

**Hand & Portable Power Tools Safety**

OSHA 1910 - Subpart P – General Industry  
 OSHA 1926 - Subpart I - Construction

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**Hazard Recognition**

- Tools are such a common part of our lives that it is difficult to remember that they may pose hazards
- In the process of removing or avoiding the hazards, workers must learn to recognize the hazards associated with the different types of tools

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**Tools & Tool Use**



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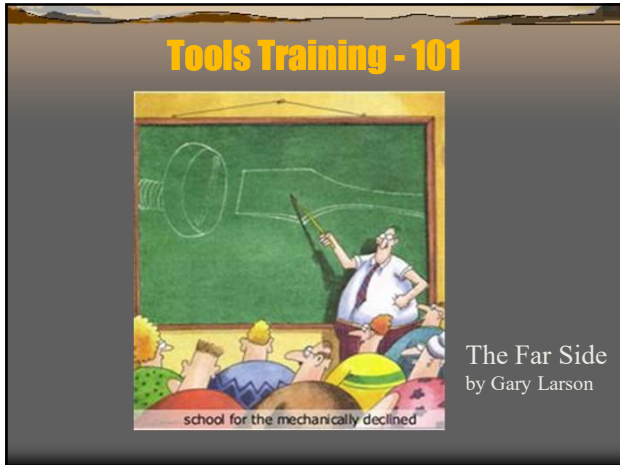
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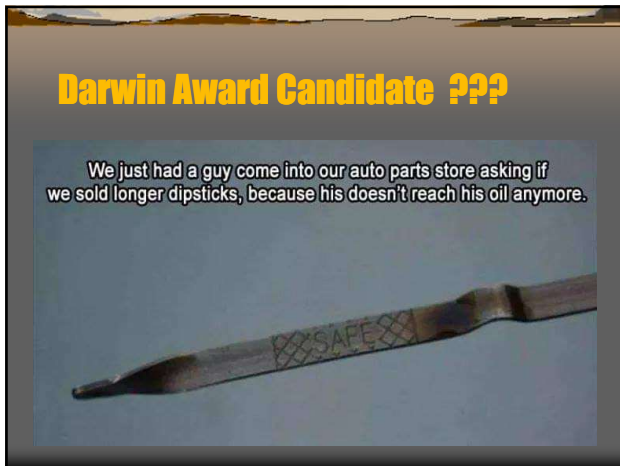
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**Slide 6**

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**LDD-D2** Leix, David D - DWD, 5/19/2020

### Secure the Proper Work Environment



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### Types of Tools

⇒ Manually operated hand tools



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### Standard English vs Metric Units

- inches vs mm -

THIS NEW WRENCH IS AMAZING.

One side is "Standard",



the other side is "Metric".

We truly do live in an age of technological marvels.

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## Presenting the 'Air Hammer 5000'



For when you hire the new guy...

"Hey, do me a favor, grab that air hose over there and hook it up to the hammer sitting on the work bench. Use that to finish this section while I go check on something."

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## Types of Tools

- Power-operated tools
  - Electrical
  - Pneumatic
  - Liquid fuel
  - Hydraulic
  - Powder-actuated





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## Darwin Award Candidate ??



I may be getting old, but I can still spot safety violations. This man has no hard hat, no safety glasses, no hearing protection and no gloves!

**WEEKLY NEWSLETTER**  
**Cal-OSHA Reporter**  
A Weekly Publication For The Occupational Safety & Health Community

**Cal-OSHA Reporter Newsdesk**

**Three More Workplace Fatalities**  
VOL. 45 | NO. 14 | PUBLISHED ON: APRIL 13, 2018

Cal/OSHA is investigating three more workplace fatalities.

Here are the latest incidents:

**In McKinleyville, Humboldt County,** an employee of Forest Solutions, Inc., sustained fatal injuries when a chainsaw he was using to clear brush "struck him in the neck," according to the Division of Occupational Safety and Health.

**In Mountain Pass, San Bernardino County,** an employee of A's Mobile Diesel Repair was killed when a vehicle the mechanic was working on rolled forward, causing devastating injuries.

**In Modesto,** a city employee was electrocuted while doing maintenance work on a streetlight.

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## Hand and Power Tool Hazards

- ⇒ Types of hazards
  - Struck-by
  - Electrical
  - Caught-in



Source: Bahr, H. (2018, 08). Hand Injuries. Retrieved from 11/22/2023. All © Copyright Reserved

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## Hand and Power Tool - Abuse

- ⇒ Types of hazards
  - Struck-by
  - Electrical
  - Caught-in
  - ABUSE
- **ABUSE – Incorrect Use / Application**

**WHY DO THESE PARTS KEEP FALLING OUT OF MY HAMMERS?**



Source: fb Sept 2023

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## 5 Steps to Tool Safety



**The 5 Steps to TOOL SAFETY**

- 1 Check your tools regularly for wear and damage.
- 2 Use the correct tool for the job.
- 3 Keep your tools clean and in good condition.
- 4 Use appropriate safety equipment.
- 5 Keep hands clear of moving parts.

1. Check your tools regularly for wear and damage
2. Use the correct tool for the job
3. Keep your tools clean and in good condition
4. Use appropriate safety equipment
5. Keep hands clear of moving parts; use jigs and fixtures to hold parts

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## Hand and Power Tool Hazards

- Spark-producing tools near flammable sources
- Tools not properly guarded
- Tools not properly grounded
- Inadequate PPE



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## ABC Company's Hand "Tools" Losses - Accidents, Injuries, Claims

- ⇒ 2012 - 2017 (YTD)
- ⇒ 7 - "Tools" – WC Injury Claims
- ⇒ \$102,000 Incurred WC Costs
- ⇒ FB in eyes - 3 cases; 4 "other"
- ⇒ Lacerations – tool caught, "jumped" and struck gloved hand – cut thumb tendon – \$84,700 Incurred (PPD)\* *(\*Ironworker holding piece / using hand as a vice while "cleaning up" pre-cast panel lifting lug weldments with angle grinder...)*



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## Hand Tools - Hazards

⇒ The greatest hazards posed by hand tools result from misuse and improper maintenance:

- Using a screwdriver as a chisel
- A wooden handle on a tool such as a hammer or an axe is loose, splintered, or cracked
- A wrench must not be used if it's jaws are sprung
- Mushroomed heads on chisels, wedges, or drift pins



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### Tool Inspection

- ⇒ Inspect tool(s) before each use
- ⇒ Do not use:
  - tools with taped handles – they may be hiding cracks
  - impact tools (chisels and wedges) when heads have mushroomed
  - tools with loose, cracked or splintered handles
  - wrenches when jaws are sprung
  - a screwdriver used as a chisel or pry bar





Mushroomed head on chisel.

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### Sub – Standard \_ 'Knock-Off' Tools



NICE TRY CHINA  
HEAVY DTUY  
NICE TRY...

Zinc-Plated Wire Rope Clip



Walmart

**THE HOME DEPOT**

\$ 0.97

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the Crosby Group

Forged Wire Rope Clips

G-450 Crosby® Clips

NEW STYLE  
1/2" WIRE ROPE CLIP



1/2" WIRE ROPE CLIP



G-450



SS-450



\$ 1.19 –  
\$ 1.69

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### Hand Tools – Common Hazards – Con't

- Using broken or cracked tools - improperly stored tools – Portable grinders – with cracked/damaged wheels
- Improperly handled tools – using electrical cords or air lines to lift/lower tools
- Unplugging electrical tools by ‘yanking’ on the power cord – re: laziness
- Using air hoses to clean self – “dusting off” – re: 30 psi can still damage soft tissues – perforate the GI tract – cause internal bleeding or an aneurysm – DEATH !!
- Overloading a tool’s rated capacity – ie, come-a-longs, jacks, lifts, tie-down binders – Prohibit “cheater” bars

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### Precautions for Safe Use

- Protect cords
- Store properly
- Use GFCI or AEGC



Assured Equipment Grounding Conductor Program (AEGCP)

Source: NIOSH

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### Hand and Power Tool Hazards

- Harmful materials
- Trips and slips
- Sharp edges/protruding objects



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### Hand and Power Tool Hazards

⇒ Exposure to hazards due to using

- Wrong tool
- Tool used wrong way
- ABUSE – Incorrect Use / Application



Source: TLEX

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### Safe Hand Tool Responsibilities

- ⇒ The employer is responsible for the safe condition of tools and equipment used by employees
- ⇒ Employers shall not issue or permit the use of unsafe hand tools
- ⇒ Employees should be trained in the proper use and handling of tools and equipment
- ⇒ Employees must follow safe work practices and use proper PPE

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### Box Cutter vs. "Finger Cutter"

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### Tools Use / Abuse - Rigging Safety – Sprung Hooks - ¾ Ton Come-Along

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### Improper Tool Use / Improper Loading (Boilermakers - 6 ton come-a-long)

**Description**

- At 4:05pm on Tuesday 7/6/2004 a pipefitter was working on the top of boiler 22 using two six ton come-a-longs to position a 12 inch pipe for welding. Both of the come-a-longs were installed with the hook placed directly over a beam flange (to pull from) in a position that would not allow proper loading of the come-a-long or allow the safety latches to close.
- The cast section of each come-a-long was pressed against the top of the beam placing pressure on that section as the come-a-longs were loaded. The pipefitter was pushing on the handle and had his other hand positioned against a nearby beam for support when the come-a-long casting flew apart. A section of the come-a-long struck the employee on the thumb causing a laceration.

