

Wolf Ridge Construction-Education



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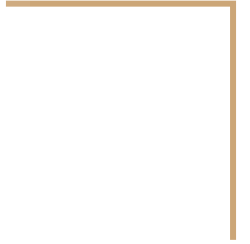
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BASIC TOOLS



Chalk Line



A chalk line or chalk box is a tool for marking long, straight lines on relatively flat surfaces, much farther than is practical by hand or with a straightedge. They may be used to lay out straight lines between two points, or vertical lines by using the weight of the line reel as a plumb line.

Hook the end and stretch the string tight so it crosses directly over your mark. Reach out as far as you can and grab the string between your forefinger and thumb. To chalk a line, lift the string straight up about 4 inches and release it (it'll snap to the floor).

Hammer:

a tool with a heavy metal head mounted at right angles at the end of a handle, used for jobs such as breaking things and driving in nails.

Claw Hammer



Bricklayers Hammer



Sledge Hammer

Tip: Holding the hammer at the end of the handle and avoid holding with two hands. The extra hand will cause you to miss the nail head

Hammer Tacker:

a tool that uses a slapping motion to drive staples into a surface, similar to swinging a hammer. They are also known as slap staplers or hammer staplers.



You'll first want to be sure that you're using the correct staple. If you don't have your guide on hand, you can search your stapler's model online to see what's recommended

Once you have your staples, you'll load them into your magazine by releasing the spring mechanism that's inside the stapler's body. As the magazine is now hollow, you'll insert the staples face up into the magazine. You will then gently ease the spring back into the stapler until you hear a click

Once your stapler has been loaded, hold the tool parallel to the area you'll be stapling and hammer the staple using a flicking motion with your wrist. Be sure that you're using the proper force in order for the staple to completely penetrate the material. You should be able to familiarize yourself with the motion after a few tries. Once you have, the process will be incredibly efficient

Laser Level:

a tool used in construction and surveying to project a laser beam to create horizontal or vertical lines that help ensure work is level and straight

A laser level projects a red or green laser beam that can be visible or invisible. The beam can be a straight line or cross-shaped pattern. Some laser levels are self-leveling, while others can be leveled manually.



Using a laser level requires careful setup to ensure accurate results. Follow these steps:

1. **Attach to a Tripod:** If using a tripod, attach the laser level securely. Adjust the tripod legs and use the built-in levelling bubble to ensure stability
2. **Turn On and Calibrate:** Turn on the laser level. If it's a manual model, adjust the thumbscrews to level it using the bubble vials. For self-leveling models, allow the device to self-calibrate
3. **Project the Beam:** Identify your target surface and project the laser beam. The beam can be a dot, a line, or a combination, depending on the model
4. **Use a Laser Detector (If Needed):** For outdoor use, attach a laser detector to a levelling rod. Slide the detector until it beeps, indicating it has found the beam. Secure the detector and make your measurements

Level

To use a level:

1. Place the level on the surface you want to check, making sure the tube runs parallel to the surface.
2. Observe the bubble. Allow the bubble to float to the top of the tube.
3. Check the bubble's position. If the bubble is centered between the lines, the surface is level. If the bubble is to the left or right of the lines, the surface slopes in that direction.
4. Take multiple readings

For consistency, take readings from multiple positions. You can also flip the level over and recheck to ensure the bubble is in the same position.

Using a level:

1. Clean the level: Before taking a reading, make sure the level and the surface are clean and free of dirt and buildup.
2. Use the right level: Different types of levels are designed for different purposes. For example, a line level is good for setting fence posts, while a post level can measure level in multiple directions at once.
3. Consider the surface: Different surfaces may require different techniques. For example, you can use shims or adjustable feet for uneven surfaces, or a straight edge for curved surfaces.
4. Check the level's accuracy: You can check the accuracy of your level by placing it on a flat surface, marking the end and side of the level, and rotating it 180°. If the bubble is centered between the marks, the level is accurate.



Screwdrivers:

a tool with a flattened, cross-shaped (philips), or star-shaped tip that fits into the head of a screw to turn it.

Flat Head Screwdrivers



Philips Screwdriver



Star Shaped Screwdriver



Snips: used to cut thin sheet metal.

If you have to use force to cut metal, the metal is too thick. Forcing a cut will cause damage to the snips. Snips can not be repaired if they are damaged.





Speed Square

A speed square, also called a rafter square, rafter angle square, and triangle square, is a multi-purpose triangular carpenters' tool used for marking out. Its functions encompass many of those offered by combination squares, try squares, and framing squares. Carpenters use it to make basic measurements and mark lines on dimensional lumber, and as a saw guide for short 45 and 90 degree cuts.

Among its basic uses are marking common, hip, valley and hip, or valley jack rafters, laying out stair stringers, determining and marking angles, and making square cuts on boards.

Common lines made using a speed square include perpendicular cut marks and Angles definition of an angle for roofs, stairways, and decks.

The tool uses a 0° reference. This means when a board is squared off the tool reads 0°. The angle derived is actually a complementary angle, for example a 22.5° angle is actually 67.5°. The sum of the angles equals 90 degrees ($22.5^\circ + 67.5^\circ = 90^\circ$). It is also obvious from a visual check when using a protractor that where the instruments displays 22.5° is actually 67.5° on the protractor.

Tape Measure: flexible ruler used to measure length or distance

To use a tape measure

Find the start and end points

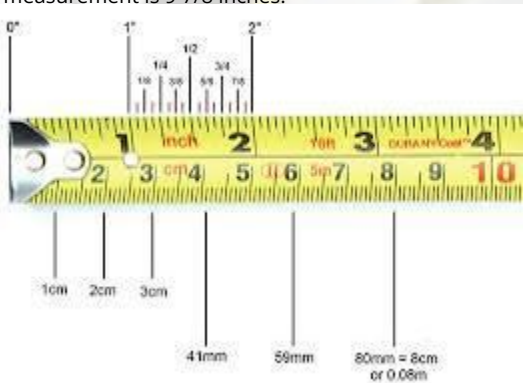
Make sure the beginning of the tape measure is lined up with the start of what you're measuring.

