

# MICHIGAN



## MICHIGAN STATE UNIVERSITY: Prevention of work-related injuries & illnesses through research & investigation

### DON'T GET NAILED BY A NAIL GUN

Hazard Alert: Nail Gun Safety 3/20/20

In 2013, a male carpenter/laborer in his 30s died from head injuries after a C Pak, 33-degree clipped head paper taped, 3-inch by 0.131 smooth nail from a Model F350S Paslode pneumatic nail gun entered his eye socket and lodged in his head. The Paslode nail gun had a sequential trigger, but the trigger had been “swapped out” with a contact trigger. He was reattaching the entry wall to the garage wall. He reached around the entry wall while hanging around the corner using his right hand to hold the wall and his left hand (non-dominant) to hold the nail gun to nail inside of the wall joists back towards his body. A nail was found to be partially embedded in one of the entry wall studs. This could have been the result of a “double fire” or a nail that had not been removed from the stud as the wall was being repositioned. He was not wearing eye protection. He died several days later in the hospital.



[MIFACE Case #324](#)

**All pneumatic (air, gas, or electric) nail guns rely on two basic controls: a finger trigger and a contact safety tip located on the nose of the gun.** Trigger mechanisms vary based on: 1) the order in which the controls are activated, and 2) whether the trigger can be held in the squeezed position to discharge multiple nails OR if it must be released and then squeezed again for each individual nail. Combining these variations gives four kinds of triggers:

**Full Sequential trigger:** the safety contact tip must be pushed into the work piece then the user must squeeze the trigger to discharge a nail. Both the safety contact tip and the trigger must be released and activated again to fire a second nail. **Single Sequential trigger:** the safety contact tip must be pushed into the work piece. Then, the user squeezes the trigger to discharge a nail. To fire a second nail, only the trigger must be released. **Contact trigger:** fires a nail when the safety contact and trigger are activated in any order. **Single Actuation trigger:** trigger will fire a single nail when the safety contact and trigger are activated in any order. A second nail can be fired by releasing the trigger, moving the tool and squeezing the trigger again without releasing the safety contact tip. Some nail guns have a selective trigger switch, which allows the user to choose among two or more trigger systems.

In 2015 the American National Standards Institute (ANSI) approved a revision to its 2002 Safety Requirements for Portable Compressed - Air - Actuated Fastener Driving Tools calls for all large pneumatic framing nail guns manufactured after 2003 to be shipped with a sequential trigger but failed to require a FULL SEQUENTIAL trigger. Contractors may need to contact manufacturers or suppliers to purchase a FULL SEQUENTIAL trigger kit. ANSI/ISANTA SNT-101-2015 is available from <http://isanta.org/Portals/0/PDFs/ANSI%20SNT-101-2015.pdf?ver=2015-12-30-161900-753>

### PREVENTING INJURIES AND FATALITIES FROM NAIL GUNS

#### Employers should:

- **Check the tool label and manual for manufacturer-specific trigger names and operating information.**
  - Ensure manufacturer’s tool operating/safety instructions are available to operators
  - Review the owner’s manual carefully with all operators.
- **Use full sequential trigger nail guns.** This is the safest type of nail gun trigger. Nails cannot be bump fired.

- **Provide Employee Training.** Training Topics (at a minimum):
  - How nail guns work
  - Appropriate compressed air pressure for the gun
  - How triggers differ
  - Main causes of injuries
  - Emergency procedures (first aid and medical treatment)
  - Manufacturer tool manual availability and location
  - What to do if gun malfunctions
  - Company work rules and procedures
  - Required personal protective equipment, and
  - Hands-on training. Observe each employee demonstrating safe operating procedures.
- **Establish and enforce nail gun work rules and procedures.** Include (at a minimum):
  - Allow only persons who have read and understand the tool operating/safety instructions to operate the tool
  - Require tools to be kept in safe working order. Tag and remove defective tool from service.
  - Rules when to disconnect the power source (compressed air, compressed gas or electric).
  - Set up the operation so coworkers are not in the line of fire (watch for coworkers behind objects, e.g., drywall, sheet metal);
  - Don't operate tool in explosive atmospheres
  - Do not touch the trigger unless firing the tool against a work piece. Hold and carry the nail gun with your finger off the trigger.
  - Recognize and minimize dangers of awkward position work and working at heights
  - Reporting procedures for injuries and near miss/close call incidents.
- **Provide personal protective equipment (PPE):** At a minimum, companies should provide safety shoes, hard hats, high impact eye protection meeting the requirements of ANSI Z87.1, and hearing protection.

### Employees should:

- Utilize safe work practices, including but not limited to:
  - Inspect tools, power sources, and work surfaces before operating.
  - Determine tool's actuation system.
  - Never point the tool at anyone. Treat the tool like a firearm and assume it is loaded.
  - Always shoot nail guns away from your body.
  - Use your dominant hand to operate a nail gun.
  - Allow for space for nail gun recoil ("kickback") and don't try to stop or fight this recoil.
  - Keep free hand as far from the nailing location as possible (12 inches or more is best).
  - Disconnect tool from the air hose when not in use, performing any maintenance or repairs, clearing a jam, elevating, lowering or otherwise moving it to a new location and when removing fasteners from the magazine.
  - Always assume that the tool contains fasteners.
  - Don't engage in horseplay.
  - Don't overreach – keep proper footing and balance at all times
  - Work only as fast as you can safely control the gun. Resist pressure to work faster.

### Resources

- MIOSHA Fact Sheet: [Dangers of Pneumatic Nail Guns with Contact Triggers](#)
- OSHA: Nail Gun Safety Guide: A Guide for Construction Contractors ([English](#))([Spanish](#))
- NIOSH: [Nail Gun Safety: Straight Talk About Nail Gun Safety](#) Video: "Know Your Nailer: Nail Gun Safety" [long](#) / [short](#) / [Spanish](#)
- Nail Gun Safety: [The Facts](#)
- CPWR Hazard Alert: [Nail Gun Safety](#); [Nail Gun Webpage](#)
- ASSE: [Nail Gun Safety Guide](#)

### DID YOU KNOW?

#### Seven major risk factors that can lead to a nail gun injury:

- Unintended nail discharge from double fire (contact trigger)
- Unintended nail discharge from knocking the safety contact with the trigger squeezed (contact & single actuation trigger)
- Nail penetration through lumber work piece (all triggers)
- Nail ricochet after striking a hard surface (e.g. wood knots, metal framing hardware, dense laminated beams) (all triggers)
- Missing the work piece (all triggers)
- Awkward position nailing (all trigger types particularly with contact & single actuation)
- Bypassing safety mechanisms (all triggers)