



BCATS

BUILDING, CONSTRUCTION
AND ALLIED TRADE SKILLS

Hand tools



Unit Standard 12927 (v5), Level 2

Demonstrate knowledge of, select,
maintain, and use hand tools
for BCATS projects

6 CREDITS

BCITO
buildingpeople

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(BCITO)**

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Introduction

This handbook is an introduction to a wide range of hand tools used in the construction of BCATS projects. By the time you've completed this unit standard you will no doubt find it impossible to think of any projects that can be completed without any hand tools.

While power tools and fixed machinery are convenient and often essential equipment, hand tools remain very important across the trades. There are many tasks that a competent person can complete with hand tools at least as effectively as with power tools or fixed machinery. Some tasks can only be done with hand tools.

Working by hand also gives a feel for the material being worked, a sense that using a machine will sometimes not provide. For example, how the mortar feels on the trowel tells a bricklayer whether to add more of one of the ingredients.



A trowel is being used to place the mortar ready to place the next course (line of bricks).

To include and describe every hand tool you could use for your BCATS projects would make this resource into an encyclopaedia. The main tools used across a range of trades and tasks have been selected instead. Your teacher/tutor will teach you to identify, select, use, and maintain all the hand tools needed for your two BCATS projects.

How you will be assessed

You will be assessed through a combination of practical and written work.

To achieve this unit standard, you need to complete two BCATS projects where you can identify, describe, select, use and maintain hand tools. Your teacher/tutor will tell you which project(s) to complete.

You need to show your teacher/tutor that you can:

- identify, describe and select hand tools for your BCATS projects
- safely and correctly use the hand tools
- care for and maintain the hand tools.

Your teacher might give you a work diary to help you record how you made your projects.

If you can, have someone take photos of you using and maintaining hand tools as your projects progress.

Glossary of terms

Term	Meaning
Bevel	The slanted end of a tool blade that can be honed to produce a sharp edge for cutting.
Blueing	The discolouration of a cutting blade as a result of overheating during the grinding process and indicating a loss of hardness in the metal.
Burr	The rough or sharp edge of a cutting blade formed as a result of the sharpening process.
Chamfer	A transitional flat edge between two faces, often formed at a 45 degree angle.
Concave	Curving inward and having the shape of the inside of a sphere.
Convex	Curving outward and having the shape of the external surface of a sphere.
Countersink	To enlarge the upper part of a hole to allow the head of a screw to finish below the surface of the work.
Cupped	When the grain of timber forces the edges higher or lower than the centre across the width.
Ferrule	The metal band that protects the end of a wooden chisel handle from damage when struck by a hammer.
Grinding angle	The angle on the cutting edge of a plane or chisel. Usually between 20 and 25 degrees.
Honing angle	The angle used to produce a sharp cutting edge on a whetstone. Usually 5 degrees greater than the grinding angle.
Impelling	The driving force used to propel a cutting tool forward.
Knurled	A section of fine ridges on a tool that provide grip.
Level	When something is perfectly horizontal.
Mushrooming	The distortion of the end of a metal tool as a result of being struck with a hammer.
Plumb	When something is perfectly vertical.
Serrated	Having a notched or saw toothed edge.
Strop	The final stage of the sharpening process after honing.
Torque	The twisting force that produces rotation.

Health and safety

The Health and Safety at Work Act 2015 is designed to:

- prevent harm to employees at work
- promote good practices in health and safety management.

The Act puts responsibilities on everyone to take all practical steps to ensure their own safety and the safety of others.

Apart from using the correct Personal Protection Equipment (PPE) one way you can help ensure your own safety is to select and use hand tools correctly. Keep them well maintained and check them before using. Make sure your work is secure before using any cutting tool or applying a force, such as using a set spanner to tighten a fastener.

You must receive training in the use and maintenance of hand tools and put this training into practice when you select and use hand tools. You have a responsibility to ask your teacher/tutor for guidance if you are unsure of any tool or procedure.

Hand tools safety rules

ALWAYS



- select the right tool for the job
- carry sharp-edge and pointed tools carefully. Hold firmly, close to the body, and point downwards
- pass them handle first or by holding them sideways (without holding any sharp edge)
- clean and store tools correctly
- use them only as you have been instructed to
- select and use appropriate PPE for the job.

NEVER



- use tools that are blunt or damaged
- use a tool for a job it is not designed for
- use a sharp tool without securing the work first
- run your fingers across a blade to check how sharp it is
- carry too many tools at once.

Hand tool hazards and controls

Every hand tool has its own hazard, and every hazard is able to be controlled or have the risk minimized. Be aware of the hazard and use the appropriate control. An example of how to do this is below.

HAZARD	POTENTIAL HARM	CONTROL(S)
Blade breaking while using the tool.	Damage to eyes from broken blade.	Use the cutting knife as trained to. Blades are brittle and easily snap if side loads are applied. Wear safety glasses.
Sharp blade.	Cutting fingers/hands (or other body part) by slipping.	Use the cutting knife as trained to. Use a straight to guide a cut. The straight edge should be clamped into position. Keep body parts behind the path of the blade, not in front.
Material moving.	Cutting hand/fingers (or other body part) as a result of the material moving.	Use the cutting knife as trained to. Secure the material being cut in a vice or by clamping it.
Blunt blades.	Excessive force required to complete the task, which could lead to slipping and resulting hand/finger injury.	Change the blade as trained to.
Dropping the knife.	Foot injury caused by dropping cutting knife onto foot.	Wear covered footwear.
Knife left out with blade exposed.	Injury caused by exposed blade when not in use.	Retract the blade after use. Put the knife away where it belongs.

Hazard	Control
	
<p>Before I use a cutting knife, I think about the hazards and make sure I can control each hazard.</p> <ol style="list-style-type: none"> 1. I think about what could/might happen. 2. I take action to eliminate or reduce the likelihood of it happening. 	

In summary, every tool has potential hazards. Use each tool for its intended use only. Ask your teacher/tutor for help if you unsure of or have forgotten how to use a particular tool safely.

Your safety and the safety of others is important.

Care, maintenance and safety

Keep tools sharpened and in good condition. Good-quality work is impossible to achieve with blunt or incorrectly sharpened tools. They are also dangerous because you have to apply extra pressure on the tool. This reduces your control and this increases the likelihood of injury. Keep them sharp and use them safely at all times.

Take care when handling, packing, or storing tools. Cutting tools can lose their edges when they come into contact with metal. Storing them in pouches or on a shadow board prevents tools from coming into contact with each other and dulling (losing their cutting edge).



Putting tools away as soon as you've finished using them is good practice because a cluttered area can be unsafe.

When starting a job outdoors it is useful to take all the hand tools you think you'll use. Keep them all to one side of the job, as shown below. Once finished, clean and store the tools as per the guidelines in this resource or how you were trained to.



Note: It is important to clean tools immediately after working with materials that harden, such as concrete or resin. It is very difficult to remove these materials once they have dried.

Always store tools in a dry place. Periodically rub them down with light machine oil to prevent rust.

Classification

Hand tools can be classified according to their purpose. Some hand tools will be used across a wide variety of projects. Others are specialist tools used for one or very few tasks, such as a steel trowel for finishing concrete and a diamond cutter for cutting glass.

MEASURING, MARKING & SETTING OUT TOOLS	CUTTING TOOLS	IMPELLING TOOLS
Steel rule	Tenon saw	Sledge hammer
Folding rule	Dovetail saw	Claw hammer
Carpenter's pencil	Panel saw	Warrington hammer
Measuring tape	Cross cut saw	Nail punch
Try square	Rip saw	Mallet
Combination square	Coping saw	Screwdriver
Sliding bevel	Hack saw	Rubber mallet
Marking gauge	Chisel	
Cutting gauge	Plane	
Spirit level	Spokeshave	
String line	Scraper	
Plumb bob	Rasps and file	
Chalk Line	Sanding block	
Lasers		
GRIPPING TOOLS	SHARPENING TOOLS	TILING TOOLS
Adjustable spanner	Bench grinder	Manual tile cutter
Pliers	Motorised whetstone	Tile nippers
Cramps	Oilstone	Tile trowel, pointed and notched
Pincers	Diamond stone	Rubber grout floats
Set spanners		Grout sponge
Allen keys		Tile spacers
Socket set		Tile levelling system
Vice grips		Diamond drill bits
		Suction cups
		Tile marker pen

Classification

PAVING/CONCRETE PLACING TOOLS	GLAZING TOOLS	BRICKLAYING TOOLS
Brush	Fixed braced L square	Skutch hammer
Broom	Glass cutters	Bolster
Shovel	Glass breaking pliers	Trowel
Spade	Circle cutters	Pointing trowel
Trowel	Vacuum suction cups	Concave pointer
Finishing trowel		Wheeled raker
Screed board		Block and line
Masonry mortar board		

There are many other trades in the building and construction industry, all of which have their own specialist hand tools. Your teacher/tutor will introduce you to these and teach you how to use them if your project relates to one of them instead of those covered in this resource.