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### Evaluation -

**Evaluation -** In order to evaluate the accident the following actions were taken:

- An interview was held with the injured employee and the others present.
- A visual examination of the broken come-a-long was made.
- The rigging set up was reconstructed in order to assist in evaluating the accident.

The photos are below with notes.

- The employee had no previous experience with a six-ton come-a-long. His experience was with two-ton come-a-longs
- The task is considered common and was being performed under typical conditions.
- The force used to move the pipe was high, but not considered excessive by the employees.
- A handle extension (cheater) was not being used to gain extra force.
- Failure of come-a-longs due to excessive force exerted usually occurs in the handle or clutch assembly.
- The rigging configuration was improper and not in conformance with safe work practices.
- An inclusion is evident in the casting along one of the break lines. See photo.
- While the two JPSAs for the crew were complete for tool inspection, housekeeping, welding and other items, specific rigging techniques were not discussed.

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### Improper Tool Use / Loading

**Notes**  
Position of injured hand

Hook placement over flange

Pressure forcing casting downward onto beam.

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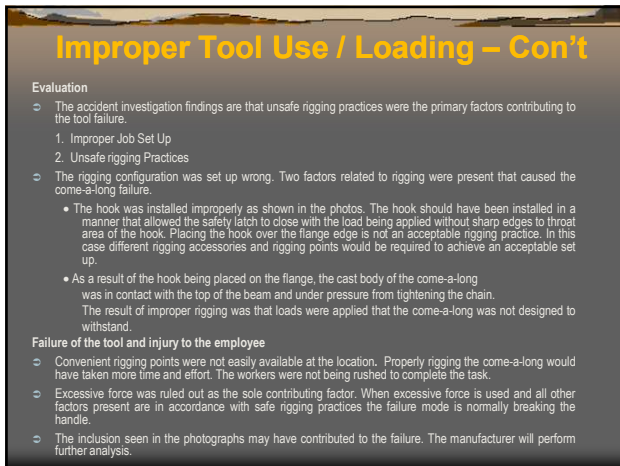
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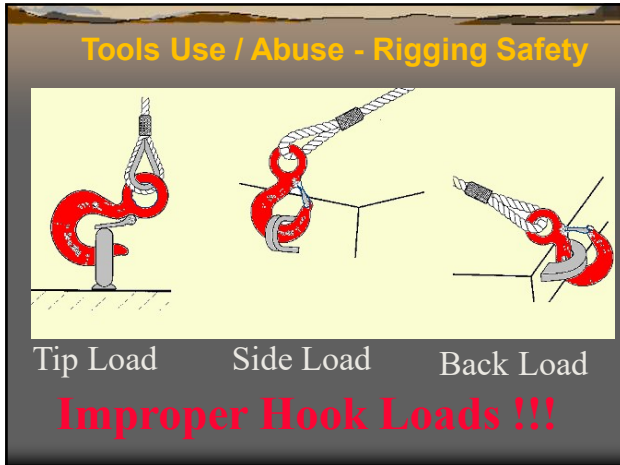
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### Tools Use - Rigging Safety



- Use A Hook Latch For Overhead Lifting
- Shake Out Hooks Are Not Allowed For Overhead Lifting
- The Latch Should Never Carry Any Load

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### Tools Use - Rigging Safety



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### Tools - "Red Tag Out" Program



Not a chance! The cable puller's latch is missing on the throat opening. This can cause the load to detach from the hook. For this reason, the unit was tagged out of service until the latch is replaced.

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**LATCH PURPOSE**

“WHERE REQUIRED, A LATCH SHALL BE PROVIDED”

THE REQUIREMENT IS INDICATED BY THE TYPE OF HOIST EQUIPMENT BEING USED

THE PURPOSE OF A LATCH IS TO BRIDGE THE THROAT OPENING OF THE HOOK, FOR THE PURPOSE OF RETAINING SLINGS OR OTHER DEVICES UNDER SLACK RIGGING CONDITIONS ONLY

THE LATCH IS NOT INTENDED TO SUPPORT THE LOAD

theCrosbygroup inc.

(POH529B) ASME B30.10

Crosby® 2019 The Crosby Group, Inc. All Rights Reserved. REFER TO SECTION IV.A, PAGE 9

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**Lifting Hooks - Safety Latches**

**Crosby – Bullard – “Golden Gate” Hooks**

**HOOKE & SWIVELS**

**Crosby® / Bullard® Golden Gate® Hooks**

- For use where hoisting line or shackles can be inserted into the hook.
- BE D with self-closing gates.
- BE D with non-closing gates.
- Subject to inspection, with continuous rotation under load.
- Use in accordance with applicable regulations, standards and local inspection in accordance with applicable code.
- Crosby®/Bullard® hooks incorporate best types of strategically placed markings to provide the user with a clear visual indication of the hook's condition.
- Angle indicators and Determination indicators with the Golden Gate®/Crosby® logo are available on page 12 for related references.

**SEE APPS CAUTION AND WARNINGS BEFORE USE**

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### Homemade Hooks



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### Welded Hooks



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### “Moussing” – Welding



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## Grinders - Torches - Cutting Tools

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### Hot Work – Sparks & Flames



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## Hand Tools – Hot Spark / Cold Spark



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## Hand Tools – Hot Spark / Cold Spark

➤ Around flammable substances spark-resistant tools made from brass, plastic, aluminum, or wood should be used – Brass, Copper Beryllium & Bronze common

**What is a “non-sparking” tool?**  
 “Non-sparking”, “spark reduced”, “spark-resistant” or “spark-proof” tools are names given to tools made of metals such as brass, bronze, Monel metal (copper-nickel alloy), copper-aluminum alloys (aluminum bronze), or copper-beryllium alloys (beryllium bronze).

Commonly used hand tools are often manufactured of steel alloys. Preferred “non-sparking” metals have less tensile strength than steels usually used to make tools. These tools are softer, wear down more quickly than ordinary steel tools, and have to be dressed more frequently.



Fire Axes  
 \$1,240 – Tool Kit  
 Scraper Drum Wrench  
 Sockets  
 \$1,630 Hammer – copper beryllium

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**Corn Bin Ignites in Washington County – Allentown, WI**

*Milwaukee Journal Sentinel*

Nov. 30, 2009 | A storage bin holding approximately 5,000 bushels of corn caught on fire Monday afternoon in Washington County.

The fire was started from sparks emitted from a grinder being used to do maintenance work on the bin, according to a release from the Allenton Fire Department.

Grain hulls and other byproducts from corn, soybeans and oats products had caught on fire.

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**Hand Tools – Sparks Producing**

- Around flammable substances spark-resistant tools made from brass, plastic, aluminum, or wood should be used



- April 2010 – Columbus, WI – “Hot Work” Hand held grinder spark explosion & Fatality....

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**Explosion at Wis. Manufacturing Plant - Kills Worker**

*Wisconsin State Journal*

[http://host.madison.com/news/state-and-regional/wisconsin/article\\_9e446077-e8b0-5645-92c7-19a323716a.html](http://host.madison.com/news/state-and-regional/wisconsin/article_9e446077-e8b0-5645-92c7-19a323716a.html)

October 19, 2009

Sparks from a power tool were blamed Monday for igniting fumes in a Wisconsin manufacturing plant and setting off an explosion that killed a maintenance worker.

The blast tore through the American Packaging Corp. plant in Columbus on Sunday about 6 p.m., though flames were largely contained by the building's sprinkler system, Koehn said. The victim, a 47-year-old married man from Columbus, worked at the plant for 13 years, Koehn said. His name wasn't immediately released.

The blast occurred as the man was using a hand-held grinder on floor bolts, authorities said. Sparks landed near a washer, a machine where workers use solvents to wash ink.

"Apparently there were residual vapors inside that were ignited," Koehn said.

*Flammable vapors were present when the worker was using a grinder to cut off a bolt while installing a metal floor threshold.*

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## Columbus packing plant cited after fatal explosion



Posted: April 19, 2010 <http://www.jsonline.com/news/wisconsin/91545284.html>

**Madison** — Federal investigators have cited a Columbus packing plant with nearly 30 health and safety violations following a fatal explosion.

