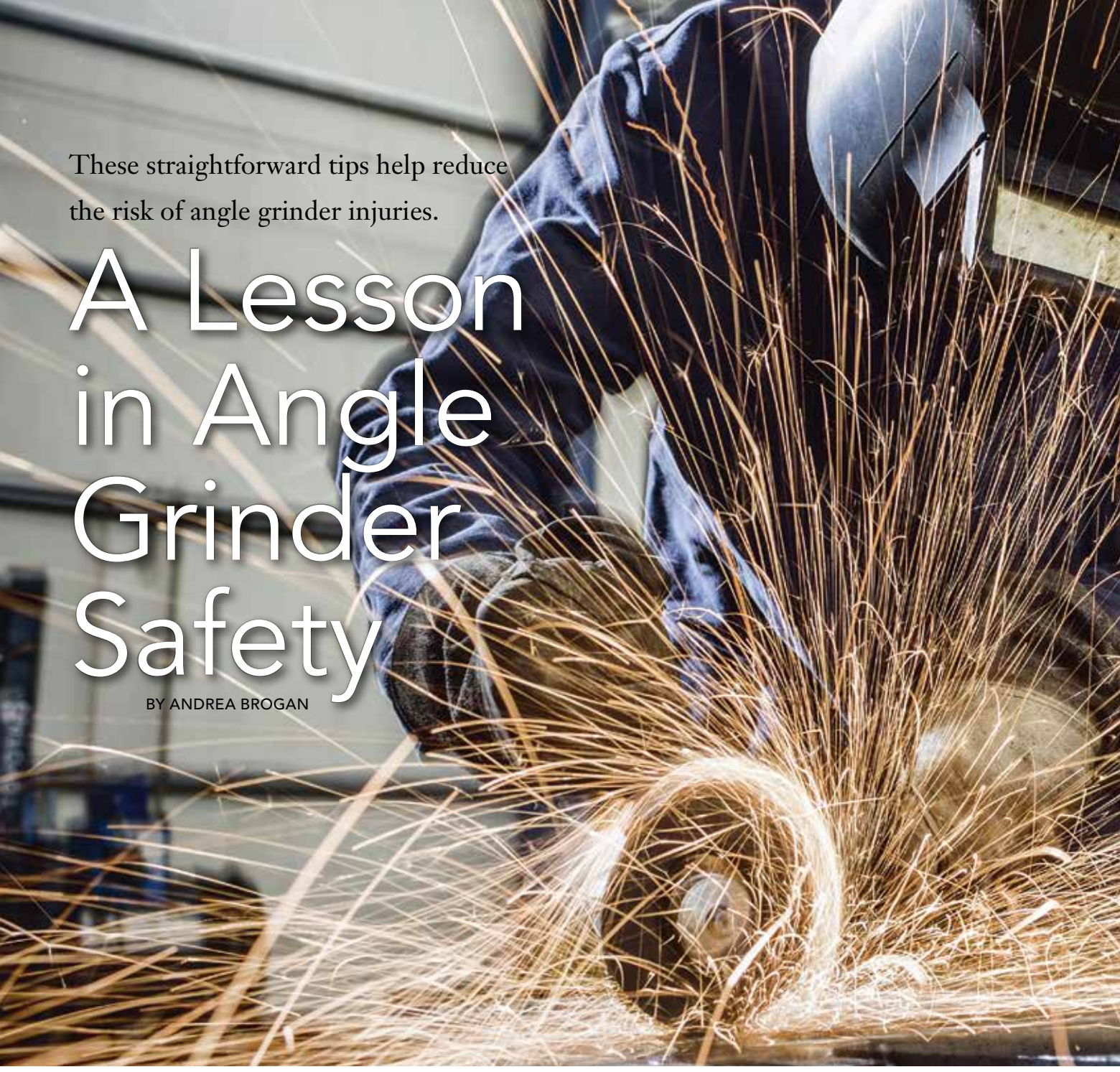

These straightforward tips help reduce the risk of angle grinder injuries.

A Lesson in Angle Grinder Safety

BY ANDREA BROGAN

ANGLE GRINDERS HAVE CHANGED a lot over the years, with innovative features and accessories that allow for a range of applications.

Today's angle grinders are much more compact, ergonomic, safe and powerful than their predecessors. However, the versatility, ease of use and increased safety features of an angle grinder should not overshadow following proper operational procedures. Anyone who uses angle grinders and power tools—from the inexperienced user to the overconfident veteran—needs to pay attention to what they are doing. Some of the risks to be aware of include sudden kickback, flying debris, working near combustibles/flammables, noise exposure and repetitive strain injury.

