrians from moving plant such as loading shovels, excavators and dump trucks by the use of physical barriers.