BCATS trades are listed below, most of which have specialities within them:

Architectural aluminium joinery		Brick and block laying	
Carpentry		Concrete	
Exterior plastering		Flooring	
Frame and truss fabrication		Glass and glazing	
Interior systems		Joinery	
Kitchen and bathroom design		Painting and decorating	
Stonemasonry		Tiling	

Measuring, marking and setting out tools

Selecting and using the correct setting out tools and marking the materials out accurately are essential skills for any successful project.

Steel rule

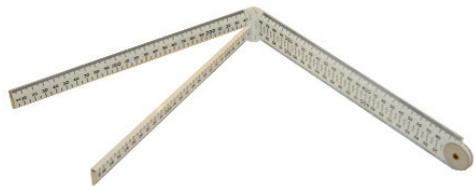
Common sizes of stainless steel rulers are 300, 600mm and 1m long. For tight spaces, 150mm steel rules are used.



Use	Care and maintenance
<ul style="list-style-type: none">→ For accurate measuring and marking out, particularly for bench work and setting up machines.→ Use with a sharp marking knife or sharp pencil for maximum accuracy.	<ul style="list-style-type: none">→ Protect the edges and ends from damage.→ Keep clean.

Folding rule

A folding, 1-metre rule graduated in millimetres.



Use	Care and maintenance
<ul style="list-style-type: none">→ For accurate measuring and marking out.→ Use flat for an approximate reading, Use on its edge to accurately mark measurements with a sharp pencil.	<ul style="list-style-type: none">→ Easily broken.→ Lubricate hinges and keep the ruler clean.

Carpenters pencil

The carpenter's pencil has a rectangular shaped lead and comes in hard, medium or soft grades. Other softer pencils, such as a HB pencil, can be used for marking out and recording measurements. On some surfaces, such as polycarbonate panels, a fine tipped marker pen may be used instead.

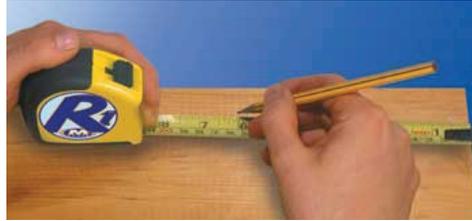


Use	Care and maintenance
<ul style="list-style-type: none">→ For marking and recording measurements.→ Use as a finger gauge for drawing lines parallel to an edge.	<ul style="list-style-type: none">→ Keep the point sharp and chisel shaped.

Measuring, marking and setting out tools

Measuring tape

A flexible strip of steel divided into millimetres, centimetres and metres. Common lengths used by carpenters are 5m and 8m.



Use

- To accurately measure lengths.
- When measuring, hold the tape tight and support it to prevent sagging.
- Rewind after use.

Care and maintenance

- Avoid loops in the tape as they may cause it to snap when it is pulled tight.
- It's important to keep the tape dry, lightly oiled, and free from grit that may scratch the enamel surface and make reading and rewinding difficult.
- Avoid retracting the tape hard onto the stop end.

Laser measure

A laser measuring device is an electronic measuring device that is used to take site measurements, such as measurements of room sizes. The tool sends out a laser beam that bounces back off an obstruction. They are



used as an alternative to manual tape measures because they provide a high, reliable degree of accuracy. They are not used in the workshop but you may use one when checking measurements for projects such as a non-consent utility building.

Use

- To measure between points generally over a long distance with a high degree of accuracy

Care and maintenance

- Check for accuracy before using and reset it if necessary. To test for accuracy, take the reading over a pre-determined measure such as between two existing walls.

Measuring, marking and setting out tools

Try square

Try squares come in a wide range of sizes. In all cases the blade is fixed at 90 degrees to the stock.



Use

- For marking angles of 90 degrees.
- To test if edges and corners are square.

Care and maintenance

- Keep clean and free of rust by using a light oil.
- Ensure edges are not knocked or damaged.
- Check that the square remains square.

Note: To test a square for accuracy, hold the stock firmly against the straight edge of a board and with a sharp pencil mark a fine line along the blade. Rotate the stock 180 degrees and against the same edge check the position of the pencil line. If the edge of the blade does not line up with the line on the board it is not accurate.

Combination square

The stock is adjustable and can be fixed by a thumb screw in any position along the blade.



Use

- For marking angles of 45° and 90°.
- Use as a gauge in awkward places and for measuring the depths of rebates.

Care and maintenance

- Keep clean and free of rust.
- Lightly oil the thread screw so the stock moves easily on the blade.

Measuring, marking and setting out tools

Sliding bevel

The blade is held in position on the stock by a thumbscrew and wingnut. The blade of the bevel can be adjusted to any desired angle.



Use

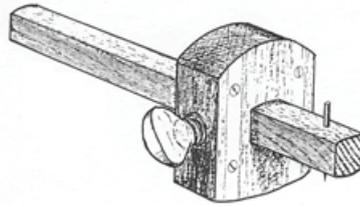
- For marking odd angles and testing bevel cuts and mitres as well as transferring angles such as setting up a compound saw.

Care and maintenance

- Keep clean.
- Lightly oil thread at thumbscrew to keep moving parts in operating order.
- Retract blade when storing.

Marking gauge

The spur scribes the line and is mounted in the stem. Move the position of the stock on the stem to adjust. The thumbscrew locks the gauge in a set position.



Use

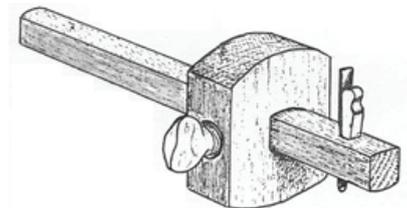
- For scribing lines parallel to an edge.

Care and maintenance

- Keep the spur sharp.
- Release the tension on the thumb screw when not in use.
- Store in a clean and dry environment.

Cutting gauge

A cutting gauge is similar to the marking gauge but with a cutter or blade instead of a spur.



Use

- For cutting or marking out across the grain.
- Used for cutting veneer or thin timber into strips.

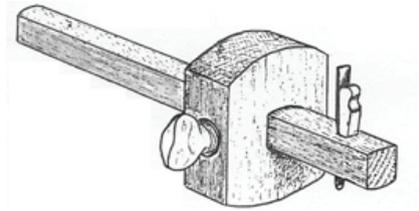
Care and maintenance

- Keep the cutter sharp.
- Release the tension on the thumb screw when not in use.
- Store in a clean and dry environment.

Measuring, marking and setting out tools

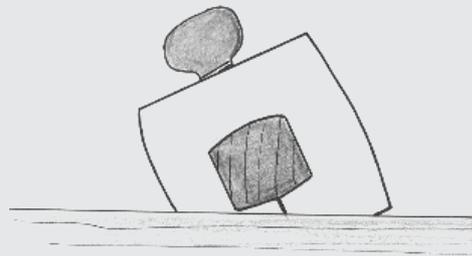
Mortise gauge

The mortise gauge has two spurs, one of which is adjustable and used to mark two lines parallel to a face or an edge. This gauge is particularly useful for marking out mortise and tenon joints and as positioning for dowel joints.

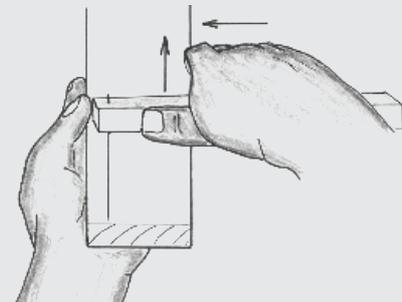


Gauges - Accurate setting up and use

- To set them up, adjust the stock to the correct distance from the spur using a ruler.
- Gently tighten the thumbscrew to lock the stock in place.
- Make fine adjustments by lightly tapping the end of the stem against the bench.
- When it is correctly set, firmly tighten the thumbscrew.
- Place the stock firmly against the edge of the work.
- Slide the gauge along the edge with the spurs dragging on the surface to leave the required mark.