Fire officials have said sparks from a grinder ignited vapors set at the American Packaging Corp. in October. The grinder's operator, 47-year-old Jeffrey Doxtator, was killed in the ensuing explosion.

The company faces \$127,350 in proposed penalties. Company Vice President of Operations Dennis Couture says the company will contest the citations.

OSHA began its inspection October 2009 after learning from the company that a maintenance technician was killed during an explosion at the plant. Flammable vapors were present when the worker was using a grinder to cut off a bolt while installing a metal floor threshold.

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## Fire Protection – Control - Hot Work Torch Use – Safety

*(PA Papermill Maintenance Shop)*



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## Torch Flashback Arresters



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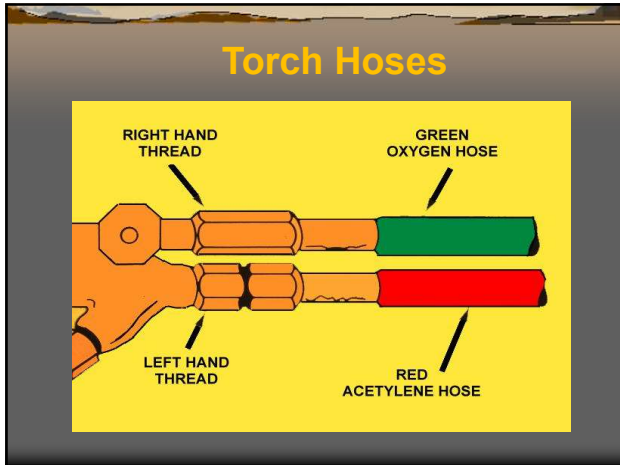
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[TheBakersfieldCalifornian.com](http://TheBakersfieldCalifornian.com)

### Cal-OSHA investigating Arvin tank explosion that kills one, critically injures another

June 19, 2012

ARVIN — The explosion of a decommissioned crude oil tank in a vacant field just north of a stretch of businesses *killed one man, critically injured another* and left questions unanswered about what safety procedures the men used as they worked on the tank.

The men were using a torch to dismantle pipes on top of the tank when vapors inside ignited, blowing the 16,800-gallon container some 30 feet in the air and a distance of 79 feet, firefighters reported.

Arvin resident Cesar Martinez, 24, *was carried some 50 feet into the air and more than 100 feet away*, Kern County Fire Department Capt. Derek Tisinger said. Martinez died just after 9 a.m.

The other worker, identified by their employer Sky-Brand Services as 33-year-old Eric Robles, was *thrown into a nearby chain-link fence*.

The workers believed the tank was empty, Tisinger said.

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[TheBakersfieldCalifornian.com](http://TheBakersfieldCalifornian.com)

### Cal-OSHA investigating Arvin tank explosion that kills one, critically injures another

June 19, 2012

People prepare to do the somber process of transporting the body of a 24-year-old man who died when an empty oil tank exploded. Two men were using a torch to dismantle pipe on the tank in a field behind Kern County Fire Department Station 54 in Arvin when vapors ignited, killing one man and severely injuring the other. The tank that exploded lies on its side in the background.

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**Fond du Lac Reporter**  
PART OF THE USA TODAY NETWORK

HOME NEWS BUSINESS SPORTS PAGES OPINION

Nov. 17, 2017

### Knaus Cheese employee injured after explosion sparks fire

ROSENDALE - Multiple fire departments were called to Knaus Cheese, N5722 Fond du Lac County C, just after 7 a.m. Friday to extinguish a fire caused by an explosion.

According to a news release from the Fond du Lac County Sheriff's Office, employee Travis Klotzbach was cutting an empty 55-gallon barrel with a cutting torch when the explosion occurred, causing injury to his legs, back and face.

Klotzbach was transported by ThedaStar to ThedaCare Hospital, in Neenah. The fire was contained to the auto shop portion of Knaus Cheese, and did result in smoke and fire damage, according to the release.

<http://www.fdlreporter.com/story/news/2017/11/17/knaus-cheese-employee-injured-after-explosion-sparks-fire/873696001/>

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**Ozaukee PRESS**  
Ozaukee's Largest Print and Online News Source

March 14, 2018  
By KRISTYN HALBIG ZIEHM - Ozaukee Press staff

### Explosion blows doors off Port building No one injured when hatch blew off tanker truck

Port Washington police officers and Fire Chief Mark Mitchell responded to Lakeland Cartage late Wednesday morning after an explosion went off in a maintenance garage.

Police Chief Kevin Hingiss said nearby residents called about 11:40 a.m. Wednesday to report the explosion, which blew out the garage doors and a portion of the roof. A number of calls were received by police, with some callers reporting they saw a puff of smoke, he said.

There were two workers inside the building working to clean a tanker truck used to haul soapy water from Kleen Test Products, Hingiss said. **The employees were heating a bolt when they heard what sounded like "a very muffled explosion," he said.**

The next thing they knew, Hingiss said, the hatch atop of tanker truck blew up.

<http://www.ozaukeepress.com/content/explosion-blows-doors-port-building>

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**Waukesha FREEMAN**

July 19, 2016  
By Katherine Michalets - Freeman Staff

### Tank launched from Waukesha Metal & Iron, crashes through roof

*Large hole in Mander Collision's roof, fence damaged on Harding Ave*

WAUKESHA — Employees at Mander Collision & Glass heard a loud boom Saturday afternoon — then about 10 seconds later a huge chunk of steel came crashing through the business's roof, punching a large hole, said President Nathan McPherson. No one was injured.

Waukesha Fire Marshal Brian Charlesworth said a compressed natural gas cylinder measuring about two to three feet in length and 12 inches in diameter was launched from Waukesha Metal & Iron, 1351 Main St., around 1:10 p.m. Saturday when it was being processed. He said the tank was labeled that it had been purged, but obviously that was not the case.



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## Power Tools

- Electric
- Pneumatic
- Liquid fuel
- Hydraulic
- Powder-actuated



*Blade Installed Backward!!  
⊗ An Accident Waiting to Happen!! ⊗*

**What's Wrong Here ?**

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## Dangers of Power Tools

**\*\*\* Warning – Graphic Images \*\*\***



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## Why Risk a Finger, Fingers or a Hand?



\$2.99 - \$9.95



\$14.95



\$19.95

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### Power Tools Safety Precautions

- ⌚ Never carry a tool by the cord or hose
- ⌚ Never 'yank' the cord or the hose to disconnect it from the receptacle
- ⌚ Keep cords and hoses away from heat, oil, and sharp edges
- ⌚ Disconnect tools when not using them
- ⌚ Keep all people not involved with the work at a safe distance from the work area



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### Power Tools Safety Precautions

- ⌚ Secure work with clamps or a vise freeing both hands to operate the tool
- ⌚ Avoid accidental starting
- ⌚ Maintain tools with care
- ⌚ Follow instructions in the user's manual for lubricating and changing accessories

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### Power Tools Safety Precautions

- ⌚ Be sure to keep good footing and maintain good balance when operating power tools
- ⌚ Wear proper apparel for the task
- ⌚ Remove all damaged portable electric tools from use and tag them: "Do Not Use"



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**Contractor Hand Tools**

**Man Survives Drill Through Skull –**  
CBS News - Reno, NV



<https://www.cbsnews.com/news/man-survives-drill-through-skull/>

Sep 3, 2003 - The construction worker lost an eye but survived a freak accident without brain damage after falling from a ladder and onto an 18-inch-long drill bit that impaled his skull.

"I'm very fortunate I'm not paralyzed or dead," the 41-year-old electrician said Friday. The 1.5-inch diameter chip auger drill bit was still in ...

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**Contractor Hand Tools**

**Man Survives Drill Auger Bit Through Skull – Reno, NV**  
September 3, 2003

<https://www.cbsnews.com/news/man-survives-drill-through-skull/>





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**Man Survives Drill Auger Bit Through Skull – Reno, NV** - September 3, 2003

<https://www.cbsnews.com/news/man-survives-drill-through-skull/>

Ron Hunt's friends have good reason to call him the "Miracle Man." The construction worker lost an eye but survived a freak accident without brain damage after falling from a ladder and onto an 18-inch-long drill bit that impaled his skull.

"I'm very fortunate I'm not paralyzed or dead," the 41-year-old electrician said Friday.

The 1.5-inch diameter chip auger drill bit was still in his head when his brother, Chris Hunt, and nephew, Ben, met him in a hospital emergency room in Reno, Nevada.

**While drilling above his head on Aug. 15, the six-foot ladder Ron Hunt was standing on started to wobble so he tossed the drill aside — as construction workers are trained to do.**

**But he fell off the ladder face-first and onto the drill.**

"I ran my hands up the drill bit, up to my eye, and put my other hand in the back of my head and felt it coming through the back of my head," he said. "And that's where pretty much the shock set in."