However, these factors can be prevented by following safety procedures, becoming familiar with the product's safety features and using additional safety accessories.

Follow Safety Procedures

The first step in using an angle grinder safely is to follow basic safety procedures. This includes wearing the appropriate personal protective equipment (PPE), such as hearing protection, safety glasses, a face shield, gloves, a flame-resistant shirt and protective foot wear (see Figure 1). PPE is required by most employers. It is important for the operator's safety as well as the safety of those working around him or her.

Additionally, the environment should be checked to make sure it is safe for angle grinding. A clean, dry and well-lit environment helps prevent tripping and electrocution hazards. Angle grinding should never be performed near combustible liquids, gases or dust. Safeguarding the environment also includes eliminating distractions, which are a major cause of injuries. When possible, cell phones and other distracting

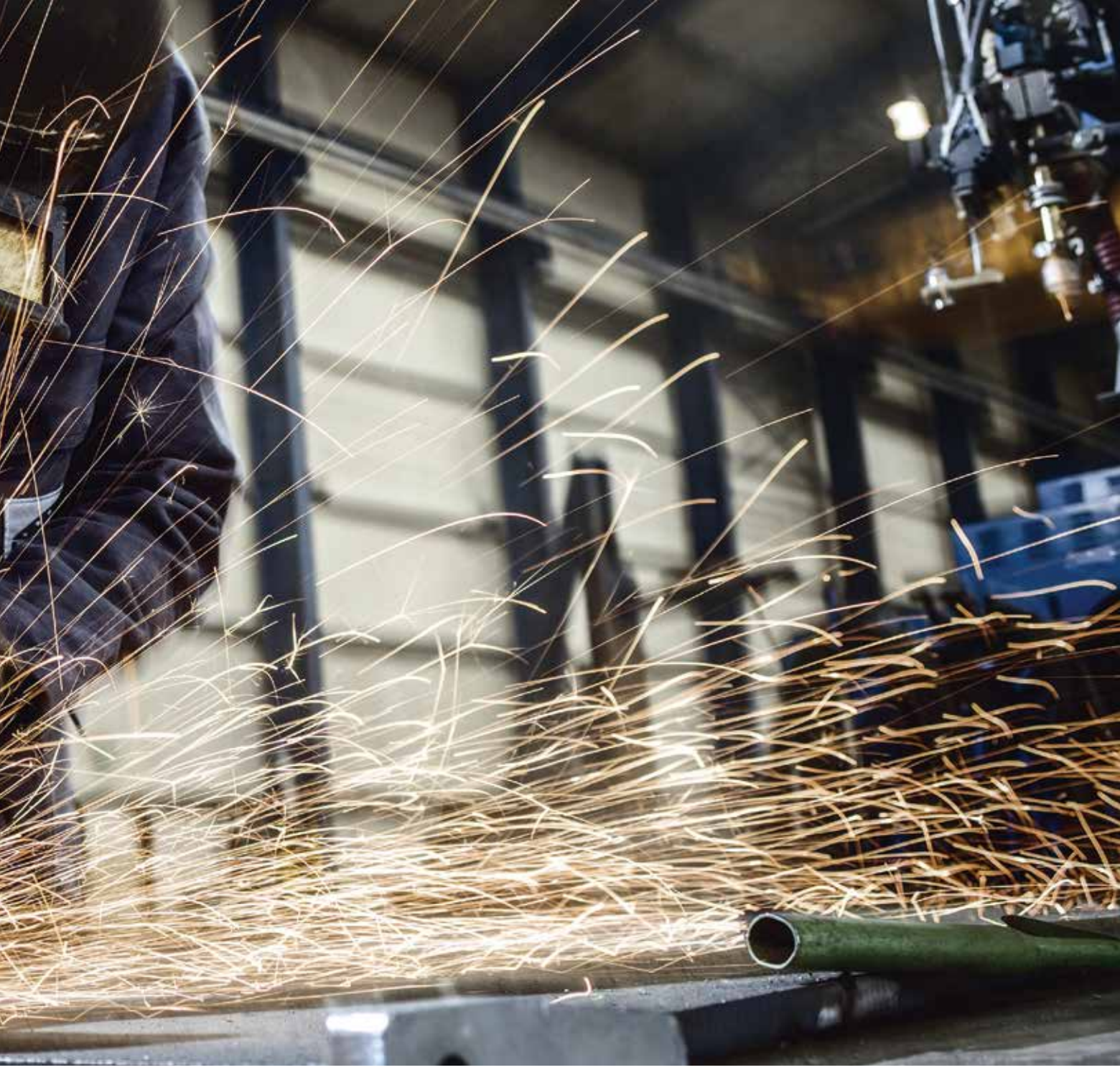

figure 1. To safeguard against injuries, personal protective equipment (PPE) must be worn by the operator and those around him/her when angle grinding is being performed.

devices should be turned off or removed from the area where angle grinding is being performed.

