

Bolts

This worksheet is about bolts used to fix timber together. It tells you about the different types of bolts and how to fix them.

What you will learn

When you have finished this worksheet, you should be able to:

- Choose the correct bolt for a job.
- Fix bolts safely and correctly.



Things you need before you start

Materials

You will need some scrap timber and some bolts to work with.

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Tools or equipment

Measuring and marking tools

Brace and bit

Wrench or spanners

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What are bolts used for?

Bolts are used to fix timber to:



Other timber



Or metal

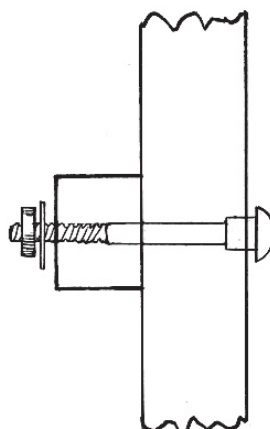
Bolts:

- Are stronger than nails or screws
- Simple to fix
- Take longer to fix than nails or screws
- Can be undone later if needed
- Used for heavy work in construction.

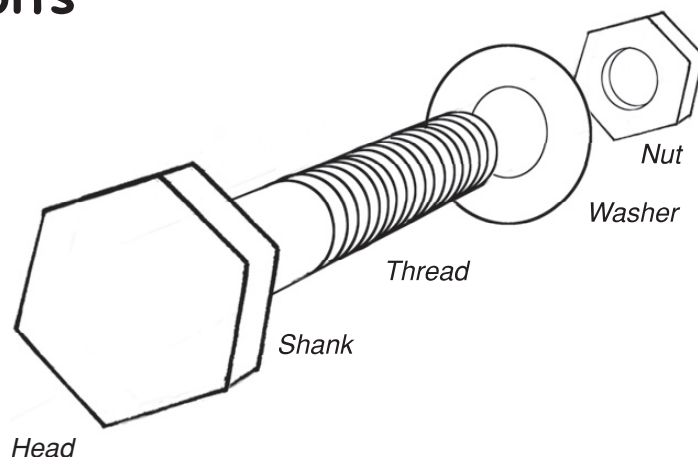
How do they work?

The bolt goes through holes in two pieces of timber.

When the nut is tightened onto the screw thread, the two pieces are held together tightly.



Types of Bolts

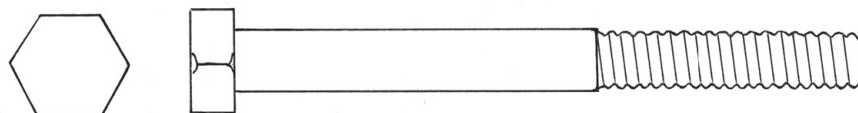


Bolts are usually made of strong steel.

To protect from rust, they are usually plated or galvanized with a zinc coating. Galvanized is better for all outside work. They can also be made of stainless steel to make them completely rust-proof — but these bolts are very expensive.

Bolts come in all sorts of shapes and sizes. Some common examples are:

Hex head bolt

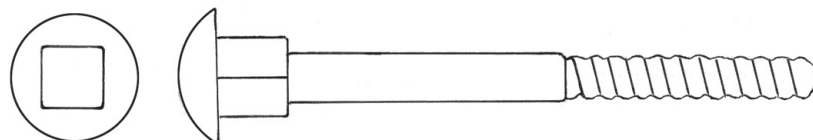


This is what most people think of.

The hex head (*hexagonal* shape) is the same shape and size as the nut.

The head and shank are made in a range of standard sizes.

Coach bolt



The head on this bolt is rounded, but it has a square section under the head.

As the bolt is pulled into the timber, the square grips tight in the hole. You do not need a spanner on the head.

Washers

A large washer — a round piece of metal with a hole on the middle — is needed under the nut of all bolts and under the head of a hex bolt.