Roll the gauge over until the spur is dragging on the work.



Keep the stock held in firmly against the edge to ensure a parallel line.

String line

String lines have a nylon line wound on a timber or plastic dowel. Their most common lengths are 50m and 100m.



Use	Care and maintenance
<ul style="list-style-type: none">→ To set out straight lines, for foundations and wall frames.→ Must be pulled tight for accurate alignment.	<ul style="list-style-type: none">→ Keep string free of knots.→ Rewind onto dowel when not in use.→ Continual use may cause the first section of line to deteriorate. Cut off if necessary.

Measuring, marking and setting out tools

Spirit level

Spirit levels are made of either wood or metal and can have up to 6 level tubes or vials. They come in many different lengths.



Use

- For testing that horizontal and vertical surfaces are level or “plumb”. Level (when horizontal) or plumb (when vertical) is indicated when the bubble is between the lines in the centre of the liquid vial.
- Some levels have a digital display with accuracy to within one-tenth of a degree.

Care and maintenance

- Treat carefully. Do not drop or knock.
- Keep clean.
- Check for accuracy before using.

Note: Check the accuracy by placing one end of the spirit level on a fixed point. Move the other end up or down to get it level then mark the height of the bottom of the spirit level. Turn the spirit level end for end and repeat the process. If the two marks are in the same place, the spirit level is reading accurately. If there is a gap between the lines the spirit level is out of level and reading inaccurately. Follow a similar process against a vertical object to check your spirit level for plumb.

Plumb bob

Plumb bobs have a metal weight or “bob” which is usually pointed and suspended on a string. The weight of the bob reduces the effects of wind when checking for plumb (perfectly vertical). Bobs range in size and weight - the heavier the bob, the more resistant it is to wind.



Use

- To test that vertical surfaces are true and straight.
- In strong winds, suspend the ‘bob’ in a bucket of water to achieve a stable reading.

Care and maintenance

- Ensure that the string is in good condition and is free of knots.
- Rewind onto dowel when not in use.

Cutting tools

Selecting and using the correct cutting tool accurately helps create quality BCATS projects and is essential in the construction industry.

All cutting tools must be kept sharp and stored correctly to prevent the cutting edges dulling.

Saws overview

A well-balanced handsaw is an essential item for any person working with wood. While portable circular saws have, in many cases, superseded hand saws, a properly sharpened hand saw can produce a smooth, straight cut.

Hand saws vary in size and shape to suit particular jobs. The three main groups are:

- backed saws, such as tenon saws and dovetail saws
- rip, crosscut, and panel saws
- curve cutting saws, such as coping saws.

The number of teeth per 25 mm gives the size of the saw.

Safety

Use the right saw for the job. If in any doubt, check with your teacher/tutor before using it.

Teeth should be kept sharp. Dull teeth cause the saw blade to slip, stick or skip and can cause injuries. A sharp saw will cut most timbers easily. It probably needs resetting if it is sharp but always jamming in the cut. Remember to let your teacher/tutor know if the saw is jamming.

Make sure your timber won't move when you cut it. Options are using cramps, clamps or vises to keep it in place. If it is a longer piece of material you're cutting, asking your classmate to help keep it firmly in place, and apply pressure on it with your non-cutting hand if it's a smaller piece.

Take special care when using your thumb as a guide to start the saw cut. Using a glove will help protect your hand from both the saw and splinters. Protect your eyes and lungs from splinters and dust by wearing safety glasses and a dust mask.

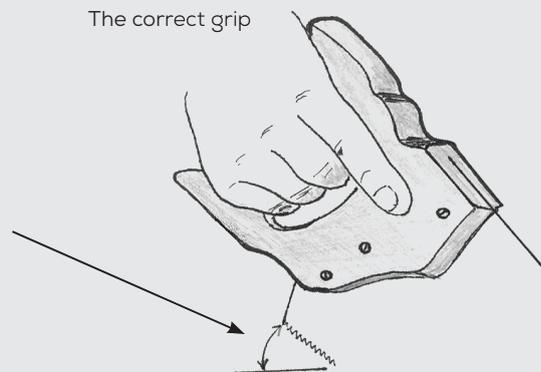
Cutting tools

Correct use

- Stand over the cut.
- Grip the handle with a pistol grip (index finger pointing forwards on the handle, to steady and control the saw, as in diagram below).
- Use the thumb of the other hand to position the blade, as the saw is upwards to start the cut.
- Stand over the blade so that both sides of the blade can be seen at the same time. This will ensure that a square cut is produced.
- To help ensure an accurate clean cut, keep your elbow and wrist of your cutting arm in line with one another
- Start sawing on the waste side of the line.
- Use long, even strokes. Keep the tool directed away from your body and keep a firm grip on the handle.
- The saw should be held at an angle of about 60 degrees for ripping and about 45 degrees for crosscutting.
- When the cut is almost complete, the waste wood must be supported to prevent it from breaking off.
- Take your time. Do not rush as a steady pace allows the saw to do the cutting.

Cutting angles

- 45 degrees for crosscutting
- 60 degrees for ripping



Care

Before you cut any timber, check that timber is free from nails, stones or any items that can blunt or damage the teeth. They can also cause buckling of the hand saw, which can lead to injury.

- Lightly oil the blade to protect from rust.
- Use a blade guard to protect the teeth when not in use or place the saw in a rack or a saw bag.
- Send to a saw doctor for sharpening and setting when required.
- Ensure that the blade is not bent. Bent blades create an angle rather than a perpendicular cut.

Cutting tools

Tenon saw

The tenon saw has a brass or steel ridge on the top edge to strengthen and stiffen the blade. The stiffener is needed to keep the thin blade firm while cutting. Blade lengths vary from 300 to 400mm, with 13 points per 25mm.



Plastic protective cover

Use

- For general bench work, especially when a fine cut is needed on small items, such as mouldings.
- Can also be used in a mitre box for consistency and improved accuracy.

Care and maintenance

- Keep clean and free of rust.
- Keep the saw sharp.
- Place a plastic cover over the teeth when not in use.
- Store in a rack or hang up.

Dovetail saw

Dovetail saws are smaller versions of the tenon saw, with 18–25 teeth per 25mm. The dovetail saw is used for cutting dovetails and other fine work. Care and maintenance is the same as for tenon saws except that dovetail saws are hung up by their blade.



Panel saw

Panel saws are normally 600mm long or less, with 10 to 12 points per 25mm.



Use

- For fine crosscutting on finishing timber and panels.

Care and maintenance

- Keep it sharp.
- Keep clean and free of rust.
- Store in a rack or hang up.

Cutting tools

Crosscut saw

Crosscut saws are normally 700mm long, with 5 to 10 points per 25mm.



Use

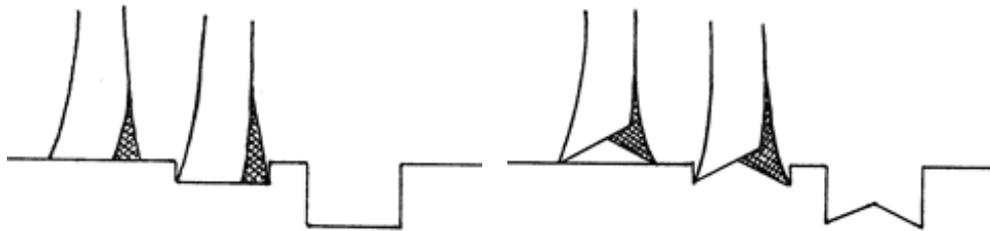
- For general-purpose cutting across the grain of timber.

Care and maintenance

- Keep clean and free of rust.
- Send to saw doctor for sharpening and setting when required.
- Hang up.

Rip saw

Rip saws are normally 700 to 800mm long, with 3 to 6 points per 25mm



Rip saws cut along the grain with a chiseling action.

Crosscut cuts the wood fibres with a slicing action.

Note: Ripping timber along the grain is usually done with a portable power tool or a table saw.

Disposable or hardened toothed saws

Cheap, disposable multi-purpose hand saws are now common. These saws are mass produced and many are designed to be used for both cross cutting and ripping. The blades of these saws are manufactured from hardened steel and so are unable to be sharpened.

If you have no other choice than to buy these disposable saws, dispose of them responsibly when they come to the end of their useful life.

Cutting tools

Coping saws

Coping saws have a fine blade held in tension in an adjustable steel frame. Two adjustable levers alter the blade position.



Use

- For cutting sharp curves in thin timber.
- Also used for scribing the ends of mouldings at internal angles.