Furthermore, operators must make sure they are physically capable of working an angle grinder. If the operator is tired, he or she should take a break. Additionally, angle grinding should not be performed under the influence of substances.

Following safety procedures also includes using the right tools for the job. When working with unique applications, a specialized tool might be needed. For instance, when working in tight spots, a die grinder with a flexible shaft, or possibly a flat head grinder, might be a better option than an angle grinder. When starting work, operators should be able to answer the following questions to ensure they have selected the right tool:

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- Is a slicer or a grinding wheel needed?
- Is the right guard installed on the grinder?
- Does the grinder size match the grinding or slicer wheel size?
- Does the maximum rpm of the grinding wheel match up with the maximum rating of the grinder?
- What direction is the wheel spinning?

When it comes to angle grinder safety, the appropriate guard also needs to be in place and positioned between the spinning accessory and the operator. Most grinders come with a Type 27 guard, but when using a Type 1 wheel (a flat cut-off or slicer wheel) a Type 1 wheel guard must be in place. This is an ANSI (American National Standards Institute) standard often overlooked by operators. There are a few choices available when it comes to Type 1 guards (i.e., where the bottom of the wheel is partially covered). A full-metal, Type 1 guard can be purchased, or some manufacturers have a clip-on option that converts their Type 27 guard into a Type 1 guard.

Become Familiar with Your Product's Safety Features

Most manufacturers have engineered corded and cordless angle grinders with a series of safety features that help manage and control the tool to protect the operator and others around them.

One such feature is the mechanical slip clutch, which absorbs the forces that create kickback. Kickback is one of the most common hazards and occurs when the wheel comes to an immediate stop. For example, if the wheel binds to the material being cut or if the tool loses power, the wheel may stop. As a result, the clutch helps keep the operator in control of the grinder. It also significantly reduces the risk of the accessory shattering and producing flying debris, which can occur with cutting wheels.

Another safety feature available on grinders is a mechanical safety brake. This can stop a slicer wheel in less than 1 second and a grinding wheel in less than 2 seconds when the grinder's switch is disengaged. If the operator loses control of the tool, this safety feature helps prevent a serious injury from happening by stopping the wheel quickly.

Grinders that have an auto-balance feature and an anti-vibration handle are also critical for injury prevention. Operators often work with their power tools for hours at a time. After working with an angle grinder, they might feel tingling in their arms and hands. Over time, this can cause permanent nerve damage referred to as repetitive strain injury (RSI). Another condition that can develop after long-term use is hand-arm vibration syndrome (HAVS) also known as white finger syndrome. HAVS is a permanent and potentially debilitating disease in which blood flow is restricted to the hands and arms, causing pain and numbness.

Using a grinder that has auto-balance and anti-vibration features greatly reduces the vibration that is transferred from the tool to the hands and arms. An additional benefit of the auto-balance feature is that it increases the life of the tool and wheel.

Another important safety feature is a drop secure, which reduces injuries from accidentally dropped tools. A 6.5-lb angle grinder dropped from 30 ft can strike with more than 600 lb of force, so having a drop-secure feature on the grinder is an easy way to prevent serious injuries. Some tools are also equipped with a tethering eye at the rear of the tool, allowing it to be attached to a lanyard (see Figure 2).

Use Accessories to Enhance Safety

When performing angle grinding, always use the accessories that are provided at the time of purchase, such as the guard and side handle. Review the accessories that come with the tool and make sure the purpose of the accessories is understood. Additionally, the handle that is provided must be installed and used during operation. It is also important to never alter the tool. For example, some users remove the handle because they feel it gets in the way. If this is a frequent issue, they can purchase a multi-position handle that offers many options for positioning the handle.