Doctors said the drill bit pushed his brain aside rather than pushing into it, which likely would have caused serious brain damage or death. After weighing their options, doctors essentially unscrewed the bit to remove it.

His nephew thinks he'll be able to laugh about it someday.

"It's just going to be one of those stories," Ben Hunt said. "He'll joke around with his glass eye and pop it out."



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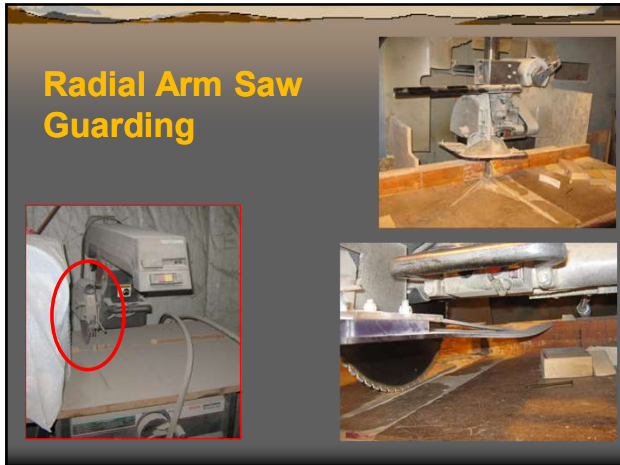
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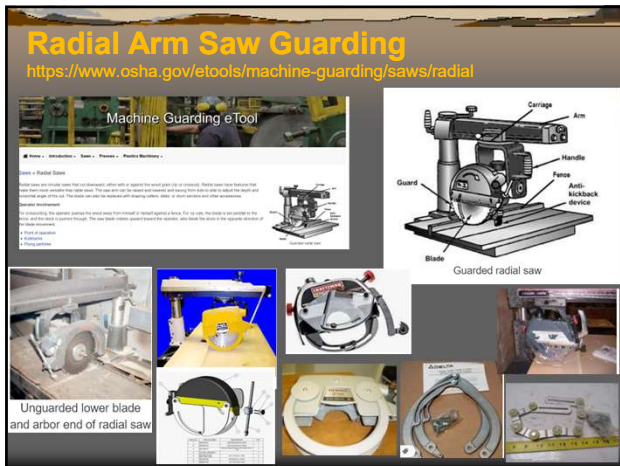
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## Bench Grinder Safety



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## Precautions for Safe Use

- Abrasive wheels and tools
  - Equip with guards.
  - Before mounting, inspect and test.
  - Follow manufacturer recommendations for operating speeds.



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## Precautions for Safe Use – con't

- Accelerate wheel to operating speed before beginning task.
- Do not stand in front of grinding wheel as it comes up to speed.
- Properly adjust (1/8" opening) and use work rest.



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**Safety|Smart!**

<http://www.osha-safety.com/>  
[http://www.safetysmart.com/Article/070507/pic\\_pic.htm](http://www.safetysmart.com/Article/070507/pic_pic.htm)

**PICTURE THIS!**



Photo courtesy of David Feltz/OSHA

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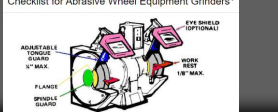
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**Bench – Pedestal Grinder Safety**



**Checklist for Abrasive Wheel Equipment Grinders<sup>1</sup>**



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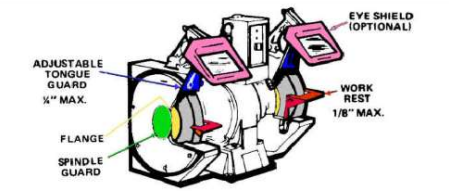
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UNITED STATES DEPARTMENT OF LABOR  
 Occupational Safety and Health Administration

<https://www.osha.gov/SLTC/machineguarding/new-grinder-checklist.html>

**Checklist for Abrasive Wheel Equipment Grinders<sup>1</sup>**



<https://www.osha.gov/SLTC/machineguarding/new-grinder-checklist.html>

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## Guarding – con't

- ⇒ Guard
  - Exposed moving parts
  - Point of operation, in-running nip points, and rotating parts
  - Flying chips and sparks
  - Abrasive wheels and cutting blades
  - Never remove guards when tool is in use



Source of photos: OSHA

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## Guarding

- ⇒ Properly guarded blower



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## Operating Controls and Switches

- ⇒ Drills
- ⇒ Tappers
- ⇒ Fastener drivers
- ⇒ Horizontal, vertical, and angle grinders with wheels more than 2 inches (5.08 centimeters) in diameter
- ⇒ Disc sanders with discs greater than 2 inches (5.08 centimeters)
- ⇒ Belt sanders



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## Identify – Control Hazards



Grinder guard removed to accommodate larger wheel.

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## SafetySmart! - Weekly Briefing - Monday • June 6, 2005

<http://www.safetysmart.com/>

### COULD THIS HAVE BEEN YOU? BROKEN GRINDING DISK KILLS WORKER

A chunk of broken grinder disk smashed a worker's face shield and hit him in the forehead, causing a fatal head injury.

About 10 hours into the shift, the grinder disk broke and a piece flew into his face. A co-worker heard an unusual sound and came to investigate. He found the victim lying on the ground and bleeding heavily. Emergency medics were not able to revive him, and a medical examiner pronounced him dead at the scene.

This fatality was caused by incorrect use of the angle grinder. The tool was missing a safeguard. The cutoff saw disk installed on it was 4.13 inches (105 millimeters) larger in diameter than the size recommended by the manufacturer, and the ring size was too large for the shaft of the grinder.

The grinder was designed to use a depressed center disk. Instead, the flat-surface cutoff saw disk was installed without adequate support in the center. In addition to failure to follow the manufacturer's instructions, the missing safety guard indicates a weakness in supervision.

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## ACCIDENT ALERT - FATAL GRINDER ACCIDENT AT QUARRY INCIDENT

[HTTP://WWW.OSH-DOL.GOV.TZ/PUBLICATIONS/SERIES/AA-FATALGRINDERATQUARRY.HTML](http://www.osh-dol.govt.nz/publications/series/aa-fatalgrinderatquarry.html)

OCTOBER 2004

A welder was carrying out maintenance on a quarry excavator bucket. He was using an angle grinder to prepare surfaces for welding when the disk disintegrated



Angle grinder and disintegrated disk

### CIRCUMSTANCES

The hand-held angle grinder was fitted with a 230 mm diameter cutting-off wheel and when it disintegrated, fragments penetrated the victim's chest and abdomen. He was rushed to hospital by rescue helicopter but died the same day.

### INVESTIGATION

This is continuing but initial inspections show that the grinding machine and cutting disk were not compatible - and the grinder was not fitted with a guard.

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**ACCIDENT ALERT - FATAL GRINDER  
ACCIDENT AT QUARRY INCIDENT – Con't**

**RECOMMENDATIONS**

Grinding machines and abrasive wheels should always be used in accordance with the manufacturer's instructions.

In particular:

- Always ensure the maximum speed (the no load rpm) marked on the abrasive wheel is greater than the rated speed of the grinder.
- Do not use grinding wheels that are larger than the maximum recommended size, or worn down wheels from other grinders.
- Never use grinding wheel power tools without the wheel guard attached to the tool and positioned for maximum safety.
- Store and handle abrasive wheels with care and inspect them for chips or cracks before installing. Do not use any wheel that may be damaged.
- Refer to OSHA Standard 1910.215 - Abrasive Wheels for more detail.



Angle grinder and disintegrated disk

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**The worst of a home built, make-shift - bench motor grinder ? or, a cut off wheel disk grinder ??**



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**Operating Controls and Switches**

- ⇒ Reciprocating saws
- ⇒ Saber saws
- ⇒ Scroll saws
- ⇒ Jigsaws with blade shanks greater than 1/4-inch (0.63 centimeters) wide
- ⇒ Other similar tools



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### Operating Controls and Switches

- ⇒ The following hand-held power tools must be equipped with either a positive “on-off” control switch, a constant pressure switch, or a “lock-on” control:
  - Disc sanders with discs 2 inches (5.08 centimeters) or less in diameter
  - Grinders with wheels 2 inches (5.08 centimeters) or less in diameter
  - Platen sanders
  - Routers

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### Operating Controls and Switches

- Planers
- Laminate trimmers
- Nibblers
- Shears
- Jigsaws, saber and scroll saws with blade shanks a nominal 1/4-inch (6.35 millimeters) or less in diameter

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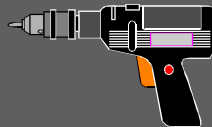
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### Electric Tools

- ⇒ Hazards in using electric tools include:
  - Electrical burns
  - Shock
- ⇒ To protect the user, tools must:
  - Have 3-wire cord with a ground
  - Plugged into a grounded receptacle
  - Be double insulated or powered by low voltage




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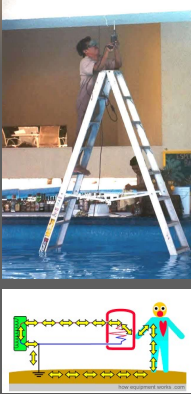
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### Electric Tools – con't

- Operate electric tools within their design limitations
- Use gloves and appropriate safety footwear when using electric tools
- Store electric tools in a dry place when not in use
- Do not use electric tools in damp or wet locations unless they are approved for that purpose
- Keep work areas well lighted when operating electric tools
- Ensure that cords from electric tools do not present a tripping hazard



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### Identify & Correct Hazards



Hand-held sander with exposed wires, broken housing should be "red tagged," not be used.