Care and maintenance

- Release blade tension when storing.
- Replace the blade when necessary.
- Keep clean and free of rust.
- Align the adjustable pins to ensure that the blade is straight within the frame. A twisted blade will produce a rough, inaccurate cut and is more likely to break.

Hack saws

Blade lengths vary from 225 to 305mm, with 18, 24 or 32 teeth per 25mm. Hack saws have a detachable blade held in a heavy duty metal frame. The blade is held under tension to help prevent it twisting and bending



Use

- For cutting metal or plastic.
- For softer material, generally use a coarser blade.

Care and maintenance

- Release blade tension when storing.
- Keep clean and free of rust.

Chisels

Chisels are used for a variety of tasks, including checking out hinges and chamfering rounded machined rebate corners flat.

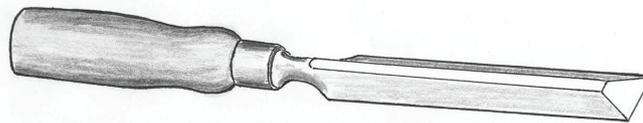
Woodworking chisels consists of a tempered steel blade and a shaped plastic or wooden handle. One end of the blade is ground and sharpened to produce a cutting edge while the other end has a sharpened tang which fits into the handle. The blades are heat treated to ensure that they retain a fine cutting edge.

Cutting tools

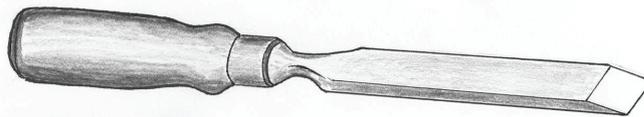
There is a wide range of chisels, each designed for a different purpose. Chisel widths vary from 6 to 50mm. The bevelled edged and firmer chisels are most commonly used. Other chisels available include butt, registered firmer, parring, mortise and carving chisels. A set of the standard size bevel-edged type is suitable for most construction work.

Modern chisels with shatter-resistant plastic handles are able to withstand being repeatedly struck with a steel hammer. Some chisel handles have a steel plug set into the end to take the impact of being hit with a hammer. It is important that only a wood mallet is used on the traditional wooden-handled chisels.

Bevelled edge chisel



Firmer chisel



Use

- Chisels have a wide range of applications. Examples are:
 - for fine, delicate cutting including checking out hinges, and forming and levelling joints.
 - shaping and trimming timber.

Care and maintenance

- Keep clean and free of rust.
- Keep the cutting edge sharp.
- Do not use excessive force when driving with a hammer or use a levering action. The blade could bend or break.
- Store in a rack, roll up pouch or carrying case.

Using chisels safely

Chisels can cause serious injuries if not used correctly. Always:

- use them for their intended purposes only
- keep chisels sharp by honing or grinding and honing if the cutting edge is chipped
- keep both hands behind the cutting edge
- ensure that all work is securely fastened down
- maintain control of the chisel at all times
- carry the chisel with the blade pointing downwards.

Cutting tools

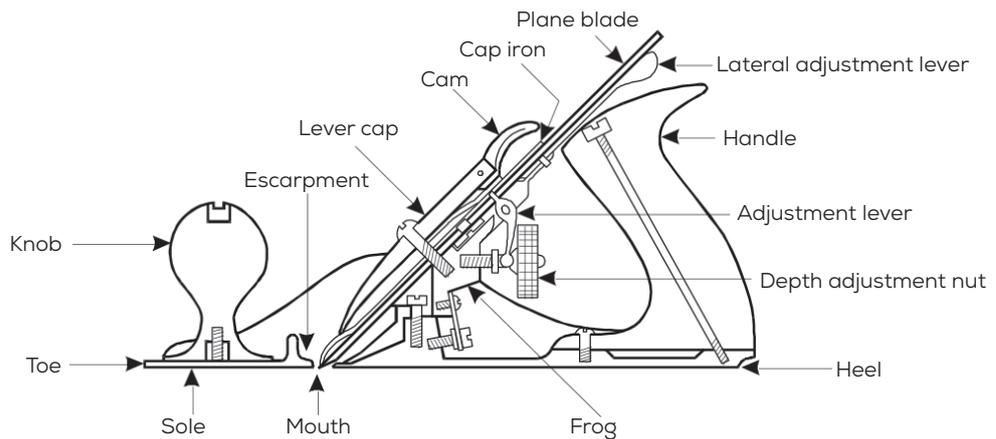
Planes

Planes have a cast steel body and a steel blade attached to a cap iron held firmly in place with a lever cap. The blade can be adjusted in two directions using a lever and a wheel adjustment.



There are different types of planes. The most common are:

- smoothing plane
- jack or bench plane
- rebate plane
- block plane.



Use	Care and maintenance
<ul style="list-style-type: none">→ To produce smooth timber surfaces, straighten timber, and reduce timber to the required width.	<ul style="list-style-type: none">→ Keep clean and free from rust by applying a light coat of oil.→ Do not knock or drop the plane.→ Keep blades sharp and correctly set.→ Retract blade from the cutting position when not in use.→ Always store a plane on its side when not in use. This protects the cutting edge of the blade.

Safety: Ensure that the work is securely fastened before planing.

Selecting the best plane for the task

- A **smoothing plane** is mainly for smoothing and finishing work. It can also be used for cleaning up end grain, chamfers and rounding edges. Because of its relatively short length, it should not be used for planing long lengths of timber, as its sole will follow the shape of the surface.
- A **jack** plane has a longer sole for planing longer lengths of timber, taking off the high spots to create a straight, flat surface.
- Small **block planes** are used for fine chamfers and planing end grain.

Cutting tools

Spokeshaves

A spokeshave is used for smoothing surfaces on internal or external curves. The cutting action is similar to that of a plane but because the sole is short it follows the curve of the component. The sole face can either be flat or curved, with the curved sole being more suitable for concave curves.



Front view of spoke shave.



Back view of spoke shave showing blade.

The care and maintenance of spokeshaves are the same as for planes. However, be careful when using spokeshaves as the casting is likely to break when dropped.

Scrapers

Hand scrapers are usually a flat piece of steel with a cutting edge formed by burring over its long edge(s). It is used to remove marks and defects on planed surfaces and is particularly good on irregular or opposing grains. Scrapers can also be shaped for use on curved surfaces.

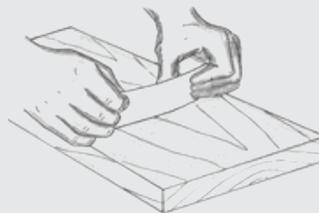


Scraper use

Use a scraper by holding it in both hands, with your thumbs behind the blade. Lean the scraper forwards until it begins to cut. Push the scraper along the grain, bending it slightly so that it forms a curved cutting edge without the corners digging in



Use at an angle of approximately 85 degrees



Handle scrapers carefully to prevent damaging the cutting edge. When you put it down, use a piece of timber, and hang the cutting edge over the edge of the timber.

Sharp scrapers produce fine shavings while blunt or dull edges just produce dust. Use the instructions in the 'Sharpening cutting tools' section to sharpen your scraper.

Cutting tools

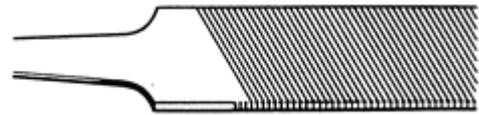
Rasps and Files

Rasps are used to rough out the shape or smooth the edges of wood and are generally used in a freehand manner. The shape of the rasp can be flat, round or have a half-round profile.

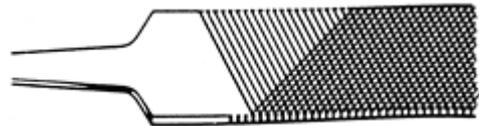
Files have a finer cutting edge than a rasp and are used to clean up edges and to reduce the size or shape of a range of materials. Files come in a range of profiles and cutting surfaces according to the task they are designed for.

To avoid serious injury to the wrist, never use a file without a handle.

Single cut files are used for cutting hard metals, e.g. knives and saws. They have an unbroken series of cuts, parallel with each other but running at an angle to the length of the file.

