

Introduction Thanks for volunteering to help at a construction site. Your efforts will make a difference not only to one particular family in need of decent, affordable housing but also the whole neighborhood.

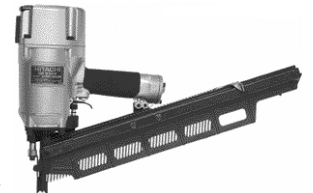
In this [Construction Volunteer How-To article](#) we discuss nail guns. During certain phases of construction we make extensive use of *pneumatic* (meaning powered by air) nail guns. While there will always be a need to hand-drive nails on job sites, much of that strenuous and difficult hammering work is now powered by compressed air. Pneumatic nail guns (and their smaller cousins brad nailers and staplers) are much more efficient than hammering, but they pose their own risks and other problems.

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Nail gun described [TOP](#)

The image at right shows a typical nail gun. You connect one end of a rubber or plastic hose to the gun and the other end to an air compressor. The gun is loaded with a strip of nails, and when you pull the trigger a blast of air fires a nail.



framing nailer

In this photo the nails are loaded point down into the angled channel, the handle is the black horizontal strip (with the trigger barely visible), and the nails would shoot straight down from the spring-loaded *nose piece* at the bottom.

There are also special nail guns for roofing. A cylindrical drum is loaded with a coil of roofing nails joined by tiny wires. At the time of this writing you should not expect to be allowed to perform shingling, but rather that work, which can be both dangerous and difficult, is usually performed by sub-contractors.

Uses for a nail gun [TOP](#)

The nail gun shown above (sometimes called a *framing nailer* as opposed to the smaller *finish nailer*) is of the type used for “big wood.” Framing is attaching thick sticks of wood to one another, such as nailing studs to top and bottom plate to make walls and nailing roof trusses to the top floor of the house.

These pieces of lumber are almost always what’s called “2-by” wood, meaning the nominal thickness dimension is 2 inches, such as a 2 by 4 or a 2 by 6. (Note: A “2 by 4” is never really 2 inches by 4 inches, it’s actually 1-1/2 by 3-1/2 inches. A nominal “2 by 6” is actually 1-1/2 inches by 5-1/2 inches.)

The other typical use for a framing nailer is attaching sheet goods to 2-by wood. For example, we nail many 4-foot by 8- or 9-foot sheets of a type of plywood called *OSB* (oriented strand board) to the outside of the exterior walls of the house to sheathe it, and we do the same to the roof.

Safety [TOP](#)

Before we get to the fun part – how to use a nail gun – we will talk about safety, that is, how not to use it.

When you hand drive nails, about the worst thing you can do is miss the nail and hammer your finger, what's sometimes called "hitting the wrong nail." It hurts, and you wish you hadn't done it, but it rarely requires more than a Band-Aid and maybe an aspirin.

Using 120 pounds of pressure per square inch to drive a sharpened, three-inch rod of steel into any part of anyone's body is a whole different category.

It is imperative, of course, that you make sure that doesn't happen. You must always be in control of your nail gun so it doesn't shoot anywhere it shouldn't. Many novice volunteers can learn to use a nail gun, but if you discover you aren't among them then please volunteer for a different task.

Two safety features: Nail guns come with exactly two safety features.

1. Nose piece Nail guns are designed so that they cannot shoot unless the nose piece is pushed up against a surface. What this means is that if you just point the gun at the ground and pull the trigger, it should not fire.

What this also means is that you must be careful about how you hold or rest or set down your nail gun. If you mistakenly place it in such a way that the nose piece gets depressed, all you or anyone else has to do at that point is touch or jostle the trigger and you might fire a nail at a horrendous velocity into human flesh. Whether that flesh is yours or someone else's, it will likely be awful.

Some framing nail guns have a U-shaped hook that unfolds from the rear that is designed to fit over 2-by wood, so you can set the gun down pretty much anywhere on a roof you're working on. This same hook can be used to attach the gun to a ladder or a really sturdy part of your tool belt, but no matter what you must make sure the nose is never pressed against anything.

2. Your brain The more important safety feature by far is your brain: your common sense and cautious good judgment. If you've spent a dozen or more hours using nail guns in a variety of situations, you will likely have learned and ingrained as habit the good safety practices we expect of all volunteers. If this is the first time you've ever used a nail gun, you must be extra prudent. Make sure you understand any on-site explanations and demonstrations you receive, have someone more experienced check you out on your first several shots, and always be looking out for ways the next nail you shoot can hurt anyone.

More safety rules: Below are some more safety rules you must follow when using a nail gun.

- Never touch or allow anything or anyone else to touch the trigger till you're ready to fire. This is a safety habit the professionals have learned from experience, and now you can learn from them. For that matter, you should adopt this practice when handling any of the many tools on a job site that use a trigger.