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### Electrical Components



Electrical components within a area pose many hazards.

To minimize the danger of these hazards, machines must always be grounded, circuit breakers and fuse boxes must be labeled, cords, cables, and plugs must be kept in good repair, and outlets, switches, and fittings must be covered.

Any compromise in these or other safety precautions could lead to serious injury, even death.

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## Identify Hazards – “Red Tag” Defective tools – program

**Electrical Shock**  
The body becomes part of an electrical path.

Line-to-ground fault energizes metal parts

Broken Terminal

1000 Ohms

120V

$I = E/R$   
 $120V/1000\Omega = 120\text{ mA}$

Grounded Object or Surface

This three-prong grounding plug has the ground prong broken off.

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## Double Insulated Electric Tools

### Electric Power Tools

To protect a worker from shock, these tools must:

- > have a 3-wire cord plugged into a grounded receptacle
- > be double insulated, or
- > be powered by a low-voltage isolation transformer

Double insulated markings

Plug with a grounding pin

**Class 2 electrical appliances**

- Desktop printers
- Hedge trimmers
- Lawnmowers
- Drills
- Food mixers
- Lamps
- Televisions
- DVD players
- CD players
- Hairdryers
- Hair straighteners

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## Double Insulated Electric Tools

- Double insulated tools are labeled.
- It will be marked “Double Insulated”.
- It will have the following symbol:

**Class II equipment**  
The symbol for class II equipment is 2 concentric squares indicating double insulation as shown below.

**Double insulated symbol**

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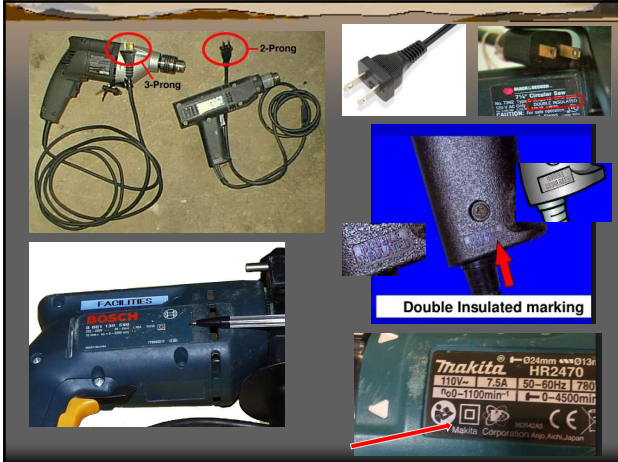
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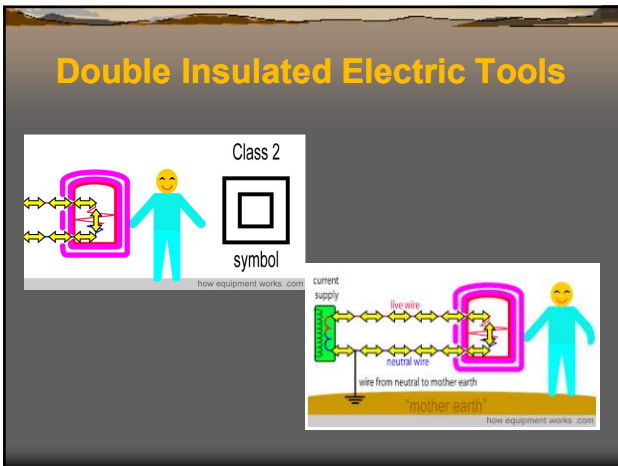
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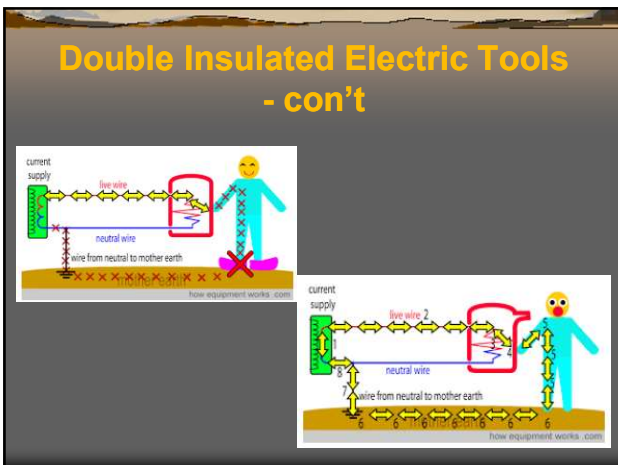
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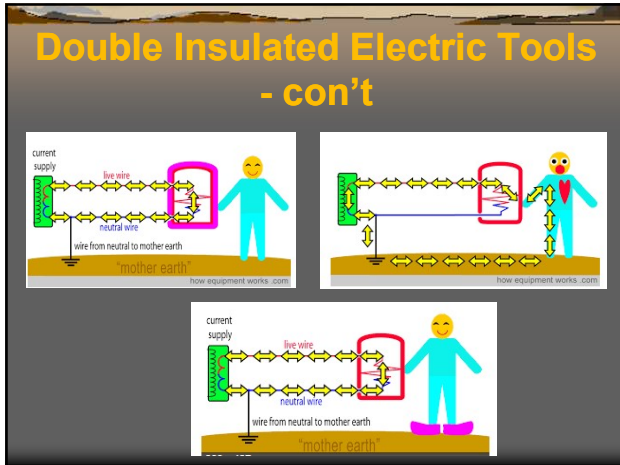
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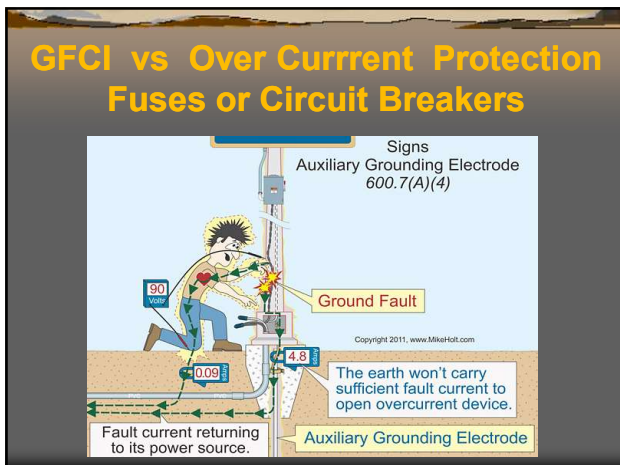
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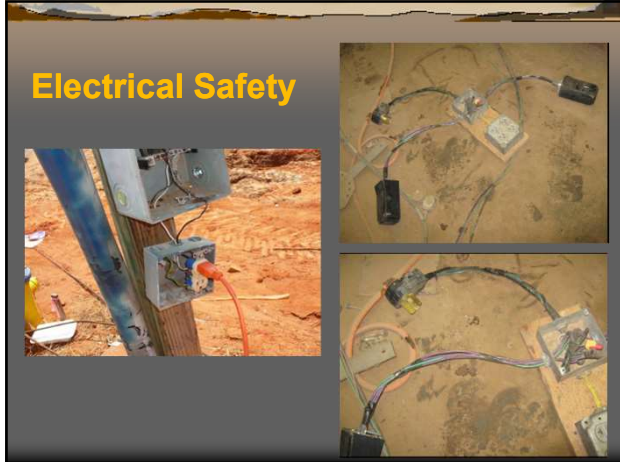
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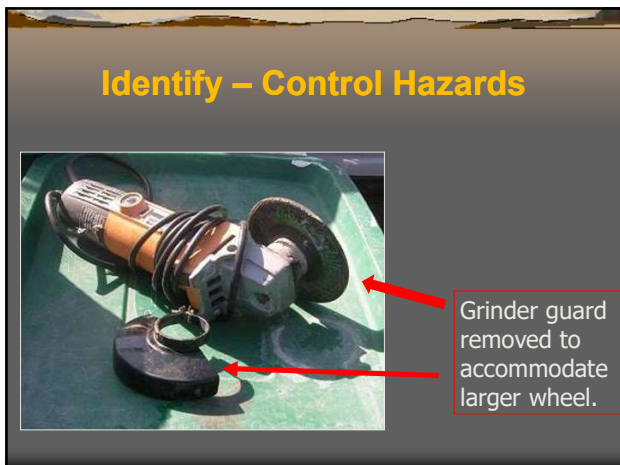
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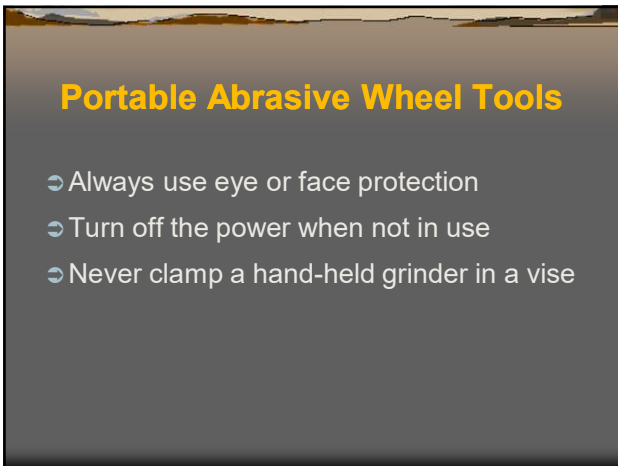
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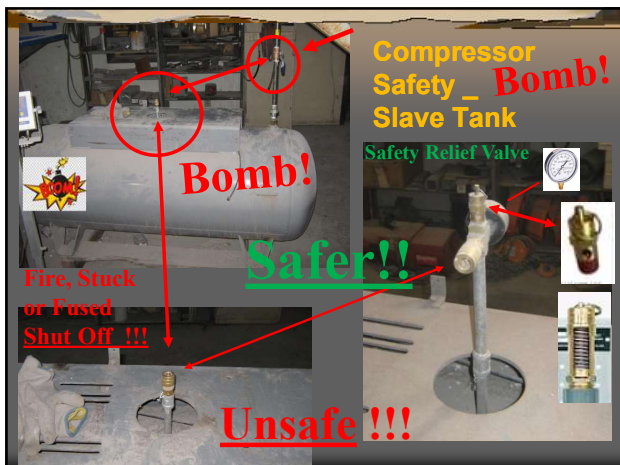
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## Precautions for Safe Use

