

APEX WHITEPAPER

Improve Operator Safety and Prevent In-System Damage With Covered Drive Tools

Electric and pneumatic nutrunners and other tools with rotating shafts may seem to pose relatively little injury risk compared with, say, circular saws, but in fact, they can cause significant injury.

Consider the following incidents:

- On May 11, 2011, a worker at a battery manufacturing plant in Southern California was using a pneumatic tool to install bolts in an assembly when his left glove became caught in the tool's driveshaft. The worker's left thumb was amputated and his left wrist was sprained.
- On Feb. 20, 2012, a worker at a machine shop in Central California was polishing a cylindrical part while it was rotating in a portable power drill. His left middle finger was amputated when it accidentally became caught in the rotating mechanism.
- On Aug. 3, 2011, a worker at a defense contractor in Virginia was drilling holes in a part with a handheld electric drill. The driveshaft caught his glove and partially amputated his left pinky finger.



APEX u-GUARD UGS Series bits, bit holders, sockets and extensions are surrounded by a soft plastic cover. The drive tool can spin freely inside the cover, preventing contact between the tool and an assembler's fingers.

Injuries from power tools—both on the job and at home—account for as many as 400,000 emergency room visits annually. Granted, the overwhelming majority of those incidents are related to equipment like power nailers, chain saws and table saws. However, that doesn't mean fastening tools should be taken lightly. Operating at speeds of 250 to 3,000 rpm, these tools are absolutely a potential hazard if workers are not properly trained and equipped for safety.

Fastening tools may not have the sharp edges of a saw, but they more than make up for that in terms of volume. If a vehicle contains 1,000 threaded fasteners

PREVENTING IN-SYSTEM DAMAGE

Accidents do happen, particularly in the hustle and bustle of a high-volume assembly plant. Seemingly minor accidents—such as a power tool slipping off a fastener and marring a Class A finished surface—can cost an assembler thousands of dollars annually. A scratch just 1 centimeter long costs, on average, \$175 to repair.

Of course, that's chump change if a scratched or dented assembly reaches the consumer. The cost of warranty claims, lost sales and consumer goodwill is incalculable.

Fortunately, there are ways to protect assemblies from accidental dings and scratches. A small investment in protective equipment and materials can save assemblers thousands in repair bills.

- **Covered fastener drive tools.** Fastening tools don't have to be dropped or dragged across a finished surface to cause damage. Just using the tool is enough to do harm. When the spinning socket rubs against a surface, it can leave behind a nasty circular scratch. APEX u-GUARD bits, bit holders, sockets and extensions prevent that from happening. These drive tools spin freely inside a soft plastic cover. Nuts and bolts get fastened, but the bit or socket can't scratch a finished surface.
- **Reusable plastic shields.** Tools, air hoses and even belt buckles represent hazards to carefully finished paint jobs. Reusable plastic shields can be placed over fenders, doors and other surfaces prevent dings, dents and scratches on the assembly line. The shields consist of two layers. An impact-resistant outer layer is made from tough plastic. A soft inner layer is made from energy-absorbing foam with a high coefficient of friction, so it won't slip off of vertical surfaces. Shields are typically custom-made to fit a specific part.
- **Protective plastic films.** These thin films are typically made from low-density polyethylene, but they can also be made from polyvinyl chloride, polypropylene or polyethylene. Films protect against dirt and grease from hands and boots, scratches during handling, and impacts from small objects, such as stray fasteners. The films are backed with a light, pressure-sensitive adhesive that has just enough tack to stick to the parts, but not so much that it leaves behind a residue or damages the surface upon removal.



Gap covers guard the gaps between the socket and extension, or between the right-angle tool and socket (or extension).

and an assembly line is turning out 250,000 vehicles annually, that's more than 250 million run-downs. Put another way, that's 250 million opportunities for an accident. Without the right power tools and accessories, that kind of volume can result in an ergonomic and safety nightmare.

Inattention to safety can cost manufacturers dearly. According to data compiled by Missouri Employers Mutual Insurance, the average cost of a lost-time injury claim is more than \$20,000. What's more, the costs of workplace injuries can extend far beyond the cost of medical care. Workplace injuries can decrease morale, raise health insurance premiums, reduce productivity, and increase hiring costs.

Fortunately, these issues can be avoided by creating a corporate culture of safety, providing adequate training, keeping track of maintenance, and investing in the right equipment.

When tightening a fastener, the driveshaft of the tool should be perpendicular to the work surface, and the center line of the driveshaft should be aligned with the center line of the fastener. Operators should avoid using a tool over their shoulders or reaching to tighten a fastener.

