



# CONSTRUCTION

## Helper Shuttering Carpenter

(Facilitator's Guide)

REFERENCE ID: CON / Q 0301

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## Introduction to the Facilitator Guide

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### 1. Preface and Purpose of the Guide

This guide is designed to help you (the facilitator) to plan and conduct the course.

### 2. What will I find in the guide?

This facilitator's guide is a comprehensive package that contains:

- Presentation scripts and key points to cover
- Key points at a glance
- Facilitation tips
- Sampling of potential questions
- Checklist of necessary materials and equipment

### 3. Program Preparation

Programs require a significant amount of preparation. It is crucial that program facilitators familiarize themselves with the material they designed or are expected to deliver and have adequate time to adapt the content to the specific audience.

### 4. The Role of the Facilitator

Who is a facilitator?

A facilitator is someone who is present to assist a group reach its objectives; the group, not the facilitator, may determine the objectives.

The facilitator's role:

When adopting the role of a facilitator, the facilitator needs to:

- Ensure the more verbose do not take over and encourage contributions, particularly from those who may be less confident
- Devise non-aggressive, friendly ways to deal with difficult participants
- Control conflict by stepping in if necessary to help participants learn to deal with conflict positively
- From time to time get the participants to summarize what has been discussed
- Assist 'weaker' participants by rephrasing their arguments for them so that these do not get lost just because they are not forcefully put across
- Provide feedback to the group as a whole as to its performance
- Provide the information and resources for the group to function effectively



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### Session Preparation:

#### A. Questions

##### What

- What is the subject I have been asked to present on/lead/arrange

##### Why

- Why have they asked me to do it?
- What is the purpose of the session or the training course?
- To communicate information and knowledge.
- To make a proposition.
- To test existing knowledge.
- To practice skills.
- To inspire and motivate.
- The first thing to get clear in your mind is the objectives of the entire course or one session.

##### When

- What time of day will my session(s) take place? After lunch is known as the graveyard slot; you should therefore consider making it more active than, say, a morning session.
- How long have I got?

##### How

- How am I going to present my subject?
- Straight talk
- Talk with overheads
- Talk with PowerPoint presentation
- Talk with video
- Give the participants a period in which to discuss aspects of the subject, e.g. by using a case study.
- Combination of any of these.
- Am I going to allow questions during the session?
- Always leave time at the end for questions and discussion.

##### Where

- Where is the presentation due to take place?
- How do the windows open/air conditioning work? If using PowerPoint or video, how do we darken the room?
- What equipment have they got, e.g. video, computer, projector, overhead projector, etc.?
- Decide on seating arrangements
- Are there likely to be any distractions, e.g. loud air-conditioning; things happening outside the window, etc.
- Can I be heard at the back of the room?

##### Who

- Who are they? How senior/junior are they?
- How many will be present?
- What is the extent of their existing knowledge of the subject I am going to present?
- What will be of interest to them?
- What will their attitudes, preconceptions or expectations?
- Is there a gender balance within the group?










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- Could you foresee or expect any kind of dynamics or potential resistant due to group composition?
- What can you glean overall from the participants list and profile without making too many assumptions?











### Icons Used In This Guide

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| Icon  | Description/guidelines  |
|---|---|
|    | Trainer Led Discussion  |
|   | Show a slide < Used to denote the slide to be shown>. Even better paste the image of the slide being discussed. |
|  | Show a video<br><mention video/clip name>   |
|  | Evaluate - administer assessment<br><mention name and guidelines for assessment>                                |
|  | Narrate/Share a story or valid examples   |
|  | Share insights or ask participants to share insights about current topic  |
|  | Distribute Hand-outs  |



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|   |  |
|---|--|
|    | Transition from one subject/topic/objective/story, etc to another (also could indicate flow)   |
|    | Derive objective/key point   |
|    | Materials required   |
|    | Ask following Questions  |
|    | Group Discussion<br><mention guidelines (number in each group, whether team leader is required in each group, etc.) and duration>          |
|  | Play music<br>< mention file names and duration>   |
|  | Capture on flipchart and put up in the class to be reference at a later point during the class or to summarize the learning of the session |
|  | Summarize the session/day  |
|  | Activity - describe activity   |
|  | Debrief to bring out relevant learning   |



*“Unit 3: Identify, Shift and Stack Tools, Materials and Equipment Relevant to Shuttering Carpentry and Scaffolding”*



## The Session in Perspective



### Unit 3: Identify, Shift and Stack Tools, Material and Equipment Relevant to Shuttering Carpentry and Scaffolding

#### Module Learning Goals

This module covers the overview of identifying, shifting and stacking tools, materials and equipment relevant to shuttering carpentry and scaffolding.