Sometimes you need to hand a nail gun to someone. When you do so, make it as easy as possible for both of you to handle it in such a way that neither of you needs to grab the trigger area (or depress the nose piece).

- Speaking of the trigger, don't pull twice. If you mistakenly pull the trigger twice – which many novices accidentally do till they learn not to – the gun will obey you and try to fire a second nail right behind the first one, which is wasteful at best and dangerous at worst.

Here's how the **uninformed novice** does it. Get all set. Pull on the trigger. The gun fires and makes a noise and exhales air and moves backwards according to Newton's third law, all of which startles the novice, who keeps his finger on the trigger and accidentally fires another nail.

Here's how **you** should do it. Get all set. Pull the trigger by moving your trigger finger back till the gun fires, then *immediately* let go with your trigger finger. You trip the trigger then you *instantly* let go with that finger, almost as though it's all in one motion. This way you will never fire two nails at once.

- Make sure you know what's on the other side of the wall you're sheathing. Many people who get shot by nail guns every year were too close on the other side of a wall someone was nailing carelessly. If you're the nailer, make sure no one is leaning or working near where you're shooting into, especially since you probably can't see the other side. And, of course, try to be accurate to begin with, so that *all* of your nail goes into wood.

Looked at from the other perspective, if you suspect someone is or will be nailing towards you from the other side of a wall, especially with a nail gun, don't lean up against it or work on it unless you know it's safe.

- Bump gun. It's possible you will find yourself using what's sometimes called a *bump gun*. If a regular nail gun is like a semi-automatic firearm – in which the trigger must be pulled once for each shot – a bump gun is like a fully automatic firearm, i.e., a machine gun – in which you pull the trigger only once, hold it down, and ammo keeps coming out till you let go of the trigger.

In the case of a bump gun, the way it works is you can just keep the trigger held down and then every time you bump the nose piece against a surface (presumably one you want to nail into), another nail gets fired.

Bump guns are designed for use by experienced professionals for whom the saving of a second or two per nail can add up to a significant difference over time and in overtime. An experienced roofer using a bump gun can shoot three nails into three precise locations into an asphalt shingle in about one second! Needless to say, such a high degree of efficiency is not expected of the typical volunteer.

Bump guns can obviously be more dangerous, because you don't have to pull the trigger for each shot except the first one, so test to make sure you don't have a bump gun. To do so, push the nose piece against wood, pull *and hold* the trigger, then, after the nail fires, release the nose piece and bump it into wood again. If it fires even though you haven't let go of the trigger, you've got your hands on a bump gun. If that is the case, inform your site supervisor to make sure you have permission to use such a weapon.

Preparation [TOP](#)

Before you can get started nailing you have to get loaded and get powered up. Here's how.

1. Loading and unloading nails. Load up your gun with the correct size of nail strip. For additional information see the section below titled "[Nails](#)." The exact method of loading your gun will vary with the model, so if you don't understand it, get help.

If the wrong size nail is already loaded, they'll have to be unloaded. Again, the exact method of doing this varies with the model of the gun. It is usually more difficult than loading, and if you want to do it with the hose disconnected, that's OK.

2. Hook up to an air hose if you haven't already. Typically you slide a knurled collar, plug in, and then release the collar, which springs back to its normal position and secures the connection. If you pull on the hose and it comes loose from the gun, you'll have to try again; try moving the collar back farther or pushing the hose on harder. For additional information see the section below titled "[Compressor](#)."

Disconnecting from air is easier: Press the hose connector against the gun and slide the collar, give the hose

a little tug, and it will fly off, usually accompanied by a blast of air that startles people who've never done this before. Be sure to hang on.

How to nail with a nail gun [TOP](#)

Now that you understand the safety rules and you've prepared your nail gun, start by taking a practice shot or two. Almost certainly there will be some wood on the site you can shoot a nail into just to see how it works. If you are new to this, do it under supervision to make sure you're getting it all right. It takes awhile to get used to how the guns react when you fire them.

To fire a nail, press the nose piece against the wood where you want the nail to go and pull the trigger. The nail will be driven into the wood and then into whatever is on the other side of it, presumably another piece of wood.

Here are a few tips.

- As noted above, the gun's trigger is designed to be inactive unless the nose piece is pressed against a surface. For example, if you want to shoot a nail through a sheet of OSB into a stud, you have to *press* the business end of the nail gun against the sheet of OSB. If you merely place the nose piece on the OSB without pushing it far enough, maybe half an inch, the trigger won't work.

The deal is, either it works or it doesn't. If you pushed down correctly, it fires a nail and you move on. If you pull the trigger and nothing happens then you have to start over, which means pulling the nose piece all the way away from the surface and pushing it down again, this time correctly.

