Nail guns are used every day on many construction jobs, especially in residential construction. They boost productivity but also cause tens of thousands of painful injuries each year. This course is important for construction workers and contractors. It will discuss ways to protect yourself from nail gun injuries. We will also look at the types of training you will need to operate a nail gun on a worksite.
OSHAcademy Course 611 Study Guide

Nail Gun Safety

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Contact OSHAcademy to arrange for use as a training document.

This study guide is designed to be reviewed off-line as a tool for preparation to successfully complete OSHAcademy Course 611.

Read each module, answer the quiz questions, and submit the quiz questions online through the course webpage. You can print the post-quiz response screen which will contain the correct answers to the questions.

The final exam will consist of questions developed from the course content and module quizzes.

We hope you enjoy the course and if you have any questions, feel free to email or call:

OSHAcademy

15220 NW Greenbrier Parkway, Suite 230
Beaverton, Oregon 97006
www.oshatrain.org
instructor@oshatrain.org
+1 (888) 668-9079

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Course Introduction

Nail guns are used every day on many construction jobs—especially in residential construction. They boost productivity but also cause tens of thousands of painful injuries each year. Nail gun injuries are common—one study found that 2 out of 5 residential carpenter apprentices experienced a nail gun injury over a four-year period. When they do occur, these injuries are often not reported or given any medical treatment.

This course is important for construction workers and contractors. It will discuss ways to protect yourself from nail gun injuries. We will also look at the types of training you will need to operate a nail gun on a worksite.

Course Components

Once you complete this training, you will have knowledge of the following components:

- nail gun hazards
- likelihood of injuries
- nail gun triggers
- personal protective equipment
- establishing work procedures
- air pressure
- musculoskeletal disorders
- noise hazards
Module 1: Nail Gun Hazards

Nail guns have replaced hammers in wood frame construction. They are powerful, easy to operate and boost productivity for nailing tasks. They are also responsible for an estimated 37,000 emergency room visits each year – 68% of these involve workers and 32% involve consumers.

Puncture wounds to the hands and fingers are most common, but more serious injuries and deaths occur using nail guns. A nail gun can produce nail velocities as high as 1,400 feet per second penetrating stressed concrete up to .4 inches (10 cm).

When nail gun accidents do occur, the injuries are often not reported or given proper medical treatment.

Quiz Instructions

After each section, there is a quiz question. Make sure to read the material in each section to discover the correct answer to these questions. Circle the correct answer. When you are finished go online to take the final exam. This exam is open book, so you can use this study guide.

1. What is the most common nail-gun injury?
   a. Electric shock
   b. Puncture wound
   c. Struck by flying object
   d. Muscle strain

Likelihood of Injuries

Nail gun injuries are common - one study found that 2 out of 5 residential carpenter apprentices experienced a nail gun injury over a four-year period. Nail gun injuries hospitalize more construction workers than any other tool-related injury.

Injury Types

- **Hands and fingers**: More than half of reported nail gun injuries are to the hand and fingers. One quarter of these hand injuries involve structural damage to tendons, joints, nerves, and bones.

- **Legs**: After hands, the next most often injured are the leg, knee, thigh, foot, and toes.
- **Arms, neck, head, and trunk**: Less common are injuries to the forearm or wrist, head and neck, and trunk.

Serious nail gun injuries to the spinal cord, head, neck, eye, internal organs, and bones have been reported. Injuries have resulted in paralysis, blindness, brain damage, bone fractures, and death.

According to NIOSH, there are several common causes (risk factors) for nail gun injuries.

**Injury Causes**

- **Unintentional fire**: If the trigger is pulled on a single contact or actuation trigger and you accidentally knock a person or material the gun may discharge the nail.

- **Knocking the safety contact**: Unintentional fire due to knocking the safety contact with the trigger squeezed.

- **Accidental double fire**: A double-fire may occur if you push too hard on a contact trigger nailer or are nailing in an awkward spot. The second may come out too fast for you to react.