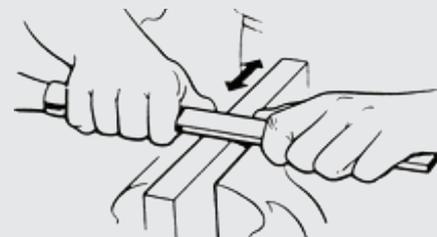
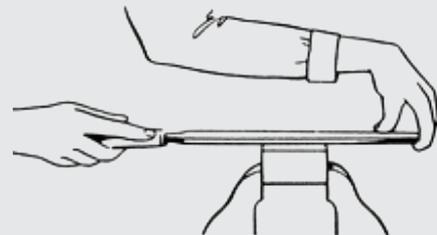


Double cut files are used for general purposes. They have two series of cuts running diagonally across each other, one series being finer than the other. The double cut file is used with a heavier pressure than the single cut and removes material from the work piece faster.



The two most common methods of using a file are:

- 1. Straight filing:**
This consists of pushing the file lengthwise – straight ahead or slightly diagonally – across the work piece.
- 2. Draw filing:**
This consists of grasping the file at both ends and pushing and pulling it across the work



Cutting tools

Sanding block

Sanding blocks are usually blocks of compressed cork, rubber or a similar soft material and are used to provide a firm base for the abrasive paper as it is pushed back and forth along the surface being prepared for finishing.



Work in an adequately ventilated area or wear a suitable dust mask to protect you from inhaling the dust.

Use

- To provide a final, smooth finish to cut materials.
- Cut a piece of abrasive paper to the same length as the block, and twice its width. Wrap the paper tightly around the block and commence sanding along the grain. A fine dust should be produced.

Care and maintenance

- Use the block for its intended use only. Discard if the sanding surface is damaged.

Note: Sanding with the aid of a block gives a flatter, more even finish than can be achieved by holding the paper in the hand. Without a block the uneven pressure from individual fingers will result in dips and hollows in the surface of the timber.

Cutting tools

Sharpening cutting tools

A sharp cutting edge can be produced on a plane cutting iron or chisel by:

- using a grinder to shape the edge
- using an oilstone or a diamond stone to sharpen or hone the cutting edge
- stropping the edge to remove the burr.

Grinding does not produce a fine enough edge, so the ground edge must be sharpened on an oilstone. Sharpening, or honing, is done more often than grinding.

Grinding equipment

Bench grinder

The bench grinder is a tool used to grind steel cutting tools to repair a cutting edge that is blunt or has been damaged.

It is used mainly for sharpening cutting tools such as hand tools (planes, chisels etc) and twist drills.

It can also be used for removing excess metal or material, and the rough shaping of parts.



Safety

Grind only steel, as other materials will clog up the wheel, causing the wheel to possibly explode.

Before starting the grinder:

- always wear eye protection when working on or near a grinder
- do not wear gloves, loose clothing or items that could catch on the wheel and cause injury. Keep long hair tied back and hoodie strings tucked inside your top. Check that the grinder is firmly fixed to the bench, there are no chips or cracks in the wheels, and they are securely attached to the grinder
- check that all guards and guides are in place and that the transparent safety shield is set in the correct position
- make a habit of standing to one side of the grinder when starting the machine and until it has reached its full operating speed.

Always allow the bench grinder to reach full operating speed before starting the grinding process.

Keep the adjustable work rest within 2mm of the wheel.

Do not use the side of the wheel as this may lead to the wheel shattering.

Do not apply the work to the grinding wheel after the power has been turned off.

Cutting tools

Motorised whetstone

This is a slow turning motorised stone that is lubricated by water to help it prevent overheating.

It is slower cutting than a bench grinder but safer and easier to use. The water also helps to maintain a clean cutting surface.



Oilstone

An oilstone is used to hone the blade to produce a very sharp, cutting edge.

Lubricate the surface of the oilstone with a light film of oil to prevent clogging and to help the blade slide across surface of the oilstone more easily.



Move the blade over the surface of the oilstone in a figure 8 pattern to ensure even wear of the face. This prevents creating dips and hollows in the oilstone.

A dirty or clogged oilstone can be cleaned with kerosene to restore its cutting edge.

Store your oilstone in a clean and dry place (preferably in a box) to protect it from damage.

Never drop an oilstone. They are very fragile and break easily.

Diamond stone

Diamond stones are an alternative to oilstones. Their main advantage over an oilstone is that the surface is much harder, eliminating the possibility of hollowing out. Most diamond stones have a course cut on one side and a fine cut on the other side.



Diamond stone clamped securely in 'extra pair of hands'.

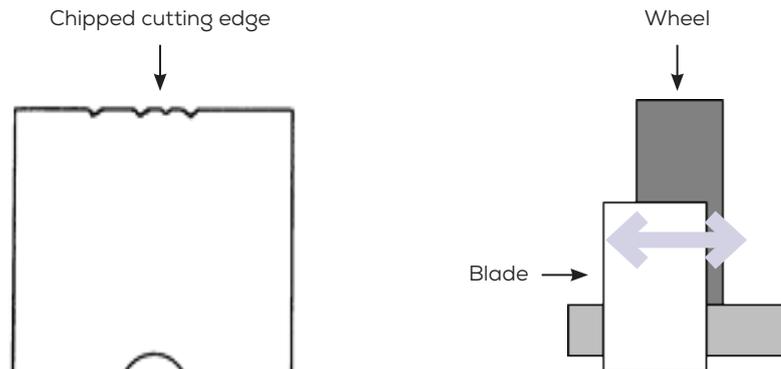
Cutting tools

Sharpening chisels and plane blades

Your teacher/tutor will show you how to use sharpening equipment. Here is a summary of how to sharpen chisels and plane blades.

1. Grinding

Grind the blade back until the chip has been removed.



Move the blade from side to side across the face of the grinding wheel. The bevel is hollow ground at an angle of 20 to 25 degrees.

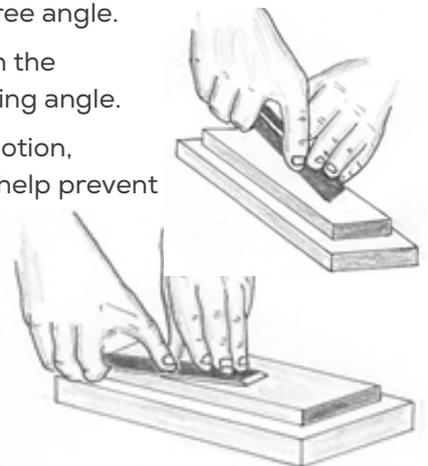
2. Honing

Hone or sharpen the blade at a 25 to 30 degree angle.

Place the blade with the grinding bevel flat on the oilstone and tilt slightly to create the sharpening angle.

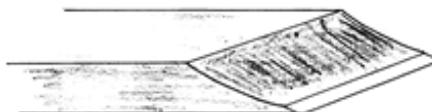
Move the blade back and forth in a figure 8 motion, covering the full length of the stone. This will help prevent the stone from developing dips and hollows.

When a slight burr appears on the back of the blade, turn the blade over and place flat on the stone. Rub along the stone to remove the burr.



3. Stropping

To produce a really sharp edge, the blade is stropped on a leather strop, to remove any remains of the burr. The finished chisel will be razor sharp.



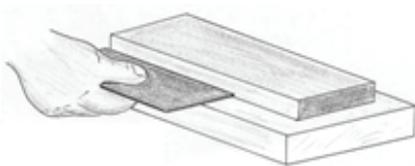
Note: the hollow ground bevel of 20–25 degrees and the honed edge of 25–30 degrees.

Cutting tools

Sharpening scrapers



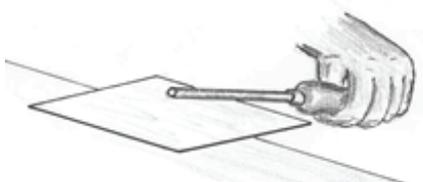
File the edges straight and square by draw filing with a smooth mill file. Round the corners slightly.



Remove the file marks using either the edge or face of an oilstone. Using the edge provides the option of using the oilstone's box for support to ensure a square edge.



Remove the burr by laying the scraper flat on the oilstone. The edges should be very smooth and sharp.



Raise the burr. Move the scraper so that it overhangs the edge of the bench. Holding the burnisher at a slight angle, draw it along the edge of the scraper.



To turn the burr over, hold the scraper on its end. With the burnisher approximately 90 degrees to the face for the first stroke and 85 degrees for the rest, make two or three firm strokes.



Stroke 1
90° to face

Stroke 2
85° to face

Note: When the cutter loses its edge, raise a new burr using the burnisher. There is no need to square the edge again unless it is rounded or damaged.

