

Guards and discs on angle grinders

Purpose

The purpose of this safety alert is to highlight the risks associated with removing guards and using incorrect discs on angle grinders.

Background

In early February 2016, a Queensland worker received fatal injuries while operating a 230 mm (9 inch) angle grinder. The worker was killed when part of a broken disc struck the worker's chest. It appears that due to the high impact of the projectile it caused fatal internal injuries.

In another incident the disc jammed and the angle grinder kicked back and cut the worker's wrist.

Contributing factors

One major contributing factor is the use of cutting discs that are too large for the angle grinder. In some cases the guards have been removed and the grinder fitted with a 14 inch (356 mm) cut-off disc.

Cutting discs are usually designed for a maximum outside edge speed (i.e. peripheral speed) of approximately 70 metres/second (250 kmph). Larger angle grinders are manufactured with lower revolutions per minute (RPM) speeds than smaller angle grinders, so that the edge speed of the disc always remains around 70 m/s.

Fitting a 14 inch (356 mm) cut-off disc to a 9 inch (230 mm) angle grinder will increase the edge speed excessively to at least 120 m/s (430 kmph). Photograph 1 shows an angle grinder with the wrong size cutting disc fitted and the guard removed. Discs are not designed for the higher speed, and if used, risk the possibility of the disc shattering and striking the user and others.

Guards should be provided and used on all power tools where there is a risk of the disc ejecting, disintegrating or cutting the worker. If the guard has been removed:

- there is nothing to stop the broken pieces hitting the user
- the user's hand will be closer to the unguarded moving blade
- there is also a greater risk of the blade being damaged when the angle grinder is put down and the weight of the grinder is resting directly on the disc.

Another factor that increases the risk of disc failure is when the central disc hole size is too large for the spindle flange on the angle grinder. As the disc diameter increases so will the hole size. For example, the hole size of a 14 inch (356 mm) cut-off wheel is typically 25.4 mm compared to 22.3 mm on a 9 inch (230 mm) cutting disc (see Photograph 2). If the disc hole is too big for the spindle flange, the disc may be off centre, become unbalanced, vibrate excessively and rapidly lead to it shattering.



Photograph 1: Unsafe 230 mm (9 inch) angle grinder with 356 mm (14 inch) disc fitted and guard removed.



Photograph 2: Unsafe excessive clearance for the central hole on 356 mm disc on 9 inch spindle flange.



Photograph 3: 230 mm (9 inch) angle grinder with guard and right sized disc fitted.

Action required

Always:

- Use the angle grinder with the correct guard supplied by the manufacturer.
- Fit the right sized disc that has a hole matching the spindle flange.
- Use the tightening tool supplied by the grinder manufacturer to tighten the disc. The use of another device (i.e. punch and hammer) can damage the disc and grinder.
- Hold the angle grinder with both hands ensuring the side handle is inserted on the side of the unit that gives the best grip for the work activity.
- Use a grinding disc for grinding. Grinding with a cutting disc damages the disc and increases the likelihood of the disc breaking during use.
- Ensure the maximum RPM disc speed marked on the disc is higher than the maximum speed of the angle grinder.
- Ensure damaged discs are thrown out and not re-used.
- Allow the grinder to run to speed before cutting or grinding.

Note: 9 inch (230 mm) angle grinders have been banned on some work sites due to the increased risk of injury. The increased power and size of the unit will cause more severe kickback and gyroscopic effects (i.e. makes the grinder difficult to manoeuvre). A risk assessment to identify alternative methods and tools should be carried out prior to selecting a 9 inch (230 mm) angle grinder.

Further information

Further information can be obtained from the following:

- [Managing Risks of Plant in the Workplace Code of Practice 2013](#) (PDF, 1072.88 KB)
- [Safety alert - Multi-cutters and other discs on power tools and air tools](#)

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<https://www.worksafe.qld.gov.au/news/safety-alerts/whsq/2016/guards-and-discs-on-angle-grinders>