- **Nailing through wood/materials**: The nail may come out the other side of the material you are nailing, posing a risk to others. This is especially true if you are holding the material in your hand when firing the gun.

- **Blowout**: The nail may go through the material and ricochet off a hard piece of metal or other material underneath.

- **Missing the work target**: Take careful aim and do not rush.

- **Modified safety mechanism**: Never modify a nail gun to circumvent the safety features such as removing the spring in the safety contact tip. (Source: OSHA)

The most common nail gun injuries occur as a result of unintentional double-fire, blowout, and misses.
Real World Accident
A 26-year-old Idaho construction worker died following a nail gun accident in April 2007. He was framing a house when he slipped and fell. His finger was on the contact trigger of the nail gun he was using. The nosepiece hit his head as he fell, driving a 3-inch nail into his skull. The nail injured his brain stem, causing his death. The safety controls on the nail gun were found to be intact. Death and serious injury can occur using nail guns—even when they are working properly.

2. More than half the injuries while operating nail guns is to the _____.
   a. forearm and wrist
   b. neck and head
   c. hand and fingers
   d. leg and toes

Nail Gun Triggers
Nail gun safety starts with understanding the various trigger mechanisms. Let’s take a look at what you need to know.

How Triggers Differ
All nailers rely on two basic controls: a finger trigger and a contact safety tip located on the nose of the gun. Trigger mechanisms can 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 the above variations gives four kinds of triggers. Some nail guns have a selective trigger switch which allows the user to choose among two or more trigger systems.

There are four nail gun trigger types recognized by OSHA. They are:

• Contact Firing,
• Full Sequential,
• Single Sequential,
• Single Actuation.

Each trigger type is described below along with a summary of how the controls are activated.

3. What two types of controls do nailers rely on?

   a. Finger triggers and contact safety tips
   b. Engineering controls and personal protective equipment
   c. Triggers and guards
   d. GFCIs and safety switches

Contact Firing Trigger

This type of trigger fires a nail when the safety contact and trigger are activated in any order. You can push the safety contact tip first and then squeeze the trigger, or you can squeeze the trigger first and then push the safety contact tip.

If the trigger is kept squeezed, a nail will be driven each time the safety contact is pushed in. All nails can be bump fired. This type of trigger is also known as bump trigger, multi-shot trigger, successive trigger, dual-action, touch trip, contact trip, and bottom fire.

Bump firing or bounce nailing is using a nail gun with a contact firing trigger held squeezed and bumping or bouncing the tool along the work piece to fire nails. Red dots in the image show path of motion of the nail gun. Each time the gun contacts the surface, a nail is fired.

When using a contact trigger, there are things you need to remember when using single nails and multiple nails.

• Single nail: Push the safety contact, then squeeze the trigger, or squeeze the trigger, then push the safety contact.

• Multiple nails: Squeeze and hold the trigger, then push the safety contact to fire one nail, move and push the safety contact again to fire additional nails.

4. Which type of trigger is used when bump firing or bounce nailing?

   a. Single action trigger
   b. Single sequential trigger
   c. Full sequential trigger
   d. Contact firing trigger
Full Sequential Trigger
The full sequential trigger is always the safest trigger mechanism for the job. It reduces the risk of unintentional nail discharge and double fires. It reduces the risk of unintentional nail discharge, double fires, and injuries from bumping into coworkers. To drive a nail, the worker must first depress the trip against the surface and then pull the trigger.

Use full sequential trigger nailers for placement work where the lumber needs to be held in place by hand. Examples include building walls and nailing blocking, fastening studs to plates and blocks to studs, and installing trusses.

Unintended nail discharge is more likely to lead to a hand or arm injury for placement work compared to flat work, where the lumber does not need to be held in place by hand. Examples of flat work include roofing, sheathing, and subflooring.

When using a full sequential trigger, there are things you need to remember both when using single nails and multiple nails.

**Single Nail:** Push the safety contact and then squeeze the trigger.

**Multiple Nails:** Release both the safety contact and trigger and repeat the process.

You may want to consider restricting inexperienced employees to full sequential trigger nail guns starting out. Some contractors using more than one type of trigger on their jobs color-code the nail guns so that the type of trigger can be readily identified by workers and supervisors.