#### Enabling objectives:

Upon completion of this module, the participant will be able to:

- Understand and learn about sizes of Carpentry Materials
- Understand and learn about handling, stacking and use of building construction materials at construction site:
  - Bricks
  - Cement
  - Sand and Aggregates
  - Steel
  - Glass
- Understand and learn about safety and environmental considerations in use of various building materials
- Understand and learn about use of scaffolding at construction site
- Understand and learn about use of fixings and adhesives for carpentry work
- Understand and learn about finishes and solvents for carpentry work
- Understand and learn about organising materials at construction site
- Understand and learn about quality requirements of materials
- Understand and learn about basic equipment used for handling materials at construction site
- Understand and learn about methods of stacking materials at construction site
- Understand and learn about storage of materials at construction site
- Understand and learn about types of mechanical lifting equipment
- Understand and learn about meaning of various hand signals

#### Methodology

Trainer Led Discussion, Skill Practice, Individual Reflection, Assessment





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### Instructions to the Trainees:



The students should participate while the trainer discusses about each topic to make the class more interesting.

### Equipment /Tools Required:

Computer, Projector, White Board, Participants Manual, Markers, Flipcharts, Notes, Handout & PPT



Duration: 24 Hours



## Sizes of Carpentry Materials

30 Minutes

Carpentry materials are available in many different lengths, shapes and sizes, which you'll need to take into consideration when you're handling, sorting, stacking or storing them.

### Stock Size/Length - Timber

The term 'stock length' or 'stock size' refers to standard lengths and sizes for timber that can be bought 'off the shelf' from suppliers.

Timber comes in 'stock' sizes. This means a size that's usually available 'off the shelf' from a timber merchant. Timber lengths can be bought in increments of 300 mm and in stock lengths of between 0.9-6 m.



**Note: 300 mm is equal to 1 foot (12 inches)**

Timber is also available in many different section sizes. The following table shows you some of the more common softwood section sizes used in the construction industry today.

|             |                                 |         |          |          |          |
|-------------|---------------------------------|---------|----------|----------|----------|
| 35 mm thick | 45 × 35                         | 70 × 35 | 90 × 35  | 120 × 35 | 140 × 35 |
|             | 190 × 35                        |         | 240 × 35 |          | 290 × 35 |
| 45 mm thick | 45 × 45                         | 70 × 45 | 90 × 45  | 120 × 45 | 140 × 45 |
|             | 190 × 45                        |         | 240 × 45 |          | 290 × 45 |
| 70 mm thick | 70 × 70                         |         | 90 × 70  | 120 × 70 | 140 × 70 |
|             | 190 × 70                        |         | 240 × 70 |          | 290 × 70 |
|             | 90 × 90<br>for<br>timber stumps |         |          |          |          |



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### Stock Size/Length - Sheet Materials

Sheet materials such as plywood, chipboard and MDF are available in a number of sizes. They're generally metric but some imported plywood is still in imperial sizes.

- Lengths are usually 2440 mm (8 foot), 2135 mm (7 foot) or 1830 mm (6 foot).
- The metric equivalents would be 2400 mm, 2100 mm or 1800 mm.
- Widths are 1220 mm (4 foot) or 915 mm (3 foot) [imperial] and 1200 mm or 900 mm (metric).



### Bricks

Bricks and concrete blocks are widely used in the building industry to construct walls. They're generally delivered to site in packs or on pallets that can be mechanically handled with forklifts or pallet trucks.

Smaller amounts of bricks often have to be moved manually - usually by wheelbarrow - to their final position. Careless handling of bricks and blocks can damage their faces and corners, making them useless for decorative face work.



