# BLOCKED & STALLED CRUSHER PROCEDURES

## IN EVERY BLOCKAGE SITUATION RE-ASSESS THE RISKS BEFORE ATTEMPTING TO CLEAR THE BLOCKAGE – EVERY BLOCKAGE IS DIFFERENT

## JAW CRUSHERS

**Unblocking crushers can be hazardous. Do not undertake without careful consideration to the risks set out below.**

### Blockage Causes

- Overfeeding crusher
- Oversize feed material
- Excessive clay or other fines in crushing cavity
- Foreign material (wood, steel)
- Mechanical or electrical
- Incorrect feeder speed

### Prevention

Working on the premise that prevention is better than cure, every effort should be made to prevent steel contamination, oversize material or excessive clay from entering the feed hopper by:

- Know what the maximum feed size is for the machine. e.g. jaw <500mm
- Dig material in a way that you can see what is entering the excavator bucket
- Do not overfeed crusher, jaw chamber should not be more than ¾ full
- Try to feed larger material with a mix of smaller material
- Have feeder set to correct speed

### Potential Hazards encountered may be:

- Poor or difficult access
- Being struck by material from the feeder, chute or projected material
- Accidental start up of feeder, crusher or associated plant
- The movement of any material present inside the crusher
- Slipping and falling
- Manual handling of rocks and equipment
- Unexpected movement of crusher components
- Noise
- Stored energy in crusher
- Unsafe placement of material removed from crusher
- Falling material

## 1. Stalled Jaw Crusher (Potential Tramp Metal)

- A stalled crusher should be treated as possibly being jammed with tramp metal, which could be ejected at any time with fatal consequences.

- 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 in which case **your supervisor should be contacted immediately** before there are any attempts to remove it.

- Ensure the safety grid is in place over the mouth of the crusher

- To release any stored energy, use the Hydraulic wedge adjust system (if fitted) to open the Jaw crusher gap.

- If this does not release the tramp metal, but the tramp metal is loose in the Jaw (All stored energy has been released). Then manual removal can be considered, only after a thorough risk assessment has been completed.

- If there is any level of risk that there is still stored energy in the Jaw, then the toggle plate will need to be cut. Only after a careful examination and risk assessment can this be completed

- Before the cutting operation is commenced, adequate and appropriate provision must be made to support the weight of the stored energy to prevent the violent swinging movement of the jawstock.

- The toggle plate should then be heated across the centre line (i.e. between the holes) using a long handled “oxy acetylene torch “or similar, such that the operator can stand in a protected position, preferably to the side of the plant. Heat the material to a dull red, starting at the mid-point, and working outwards to either side in turn. Ideally the toggle plate should be heated until it yields. The yielding of the toggle plate will reduce or eliminate the pressure on the trapped object. If the plate does not yield, then it is recommended that small cuts are made in either side of the toggle plate (say 50mm either side) and the heating procedure repeated until yielding occurs.

- After the pressure (stored energy) is released due to yielding, the toggle plate should be cut in two and removed.

- **Every effort must always be made to remove tramp metal and oversize from the feed material prior to feeding into the crusher**

## 2. Blocked Jaw crusher

- Stop the feeder at the earliest opportunity
- Remove excess material from the feeder by mechanical means where possible before the cause of the blockage can be assessed
- In some cases, however, an amount of removal by hand will be involved and when this occurs the crusher and associated plant must be stopped and isolated
- Manual removal should only be carried out by suitably trained and competent persons
- Your supervisor must be notified, and safety risks must be reassessed prior to manual removal of material from the feeder.

**Clearing Blockages**

The preferred method of clearing a blocked crusher is using a static pick attached to the excavator; this can be carried out with the crusher still operating providing:

- The pick does not enter the crushing chamber as this can cause permanent damage
- No pressure should be put on the rock when the crusher is stationary as this will cause permanent damage to the bearings
- No persons on or near the crusher

If crusher is still blocked, and it becomes necessary for a person to approach the crusher to position hooks or chains the machine must be shutdown and all energy sources isolated.