- Pneumatic tools
  - Use same precautions with air hose as with electric cords
  - Securely fasten air hose to tool and safeguard with a positive locking device



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## Pneumatic Tools

- When using pneumatic tools, a safety clip or retainer must be installed to prevent attachments such as chisels on a chipping hammer from being ejected during tool operation
- Pneumatic tools that shoot nails, rivets, staples, or similar fasteners and operate at pressures more than 100 pounds per square inch must be equipped with a special device to keep fasteners from being ejected, unless the muzzle is pressed against the work surface

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## • Precautions for Safe Use

- Equip tool with device to keep fasteners from accidentally being ejected.
- Use screens to protect nearby workers.
- No not use compressed air for cleaning off clothing.





Source of photos: OSHA

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## Pneumatic Tools – con't

- ⇒ Eye protection is required,
- ⇒ Head and face protection is recommended
- ⇒ Screens must be set up to protect nearby workers from being struck by flying fragments from:
  - Chippers
  - Riveting guns
  - Staplers
  - Air drills

*OSHA Prohibits 'dusting off' clothing and one's body...*

*OSHA Violation ... Standard 1910.242(b) & 1917.154 ... explicitly prohibits the use of compressed air for personnel cleaning ...' Maritime Std Interpretations*



➤ Prohibit 'Dusting Off'

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## Safety Glasses – USE THEM !!!

**An Eye Saved by Safety Glasses**



A Boeing employee convinced his 18 year old son working in Construction to wear Safety Glasses





ANSI Z87.1 - ???

**NEAR MISS SAFETY ALERT!**

**EYE PROTECTION**



*The screw went straight into the lens, but no metal went through.*





"Street Wear" – Tempered Safety Lenses - Glasses ... vs ANSI Z87.1

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## No Safety Glasses – Wire Wheel Use

\*\*\* Warning – Graphic Image !! \*\*\*

**Incident:**

This incident occurred to the father of the environmental manager of one of our ADM facilities. He was working in his shop on their farm in upstate Iowa on Thursday, September 4<sup>th</sup>. He was using a grinder with a wire wheel and he was using his safety glasses as well. When he stopped grinding, he took his glasses off. He saw a spot he missed and picked up the wire wheel and turned it on but failed to put his safety glasses back on. A loose strand flew up and landed squarely in his eye. He was taken to his local medical center where they gave him some sedatives and sent him on to the Mayo clinic. Four hours later they performed surgery on him to remove the wire. During his recovery from surgery, he aspirated vomitus into his lungs and was placed into intensive care for a day. He was released from the hospital after 3 days and is expected to make a full recovery but with some vision impairment that will be correctable by glasses or contact lenses (he did not need these before the incident). The wire strand punctured his eye to a depth of 1/2 inch. They tell us this picture will make the ophthalmology text books!

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### No Safety Glasses – Wire Wheel Use





The wire strand punched his eye to a depth of 1/2 inch.

They tell us this picture will make the ophthalmology text books!

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### PPE – Eye – Head



**Nothing Like A Flammable Welding Mask**  
The point of a welding mask is both to protect your eyes from the brightness of the flames as well as your face from any sparks.

This man's mask doesn't accomplish either of these. On top of that, he's using a newspaper to protect his face which is flammable. All it would take is one spark landing in the perfect spot to set that whole thing alight.

3/09/21 - <https://www.postfun.com/lol/safety-clearly-wasnt-a-concern/8/2D3e=1>

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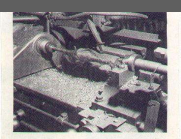

### Acceptable Risks - Results??

#### Hair & Jewelry - Consequences of Risk

**\*\*\* Warning – Graphic Image !! \*\*\***

**Who Me?**

THIS could not happen to me, one thinks, but it did happen. This young woman was literally scalped, as these photographs so graphically illustrate. What happened? She bent over to clean the air ports on a lathe she was operating, and her hair became entangled with a moving part of the lathe. It pulled her hair out and pulled a portion of her scalp loose from her head. Except for a small portion of her scalp at the back of her neck, she would have lost her scalp entirely. She was also pulled against the machine with such force that she was discovered unconscious and losing a tremendous amount of blood. She is lucky to be alive. Because the doctors are not sure her hair will grow back, it is very possible that she will have to wear a wig for the rest of her life. At the time the accident occurred she was not wearing

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### Jewelry - Consequences of Risk

\*\*\* Warning – Graphic Images !! \*\*\*



Machinist – wedding ring caught on CNC spindle

Rings – Pose Degloving Dangers !!!

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### Foot Protection – Steel Toes

Darwin Award Candidate ???



Don't be this guy...!!

This guy wanted to see if steel toe boots would stop a 45 cal. Bullet.

May 2017 \_ fb

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### Pneumatic Tools – con't

- ⇒ Jackhammer hazards
  - Vibration
  - Strains
  - Noise
- ⇒ Use requires proper PPE
  - Eye and face protection
  - Safety shoes
  - Hearing protection
  - Possibly respiratory protection



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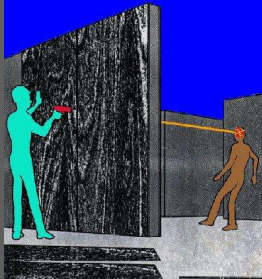
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### Fatal Fact



- ⇒ Employee killed when struck in head by a nail fired from a powder actuated tool.
- ⇒ Tool operator was attempting to anchor a plywood form in preparation for pouring a concrete wall

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### Nail Gun - Safety

*“A nail gun is an aptly named tool – it operates like a hand gun, but shoots nails instead of bullets.”*

- ⇒ Some Nail gun Facts:
  - Powerful tools can fire up to nine nails per second
  - Velocities as high as 1,400 ft. per second
    - In 1997 - estimated 8,700 injuries
    - In 1998, there were more than 10,500
    - In 2001 there were more than 14,600.
    - How many this year?????

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### Nail Gun - Safety Meets Sarcasm



**Sarcasm Meets Humor**  
Apr 29, 2018 at 5:11 PM ·

DeWalts answer to home protection that doesn't require a registration or license. This nail gun can shoot a 16-D nail through a 2x4 at 200 yards and incase of a home invasion well you can NAIL THEIR ASS to the wall. Im not saying it wont kill the perp but they wont get away. You can also help build a friends fence 2 blocks away while sitting in your front lawn. This is truly how you adapt and overcome so Thanks Dewalt.

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### A Sign of a Serious Problem

Nail Gun Accidents make the news regularly...