5. Which type of trigger is always the safest trigger mechanism for the job?

   a. Contact firing trigger  
   b. Full sequential trigger  
   c. Single actuation trigger  
   d. Single sequential trigger
Single Sequential Trigger
Like the full sequential trigger, this trigger will only fire a nail when the controls are activated in a certain order. First, 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. The safety contact tip can stay pressed into the work piece. Nails cannot be bump fired.

When using a single sequential trigger, there are things you need to remember both when using single nails and multiple nails.

Single nail: Push safety contact, then squeeze trigger.

Multiple nails: Release trigger, move tool, and squeeze trigger to fire additional nail.

Research has identified that the risk of a nail gun injury is twice as high when using a multi-shot contact trigger as when using a single-shot sequential trigger nailer.

6. Which type of trigger can shoot multiple nails only after you release the trigger, move the tool, and squeeze the trigger again?
   a. Single actuation trigger
   b. Contact firing trigger
   c. Single actuation trigger
   d. Full sequential trigger

Single Actuation Trigger
Like the contact trigger, this 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. Note that some manufacturers refer to these triggers as “single sequential triggers”, but they are different. The first nail can be bump fired with a single actuation trigger but not with a true single sequential trigger.

When using a single actuation trigger, there are things you need to remember both when using single nails and multiple nails.

Single nail: Push safety contact, squeeze trigger, or squeeze trigger, then push safety contact to fire.

Multiple nails: Release trigger, move tool, and squeeze trigger to fire additional nail.
7. Like the contact firing trigger, which trigger will fire a single nail when the safety contact and trigger are activated in any order?

   a. Full sequential trigger  
   b. Single sequential trigger  
   c. Full actuation trigger  
   d. Single actuation trigger
Module 2: Nail Gun Training

Studies of residential carpenters found the overall risk of nail gun injury is twice as high when using contact trigger nail guns compared to using sequential trigger nail guns. About 1 in 10 nail gun injuries happen to co-workers. This is from either airborne (projectile) nails or bumping into a co-worker while carrying a contact trigger nail gun with the trigger squeezed.

A voluntary ANSI standard calls for all large pneumatic framing nailers manufactured after 2003 to be shipped with a sequential trigger. However, these may not always be full sequential triggers. Contractors may need to contact manufacturers or suppliers to purchase a full sequential trigger kit.

Real World Accident

A carpenter apprentice on his first day ever using a nail gun injured his right leg. He was working on a step ladder and was in the process of lowering the nail gun to his side when the gun struck his leg and fired a nail into it. He had no training prior to using the nail gun. New worker training is important and should include hands-on skills.

This module takes a closer look at ways to protect yourself against nail gun injuries, such as the one in the accident above.

1. Which type of nail gun is the most dangerous?
   a. Single actuation trigger nail guns
   b. Sequential trigger nail guns
   c. Contact firing trigger nail guns
   d. Full contact trigger nail guns

Worker Training

Both new and experienced workers can benefit from safety training to learn about the causes of nail gun injuries and specific steps to reduce them. Be sure the training is provided in an understandable way. Here is a list of topics for training:

- Describe how nail guns work and how triggers differ.
- List the main causes of injuries - especially differences among types of triggers.
Provide hands-on training with the actual nailers that will be used on the job. This gives each employee an opportunity to handle the nail and get feedback on the following issues:

- how to load the nail gun
- how to operate the air compressor
- how to fire the nail gun
- how to hold lumber during placement work
- how to handle awkward position work

Describe what to do if a nail gun malfunctions.

Training should also cover items such as company nail gun work procedures, personal protective equipment, injury reporting, and first aid and medical treatment.