**To lock out the machine the procedure for isolation of plant must be followed**

**Chaining material out**

Hooking chains or slings around rocks can pose a safety risk and should only be attempted after a thorough risk assessment.
All personnel must be wearing appropriate PPE, and all energy sources isolated
Under no circumstances should a:

- person be unsupervised working in or around the crusher chamber
- person be below any rocks or material
- Be in the crusher whilst tension is on chain or sling

**All persons must be well clear of machine when lifting or dragging rocks**

Excavator operator must position machine so that he can see into crusher chamber from operating position

# CONE CRUSHERS

**Unblocking stalled crushers can be hazardous. Do not undertake without careful risk assessment**

## Causes

- Steel
- Oversize material
- Electrical or mechanical problems
- Foreign material entering crushing chamber

## Prevention

Preventing a blockage is the safest option, listed below are some key points to remember:

- Know the maximum feed size of the machine
- Maximum feed size for a 1000 automax is 160mm, check primary crusher ccs
- Always check metal detector is operating by placing a piece of steel over feed belt to check its operation

To avoid the Automax cone crusher becoming blocked the machine is equipped with an automatic hydraulic release mechanism to raise the upper frame when excessively high crushing pressure is sensed. The upper frame automatically returns to the original setting when the foreign object should have been released through the machine. However, unduly large uncrushable objects may stall the crusher and become tightly wedged in the crushing chamber.
Tramp metal is a serious problem when it enters a crusher as this can cause more problems than oversize stone or clay.

When metal enters any type of crusher it does not shear in the same manner as stone and can become wedged and under considerable pressure. In order to release the tramp metal it is necessary to take the pressure off it and at this time it can be ejected from the machine with catastrophic consequences.

**Action when crusher becomes blocked**

**Bridged**

**Ensure appropriate PPE is worn**

A cone crusher can become "bridged" when oversize material is fed into it and the material will not enter crushing chamber.
In the event of this happening the operator should:

- Stop the feed conveyor immediately
- Raise the upper frame by putting the machine into "manual" and pressing the "open" button.
- Should this not open sufficiently to allow the stone to drop through then it will be necessary to isolate and lockout the machine and remove the rock or break it up manually.

  ENSURE ALL ENERGY SOURCES ARE ISLOATED

**Hazards encountered may be:**

- Poor or difficult access
- Being struck by material from the feeder, chute or projected material
- Accidental start up of feeder, crusher or associated plant
- The movement of any material present inside the crusher
- Slipping and falling
- Manual handling of rocks and equipment
- Unexpected movement of crusher components
- Noise
- Stored energy in crusher
- Unsafe placement of material removed from crusher
- Falling material

**Stalled Crusher**

**Ensure appropriate PPE is worn**

If the crusher should stall whilst crushing due to an overload or blockage, the crushing chamber will be full of stone and, or tramp steel.
The following procedures should follow:

- Stop feed belt immediately
- In the case that a piece of tramp metal is in the machine extreme care must be taken whilst releasing it
- To avoid the tramp metal being ejected it may be necessary to fill the opening to the machine with stone whilst the pressure is released
- Raise the upper frame by putting the machine into “manual” and pressing the “open” button.
- This will let the material fall through, emptying the crusher chamber
- Inspect crushing chamber is empty
- If it is necessary to access crusher hopper, machine must be isolated and locked out

ENSURE THE MACHINE IS ISOLATED IF ACCESSING HOPPER

- Prior to resetting, the reason why the machine has stopped should be investigated.
- Check machine for possible damage before resuming operations

**Hazards encountered may be:**

- Poor or difficult access
- Being struck by material from the feeder, chute or projected material
- Accidental start up of feeder, crusher or associated plant
- The movement of any material present inside the crusher
- Slipping and falling
- Manual handling of rocks and equipment
- Unexpected movement of crusher components
- Noise
- Stored energy in crusher
- Unsafe placement of material removed from crusher
- Falling material