

OE-3: 2024-02

July 2024

## Prevention Of Injuries Using Portable Grinders

### PURPOSE

The purpose of this Operating Experience Level 3 (OE-3) document is to raise awareness of the hazards of working with portable hand-held grinders that are used across the Department of Energy (DOE) complex.

### BACKGROUND

Portable hand-held grinders, sometimes called side or angle grinders, are such a commonly used power tool that workers may forget that using them can create significant hazards. Plumbers, pipefitters, and steamfitters, along with many other construction/maintenance personnel, use them daily for purposes such as cutting, grinding, sanding, and polishing.

The many hazards that workers are exposed to while operating portable hand-held grinders can include:

- sparks from the grinder that can come into contact with combustible materials leading to fires or explosions;
- electrical shocks;
- particulates from the dust and shavings from the work surface can pose skin and inhalation hazards; and
- kick-back, which is when the grinder may jump off of the material it is being used on, injuring the user.

This OE-3 is primarily focused on the serious injuries caused by kick-back. When this happens, the grinding wheel of the tool makes contact with the worker. This may require treatment in an emergency room and can result in days away from work and/ or being restricted from performing their routine work activities.

See the Appendix for explanatory photos and case demographics.

### OPERATIONAL HISTORY

A review of the Computerized Accident Incident Reporting System (CAIRS) database for the past 18 months was conducted for incidents involving hand-held grinders. It should be noted that none of the following incidents were reported into the Occurrence Reporting Processing System (ORPS).

Below are brief descriptions of seven grinder incidents taken from the CAIRS database:

**Event (2/6/2023):** A worker was using a grinder and changed the blade/disc and started cutting a section of steel tubing. The disc hit a groove in the support. It kicked back and struck the employee in the chest causing a superficial laceration across the chest area. The worker received 10 sutures across the chest area and was placed on work restriction for 8 days.

**Event (6/15/2023):** A worker was dressing a weld using a sanding disc on a portable hand-held grinder and was holding the material on which the weld was being dressed. In the process of dressing the weld, the sanding disc was held up on the material. When the disc released, the grinder's momentum caused the grinder to travel towards the worker's left hand, catching the leather glove then the worker's left thumb, causing a laceration to the interior portion of the thumb resulting in four sutures.

**Event (8/14/2023):** A worker was using a wire wheel on an electric grinder. The wire wheel kicked back and caught onto the worker's long-sleeve shirt, destroying their sleeve, and causing an abrasion/ burn to their left forearm. The injury was bandaged and prescription medication was provided.

**Event (10/4/2023):** A worker was grinding on an aluminum support when the grinder kicked back, striking the worker's right knee resulting in a laceration that required four sutures.

**Event (11/17/2023):** A worker was cutting a pipe, using a battery-operated grinder. When the worker was finished, they pulled the grinder back and it kicked back off the pipe, or the wall they were working against, causing a laceration to the worker's right finger resulting in three sutures.

**Event (4/25/24):** A worker was preparing a pipe spool for welding using a 5-inch electric Metabo angle grinder. The worker had the fitting secured inside a vise while grinding. During the process, the fitting slipped out of the vise. As the fitting was falling, the worker reached out and caught it and the grinder contacted the worker's left hand resulting in a laceration to the worker's left-hand middle finger. The worker was treated in an emergency room where the wound was closed using Steri-Strips™, then wrapped with an adhesive bandage, and antibiotics were prescribed.

**Event (5/7/2024):** A worker was grinding paint off a piece of metal when the grinder caught on a burr of metal, slipped, and kicked back, striking the worker's left index finger, causing a laceration which resulted in three sutures.

## RECOMMENDATIONS

1. Since the review of the CAIRS data indicates that an increased hazard exists, DOE and DOE contractors should utilize this OE-3 as an operational awareness tool for all workers who operate hand-held grinders.
2. DOE and DOE contractors should use this OE-3 to train new workers before they start a job involving the use of portable hand-held grinders, and for periodic training as often as necessary to ensure that workers are adequately trained and informed.
3. Before starting a task, users should:
  - evaluate whether a grinder is the proper tool for the job;
  - ensure the tool's safety guard is in place;
  - avoid wearing loose clothing while operating the tool;

- ensure the grinder speed does NOT exceed the maximum operating speed marked/stamped on the wheel/disc;
- inspect all grinders (battery operated or electric) at regular intervals to ensure that the mounting flanges are in good condition, proper size and shape, and that no damage has occurred to the tool or wheel as a result of abusive use or careless handling;
- ensure the workpiece is firmly secured while it is being cut or ground;
- ensure the tool is disconnected from the electric power supply or the battery is removed before changing wheel or making adjustments;
- hold the grinder firmly with two hands using the auxiliary handle, per the specific instruction manual, for maximum control over kickback or torque reactions during start-up.

## SUMMARY

Hand-held grinders are a versatile tool but, like many power tools, they are inherently hazardous. The continuing incidence of serious injuries resulting from the operation of grinders within the DOE complex indicates that this is a continued area of concern. The recommendations contained within this OE-3 should be evaluated for inclusion in each site/organizations safety and health program.

Questions regarding this OE-3 document can be directed to Craig Schumann, CAIRS Program Manager at 630-252-9176 or [craig.schumann@hq.doe.gov](mailto:craig.schumann@hq.doe.gov).

This OE-3 document requires no follow-up report or written response.



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## Appendix

Examples of various types of portable hand-held grinders



### Incident demographics:

- Age of injured worker ranged 25 to 65 years of age.
- Time of incidents ranged from 0700 to 1900 hours.
- All but one have been employed greater than 12 months.
- Five have greater than 12 months of experience on the equipment.