### Safety and Environmental Considerations:

You must take care when you're stacking bricks and blocks to prevent them from becoming unstable and falling on you and/or other workers.

When you're using a wheelbarrow to transport bricks, make sure you stack the bricks evenly so that they don't topple out. Remember that a load of bricks is heavy, so never overload the wheelbarrow.

You should also wear gloves when you're handling bricks to prevent your hands from being injured by their rough surface.



Recycling bricks minimises the need for mining and/or quarrying raw materials to produce new bricks and diverts large quantities of waste materials from landfill sites.



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Recycling bricks can also save money by avoiding landfill fees and transport costs, and through the reuse of bricks in other construction projects such as paving and landscaping.

### Cement

Cement is used in all forms of in-situ and precast concrete products, cement mortar, screeds and rendering. It used to be sold in bags weighing 40 kg, but it's now sold in 20 kg bags to help reduce manual handling injuries.



Loads of cement bags can be delivered on pallets and mechanically handled either by forklift or pallet truck.

You can handle individual bags of cement manually by placing them on your shoulder (one at a time).

#### Storage:

Because cement can 'set' if the bags become damp, it should be stored off the ground in a waterproof area if possible.

To reduce storage time, the cement should be used in the same order in which it's delivered; that is, use the oldest bags first. This is known as 'first in, first out' and prevents the cement from going 'stale'.

#### Safety and Environmental Considerations

You should always wear personal protective equipment (PPE) such as goggles, gloves and a dust mask when you're working with cement. It's also good practice to wear it when you're handling sand and aggregate materials.

You must take care when you're using cement as it can be extremely hazardous if you breathe it in. It can also cause burns to the skin and/or eyes.



The paper bags used to package cement and cement blend products have thin plastic liners inside them which can be dangerous for small children or animals. These liners also make the bags unsuitable for burning or recycling. You must take care when you're disposing of them.



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### Sand and Aggregates

Sand and coarse aggregate (blue metal) are used in the production of concrete and mortar, and can be delivered in bulk (loose) or in bags (20 kg or 1000 kg).

Loose sand and coarse aggregate should be stored separately and as close to the cement mixer (or mixing area) as possible.

You can handle sand and coarse aggregate manually using shovels and buckets but they're generally moved in small amounts by wheelbarrows, and in large amounts by loading machinery such as a 'skid loader' (bobcat).



#### Safety and Environmental Considerations:

Wear PPE such as goggles, gloves and a dust mask when you're handling sand and aggregate materials to avoid any potential injury.

### Steel

Most houses will have some form of steel component incorporated into their design. From steel structural beams left exposed as internal design features, or steel beams and reinforcing bars set in concrete for internal and external walls through to wall frames, roof trusses and sheet metal used for fencing and roofing, steel is becoming widely used in residential home design and building.



Steel components are also widely used in commercial and high-rise construction projects. Steel enables multi-story buildings to be built more quickly and economically than conventional building techniques.



#### Safety and Environmental Considerations:

Steel components can be extremely heavy so you must think carefully about how to handle and transport them. Always wear gloves when handling steel components to avoid injury due to sharp edges, especially with sheet metal.

Although there is a heavy manufacturing process for steel, the end product is 100% recyclable and can be recycled an unlimited amount of times.

This minimises the need for the mining or quarrying of raw materials each time it's re-processed. Most steel contains around 20% recycled content.



## Glass

Glass should be stored off the ground, in an upright position in dry, wind-free conditions to avoid any accidental damage. Timber or foam protectors should be used to prevent the glass from coming into contact with coarse surfaces that could scratch or damage it.

Large sections of glass can be very heavy and must be either manually carried by two people, or mechanically handled by a glass-carrying devices. Small pieces can be carried using special leather gloves.



### Safety and Environmental Considerations:

- Always handle glass carefully and wear gloves to protect yourself.
- Dispose of any unused or broken glass of considerately.
- Most types of glass can be reused and/or recycled.
- Handle broken glass carefully with gloves and wrap it in multiple layers of newspaper to avoid injury.



## Scaffolding

Scaffolding is a temporary structure used to support workers and materials in the construction or repair of buildings and other large structures. It's usually a modular system of metal pipes or tubes, although it can be made from other materials.

