Date: April 16, 2008
To: District Safety Coordinators and MOT Directors
From: Mike Bruffey
Coordinator of Safety – SIPE
Subject: Portable Grinder Injury

Portable Grinder Safety
In a recent incident at a San Luis Obispo County Public School involving a hand held portable disc sander, an employee was injured when the cut-off wheel unexpectedly disintegrated, sending pieces flying across the workshop. The employee received minor injuries to his leg from one of the flying pieces. Upon inspection of the disc sander and type of wheel being used at the time, several issues were discovered that led to the accident.

1. The disc sander in question was rated for 23,000 RPM and tested at 19,500.
2. The mounted cut-off wheel had a max RPM rating of 13,580.
3. The cut-off wheel was unknowingly mounted on the arbor (serving as a disc pad) and a sanding disc was mounted on top of it (see photos at end of report).
4. Disc Sander being used may have been too large to fit into the space being worked on and the wheel may have hit the metal being sanded in two places at the same time.

These types of incidents involving grinders do not happen often, but when they do, the results can lead to serious injuries and even death. Besides grinding wheels disintegrating, other types of incidents involve kickbacks and entanglements with clothing and other materials.
Inspection
Pre-operation inspections should occur before use and include the following:

- The guard (when required) should be present and firmly attached. Guards for most of these types of grinders have a maximum exposure angle of 180° and are located between the operator and the wheel.
- Check the wheel for cracks, chips, gouges or other damage.
- Verify that the rated wheel speed is greater or equal to that of the grinder and the correct wheel size is used.
- Flange nuts and flanges must be in good condition and suit the wheel.
- Look for worn or damaged mounting accessories.
- Grinding wheel holes should fit the arbor correctly.
- Ensure the wheel being used is correct for the application, correctly mounted and tightened before use. Do not over tighten the mounting nut.
- Inspect the electrical cord or air hose for damage.
- Inspect the work area for loose objects that might strike the grinder wheel.

General Safety Rules

- Read the manufacturers operator safety manual before use.
- Don’t use a grinder if you have not been properly trained.
- Ensure the grinder/sander being used is suitable for the task.
- Personal protective equipment such as safety glasses or goggles, face shields, hearing protection and gloves must be worn at all times. Consider wearing protective clothing on the arms, legs and feet as well.
- Never clamp the grinder in a vise.
- Use clamps or another method to secure the work piece.
- Never use a grinder without the guard. One exception to this rule is if the wheel is two inches or less, it is not required to have a guard.
- Allow the grinder to come up to full speed before applying it to the workpiece.
- Do not allow anyone to stand in front of a spinning grinding wheel at any time.
- Make smooth contact with the work piece and avoid bumping action or excessive pressure.
- When starting a cold wheel, apply it to the workpiece slowly until the wheel gradually warms up.
- Direct sparks away from yourself, others in the workplace and flammable or combustible materials.
- Keep coworkers and visitors away from all grinding operations
- Always keep both hands on the tool.
• Do not overreach and maintain firm footing and balance.
• Position the grinder in a way that the guard provides the maximum protection to the operator from sparks and/or flying debris.
• Use caution when grinding in corners because a sudden, sharp movement of the grinder may occur when the wheel strikes the secondary surface.
• Maintain an angle of approximately 15° to 30° between the disc and the working surface.
• Do not apply side pressure on the grinding or cutting wheel.
• Never override the ON/OFF switch or secure it in the ON position.
• Use only replacement parts recommended by the manufacturer.
• Wet or damp grinding wheels as well as ones that have been dropped should be discarded.
• If excessive vibration occurs or it operates roughly upon starting, immediately shut the tool off and check the grinder and wheel for damage.
• Newly mounted discs should run freely for at least one minute before cutting or grinding.
• Never apply pressure to stop a spinning disc.
• If the disc label is missing or illegible, replace it with a new one.
• Use grinders with adjustable/moveable guards when working in difficult to reach places.
• Use grinders with a safety slip clutch or other electronic clutches that prevent kickback.
• Grinder speeds should be checked periodically (SIPE will do this).
• Unplug the grinder before changing discs and wheels.
• Grinders and grinding wheels should be handled carefully to avoid damage.
• Pneumatic grinders/sander should be operated at or below the recommended PSI.

Wheel and Ring Test

Ring test: The wheels should be tapped gently with a light nonmetallic implement, such as the handle of a screwdriver for light wheels, or a wooden mallet for heavier wheels. Tap wheels about 45° each side of the vertical centerline and about 1 or 2 inches from the periphery as indicated by the spots in the figures below. Then rotate the wheel 45° and repeat the test. A sound and undamaged wheel will give a clear metallic tone. If cracked, there will be a dead sound and not a clear "ring." The ring test is subject to interpretation by the inspector and is primarily applicable to vitrified bonded wheels.
Please feel free to contact SIPE to conduct an RPM test on all portable and stationary grinders at your worksite.
Approximate area of grinding/sanding