Read the measurement

Identify the inch mark closest to the end of your measurement, and then the increment after that inch. For example, if your measurement is past the 9 inch mark but not the 10 inch mark, your measurement is $9 \frac{7}{8}$ inches.

Add fractions

If the length is between two inch marks. For example, if the length is between the 2 inch mark and the 3 inch mark, add 1 inch +



Use a retractable tape measure

If you're using a retractable tape measure, mark where the tape lines up with the edge of what you're measuring. If the measurement goes into a corner, add the length of the case to the tape measure reading.

Take an accurate measurement

For extra accuracy, you can start your measurement at the 1 inch mark instead of the hook, and then subtract 1 inch from your measurement.

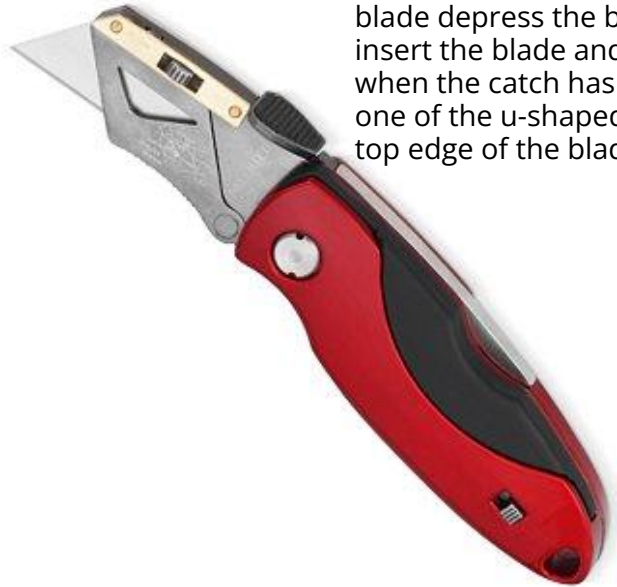
Retract the tape measure carefully

When retracting the tape measure, gently guide it back into the case to avoid nicks or cuts.

Utility Knife:

a knife with a small sharp blade, often retractable, designed to cut wood, cardboard, and other materials.

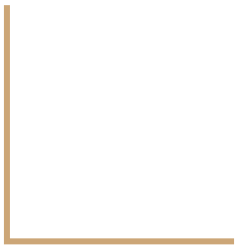
Slightly depress the knurled button to release the catch holding the blade in place and remove the blade. To insert a new blade depress the button and insert the blade and then release when the catch has engaged in one of the u-shaped notches in the top edge of the blade.



Snap-off blade segments: Bend blade against a hard surface to snap off dull end of the blade.



POWER TOOLS



Angle Drills

A right angle drill is a power tool with a head that's set at a 90-degree angle to the handle, allowing the user to drill holes in tight spaces and corners.





Angle Grinder

A handheld power tool used for grinding, polishing, and cutting hard materials like metal



Circular Saw

The circular blade spins at high speed and is guided down by the user to cut the material which needs to be held firmly in place underneath it. They are compatible with a number of different blade types, enabling them to cut through various materials, including stone, metal, wood, plastic, and ceramics

Cut Off Wheel

A thin, circular blade made of abrasive grain and an organic bond system that's used for cutting, grinding, and notching materials



Drill

A power tool that uses a rotating drill bit. It is used to create holes in various materials, such as wood, metal, and plastic.



Right Angle Drill

An electric drill with a head set at a 90-degree angle to the grip. The head on a right angle drill is typically much shorter than what you'd see in a traditional model, too, and the grip is usually designed to be comfortable when operated with one hand.





Hammer Drill

A power drill that works by delivering a rapid succession of blows, used chiefly for drilling in masonry or rock.



Impact

They use a hammer-and-anvil mechanism to deliver a rotational force, which can be up to 50 impacts per second. Impact drivers are often used to loosen or tighten large, corroded, or over-torqued fasteners.

Jigsaw

A jigsaw is a handheld power tool that can make both straight and curved cuts. It has a downward pointing blade that is guided along by an upper handle and can come in both corded and cordless varieties.



Miter Saw



These saws operate similarly to circular saws in that they have a round blade which is pulled downwards to cut the material. However, a miter saw is specifically designed for making precise angled cuts, notable for miter joints, which are when two pieces of wood are seamlessly joined at an angle. Miter saws allow you to custom set the tool to make any angle of cut you need, and they are indispensable if you are cutting trim or molding.



Nail Gun

Known as a nailer, is a power tool used to drive nails into materials like wood or other construction materials.



Nibblers

A tool used in construction to cut sheet metal and other thin, flexible materials

Reciprocating Saw

They work by powering a small blade in a back and forth motion to cut through both metal or wood.





Sawzall

A type of reciprocating saw used in construction and demolition for cutting through thick materials like wood, metal, and masonry

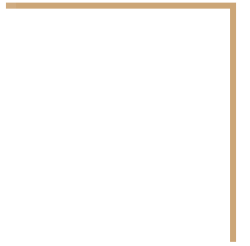
Torches

a tool used to melt and adhere materials to a roof or other surface.





MUST KNOW TERMS



A 3D cutaway diagram of a building's floor joist system. The diagram shows a grid of wooden joists supported by a concrete foundation. Several walls are shown: a central wall labeled 'Bearing Wall' that runs parallel to the joists and supports them; two side walls labeled 'Non-Load Bearing Walls' that are perpendicular to the joists and do not support them; and a front wall labeled 'Load Bearing Wall' that is perpendicular to the joists and supports them. Pink arrows point from the text labels to the corresponding walls. A white text box with a black border is positioned in the center of the diagram, containing a definition of a bearing wall. Brown L-shaped brackets are used to highlight the bearing wall and the non-load bearing walls.

Non-Load Bearing Walls

Bearing Wall

A bearing wall, also known as a load-bearing wall or structural wall, is a wall that supports the weight of a building's roof or floor and transfers it to the foundation

Load Bearing Wall

A yellow wheel loader is shown in a desert-like environment, dumping a load of material from its bucket. The background is a vast, flat, sandy landscape under a clear sky. The loader's large, treaded tires and mechanical components are visible. The overall scene is brightly lit, suggesting a sunny day.