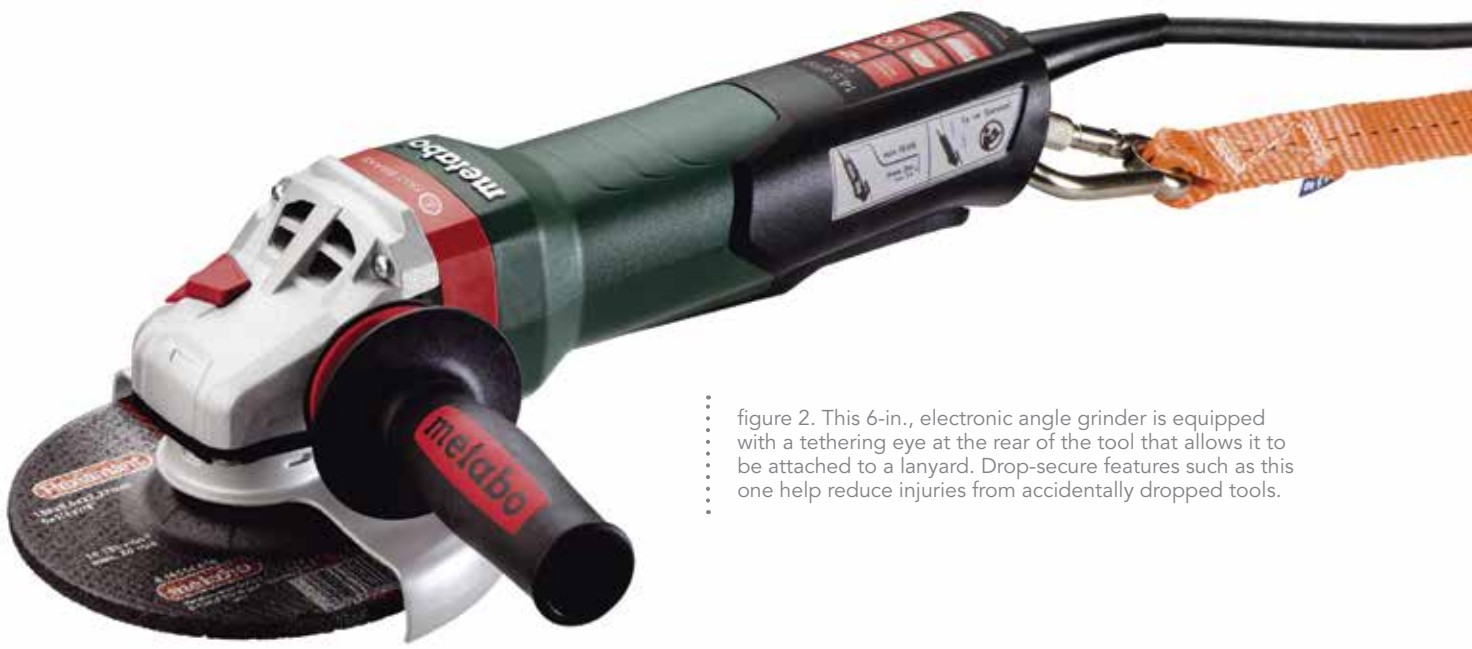

figure 2. This 6-in., electronic angle grinder is equipped with a tethering eye at the rear of the tool that allows it to be attached to a lanyard. Drop-secure features such as this one help reduce injuries from accidentally dropped tools.