2. Which of the following topics should be discussed when training employees to use nail guns?

   a. What needs to be fixed
   b. How to load the nail gun
   c. What to do when a nail gun fires expectantly
   d. When the nail gun should be disposed

Nail Gun Best Practices

Contractors should develop their own nail gun work rules and procedures to address risk factors and make the work as safe as possible. Examples of topics for contractor work procedures include, but are not limited to, the following:

- Make sure tool manuals for the nailers are always available on the job site.
- Make sure manufacturers' tool labels and instructions are understood and followed.
- Check tools and power sources before operating to make sure they are working properly. Take broken or malfunctioning nail guns out of service immediately.
• Set up operations so that workers are not in the line of fire from nail guns being operated by co-workers.

• Check lumber surfaces before nailing. Look for knots, nails, straps, hangers, etc. that could cause recoil or ricochet.

• Use a hammer or

• Use a hammer or positive placement nailer when nailing metal joinery or irregular lumber.

• For placement work, keep hands at least 12 inches away from the nailing point at all times. Consider using clamps to brace instead of your hands.

• Always shoot nail guns away from your body and away from co-workers.

3. Which of the following is a best practice while using a nail gun?

   a. Make sure OSHA labels are displayed properly
   b. Take defective nail guns out of service immediately
   c. Use a hammer to set nails before using the nail gun
   d. Don’t point the nail gun towards the ground

• Always disconnect the compressed air when:

  o leaving a nailer unattended
  o traveling up and down a ladder or stairs
  o passing the nail gun to a co-worker
  o clearing jammed nails
  o performing any other maintenance on the nail gun

• Recognize the dangers of awkward position work and provide extra time and precautions:

  o Use a hammer if you cannot reach the work while holding the nailer with your dominant hand.
- Use a hammer or full sequential trigger nailer when working in a tight space. Recoil is more difficult to control, and double fires could occur with contact triggers.

- Take extra care with toe-nailing. Nail guns can slip before or during firing because the gun cannot be held against the work piece. Use the trigger to fire ONLY after the safety contact piece is positioned.

- Recognize the dangers of nail gun work at height and provide extra time and precautions:
  - Set up jobs to minimize the need for nailing at height.
  - Consider using scaffolds instead of ladders.
  - If work must be done on ladders, use full sequential trigger nailers to prevent nail gun injuries which could happen from bumping a leg while climbing up or down a ladder.
  - Position ladders so you don’t have to reach too far. Your belt buckle should stay between the side rails when reaching to the side.

4. What type of nail gun should be used while working on ladders?
   a. Single actuation trigger nail guns
   b. Contact trigger nail guns
   c. Full sequential trigger nailer
   d. Full contact trigger nail guns

**Things You Should Not Do With a Nail Gun**

When you are using nail guns, NEVER bypass or disable the safety features. This is strictly prohibited. Tampering includes removing the spring from the safety-contact tip and/or tying down, taping or securing the trigger so it does not need to be pressed. Tampering increases the chance the nail gun will fire unintentionally both for the current user and anyone else who may use it.

Workers should keep their fingers off the trigger when holding or carrying a nail gun. If this is not natural, workers should use a full sequential nail gun or even set down the nailer until they need to use it again.
**Personal Protective Equipment**
OSHA typically requires safety shoes, which help protect workers’ toes from nail gun injuries, on residential construction sites. Employers should also provide, at no cost to employees, the following protective equipment for workers using nail guns:

- hard hats
- high impact eye protection, such as safety glasses or goggles marked ANSI Z87.1
- hearing protection (either earplugs or earmuffs)

Gloves are not recommended for use as PPE because it's more difficult to use the nail gun and fingers may get caught or injured.

5. Which item of personal protective equipment is NOT recommended for use while operating a nail gun?

   a. Safety shoes  
   b. Gloves  
   c. Hard hats  
   d. Hearing protection

**Reporting of Injuries and Close Calls**
Studies show many nail gun injuries go unreported. Employers should ensure their policies and practices only encourage their employees to report nail gun injuries. Reporting helps ensure employees get needed medical attention. It also helps contractors to identify unrecognized job site risks that could lead to more serious injuries, if not addressed.