The best way to hold a tool depends on its configuration. For pistol-grip and in-line tools, the workpiece should be positioned so the tool can be held with one hand at waist height, with the shoulders squared and the arm slightly bent. If the tool will apply more than 10 newton-meters of torque, it should be mounted on a support arm. A right-angle tool should be operated with two hands. One hand should be near the head of the tool; the other should be at the base of the handle.

Pistol tools are best for horizontal applications at lower torques. In-line tools are for vertical applications. Right-angle nutrunners can be used for both. In all cases, the tool must be held firmly. If the operator lets the tool spin or wobble excessively, this will have a detrimental effect on both comfort and torque accuracy.

Regardless of the configuration of the tool, fingers, gloves, sleeves and hair should be kept away from rotating parts and pinch points. One way to do that is with covered fastener drive tools from APEX Assembly & Fabrication Tools. APEX u-GUARD UGS Series bits, bit holders, sockets and extensions are surrounded by a soft plastic cover. The drive tool can spin freely inside the cover, preventing contact between the tool and an assembler's fingers. In addition to improving operator safety, these tools help minimize in-system damage and marring caused during fastening.

Sockets, extensions, bits, and bit holders are made from tool-grade steel that has been heat-treated using a proprietary process. Each core tool is machined for a precision fit that meets, or in most cases, exceeds industry standards. Improper fit can lead to premature failure of the fastener or the drive tool. APEX bits and sockets run true with minimal wobble. That leads to more efficient fastening and significantly longer tool life.

THE ROLE OF MANAGEMENT IN TOOL SAFETY

Here are some actions your management team can do to make safety a part of your company culture:

- Provide sufficient staffing, funds, time and equipment so employees can work safely and efficiently.
- Demonstrate safe attitudes and lead by example.
- Strive to involve every employee with safety.
- Hold every employee accountable for safety and evaluate performance accordingly.
- Comply with all governmental agencies, insurance carriers and internal procedures.
- Ensure industry best-practices are applied.
- Observe work activities to detect and correct unsafe actions.
- Brief employees on new hazards before they start work.
- Make transitional duty options available for injured employees.
- Consistently enforce safety rules and regulations.
- Acknowledge employees who work safely and set a good example to others.
- Review safety policies annually.

The cover is made from a low-durometer thermoplastic urethane (TPU) material that resists dents from incidental impacts. It absorbs side impacts and does not produce raised burrs when impacted. The cover is molded to the tool, so it doesn't take up extra space, but it still allows the tool to spin freely. A low sustained coefficient of friction between the cover and the tool produces minimal loss of tool efficiency. In addition, the cover is non-removable to prevent unwanted tampering on the line. The cover has a bright orange color, which makes fastener contact easier and station monitoring smoother. Part numbers are clearly marked for ease of identification.

If a standard u-GUARD UGS Series drive tool is unavailable to meet your fastening needs, APEX can create a covered tool configured to suit specific applications. Instead of being molded from TPU, the covers of the u-GUARD UGH Series drive tools are machined from a high-performance, high-durometer engineered thermoplastic. For example, an automotive OEM recently came to us with a safety concern about the snagging of operators' gloves while guiding a tap in a body assembly application. We developed a covered tap holder that includes a spring-loaded, non-marring sleeve that covers the entire tap except the tip. The covered tap holder improved safety and increased productivity.



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Besides covered bits, bit holders, sockets, and extensions APEX also offers Gap Covers, which guard the gaps between the socket and extension, or between the right-angle tool and socket (or extension). These gap covers further enhance operator safety by eliminating one more potential pinch point on a fastening tool. Starting with an engineered thermoplastic material that combines low friction and wear resistance with high impact resistance to ensure a long-lasting part, these covers are then machined for a form-fitting profile.

Covered drive tools and other safety equipment don't obviate the need for thorough training. Training operators to use power tools is more complicated than simply showing them how to pull the trigger. Supervisors must understand the line conditions and vary their training depending on the production rate, access to the assembly, the type of tool, and the workers' level of experience. In addition, training should not be restricted to a classroom or tool crib—it should be done on the assembly line, where the tools will be used.

In an increasingly competitive marketplace, manufacturers cannot afford any hit to the bottom line or any decrease in productivity. By paying close attention to power tool safety—including the adoption of covered fastening tools—manufacturers can prevent worker injuries and in-system damage.

For more information about increasing safety in your plants, call APEX at 800-845-5629, email apex@apex-tools.com, or visit www.apex-tools.com.