Backfill

Backfilling is the process of putting a mixture of soil, rocks or stones back into a trench or foundation after excavation, typically to bury a pipe. Compact proper backfill to provide strong base support for construction, reducing the chance of shifting, erosion or settling.



Beam

A long, sturdy piece of squared timber or metal spanning an opening or part of a building, usually to support the roof or floor above.



Cantilever

A cantilever is a rigid structural element that is only supported at one end, leaving the majority of its surface without any apparent support.

A close-up photograph showing a person's hands in yellow work gloves using a white caulk gun to apply white caulk to a joint in a white structure. The caulk gun has a red handle and a silver nozzle. The background is a white, perforated surface, possibly a ceiling or wall panel. The word "CAULKING" is written in large, bold, black letters across the top of the image.

CAULKING

Caulking is a flexible material used to fill gaps and seams in a building to prevent water damage and air leaks. It's a common waterproofing technique in construction and can be used in many situations

The background image shows a large-scale construction site. The primary focus is the steel skeleton of a building, which is heavily reinforced with cross bracing. These diagonal steel members are arranged in an 'X' pattern between the vertical columns and horizontal beams, providing structural stability. The sky is a clear, bright blue, and the overall scene is one of active industrial construction.

Cross Bracing

Cross bracing is a structural engineering technique that uses diagonal braces to reinforce buildings and other structures against lateral forces, such as wind or seismic activity. The braces are arranged in an X-shape between horizontal and vertical members of the structure's frame.



Drywall

Drywall is a rigid sheet material used to construct interior walls and ceilings in buildings. It's made of calcium sulfate dihydrate (gypsum) and paper or fiberboard, and is also known as plasterboard, wallboard, or sheetrock

Dominant Tenement

Lot 1

C: Easement by Necessity

Easement

Dominant Tenement

Lot 3

Servient Tenement

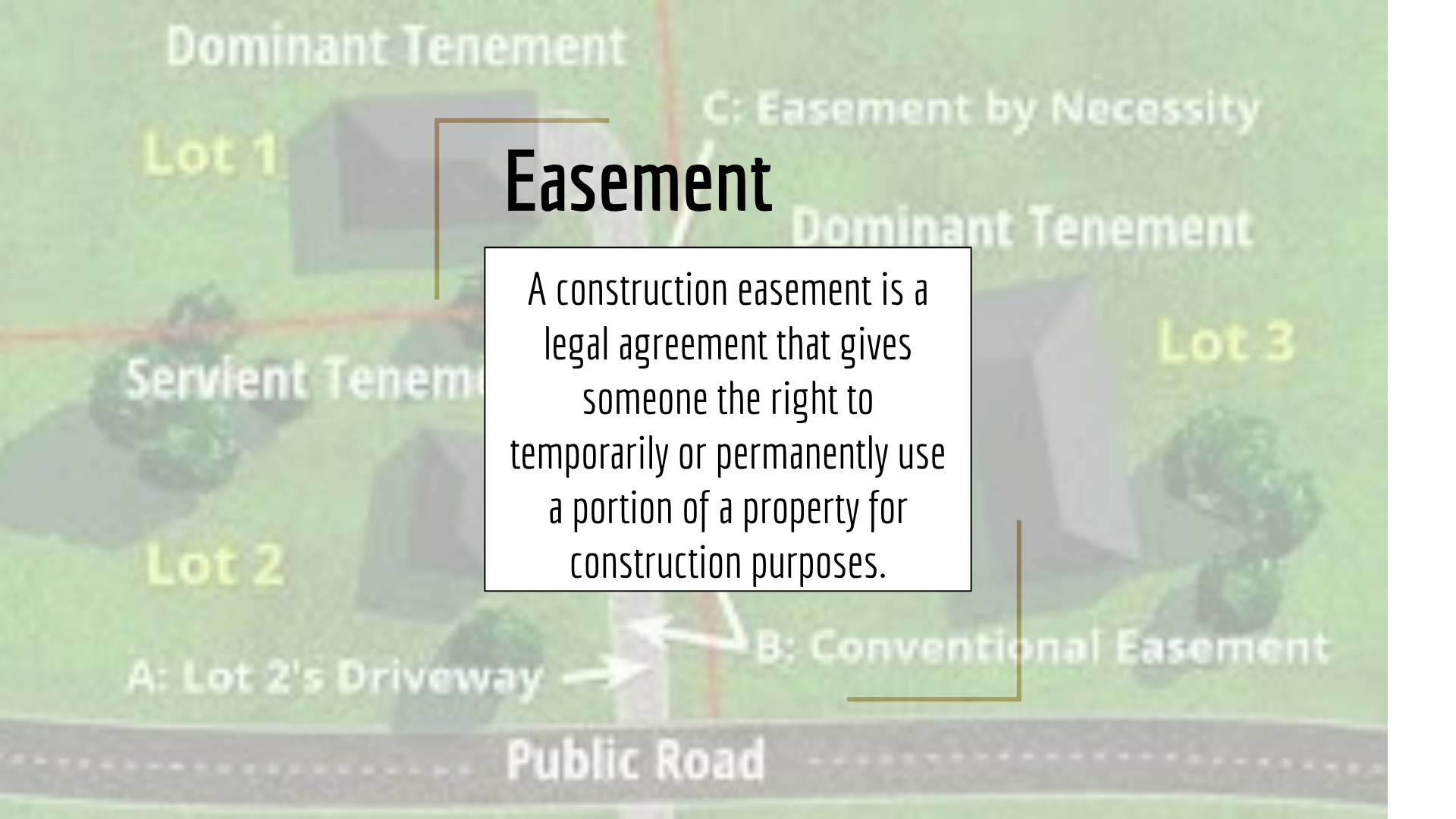
Lot 2

A construction easement is a legal agreement that gives someone the right to temporarily or permanently use a portion of a property for construction purposes.