**First Aid and Medical Treatment**
Employers and workers should get medical attention immediately after nail gun injuries. This includes for hand injuries which appear minimal. OSHA suggests 1 out of 4 nail gun hand injuries can involve some type of structural damage, such as a bone fracture. Materials such as nail strip glue or plastic or even clothing can get embedded in the injury and lead to infection. Barbs on the nail can cause secondary injury if the nail is removed incorrectly. These complications can be avoided by having workers seek immediate medical care.
6. To help ensure accurate reporting, employers should ensure their employees who report nail gun injuries ______.
   a. get at least two days off to recover
   b. only report injuries that prevent normal tasks
   c. immediately complete an OSHA investigation report
   d. are never reprimanded for reporting injuries

Real World Accident
Not all nail gun injuries are immediately visible. Failure to seek medical care can result in complications and more serious injuries. Below are a few real-world stories that illustrate what can happen while working with nail guns. Telling stories like this is an excellent way to instruct employees on the dangers of nail gun use.

1. A construction worker accidentally drove a 16 penny framing nail into his thigh. It didn’t bleed much, and he didn’t seek medical care. He removed the nail himself. Three days later he felt a snap in his leg and severe pain. In the emergency room, doctors removed a sheared off nail and found his thigh bone had fractured.

2. Two framers were working together to lay down and nail a subfloor. One framer was waiting and holding the nail gun with his finger on the contact trigger. The other framer was walking backwards toward him and dragging a sheet of plywood. The framer handling the plywood backed into the tip of the nail gun and was shot in the back. The nail nicked his kidney, but fortunately he recovered. As a result of this incident, the contractor switched to using only sequential triggers on framing nail guns. Co-workers can get injured if they bump into your contact trigger nail gun. You can prevent this by using a full sequential trigger.

3. After his crews experienced many double fires and a related serious nail gun injury, a New Jersey contractor switched to using only sequential triggers. He believes he has eliminated the risk of double fire injuries and he estimates that the change has had only a slight impact on productivity—a few extra hours per house.
7. What is an excellent way to instruct employees on the dangers of nail gun use?

   a. Tell real-world stories
   b. Have workers read OSHA rules
   c. Make sure they complete a written exam
   d. Have them memorize safety rules
Module 3: Nail Gun Injuries and Other Hazards

There are several major risk factors that can lead to a nail gun injury including:

- unintended nail discharge,
- nails ricochet,
- failure to contact the work surface,
- penetration through the work surface,
- nailing in awkward positions

Understanding these hazards will help you to prevent injuries on the jobsite. This module will take a closer look at these important risk factors and hazards.

**Double Fire**

Unintended nail discharges from double fires usually occurs when using contact firing triggers.

The Consumer Product Safety Commission (CPSC) found contact trigger nailers are susceptible to double firing. This occurs a lot when workers are trying to accurately place the nailer against the work piece. Researchers found a second unintended firing can happen faster than the user is able to react and release the trigger.

Double fire can also be a particular problem for new workers who may push harder on the tool to compensate for recoil. It can also happen when the user is in an awkward position, such as tight workspaces, where the gun doesn’t have the necessary space to recoil. The recoil of the gun can also cause a non-nail injury in tight spaces if the nail gun hits the user’s head or face.

1. Unintended nail discharges from double fires usually occur when using ________.
   a. contact firing triggers
   b. full sequential triggers
   c. single actuation triggers
   d. single sequential triggers

**Knocking and Bumping**

Nail guns with contact and single actuation triggers will fire if the trigger is being squeezed and the safety contact tip gets knocked or pushed into an object or person by mistake. For example, a framer might knock his leg doing down a ladder or bump into a co-worker passing
through a doorway. Contact trigger nailers can release multiple nails and single actuation trigger nailers can release a single nail to cause injury.

Holding or carrying contact trigger or single actuation trigger nail guns with the trigger squeezed increases the risk of unintended nail discharge. Construction workers tend to keep a finger on the trigger because it is more natural to hold and carry an 8-pound nail gun using a full, four-finger grip. Tool manufacturers, however, do warn against it.