Impelling tools

Impelling, or driving, tools are those that help drive something into something, such as a nail into timber or a peg into the ground. There are many types of hammers and mallets. As with all other hand tools, choose the best tool for the task and use it correctly.

Sledgehammers

Sledgehammers are used for driving pegs and stakes into the ground. They are also used for demolition work. They come in a range of sizes and weights to suit job requirements.



Mallets

Mallet heads are made out of either hardwood or rubber fitted to a wooden handle.



Use

- Mallets are used for striking chisels or assembling frames or carcasses.
- Rubber headed mallets are generally used for carcass assembly. Because of their softer heads, you do not need to hold scrap timber against the job when using this mallet.

Care and maintenance

- Do not use the mallet on steel or hard surfaces.
- Check head faces and handles for splits or cracks.
- Ensure that the head is securely attached to the handle.

Impelling tools

Hammers

Hammers come in a range of head and claw styles, shapes, weights and handle designs and lengths. The claw hammer, which is used for construction, and the Warrington hammer, which is used for bench work, are the most commonly used types.



Use

- For driving in and pulling out nails, and driving chisels and set punches.
- Always strike securely to avoid glancing blows.
- Use the appropriate hammer (considering head and claw design, weight and handle length) to suit the job and your personal preference.

Care and maintenance

- Clean the hammer face by rubbing it on a piece of fine sandpaper.
- Keep the handle clean and dry.
- Never use a hammer with a handle or head that is loose or damaged.

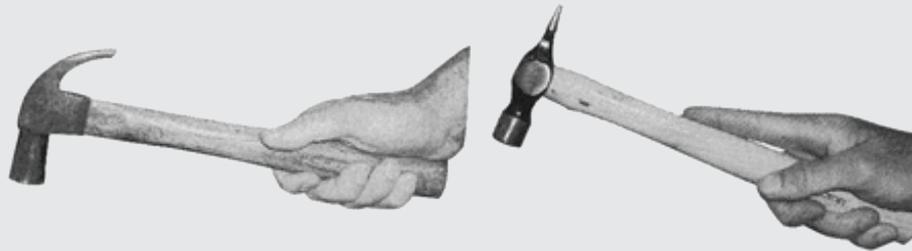
Using hammers safely

Most hand tool injuries are caused by hammers. Common injuries include eye injuries caused by projectiles that come off the face of the hammer and crushed fingers.

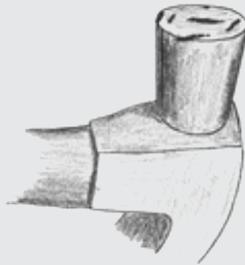
- Check that the face of the hammer is not chipped or damaged and that it is free from dirt, paint or grease.
- Check the handle for splits and ensure that the head is firmly attached to the handle.
- Do not use hammers with loose heads or chipped faces.
- Never strike with the side of the hammer.
- Never strike the face of one hammer with another.
- Wear safety glasses and hearing protection.

Impelling tools

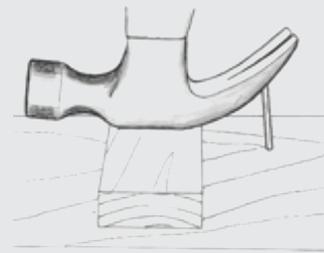
Hammer tips



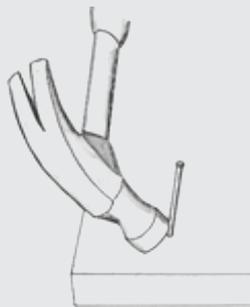
Using the correct grip provides the leverage needed to hammer a nail or brad effectively. It also reduces the chance of bending the fastener.



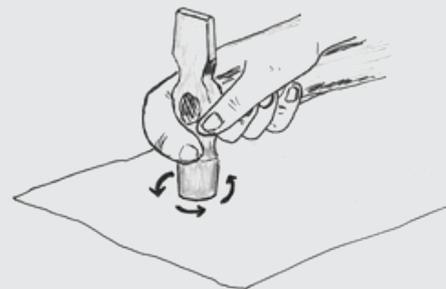
Striking the hammer against hardened objects will result in a chipped face.



Placing a piece of timber under the head gives you more leverage and prevents damage to the face of the work.



A dirty hammer face will result in the hammer slipping off the nail.



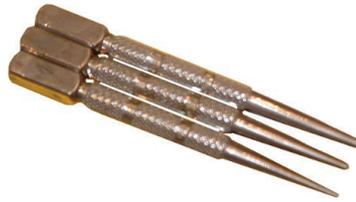
Clean the hammer face by rubbing it on a piece of fine sandpaper.

Note: Never strike your work directly with the hammer or mallet. Use a piece of scrap wood to prevent your work from bruising or damage.

Impelling tools

Nail punch

Nail punches are manufactured from hardened steel with a knurled body for grip. They are available in varying tip sizes. Select the best for the size of nail they will be setting.



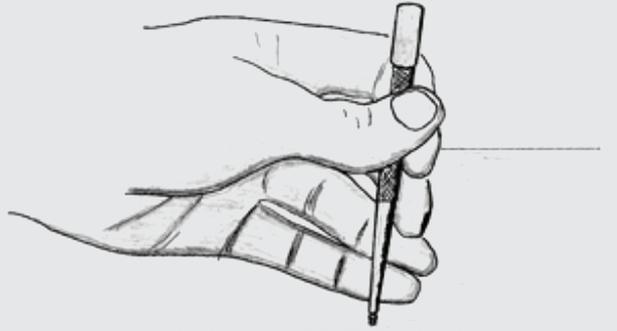
The tip is cupped and chamfered for ease of alignment and to reduce slipping on the nail head.

Use	Care and maintenance
<ul style="list-style-type: none">→ Nail punches are used to drive or set the head of the nail below the surface of the timber.→ Grip the nail punch firmly or it may fly off when struck.→ Make sure the correct size punch is used. The nail punch point should be slightly smaller than the nail head being punched.	<ul style="list-style-type: none">→ Discard if the point becomes chipped or when the cupped point wears away.→ Inspect the nail punch for damage. Any burrs that have formed on the head should be removed by grinding off.

Tips

Use a punch only for its proper purpose, i.e. punching nail heads.

When placing the nail punch on a nail head, stabilise with your little finger.



Hand drill

Hand drills have a steel frame, wooden handle, double pinion gears and a three jaw chuck. The normal chuck capacity is 6mm.



Use	Care and maintenance
<ul style="list-style-type: none">→ For drilling small holes in wood and metal, in preparation for screws or nails, and for countersinking wood.	<ul style="list-style-type: none">→ Keep clean and free of rust.→ Lightly oil crank, gear wheel and pinion with thin oil.→ Make sure drill bits and countersinking bits are sharp.

Impelling tools

Twist drill bits

Twist drill bits are available in various sizes. The chuck size determines the maximum diameter drill bit that can be used. The normal diameter range used by carpenters is 1 to 13mm with a 1mm rise.

Different drill bits are available for masonry, metal and timber. Using the wrong type of bit for the material will cause the drill bit to become blunt very quickly even if it is able to penetrate the material.



Use

- With a drill for drilling holes in masonry, timber or metal.

Care and maintenance

- Use the correct drill cutting speed to suit the drill bit and the material being drilled.
- Store in drill-set case when not in use.
- Sharpen when required.

Screwdriver

Screwdrivers are available in various sizes and to suit various screw head configurations.

Use them by gripping the screwdriver firmly. Make sure it remains perpendicular to the work. Keep a firm pressure down on the screw to maintain control and turn the screw in a clockwise direction to insert it, anticlockwise to remove it.



Use

- Use only for driving or withdrawing screws.
- Select the appropriate size screwdriver to suit the screw head. Make sure the tip fits the slot of the screw.

Care and maintenance

- Keep clean and free of rust.
- Do not use screwdrivers as levers as they may bend.
- Check the blade to ensure that the end is not damaged or rounded over.

- 👎 → **Never** use a screwdriver on a work piece held in your hand – a slip could cause serious injury.
- 👎 → **Never** depend on a screwdriver's handle or covered blade to provide insulation from mains electricity. Vinyl covered blades are intended only as a protective measure against shorting-out components.
- 👎 → **Never** use a screwdriver as a cold chisel, or for prying, punching, chiselling or scraping.