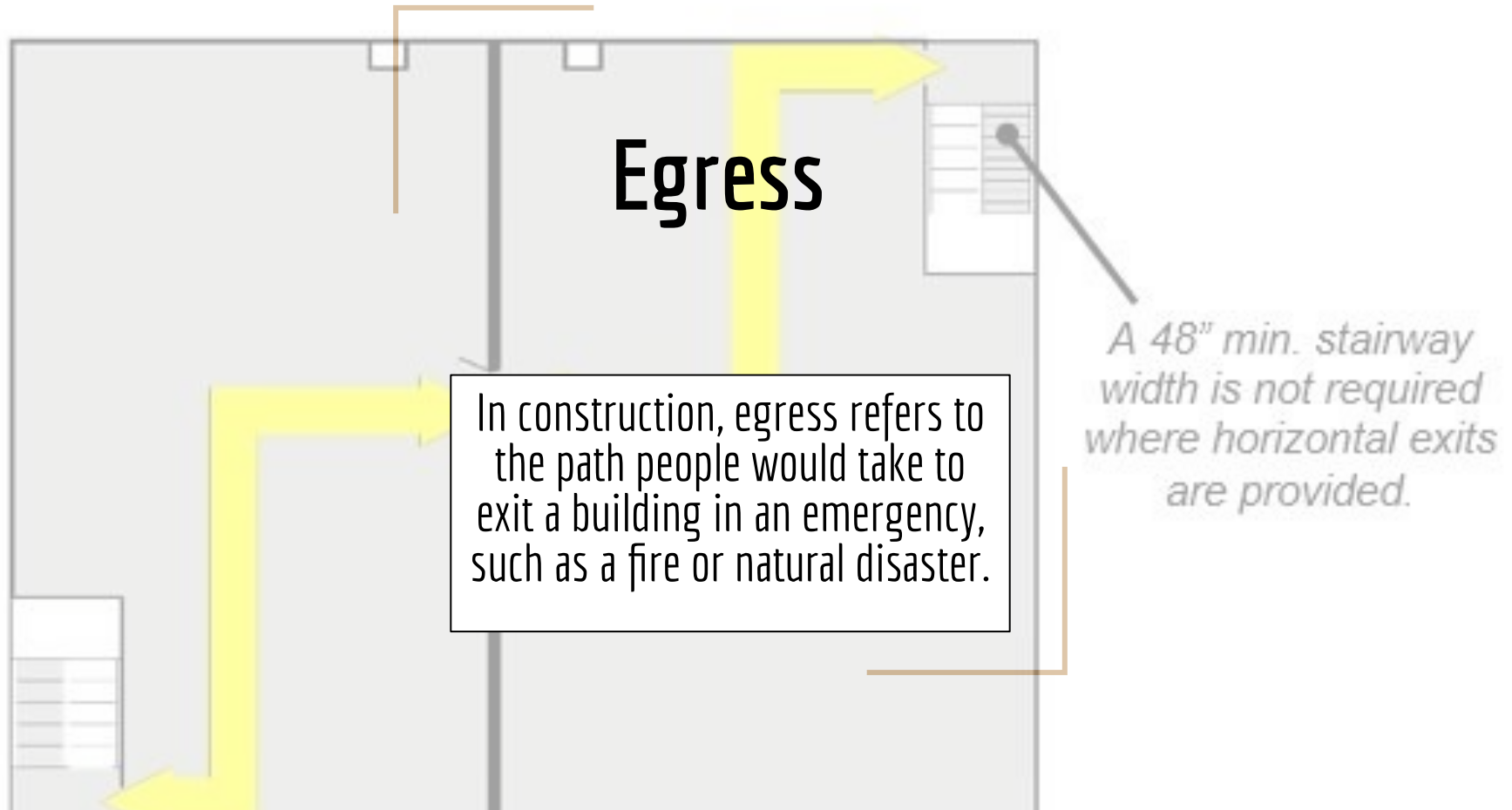
A: Lot 2's Driveway

B: Conventional Easement

Public Road



No more than half the required exits can be horizontal exits. At least one exit must lead directly to an exit enclosure or to the exterior.



Fascia

The panelling that runs just beneath the edge of the roof of a building and is sometimes referred to as the roofline. The purpose of the fascia is to cover the space between the roof, eaves and wall while creating a neat and streamlined finish.

← Fascia

← Gutters



Foundation

The base of a building or structure that connects it to the ground and transfers the building's weight to the soil. The foundation's purpose is to distribute the building's weight evenly to prevent movement or settlement that could compromise the structure's stability.



Footing

a structural component of a building's foundation that distributes a building's weight across the ground

Framing

The fitting together of pieces to give a structure, particularly a building, support and shape.





Gable

a triangular section of a building's exterior wall that extends from the eaves to the peak of a roof. Gables are often found at the end of a ridge-roofed structure, and are usually bounded by the roof's overhanging eaves.



Girder

A horizontal beam that supports the weight of a structure, such as a roof or floor.



Header

A beam that transfers the weight of a structure above an opening to the surrounding area. Headers are used to create openings for doors, windows, and interior passageways

A photograph of a rooftop HVAC system. In the foreground, several long, horizontal metal pipes run across the roof. In the background, there are several large, beige-colored HVAC units with metal grilles. A light blue electrical control cabinet is visible in the middle ground. The sky is overcast and grey.

HVAC

Refers to the heating, ventilation, and air conditioning (HVAC) systems in residential and commercial buildings.

The background of the slide is a close-up photograph of yellow fiberglass insulation being installed in a wooden wall or ceiling frame. The wooden studs are visible, and the insulation is being packed into the cavities between them. The lighting is bright, highlighting the texture of the insulation.

Insulation

A material used to reduce heat flow in a building, which can improve energy efficiency, comfort, and cost savings



Joist

A structural component that strengthens floors and ceilings by distributing weight across the building.