The washer:

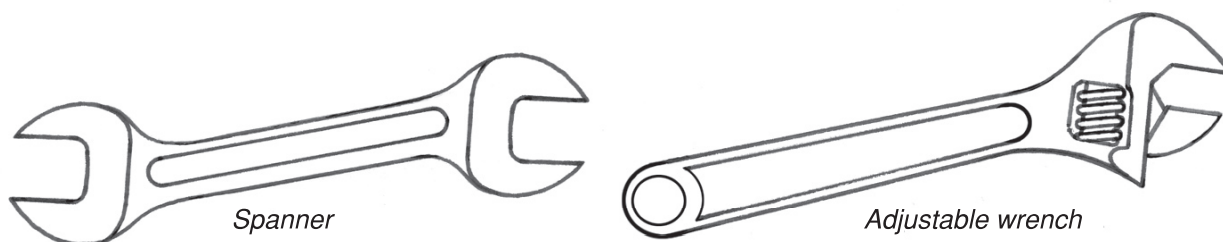
- Spreads the force created by the bolt over a bigger area. This makes a stronger joint.
- Stops the nut or head digging into the timber as it is turned.

Head and nut sizes

Each nut and bolt head comes in standard size to match the size of the bolt. Spanners also come in the same standard sizes to fit.

An adjustable wrench can also be use to turn the nut — but make sure it is adjusted to the correct size for the nut. It should *just* fit across the flat sides of the nut without any loose play.

If you use the wrong type or wrong size of spanner, you may have trouble turning the nut and you are likely to damage the head.



Choosing the right size of bolt

Bolts are made in a range of standard sizes in length and thickness (diameter). Most standard bolts use the metric system in millimetres(mm).

The length of the bolt is measured from the tip of the screw thread to the *underneath* of the head.

The thickness of the bolt is the diameter of the shank. It is *not* the size of the head or nut.

Length of bolt

The best length for a bolt is the thickness of the two pieces of timber, the nut and washers + about 10–15mm. Any extra length does not matter for the joint — but it may get in the way, or catch on other things.

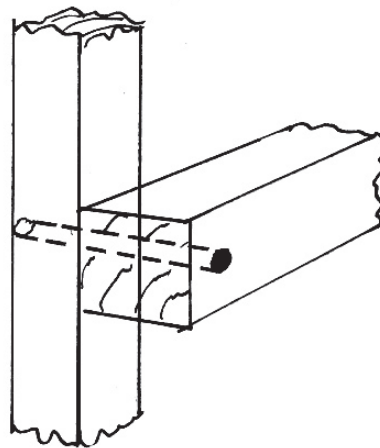
If you *have* to use a bolt that is too long, check that the shank is not too long. When the nut is screwed right down on the thread, will it hold the timber tightly?

Thickness of a bolt

Most construction work using 100mm or 50mm timber will use bolt thicknesses of 10mm (size M10) or 12mm (size M12) for most construction joints.

Fixing a bolt

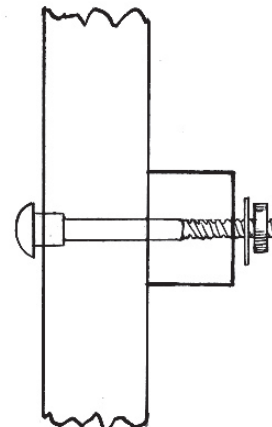
Drill a hole right through both pieces of timber



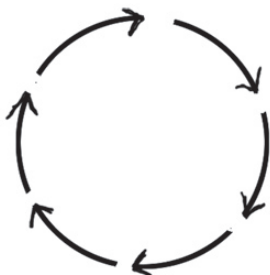
Insert the bolt and tighten the nut with a spanner or wrench

Don't forget the washers

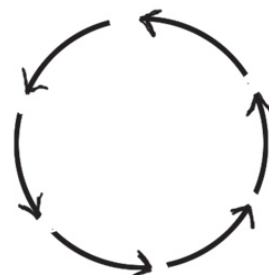
You will need to hold the head of a hex bolt with another spanner. The head of a coach bolt like this one will grip by itself.



Twist the nut clockwise to make it go in



Twist the other way (counter clockwise) to go out



Ask questions about anything you do not understand.

Safety

- Bolt heads and threads can have sharp edges.
- If a spanner slips it can hurt you. Keep your fingers out of the way !
- If you are drilling through existing walls — be careful that there are no pipes or electric cables inside!