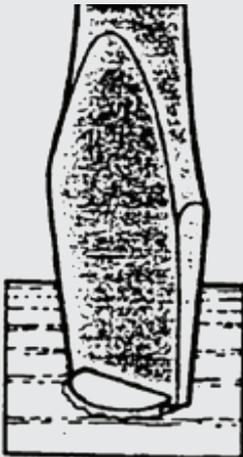
Impelling tools

Common screw head configurations

	Slotted	Standard or flat for driving single slotted screws. Tip width range from 4.2mm to 12.5mm.
	Phillips	Designed specifically for use with a Phillips head screw, which has two recessed slots at right angles to each other. Sizes range from 0 point (small) to 4 point (large).
	Pozidriv	Similar to the Phillips style, the screw can be identified by additional lines on the face. Sizes range from 1 point (small) to 4 point (large).
	Square drive	Square tip, commonly used in industrial applications. Sizes range from 1 point (small) to 3 point (large).

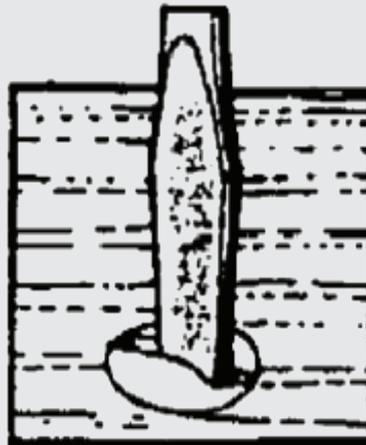
Incorrect use:

Head too big



Oversized screwdriver scores the wood.

Head too small



Screwdriver tip is too small for the screw head. There is not enough torque to turn the screw effectively and the head of the screw is damaged.

A screwdriver with a damaged, worn out or rounded point will tear the screw head.



Gripping tools

Set spanner and socket

Made from strong tempered steel. Available in a large range of sizes, both imperial and metric. They are used for precision work.



Use

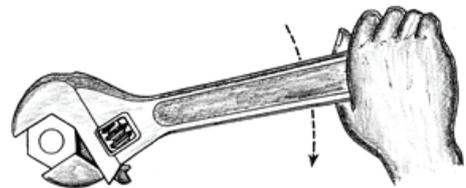
- For fastening or holding various sizes of nuts and bolts.
- Use the correct size spanner or socket for the job so the right amount of torque (turning force) can be applied.

Care and maintenance

- Keep spanner clean and free of rust.

Adjustable spanners

Always locate and use the adjustable spanner in the manner shown so the solid section takes most of the applied force.



Note: Adjustable spanners may slip when under pressure and cause damage to the work or injury to the operator. They should never be used on quality or finishing work. Fixed spanners or sockets are the correct tools for this type of work.

Gripping tools

Pincers

Pincers are used to remove small nails or tacks.



Place a piece of scrap timber between the pincers and the work to protect the face of the work from damage and gain more leverage for the pincers.

Pliers

Pliers are manufactured from tempered alloy steel. They have a serrated jaw to provide grip and leverage, and finely honed cutting edges to cut most types of wire. They are usually fitted with bonded vinyl grip on handles.



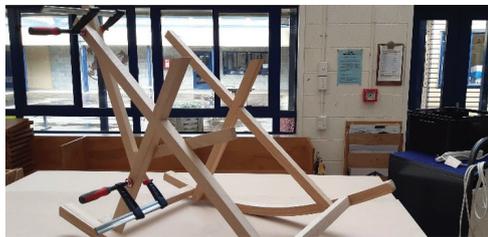
Use	Care and maintenance
→ For cutting wire, bending metal and gripping work.	→ Keep pliers clean and free from rust. → Lightly oil scissor joint.

Cramps

Cramps are used to hold pieces of timber together while they are being worked, glued or fixed. Other uses include holding components in place while the final position is checked.



Sash cramps – protect the bench top with plastic or paper.



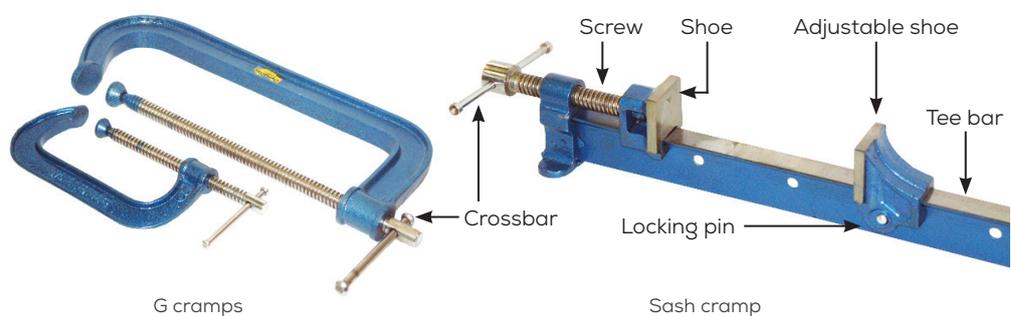
F Cramps (above and right).



Gripping tools

Some of the most common cramps are:

- **Sash cramps**, which are used for cramping together carcasses, frames, doors and edge-to-edge jointing, e.g. table tops
- **F and G cramps**, which are used to hold work firmly on the bench, and for clamping components together
- **Mitre cramps**, which are used for holding mitred pieces together while the glue sets, e.g. picture frames.



Usage tips

- If soft pads are not fitted, prevent damage to the work by placing scrap timber between the jaws and the material. Then place paper between the clamps and the work to prevent any glue from coming in contact with the steel.
- Test fit all joints and set up cramps to correct size before applying the glue for final cramping.
- Ensure that the cramps are set at 90 degrees to the face being cramped.
- Prevent the cramp and the material from being twisted out of alignment by taking care to not overtighten the cramps.

After use, care and maintain them by:

- removing any glue from the cramp
- applying a light coat of oil to keep them free from rust
- storing in a dry place.

Soft plastic pads on F cramps tend to come off. This can be remedied by gluing the pads on with araldite or similar glue.

Soft plastic pads

F cramp



Paving and/or concrete placing tools

Spades and shovels

Preparing a site to build a retaining wall, deck, foundation, or paved area usually requires excavation work. Spades and shovels are commonly used. They are generally made out of heat treated tempered or stainless steel with hardwood handles.



Use

- For excavating foundations, mixing concrete, and shovelling/controlling the flow of concrete.

Care and maintenance

- Wash down with high pressure water after use.
- Dry down before putting equipment away.

Screed

Screeds are generally made from aluminium rectangular sections with a fitted handle.



Use

- For flattening/levelling concrete after pouring the mix.

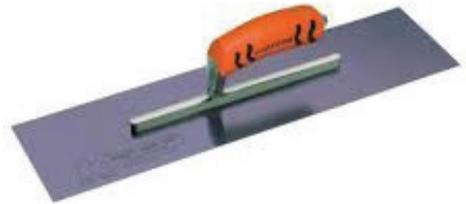
Care and maintenance

- Wash down with high pressure water after use.
- Dry down before putting equipment away.

Paving and/or concrete placing tools

Concrete finishing trowel

Finishing trowels are generally made out of carbon steel or dura magnesium with a fitted handle. Wooden finishing trowels are also manufactured.



Use	Care and maintenance
→ For flattening/levelling concrete after pouring the mix.	→ Wash down with high pressure water after use. → Dry down before putting equipment away.

Concrete finishing broom and/or brush

A broom or brush with either fine, medium, or course bristle.



Use	Care and maintenance
→ For flattening/levelling concrete after pouring the mix.	→ Wash down with high pressure water after use. → Dry down before putting equipment away.

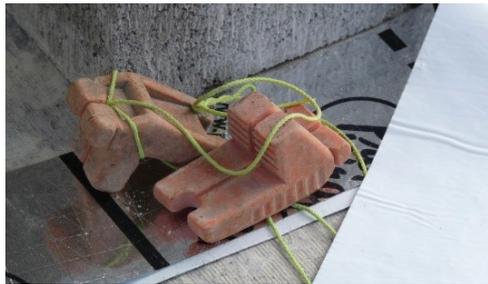
Brick and block laying tools

Below are only a few of the hand tools used by brick and block layers. Your teacher/tutor will introduce you to more if you do a brick and block laying project.

Line blocks

Line blocks are made from plastic in the form of a right angle. They have a groove in the centre at each open end for a string line to be positioned on.

Line blocks are used in pairs with one placed at each end of the wall. The position of the line blocks is such that the string line is completely level so that a row of bricks or blocks is also laid completely level.



Use

→ To help set out straight brick or block walls.

Care and maintenance

→ Wash down thoroughly with water after use.