**Real World Accident**

A contractor was on a roof with a framing nailer. He had his finger on the trigger with the autofire engaged. However, when he sat up from a crouched position, he accidentally pushed the tip of the gun against his knee, causing the gun to fire. The nail grazed his bone inside his leg, and he was unable to straighten his leg. Paramedics had to carry him off the roof and down the stairs. He didn’t have to undergo surgery, as doctors were able to remove the nail.

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**2. What practice increases the risk of injury when holding or carrying contact firing trigger or single actuation trigger nail guns?**

- a. Blocking the trigger while carrying
- b. Cycling the trigger to prepare the gun for use
- c. Holding the nail gun with the dominant hand
- d. Keeping the trigger squeezed

---

**Nail Penetration through Lumber Work Piece**

This can happen with ALL trigger types. Nails can pass through a work piece and either hit the worker’s hand or fly off as a projectile nail. A blow-out nail is just one example. Blow-outs can occur when a nail is placed near a knot in the wood. Knots involve a change in wood grain, which creates both weak spots and hard spots that can make the nail change direction and exit the work piece.

Nail penetration is especially a concern for placement work where a piece of lumber needs to be held in place by hand. If the nail misses or breaks through the lumber it can injure the non-dominant hand holding it.
**Real World Accident**

Two framers were working together to lay down and nail a subfloor. One framer was waiting and holding the nail gun with his finger on the contact trigger. The other framer was walking backwards toward him and dragging a sheet of plywood. The framer handling the plywood backed into the tip of the nail gun and was shot in the back. The nail nicked his kidney, but fortunately he recovered. As a result of this incident, the contractor switched to using only sequential triggers on framing nail guns. Co-workers can get injured if they bump into your contact trigger nail gun. You can prevent this by using a full sequential trigger.

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<table>
<thead>
<tr>
<th>3. What is a special concern when nailing a piece of lumber that is held in place by the hand?</th>
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<tbody>
<tr>
<td>a. Nail penetration</td>
</tr>
<tr>
<td>b. Nail rebound</td>
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<tr>
<td>c. Damage to the nail gun</td>
</tr>
<tr>
<td>d. Blow-outs</td>
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</tbody>
</table>

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**Nail Ricochet**

When a nail hits a hard surface, it has to change direction and it can bounce off the surface, becoming a projectile. Wood knots and metal framing hardware are common causes of ricochets. Problems have also been noted with ricochets when nailing into dense, laminated beams. Ricochet nails can strike the worker or a co-worker to cause an injury. This can happen with ALL trigger types.

**Missing Work Piece**

Injuries may occur when the tip of the nail gun does not make full contact with the work piece and the discharged nail becomes airborne. This can occur when nailing near the edge of a work piece, such as a plate. Positioning the safety contact is more difficult in these situations and sometimes the fired nail completely misses the lumber. Injuries have also occurred when a nail shot through plywood or oriented strand board sheeting missed a stud and became airborne. This can happen with ALL trigger types.

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<table>
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<tr>
<th>4. Nailing into metal and wood knots commonly cause _____.</th>
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<tbody>
<tr>
<td>a. nail gun jamming</td>
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<tr>
<td>b. nails disintegrating</td>
</tr>
<tr>
<td>c. nails ricocheting</td>
</tr>
</tbody>
</table>
d. nails being damaged
**Awkward Positions**

Nailing in awkward positions where the tool and its recoil are more difficult to control may increase the risk of injury. These include:

- toe-nailing;
- nailing above shoulder height;
- nailing in tight quarters;
- holding the nail gun with the non-dominant hand;
- nailing while on a ladder; or
- nailing when the user's body is in the line of fire (nailing towards yourself).

"Toe-nailing" is driving a nail in at a slant to secure floor joists to the plate. It’s more likely to cause an injury because the user cannot hold the gun flush against the workpiece.

Nailing from a ladder also makes it difficult to position the nail gun accurately. Nailing beyond a comfortable reach distance from a ladder, elevated work platform, or leading edge places the user at risk for a fall.