Load Bearing Wall

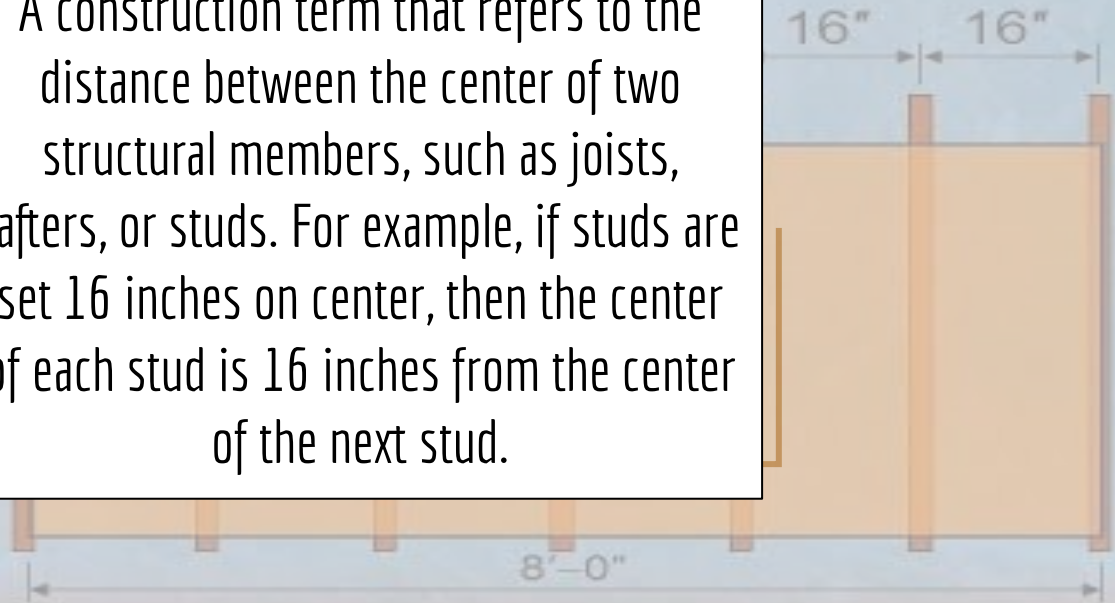
A structural element in a building that supports the weight of the roof and floors above it, and transfers that weight to the foundation.

OC Concepts

On Center

- Typical support member spacing is 16".

A construction term that refers to the distance between the center of two structural members, such as joists, rafters, or studs. For example, if studs are set 16 inches on center, then the center of each stud is 16 inches from the center of the next stud.





Overhang

A protruding structure that extends beyond the exterior wall of a building. Overhangs, also known as eaves, are a key architectural element that can provide protection from the weather and add to a building's aesthetic appeal.



Purlin

A horizontal beam or bar that provides structural support to a building, most often below the roof



Radiant Barrier

A thin, shiny material that reflects radiant heat, rather than absorbing it. It's usually made of aluminum foil, but can also be applied to other materials like cardboard, plastic, or plywood.



Rafter

A sloping beam that extends from the peak of a roof to the wall plate, and is used to support the roof's weight and shape.



Ridge Vaents

A type of vent installed at the peak of a roof to allow warm, moist air to escape the attic and circulate fresh air in

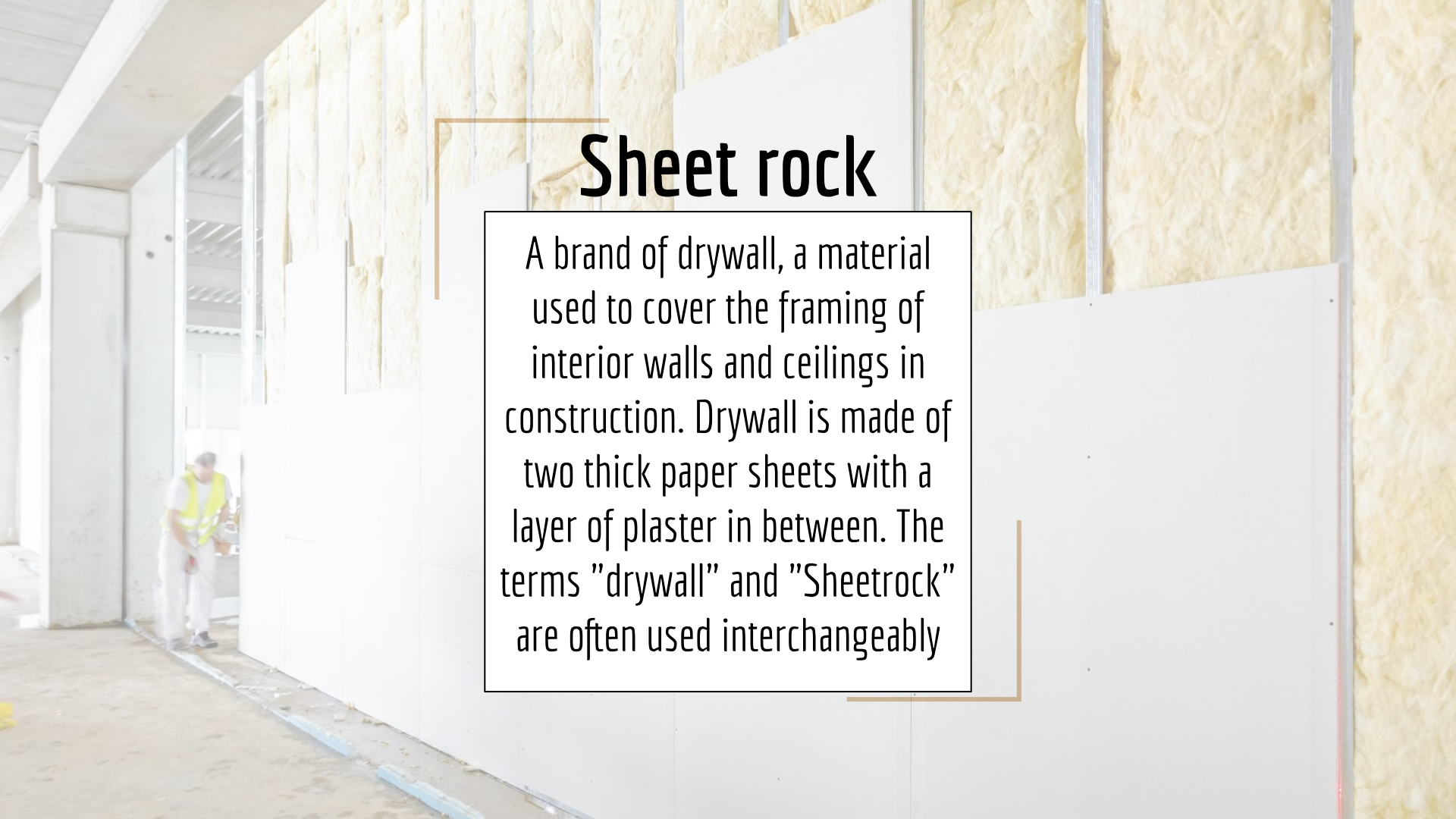


Roof Decking

A flat layer of material that provides a level surface for roofing materials to be installed on. It's also known as roof sheathing.