- One of the best uses for a nail gun is *toenailing*, which means driving a nail not at right angles but at a 45. Toenailing is often needed during framing. Using a hammer, toenailing suffers from four problems. (1) The wood you're hammering into wants to move with each blow of your hammer. (2) The wood is more likely to split. (3) Hammering a toenail takes a long time compared to the few seconds it takes with a nail gun. (4) You need room to swing a hammer, but only about 13 inches to insert a nail gun.

Toenailing accurately with a nail gun does, however, require that you pay close attention to where the nail comes out of the nose piece. Most novices initially mis-judge where the nail comes out, almost always by placing the nose too close to, not too far away from, the second piece of wood.

The very tip of the nose piece, the part you press against the wood, is actually an oddly shaped steel circle of little claws and flats. The claws and corners are designed to let you press the nose piece rather firmly against the wood – so firmly that one or more claws dig into the wood a bit so you don't slip – before you decide to pull the trigger. It is this circle of claws that you must gouge in at the right place before you try to toenail. If you are a novice you will probably gouge it in too low for downward shots and too high for upward shots, so learn right away where to set the nose piece. Also, of course, pay attention to the angle you've chosen.

- Sometimes the last few nails in a strip will not fire. To solve the problem, simply load another strip of nails on top of the old ones. If this doesn't work then you must remove *all* the nails and load a fresh strip. If you're having unusual difficulties, do this with the hose disconnected so you can't accidentally fire the gun.

- For most purposes they are a lot better than hand-driving, but nail guns still get heavy over time. If you're getting tired of toting and holding and firing your nail gun, especially if you're working on a ladder or overhead, do take a break rather than risking anyone's safety. Tired people make mistakes.

Nails [TOP](#)

For nailing 2-by wood to other 2-by wood we use what's called a *16-penny* nail (abbreviated to "16d"). A 16d

nail ranges from 3-1/4 to 3-1/2 inches in length.

For sheathing the exterior walls and other uses for OSB, since it is only 7/16th of an inch thick we can use the cheaper *8-penny* nails. 8d nails are typically 2-3/8 inch to 2-1/2 inches long. Happily, the same framing nailer that shoots 16d nails will also shoot 8d nails.

Nails for a framing nailer come in strips, often with sticky paper holding them together. If you need a few individual nails to hand-drive, maybe in a spot where the nail gun won't fit, you can simply cut or tear off as many as you need from the strip and hammer them in. They are often a wee bit narrower in diameter than regular, loose framing nails, so you have to be more careful to make sure they don't bend. Also, on most models you'll notice part of the head is missing.

If you know you're going to be doing a lot of gun-nailing, save time by grabbing a few extra strips of ammo and putting them in your nail apron or pocket.

Compressor [TOP](#)

Nail guns, from big framing nailers down to little brad guns and staplers, operate on compressed air, which comes from a compressor, which pressurizes air in a tank and releases it through the air hose when you pull the trigger, which drives the fastener out the nose of the device, presumably connecting two pieces of wood.

Compressing air in a tank requires a pneumatic pump, which is operated using a motor, which requires electricity. Some compressors get their electricity from a plain power cord. Other compressors come with their own gas-powered engine that spins a generator that creates the electricity the pump's motor needs.

Either way they're loud and stinky and hot, so it's desirable that they be located as far away as possible from where people will be, or maybe on the other side of a wall. By the same token, you have to make sure you have enough hose to reach the guns. Learn when and how to move the compressor and the hoses efficiently as conditions change.

The pressure developed in the compressor's tank is controllable, and you should make sure it's set correctly. As an example, many framing nailers are designed to be used with 100 to 120 pounds per square inch (PSI) of pressure. Look on your gun to find a label or embossing that shows what the acceptable pressure range is, and don't allow the compressor to exceed it.

Somewhere on the compressor, usually near a pressure gauge, you will find a knob. Gradually turn that knob to increase or decrease the pressure shown on the gauge it's attached to till it's just right. If the fasteners are going too deep into the wood, dial it back; if they aren't sinking fully, kick it up.

A single compressor can run one more than one gun, but there is a limit. If three framing nailers are hooked up to a little two-gallon compressor and all three gunners fire within a couple seconds of one another, it's likely whoever shot last will not get a full blast of air, which means the nail will not be driven fully into the wood. (If this happens, just hand-drive it the rest of the way.)

Nail guns are a blessing because they are so efficient compared to hammers, but they are more dangerous if you don't use them properly. We want you to use them properly.

We thank you for volunteering on a construction site, and we hope you find the experience pleasurable and educational and worthwhile. Your hard work and earnest efforts will help a deserving family afford a house you built, and that is always worthwhile.

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