

H&S Best Practice – Metal on Metal Contact

1. PURPOSE

This best safety practice provides guidance for worker safety related to the hazards associated with intentional metal on metal contact.

2. SCOPE

This best practice applies to all Mosaic North America Business operations facilities and covers all employees and contractors performing work on Mosaic property. It includes activities involving intentional metal on metal contact, including but not limited to situational, operational and routine tasks.

3. REASON FOR IMPLEMENTATION

Many steel tools have hardened steel parts. Bending, twisting, sudden impact against another hardened surface or applying extreme force can result in sharp metal fragments (shards) being ejected at very high speed. Mosaic employees and workers across industry have experienced bodily injuries from shrapnel projecting off hardened steel; the best practices in this document are being implemented to minimize the risk of injury to employees and contractors while conducting tasks involving intentional metal on metal contact.

4. RISK FACTORS TO CONSIDER

The following are some of the primary risk factors associated with intentional metal to metal contact:

- Workers unaware of the hazards associated with striking hardened steel
- Use of tools that have not been properly inspected and maintained
- Failure to follow manufacturer's recommendations for removal of a tool from service.
- Using an improper tool for task or using hand tools outside of manufacturer's recommendations.
- Not wearing appropriate PPE to mitigate the risk of possible injury

5. PREVENTATIVE CONTROLS

The requirements and recommendations in this section are designed to provide preventative measures against the risks associated with intentional metal on metal contact.



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1.1 Required: Eliminate the act of hammering hardened steel with hardened steel tools.

- Use alternate tools and methods to perform work. For example, use a bearing puller to remove a race from a shaft, or a torch to cut off the race.
- Use a portable hydraulic press (porta power) in lieu of a hammer to press/push instead of blunt force or striking.



- Whenever possible, relocate work from the field to the shop so work can be performed using ideal tools and methods.
- Include a dampening device between hardened steel components (eg. brass drift, mild steel drift, fire blanket)

1.2 Required: Substitute the tool being used for one that is made from alternate materials, such as:

- Soft steel hammers or punches
- Dead blow hammers



1.3 Required: If a metal on metal contact task is required, include the identified hazards and controls on the hazard assessment and/or permit for the task.

1.4 Required: Inspect tools prior to use and maintain or dress as needed.



1.5 Required: Use additional PPE based on risk assessment of the work being done. Examples include face shields, leather jackets, leather chaps, and leather gloves.

1.6 Recommended: Find an engineered solution, particularly if the task is required on a recurring basis. Reference the manufacturer's manual to see if there is an engineered solution for the task.

1.7 Recommended: Barricade the work area to prevent others in the area from entering the hazard zone where tasks involving metal on metal contact are being conducted. Use barriers such as welding screens when possible, or banner guard the area to restrict access.

6. TOOLS AND APPLICABILITY FOR USE

Using the appropriate tool for the job can prevent injuries caused by the intentional striking of metal on metal. Consider soft steel sledgehammers, brass hammers, slide hammers, or dampening devices.



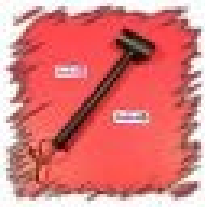
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7. ADDITIONAL INFORMATION

AVAILABLE TOOLS AND APPLICABILITY

Tool	Applicable Use	Description/Material	Photo (Eg.)
Soft Face Split Head Hammer Copper/Rawhide Item: MC1314	Metal on metal striking	Copper head absorbs impact and reduces the potential of fragmentation. Rawhide side acts as a non-metal soft hammer.	
Brass Head Hammer Item: MC1316	Metal on metal striking	Soft brass head absorbs impact and reduces the potential for fragmentation.	
Soft Safety Steel Sledge with Ergo Power Handle Item: 1966010 - 3lb/14" 1966011 – 10lb/32" 1966012 – 16lb/32" 1966014 – 6lb/16"	Metal on metal striking	Soft steel is designed to limit potential of splintering (metal pieces breaking off).	
Soft Face Hammer Item: 1966017 – 8oz	Metal on metal striking	Face absorbs impact and reduces the potential of fragmentation. Tips are available in different weights.	
Dead blow Hammers	Striking metal	Rubber or UHMW plastic – designed to absorb shock and reduce rebound.	

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Wire Rope Punch	Use to safely drive out pins and keys	Long, twohanded rubber handle to lessen shocks from blows. Head attached with wire rope to reduce shock. Urethane ring around head to reduce likelihood of chipping. Heat-treated punch, so it will not shatter.	
Slide Sledge	Metal on metal striking	Application specific tips available with each tool, a wide selection of easy-switch tips. Handle weights attach to the tools for more driving force when needed.	
HDPE Hammers	Striking Metal	The RadicalX Hammer is made from UHMW (ultra high molecular weight polyethylene). UHMW is a virtually unbreakable material. It yields the highest impact strength of any thermo-plastic. Highly resistant to most corrosive chemicals except oxidizing acids. Highly resistant to abrasion.	
Bit wrench	Changing bits on a mining machine	The “puck” is used for tapping out bits / made of PVC-type material.	