- **DENVER, CO., August 2002** —  
*"A man is lucky to survive a freak nail gun accident that lodged a nail in his skull."*
- **ATLANTA, GA., November 2003** —  
*"The dog, named Caesar, was in his own backyard according to his owners, when he was shot by a construction worker next door."*



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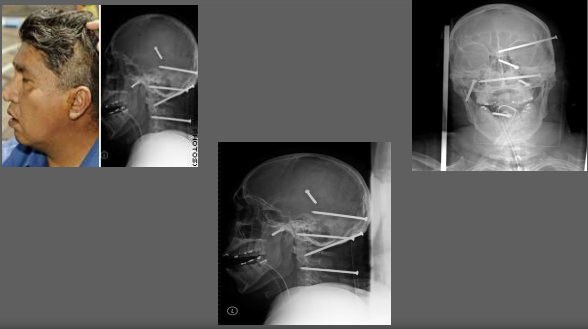
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### Contractor Tools – Pnuematic Nailers



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**.... Mejia told authorities he remembered a "shock" to the back of his neck and little else before passing out"**



Mejia and the other man apparently were atop wooden trusses and were helping secure the frame of the house when Mejia lost his balance, fell into the other man and then plunged 15 feet to the ground, said Dean Fryer of the state's Division of Occupational Health and Safety, which is investigating the accident.

(PROVIDENCE HUNTER CROSS THEORICAL CENTER/PH)

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**Incident Review – Nail Gun Incident**



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**Nail Gun Safety**

Common Injuries

- Injuries to the extremities such as hands, feet, arms and legs.
- Potentially fatal injuries to the head, neck and heart.
- Workers have also been injured from concrete and wood chips flying from the nailed surface.
- Injuries are just as common to others in work area.
- It is a dangerous tool if not used properly!



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### OSHA - Hazard Alert

- ⇒ In 2001 the Occupational Safety and Health Administration (OSHA) issued a hazard alert to warn about the dangers of pneumatic nail guns.
- ⇒ Recent injury accidents involving the use of pneumatic nail guns, have raised concerns about safe operating procedures. These injury accidents could have been easily prevented by adhering to the following simple safety procedures for the use of air nailers:

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### Safety Procedures for the Use of Air Nailers:

#### Training is the Key:

- ⇒ Review the owner's manual carefully with all operators.
- ⇒ Have someone who is familiar with the tool demonstrate safe operating procedures. Then have each employee take a turn on the tool, and watch how each one performs.
- ⇒ Always wear safety glasses.

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### Safety Procedures for the Use of Air Nailers:

- ⇒ Do not hold the trigger down unless you're purposefully firing the tool. This is especially important when descending ladders.
- ⇒ Workers often carry the gun with their finger on the trigger.
- ⇒ It is a comfortable carrying position, but very unsafe.




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**Safety Procedures for the Use of Air Nailers:**

- ⇒ Workers often check for air pressure by pulling the trigger (A short hiss will sound if there is pressure)
- ⇒ When doing this, the gun may also discharge if safety tip is stuck in the engaged position.
  - Dirt or small rocks can get in it if they lay it on the ground often
  - Is the Spring in it?
  - Gun maintenance
  - Operator experience



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**Safety Procedures for the Use of Air Nailers:**

- ⇒ Exercise extreme caution when using an air tool around another worker.
  - Who is on other side of a wall or under sheathing.
- ⇒ Never point the tool at anyone. Treat the tool like a firearm.
- ⇒ Never assume the tool is empty.

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**Safety Procedures for the Use of Air Nailers:**

- ⇒ Keep your free hand safely out of the way of the tool.
- ⇒ Which picture show the safer way? Why?
- ⇒ Is there a thing called “technique”. Do you see it?



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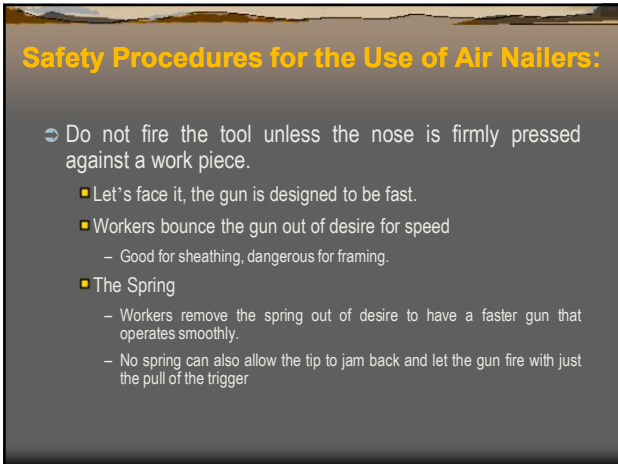
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**Safety Procedures for the Use of Air Nailers:**

- ⇒ Disconnect the air hose before clearing a jam or making adjustments.
  - Common sense but people are complacent...
- ⇒ Do not leave a Nail Gun powered and unattended.
  - Its like a loaded gun.
  - Would you want this thing landing on your head?



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**Safety Procedures for the Use of Air Nailers:**

- ⇒ Nail top to bottom when nailing wall sheathing in a vertical position.
- ⇒ Nail from the eaves to the ridge when nailing roof sheathing, this way you will not back off the edge of the roof.
- ⇒ Move forward, not backward, when nailing horizontal areas.
- ⇒ Secure the hose when working on scaffolding, to prevent the weight of the hose from dragging the tool off the scaffold if you set the tool down.

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**Differences in Nail Guns**

- ⇒ There are many different features
- Most older guns only have one feature, Rapid Fire



- Trigger has no adjustment

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### Differences in Nail Guns

⇒ Some newer guns have a setting for Single Shot vs. Rapid Fire.

➤ Back for Single Shot

➤ Forward for Rapid Fire

➤ Most Carpenters do not care about single shot or don't know there is an option.

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### Safety Devices...Do They Work?

- ⇒ Most modern nail guns are built with safety catch devices which imposes two separate firing triggers.
- ⇒ The gun has a catch that holds the blade in place and to release the catch one must press the gun against the intended surface while depressing the firing trigger.
- ⇒ A flaw of this system is that it allows users to keep the trigger depressed to quickly fire nails by merely apply the gun to the intended surface.
  - Designed for speed. ....Its what the user wants.

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### Safety Devices...Do They Work?

- ⇒ Many accidental discharges result from workers, in tight spaces, accidentally bumping into one another and the nail gun.
- ⇒ Other Injuries result from carrying the gun with a finger on the trigger and bumping the leg or other part of the body.
- ⇒ Injuries may occur when catch gets jammed from poor maintenance or tool neglect.

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### Safety Devices...What is the Future?

- ⇒ A safer gun is one that employs a sequential trip system which requires that the trigger be pulled each time before the surface is nailed.
  - Available on some guns with the adjustment.
- ⇒ Manufacturers have not produced many guns with sequential trip systems due, in part, to excessive costs as well as the fact that most users prefer the convenience and speed of the nail guns without the sequential trip device over the safety benefits of the guns with them.

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### Nail Gun Injury Cases

- ⇒ There have been numerous cases of operators, as well as bystanders being injured when both of the activation mechanisms- usually a safety wire at the muzzle and the trigger are simultaneously depressed unintentionally.
- ⇒ The nail may strike and cause sever injury.
- ⇒ Fatal injuries have occurred.
- ⇒ The hand is the most commonly injured part. Usually the non-dominant hand is the one that is injured.



Remember this?

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### Nail Gun Injury Cases

- ⇒ Mechanisms of nail gun injury include direct penetration-shrapnel wounds from exploding cartridges, and high-pressure injection injuries from the compressed air used to activate the gun.
- ⇒ The types of hand injury encountered include direct bony injury to the phalanges, metacarpals, carpus, radius or ulna, and penetrating injuries of the interphalangeal and radiocarpal joints.
  - The majority of injuries involve soft tissue injuries.




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**REGULATIONS**

- ⇒ **CALIFORNIA Code of Regulations**  
§1704. Pneumatically Driven Nailers and Staplers.
- ⇒ (a) All pneumatically driven nailers and staplers which operate at more than 100 psi pressure at the tool, shall have a safety device on the muzzle to prevent the tool from operating unless muzzle is in contact with the surface, to prevent accidental discharge.
- ⇒ (b) When not in use, or unattended, all pneumatically driven nailers and staplers shall be disconnected from the air supply at the tool.
- ⇒ (c) All hoses exceeding 1/2 inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.
- ⇒ (d) When these tools are used on roofs of 1/2 pitch and steeper, the operator shall wear a safety harness with a lanyard securely fastened to a substantial anchorage. On roofs of 1/4 pitch or steeper, the air hose shall be secured at roof level in such a manner as to provide weight, but not excessive, amounts of hose.