Sheet rock

A brand of drywall, a material used to cover the framing of interior walls and ceilings in construction. Drywall is made of two thick paper sheets with a layer of plaster in between. The terms "drywall" and "Sheetrock" are often used interchangeably





Skirting

A strip of material that covers the bottom of a wall where it meets the floor. It's also known as a baseboard or mopboard. Skirting can be made of wood, plastic, or tile.



Soffit

A horizontal material that runs along the underside of a roof overhang, connecting the exterior wall of a house to the roof's edge. Soffits are often vented to allow air to flow, but they can also be closed to protect the interior.



Studs

Framing components in timber or steel-framed walls, that run between the top and bottom plates. It is a fundamental element in frame building

cover board



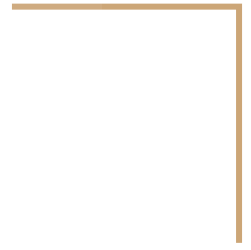
Subfloor

The foundation for a floor in a building.

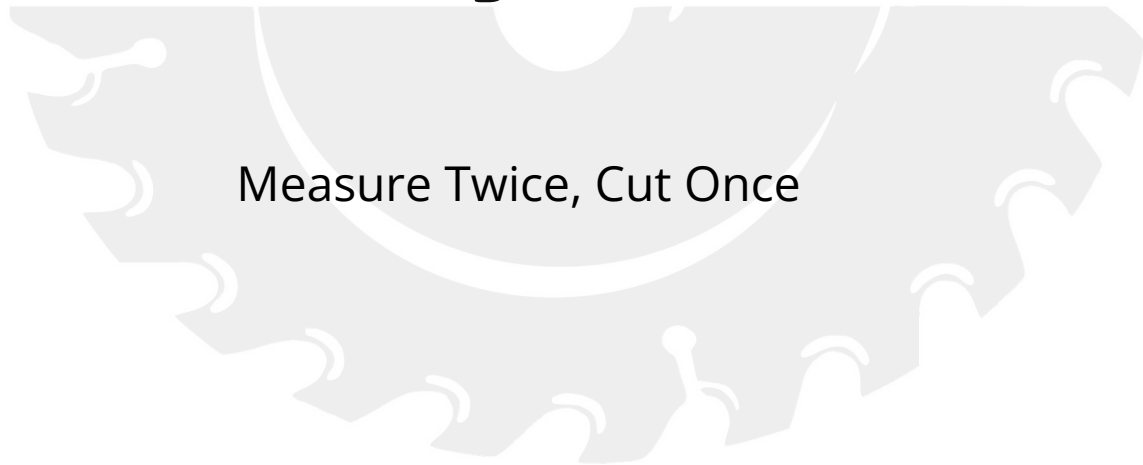


Trusses

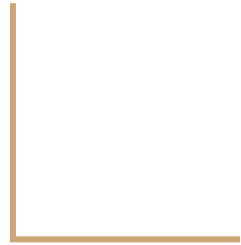
A structural member usually fabricated from straight pieces of metal or timber to form a series of triangles lying in a single plane.



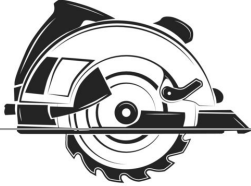
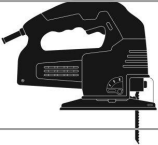
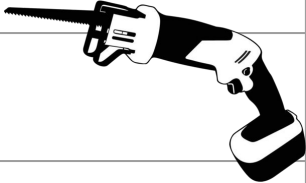

Making the Cut



Measure Twice, Cut Once



USE THE RIGHT SAW FOR THE JOB

Circular saws 	Good for short crosscuts and long rip cuts in wood. They can also be used to cut masonry slabs.
 Jigsaws	Good for cutting curves and intricate designs.
Reciprocating saws 	Good for quick, short cuts and for making cuts in tight, hard to reach areas.
 Miter Saw	Good for angled cuts, crosscuts, and bevel cuts.
Sawzall	See Reciprocating Saw

Changing Circular Saw Blades

1. Start by unplugging the saw and securing the blade guard.
2. Find the brake and engage. This will lock the blade in place while you turn the wrench.
3. Locate the blade nut on the saw's arbor. Use a wrench or an Allen key that fits the nut's size and turn it counterclockwise to loosen it.
Apply steady pressure while turning the wrench, but be careful not to force it.
Keep loosening until the nut is completely free.
4. Remove the nut, washers, and collars.
5. Carefully take off the old blade.
6. Carefully take off the old blade.
7. Check for dust or debris buildup around the arbor area before installing the new blade. This will help maintain proper contact between blade and arbor shaft.
8. Slide the new blade onto the drive spindle.
Make sure the teeth are pointed in the right direction. They should point up at the front of the saw.
9. Replace the collars, washers, and nut.
10. Re-tighten the arbor nut, moving the wrench in a clockwise direction. Apply steady pressure until you feel resistance. Ensure it's tight enough to hold the blade firmly during operation, but don't over-tighten! It can cause damage to the nut and saw.
11. Check for firmness – Check to make sure there is no play or movement in the blade.

How often should I change my saw blade?

It is recommended to change your saw blade when it becomes dull or starts to show signs of wear. The frequency of blade changes will depend on how often you use the saw and the type of materials you cut.


What tools do I need to change a saw blade?

To change a saw blade, you will need a wrench, typically provided with the saw, to loosen and tighten the blade, as well as a lock button or pin to hold the blade in place during the replacement process.



Are there any safety precautions to consider when changing a saw blade?

Yes, always remember to disconnect the saw from its power source before starting the blade changing process. Wear protective gloves to avoid injuries and handle the blade carefully.



How do I remove the old saw blade?