→ Coil the string line up and store in a dry place.

Trowels

Trowels are as important to a brick and block layer as a claw hammer is to a carpenter.

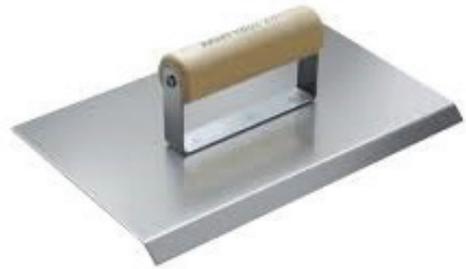
There are a variety of trowels, including a brick trowel and a pointing trowel. Each brick and block layer will have their favourite.



Brick and block laying tools

Mortar board

Mortar boards are manufactured from a variety of materials, including timber, stainless steel, and polyurethane. Handles may be located either at the end or underneath the board. Most mortar boards are flat but some have a return edge (as in the photo) to assist the transfer of the mortar to the block.



Use

→ To hold mortar when bricklaying.

Care and maintenance

→ Wash down thoroughly with water after use.

→ Store in a dry place.

Impact tools

Hammers are the most common impact tool used by brick and block layers. They use many different types, including:

- brick hammer, for cutting bricks and blocks
- scabbling hammer, to roughen concrete or stone so that mortar will stick to it
- scutch hammer, to cut bricks and blocks in conjunction with a chisel
- club hammer, which is a mini sledge hammer used to drive stakes or chisels
- claw hammer, to drive nails into and pull them out of timber
- sledge hammer, to drive stakes or break concrete.



Use and care

→ Use and care for these as you would for hammers used in woodworking but pay special attention to cleaning them after use.

Other tools often used in conjunction with hammers are:

- cold chisels, for cutting bricks and blocks
- bolsters, for cutting bricks and blocks
- plugging chisels, for removing mortar.

Brick and block laying tools

Finishing tools

Finishing tools are generally associated with finishing mortar joints. These include wheeled rakers, pointing trowels, jointers, and small tools. All of these tools push and seal the mortar into the bricks and blocks so that it is set back slightly from the face of the brick or block.



A wheeled raker being used.



A wheeled raker.

As well as making the bricks and blocks look nice, the tooled finish is designed to allow water to run off the bricks and blocks so that it does not sit in the recess and possibly cause water-tightness issues.

Care and maintenance

→ Wash and dry all finishing tools after use and store in a dry place.

Glass cutting and glazing tools

Working with glass requires specialist tools. While most glass cutting in larger firms is completed using CNC machines, smaller and decorative sections of glass are still cut by hand.

Working with glass requires extra care. "Cut resistant gloves" and safety glasses must be worn.



Diamond tip glass cutter

These are used to cut thin glass.

Once the score cut has been completed the notches on the tool may be used to lever the glass instead of using the glass breaking pliers.

Care and maintenance

- Store in a container that is partially filled with a mixture of kerosene and light oil which covers the wheel. This lubricant will remove the dirt and slivers of glass that cling to the wheel. It is a good idea to rest the glass cutter on a soft pad in the bottom of the container.
- If your glass cutter is equipped with an oil reservoir, or is "self-lubricating", always keep the reservoir full with oil. This will keep the cutter lubricated and extend the life of the cutting wheel.



Braced L Square

Used as a guide to score glass at 90 degrees to the stock.

Care and maintenance

- Wipe the tool down with a mixture of kerosene and light oil. This will remove any slivers of glass that cling to the side during the scoring process.



Glass breaking pliers

Used to break the glass after scoring with a glass cutter.

Care and maintenance

- Wipe the tool down with a mixture of kerosene and light oil. This will remove and slivers of glass that may cling to the tool.



Vacuum suction cups

Used to hold panes of glass in place when fitting.

Care and maintenance

- Clean suction cup with soap and warm water.
- Store in a sealed container in a dry location.



Tiling hand tools

Tiling requires the use of specialised hand tools which must be kept clean and in good condition.

Tiles are used for both flooring and walls. They are often used in wet areas such as bathrooms, showers or laundries. Care and attention is required to fit tiles accurately and according to the specifications.

Rubber buckets, rather than plastic, should be used to place grout in. Grout will not be able to stick to the rubber surface when dried.

Clean all tools immediately after use, especially if they have come into contact with grout or glue.

Often solvents are used to wash down tools used for tiling. Do not pour solvent down drains. If solvents have been used all rags used must be disposed of where they cannot catch fire.

Manual cutters

Manual cutters come in various sizes and capabilities.

They are used for cutting tiles – length or width according to the measurement required.

Care and maintenance

- Wash down and dry before putting away



Tile nippers

Used for cutting irregular shapes on tiles generally up to 6mm thick.

Care and maintenance

- Rinse in water and dry before putting away.
- Keep cutting edge in good condition.



Tile spacers

For maintaining the correct gap when positioning tiles in place.

Care and maintenance

- Wash down and dry before putting spacers away. Dried grout on spacers will result in uneven gaps between the next lot of tiles laid.



Tiling hand tools

Tiling trowels

These are manufactured from high carbon stainless steel with notched or straight edges.



Use

- For spreading adhesive to the wall, floor or area being tiled.
- The perforations around the perimeter assist with the spreading of the adhesive.

Care and maintenance

- Wash down with solvent and dry before putting away.

Grout float

Grout floats have a rubber base. The rubber base prevents the float from scratching or chipping the edge of the tiles when working the grout.



Use

- To spread and force the grout into the gaps between tiles and to remove excess grout from the surface of the tiles.

Care and maintenance

- Wash down with solvent and dry before putting away.

Painting/staining/varnishing tools

No matter the size of the project, a quality finish is important.



Playhouse - Awatapu College.

Paint can be applied by either brush, roller, spray or speed brushes. The application method is largely dependent on the surface area being painted.

Surfaces need to be prepared thoroughly for painting or varnishing. This may involve applying paint stripper and using a scraper to remove any existing paint or varnish before sanding.

Wear gloves and safety glasses when using paint stripper. Ensure the area is well ventilated.



Brushes come in a wide variety of sizes. Brushes for specific applications, such as 'cutting in', are also available.



Rollers are available to suit oil or water based products. There are also options for creating different surface finishes.

Adjustable extension handles can be screwed on to the handle.



Speed brushes come in a variety of sizes and options for creating smooth or textured finishes.

Adjustable extension handles are available.

Care and maintenance

- As with all tools, paint brushes, rollers, and trays needed to be cleaned immediately after use. Tools left with paint or varnish to dry on them will likely need to be thrown away.
- Clean brushes help obtain a good finish. Ensure brushes are cleaned according to the product's manufacturer's instructions and dried thoroughly after use. Wrapping newspaper around the bristles between use will help keep them in good condition.

Never wash paint, oils, varnish or stains down the drain. At the end of each job, wipe or squeeze excess paint onto rags, newspaper or cardboard. Put it in the rubbish once it has dried. Dispose of leftover paint at paint shops.

Rags used to rub in Tung oil or linseed oil **must not** be placed in rubbish bins as the material is combustible. Place used rags in a container full of water instead or lay flat on concrete, well away from anything that may catch fire, to dry thoroughly.

Summary

Safe use of hand tools

Always:

- use the right tool for the job
- use the correct personal protective equipment (PPE)
- use them correctly – follow your teacher's/tutor's instructions and ask if unsure
- check that cutting tools are sharp before using them
- check that all tools are in good condition, free of damage or defects, before using them.

Carrying and storing sharp tools

- Don't carry too many tools at once.
- Don't carry sharp-edged or pointed tools in an apron pocket or nail pouch.
- If you're carrying a sharp tool, point it towards the floor and hold it firmly.
- When passing sharp tools to someone else, pass them handle first.
- Cutting edges lose their sharpness when they are in contact with metal, so take care when handling, packing or transporting tools. Keep the cutting edges of chisels and saws away from other metal tools.
- Store tools in a toolbox, container, rack, or hang them up.
- Withdraw plane irons from the cutting position when packing them away.

Tool care and maintenance

- Good workmanship is impossible with tools that are blunt, dirty or rusty, or have broken or splintered handles. Hand tools should always be kept sharp and in good condition.
- If you find any damaged or faulty tools, tell your teacher/tutor.
- Keep tools dry and rub them with light machine oil to prevent rust.
- Clean any soil, sand or concrete from timber before using sharp edged tools on it.
- Make a habit of checking that all tools have been collected, cleaned and put away at the end of your lesson.