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**REGULATIONS**

- ⇒ **Federal OSHA: 1926.300(a)**
- ⇒ Condition of tools. All hand and power tools and similar equipment, whether furnished by the employer or the employee, shall be maintained in a safe condition.
- ⇒ **1926.302(b)(1)**
- ⇒ Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.

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**REGULATIONS**

- ⇒ **1926.302(b)(2)**
- ⇒ Safety clips or retainers shall be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.
- ⇒ **1926.302(b)(3)**
- ⇒ All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 p.s.i. pressure at the tool shall have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.

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### Summary

- Nail Guns are here to stay.
- Extremely dangerous if used improperly.
- Thorough worker training and oversight is key (use the manufacturers instructions for training).
- Reminders and retraining are tools to maintain the concepts fresh and the awareness high.
- Proper tool maintenance must follow manufacturers instructions.
- The company's Code of Safe Practices must be followed.
- ZERO TOLERANCE for improper use or care of the nail gun sends the message to all workers that management is involved and is serious about prevention of nail gun incidents and injuries.

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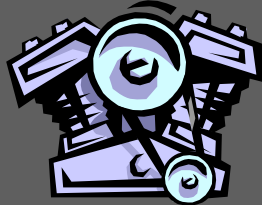
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### Liquid - Gas - Fuel Tools

- Fuel-powered tools are usually operated with gasoline
- Hazards include:
  - Fuel vapor
  - Exhaust fumes
  - CO levels
  - Fire and explosion potential



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### Liquid Fuel



- What is wrong with this picture?

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### Powder Actuated Tools

- ⇒ Operate like a loaded gun and must be treated with extreme caution
- ⇒ Must be specially trained
- ⇒ Muzzle end of the tool must have a protective shield or guard
- ⇒ Two separate motions are required for firing

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### Precautions for Safe Use

- ⇒ Powder-actuated tools
  - Treat with extreme caution
  - Must be trained and licensed
  - Wear suitable PPE



Source: TLEX

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### Precautions for Safe Use – con't

- Select appropriate powder level for tool and task
- Test tool to ensure safety devices work
- Inspect tool
- Do not use defective tools



Source: TLEX

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## Precautions for Safe Use – con't

- Do not load tools until just prior to use
- Never point tool at anyone
- Keep hands clear of open barrel end
- Never leave loaded tool unattended
- Do not drive fasteners into materials that are very hard, brittle, or easily penetrated
- Do not drive fastener into a spalled area
- Use manufacturer-recommended shields, guards, or attachments.
- Store unloaded in a locked box.

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## Powder Actuated Tools Safety

(OSHA Focus 4 – Struck By Hazards ppt – Dec 2014)



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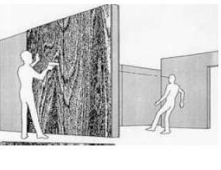
## Powder Actuated Tools Safety

(OSHA Focus 4 – Struck By Hazards ppt – Dec 2014)

**ACCIDENT REPORT**  
**Fatal Facts**

**ACCIDENT SUMMARY No. 2**

|                                        |                     |
|----------------------------------------|---------------------|
| Accident Type:                         | Struck by Nail      |
| Weather Conditions:                    | N/A                 |
| Type of Company:                       | General Contractors |
| Size of Work Crew:                     | 17                  |
| Union or Non-union:                    | Union               |
| Worksite Inspection?:                  | No                  |
| Designated Competent Person on Site?:  | No                  |
| Employer Safety and Health Program?:   | No                  |
| Training and Education for Employees?: | No                  |
| Craft of Deceased Employee(s):         | Carpenter           |
| Age;Sex:                               | 22; Male            |
| Time of the Job:                       | 3:00 p.m.           |
| Time at the Task:                      | Unknown             |



**BRIEF DESCRIPTION OF ACCIDENT**  
A carpenter apprentice was killed when he was struck in the head by a nail that was fired from a powder actuated tool. The tool operator, while attempting to anchor a plywood form in preparation for pouring a concrete wall, fired the gun causing the nail to pass through the hollow wall. The nail travelled some twenty-seven feet before striking the victim. The tool operator had never received training in the proper use of the tool, and none of the employees in the area were wearing personal protective equipment.

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## Powder Actuated Tools

⇒ Safety precautions – Summary:

- Do not use a tool in an explosive or flammable atmosphere
- Inspect the tool before using it to determine that it is clean, that all moving parts operate freely, and that the barrel is free from obstructions and has the proper shield, guard, and attachments recommended by the manufacturer
- Do not load the tool unless it is to be used immediately
- Do not leave a loaded tool unattended, especially where it would be available to unauthorized persons
- Keep hands clear of the barrel end
- Never point the tool at anyone

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## Powder Actuated Tools

⇒ When using powder-actuated tools to apply fasteners, several additional procedures must be followed:

- Do not fire fasteners into material that would allow the fasteners to pass through to the other side
- Do not drive fasteners into very hard or brittle material that might chip or splatter or make the fasteners ricochet
- Always use an alignment guide when shooting fasteners into existing holes

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## Powder Actuated Tools

⇒ When using powder-actuated tools to apply fasteners, several additional procedures must be followed:

- When using a high-velocity tool, do not drive fasteners more than 3 inches (7.62 centimeters) from an unsupported edge or corner of material such as brick or concrete
- When using a high velocity tool, do not place fasteners in steel any closer than 1/2-inch (1.27 centimeters) from an unsupported corner edge unless a special guard, fixture, or jig is used

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## Hydraulic Power Tools

- ⇒ The fluid used in hydraulic power tools must be an approved fire resistant fluid
- ⇒ Must retain its operating characteristics at the most extreme temperatures
- ⇒ Manufacturer's recommended safe operating pressure for hoses, valves, pipes, filters, and other fittings must not be exceeded

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## Jacks

- ⇒ All jacks—including lever and ratchet jacks, screw jacks, and hydraulic jacks—must have a stop indicator, and the stop limit must not be exceeded
- ⇒ The manufacturer's load limit must be permanently marked in a prominent place on the jack, and the load limit must not be exceeded

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## Jacks

- ⇒ To set up a jack, make certain of the following:
  - The base of the jack rests on a firm, level surface
  - The jack is correctly centered
  - The jack head bears against a level surface
  - The lift force is applied evenly

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**Summary –  
General Safety Precautions**

⇒ All hazards involved in the use of power tools can be prevented by following five basic safety rules:

- Keep all tools in good condition with regular maintenance
- Use the right tool for the job
- Examine each tool for damage before use
- Operate according to the manufacturer's instructions
- Provide and use the proper protective equipment

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**General Safety Precautions – con't**

⇒ Employees should be trained in the proper use of all tools

⇒ Employees should be able to recognize the hazards associated with the different types of tools – JSAs / JHAs

⇒ Employees should know safety precautions necessary to work safely

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**Knowledge Checker - Quizzes**

**Quiz Time !!!**

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**Knowledge Check**

1. Which of the following is an example of an unsafe practice regarding the use of tools?

- a. Keeping cutting tools sharp
- b. Wearing eye and face protection while operating a grinder
- c. Using a screwdriver to carve or cut wood
- d. Following manufacturer's instructions when using a tool

**c. Using a screwdriver to carve or cut wood**

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**Knowledge Check - Quiz**

2. Which term describes a tool that is powered by compressed air?

- a. Hydraulic
- b. Powder-actuated
- c. Electrical
- d. Pneumatic

**d. Pneumatic**

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**Knowledge Check - Quiz**

3. Which of the following actions may expose workers to electrical shock hazards and should be avoided?

- a. Removing the grounding pin on a three-prong plug
- b. Using double-insulated tools
- c. Using a grounded adaptor to accommodate a two-prong receptacle
- d. Removing damaged tools from service and tagging them "Do Not Use"

**a. Removing the grounding pin on a three-prong plug**

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**Knowledge Check - Quiz**

4. Which of the following statements about guarding techniques is true?

- a. Guard the point of operation, in-running nip points, and rotating parts of tools.
- b. Remove guard from tool while it is in use, then replace when the job is completed.
- c. Adjust guard on abrasive wheel to allow maximum exposure of the wheel surface.
- d. Wear PPE because guards will not protect operator from flying chips and sparks or moving parts of tool.

**a. Guard the point of operation, in-running nip points, and rotating parts of tools.**

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**Knowledge Check - Quiz**

5. Employers must satisfy all of the following requirements, except:

- a. Provide PPE necessary to protect employees who are operating hand and power tools and are exposed to hazards.
- b. Comply with OSHA training and inspection standards related to hand and power tools.
- c. Determine which manufacturer's requirements and recommendations for a tool shall be followed or ignored.
- d. Do not issue or permit the use of unsafe hand tools.

**c. Determine which manufacturer's requirements and recommendations for a tool shall be followed or ignored.**

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**LDD-D1** Leix, David D - DWD, 5/3/2019