While injuries can happen with all trigger types when working in awkward positions, accidental discharges using single-action triggers are a special concern.

5. **Why is "toe-nailing" more likely to cause an injury?**

   a. The foot is used to brace the wood while nailing  
   b. The user cannot hold the gun flush against the workpiece  
   c. The toes naturally get in the way of nailing  
   d. The gun is located flush with the toes when nailing

**Bypassing Safety Mechanisms**

This unsafe practice can occur with all trigger types. Bypassing or disabling features of either the trigger or safety contact tip is an work practice that increases the risk of injury. A worker may believe it’s more efficient to bypass safety mechanisms, but all it takes is one mistake to eliminate any benefit.
For example, removing the spring from the safety contact tip makes an unintended discharge even more likely. Modifying tools can lead to safety problems for anyone who uses the nail gun.

Nail gun manufacturers strongly recommend against bypassing safety features, and voluntary standards prohibit modifications or tampering. OSHA’s Construction Standard at 29 CFR 1926.300(a) requires all hand and power tools and similar equipment, whether furnished by the employer or the employee shall be maintained in a safe condition. Nail guns that have modified safety mechanisms must be repaired or taken out of service.

6. Bypassing nail gun safety mechanisms can occur _____.
   a. only with full sequence trigger types
   b. primarily with contact trigger types
   c. with all trigger types
   d. with single actuation trigger types

Other Hazards
Air Pressure
Pneumatic tools and compressor use are regulated under OSHA’s Construction Standard at 29 CFR 1926.302(b). The provisions in this standard that are relevant for nail guns are provided below.

1. Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.

2. 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.

3. The manufacturer’s safe operating pressure for hoses, pipes, valves, filters, and other fittings shall not be exceeded.

4. The use of hoses for hoisting or lowering tools shall not be permitted.
7. What is acceptable as a positive means to prevent a pneumatic nail gun air hose from becoming accidentally disconnected?
   a. Wrapped electrical tape
   b. A quick disconnect
   c. An adjustable clamp
   d. A screw-on hose connector

Noise
Pneumatic nail guns produce short (less than a tenth of a second in duration) but loud “impulse” noise peaks: one from driving the nail and one from exhausting the air. Most nail gun manufacturers recommend users wear hearing protection when using a nailer.

Nail gun noise can vary depending on the gun, the work piece, air pressure, and the work setting. The type of trigger system does not appear to affect the noise level. Peak noise emission levels for several nailers range from 109 to 136 dBA. These loud short bursts can contribute to hearing loss.

Employers should provide hearing protection in the form of earplugs or muffs and make sure they are worn correctly. Employers should also ask about noise levels when buying nail guns.

Methods to reduce nail gun noise include:

- improving the existing nail gun muffler; and
- incorporating a return or exhaust line

8. Peak noise emission levels for several nailers range from _________.
   a. 25 to 50 dBA
   b. 53 to 98 dBA
   c. 77 to 142 dBA
   d. 109 to 136 dBA

Musculoskeletal Disorders
Framing nail guns can weigh up to 8 pounds and many framing jobs require workers to hold and use nail guns for long periods of time while working in awkward postures. Using nail guns for tasks that require awkward postures is likely the cause for most ergonomic injuries.
Holding an 8-pound weight for long periods of time can lead to musculoskeletal symptoms such as soreness or tenderness in the fingers, wrist, or forearm tendons or muscles. These symptoms can progress to pain, or in the most severe cases, inability to work.

If use of a nail gun is causing musculoskeletal pain or symptoms of musculoskeletal disorders, medical care should be sought. The probability and severity of ergonomic injuries while using nail guns may be eliminated or reduced by:

- revising the procedure's requirements (duration, frequency, force, etc.)
- replacing the worker or helping the worker to be better able to do the task; and
- redesigning or replacing the nail guns needed to do the job

9. What is the most likely cause of ergonomics injuries while using nail guns?
   
a. Awkward postures
b. Poor design of nail guns
c. Using heavier pneumatic nail guns
d. Physical weakness of the worker
Endnotes