Start by disconnecting the saw from its power source. Then, locate the blade lock button or pin on the saw's housing, and press or insert it to lock the blade in place. Use the wrench to loosen the arbor nut in a counterclockwise direction until you can remove it. Carefully take off the old blade and set it aside.

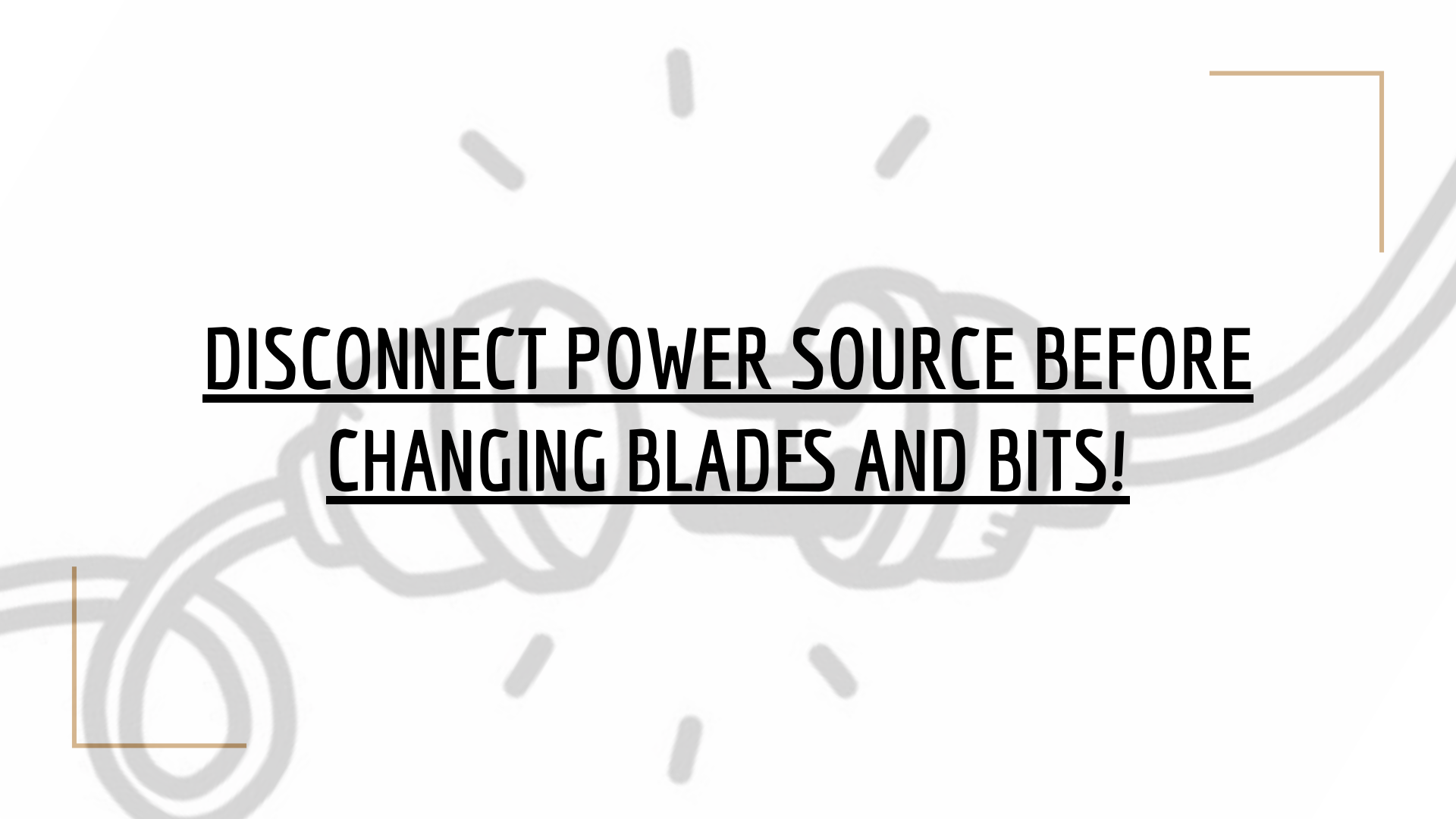
How do I install a new saw blade?

Begin by checking the new blade for any damage or defects. Align the center hole of the blade with the saw's arbor, making sure the teeth face in the correct direction (usually indicated on the blade). Insert the arbor nut and tighten it securely in a clockwise direction using the wrench. Ensure the blade is centered and aligned properly before proceeding.

How do I cut a straight line?

Make your measurement, bring your square over, line up the saw to the 0 Mark, squeeze the square in place, and then run the side of the saw against your square. Watch where you're going, not where you're at.

In case you missed it...



DISCONNECT POWER SOURCE BEFORE
CHANGING BLADES AND BITS!

Drills and Impacts

“Got 99 problems, and ‘loose screws’ are definitely one of them.” — Walter “The Wrench” White



Choose the correct drill bit.

When drilling a hole for a screw, there's an easy way to find the right size bit. Hold the screw up directly behind the bit. The bit should hide the shaft of the screw from view, but the screw threads should still be visible on both sides.

Fit the drill bit firmly into the chuck.

To replace a drill bit, make sure the drill is off (and unplugged if corded), then loosen the chuck by rotating it. Depending on the drill, you may be able to do this by hand, or you may need a chuck key located in a compartment in the top or handle of the drill. Insert the drill bit into the chuck, then tighten again. Make sure the bit is straight and secure, and remove the key before you turn on the drill.

Drill with steady pressure.

Hold the drill steady and push it into the material you're drilling. If it takes more than light force to drill the hole, you're probably using the wrong bit.

Adjust the clutch.

Each drill has a twistable collar to adjust the torque, often with a series of numbers on it. The higher the number, the more torque (rotational force) the drill will apply. If you are having trouble penetrating the material, increase the torque. If you are over-driving screws (burying them too deep), or if drilling too deep could damage something, lower the torque.