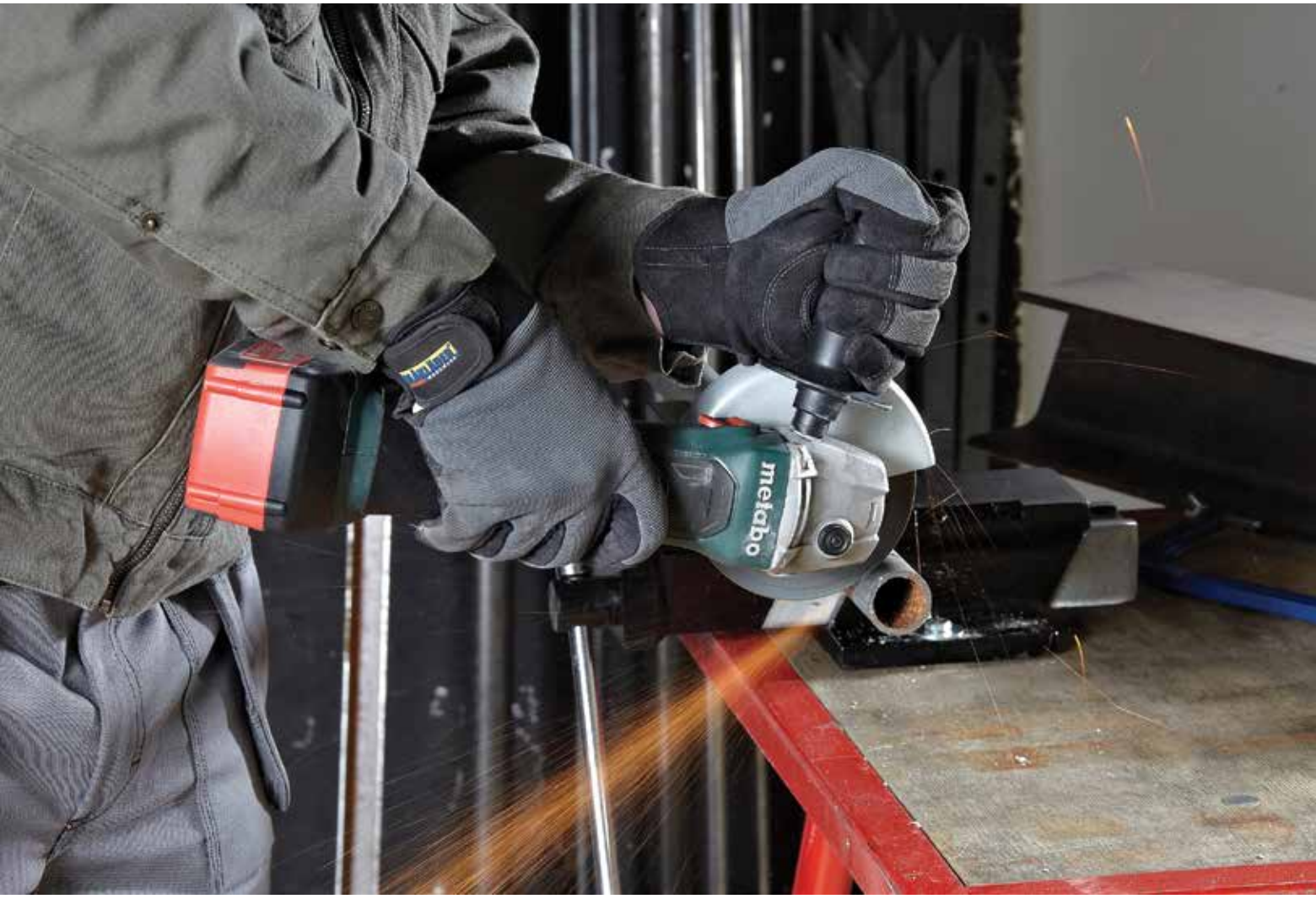

figure 3. When working with angle grinders, always secure your work with the proper vise or clamp, and don't overreach.

Another overlooked point in angle grinder safety involves securing the work, which requires the use of proper vices and clamps (see Figure 3). These keep the workpiece safely in place, preventing additional hazards such as overreaching. When using a grinder, it's vitally important that operators position themselves in an athletic stance that feels comfortable and well balanced, so they do not have to overreach or take a hand off the tool. This also ensures they are ready in case of unexpected binding.

It's also important to use an extension cord of proper gauge and length. This varies depending on the amp rating of the tool being used. The owner's manual should be referred to for recommendations, or the operator can call the manufacturer if they are unsure. When changing accessories on a grinder, it's imperative to unplug (or if it's cordless, disengage the battery from) the tool, so the tool does not unexpectedly turn on. Many users do not consider the electric plug they are using or even the extension cord. However, all electrical cords should be checked to prevent injuries. Additionally, never alter the manufacturer's plug. Doing so may cause electrocution as well as void the manufacturer's warranties.

All accessories, especially the grinder wheel, should be inspected for chips, imperfections or cracks before installing them on your grinder. A small crack in a grinding or slicer wheel can result in shrapnel flying before the operator realizes something has gone wrong. After visually inspecting the wheel, it is recommended to run the wheel at no-load, down and away from the operator and others, for 60 seconds to test the wheel's integrity. If the operator feels the wheel has any unusual vibration, it's time to replace the wheel and discard the current one.

Conclusion

Being knowledgeable on how to identify and mitigate the risks associated with using angle grinders and power tools is the first step in reducing the possibility of injury. Operators must also follow safety procedures, utilize their tool's safety features, and take advantage of safety accessories. Furthermore, the operator needs to follow their company's safety management rules and always remember to expect the unexpected while using angle grinders and other power tools. By following these straightforward rules, the user can greatly reduce the risk of injury to themselves and others. ■

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