Drill Bits

COMMON DRILL BITS

GENERAL
PURPOSE
TWIST BIT



SPUR
POINT
(WOOD)



MASONRY
(STONE,
BRICK,
CONCRETE)



SPADE BIT
(LARGE
HOLES IN
WOOD)



PHILLIPS
SCREWDRIVER
ATTACHMENT



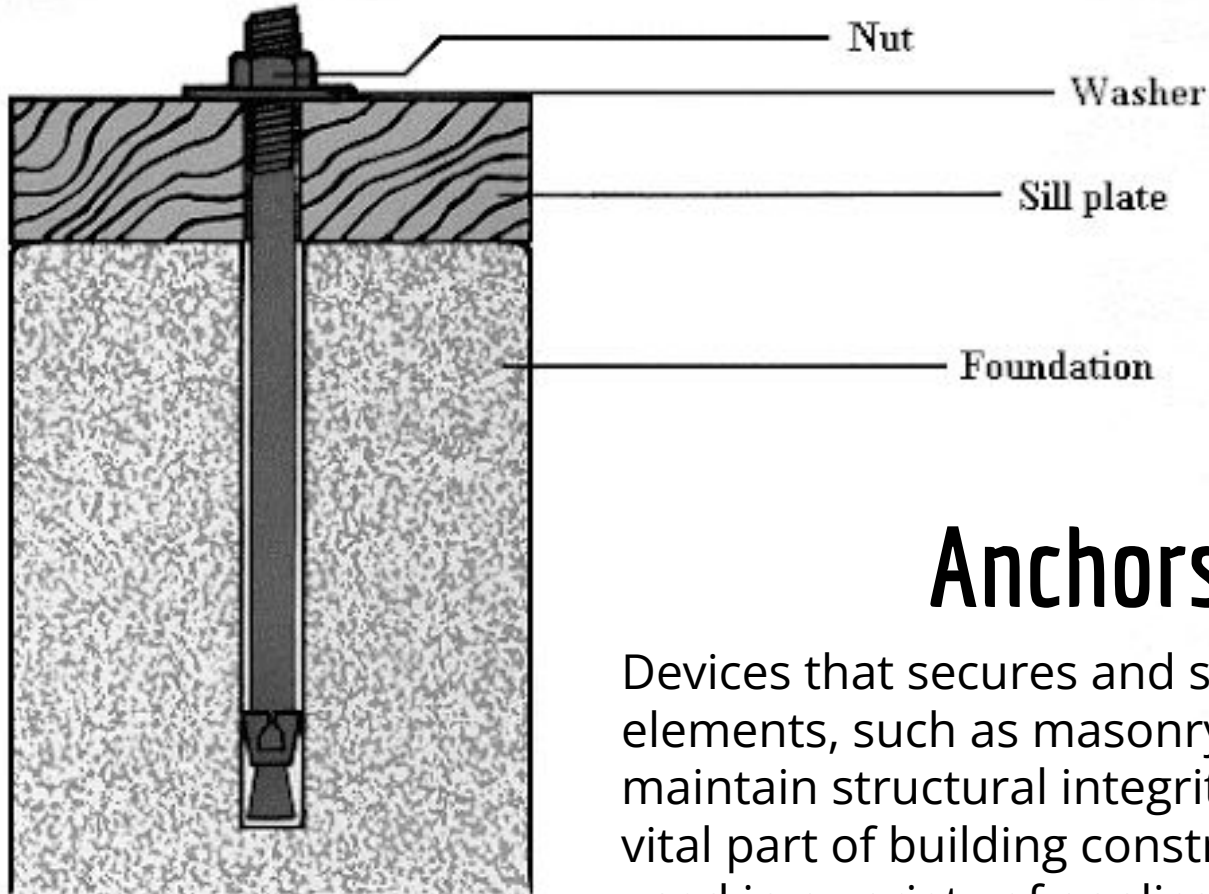
HOLE SAW
(WOOD OR
PLASTIC)



Fasteners

Stuck like...What?





Anchors

Devices that secures and stabilizes building elements, such as masonry or timbers, to maintain structural integrity. Anchors are a vital part of building construction and are used in a variety of applications.

Bolts

A high-strength fastener used to join structural elements or install them into a material or surface. They are commonly used in the construction of buildings, bridges, tunnels, highways, piers, and marine infrastructure.




Nails



common nail




ring nail



finishing nail

A metal fastener used to attach objects together in construction and carpentry. Nails are typically made of steel, but can also be made of other materials like stainless steel, iron, copper, aluminum, or bronze.



spiral chank nail

There are many different types of nails, including common nails, finishing nails, sinkers, and nails with different heads. The type of nail you use depends on the material you're driving it into and how much holding power you need.



casing nail



masonry nail

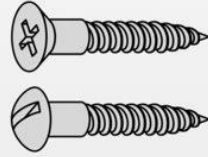
Screws

Short, slender, sharp-pointed metal pin with a raised helical thread running around it and a slotted head, used to join things together by being rotated so that it pierces wood or other material and is held tightly in place.

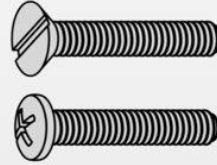


DIFFERENT TYPES OF SCREW

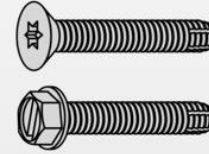
Wood screws



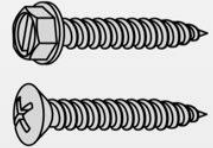
Machine screws



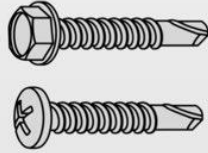
Thread cutting



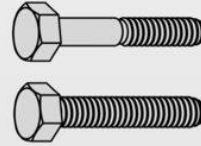
Sheet Metal



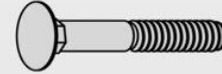
Self drilling



Hex bolts



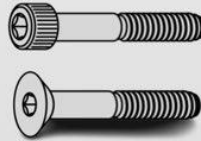
Carriage bolts



Lag bolts



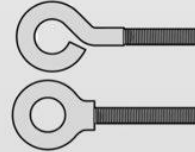
Socket screws



Set screws



Eye bolts



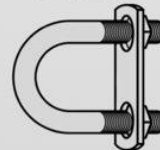
Eye lags



J-bolts



U-bolts




Shoulder bolts



Elevator bolts





“You can dream, create, design and build the most wonderful place in the world. But it requires people to make the dream a reality.” — Walt Disney