As a carpenter, you may be required to handle and/or erect scaffolding from time to time during the construction of a building.

**30 Minutes**



### Safety and Environmental Considerations:

Some scaffolding components can be extremely heavy. You should always think carefully about how you're going to handle and transport these components safely around the construction site.

Always wear gloves when you're handling scaffolding components to avoid injury. You can reuse scaffolding lots of times. This makes it reasonably environmentally friendly as it's hardly ever discarded.



### Handling Non-Timber Building Materials

1 Hr

A few of the most common types of non-timber materials you'll come across are listed here, along with what you need to consider when handling them. Note two or three key points for each type, then compare your notes with others in your class. The first one has been done for you as an example.

**Materials**

**Considerations for Handling**

Bricks/masonry

- They're heavy. I can only carry around six bricks at a time.
- Rough surface - I need to wear gloves if handling for long periods.
- Handle carefully so bricks don't get chipped or damaged.

Glass

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Steel

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Scaffolding

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



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Plasterboard, MDF, LVL, etc

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



### Fixings

30 Minutes

Most of the materials used in building and construction need to be joined together in some way, e. g. bricks need mortar for a wall to be built. As a carpenter working with timber and timber-based materials, you'll work with a variety of fixings, the most common of which we'll look at here.

- Adhesives are glue-like materials that join things together.
- Fixings are non-adhesive materials such as nails and screws that join things together.

### Nails

A nail is the simplest way of fixing two pieces of timber together. Their fixing power comes from the way the wood fibres grip the shaft of the nail as it's hammered through the timber.

Nails have evolved from the simple, wooden pins used in ancient Egyptian times into relatively cheap, mass-produced fixings that are available in a variety of types.



Nails vary by:

- length
- diameter
- head type
- the metal they're made from
- what they're coated with.

As with all other materials you'll be using, it's important to know what type of nail goes with which type of carpentry task.

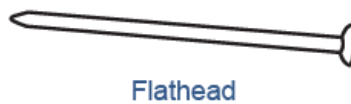




### Nail Types

2 Hrs

Look at the types of nails shown here. With the help of your trainer and classmates, fill in the spaces with information on features and applications. You can also do research online. The first type of nail has been done for you as an example.



**Features:**

**Applications:**

- Good basic nail
- Plain shank and diamond point
- Made from hardened nail wire
- Available in bright, galvanised or stainless steel
- Easy to use; only needs a hammer
- Flat, rounded head prevents pull through

- Use when a neat, flat finish is required
- Framing, boxing, fencing and general timber-to-timber fixing

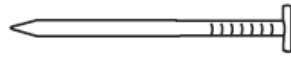


**Features:**

**Applications:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Clout

**Features:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Applications:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



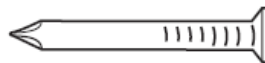
Panel pin/hardboard nail

**Features:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Applications:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Soft sheet nail

**Features:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Applications:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



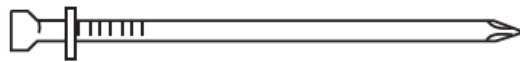
TimberLok nail

**Features:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Applications:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Duplex nail

**Features:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Applications:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Look at the types of nails shown here. With the help of your trainer and classmates, fill in the spaces with information on features and applications. You can also do research online. The first type of nail has been done for you as an example.

**Screws**

Like nails, screws vary in length, diameter, head type, the metal they're made from and what they're coated with.

Screws have some advantages over nails. They:

- have better holding power
- can be withdrawn and re-driven
- can be inserted without vibration or damage.





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However, screws also have some disadvantages compared to nails, because they:

- usually require a hole to be drilled before they're inserted, so they take more time
- are more expensive, size for size, than nails.

Screws have two parts - a head and a shank. When selecting the right screw, the type of shank you choose will depend on the carpentry task you're doing.



### Screw Types

1 Hr

Look at the types of screws shown here. With the help of your trainer and classmates, write two dot points about each screw type and what you would use it for.

The first one has been done for you as an example.



Countersunk head

- Good to use when the head of the screw needs to be recessed below the surface, e.g. decking and shelving
- Used with a countersink bit to form the recess



Ribbed countersunk head self-embedding head (SEH)

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Wafer head

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Bugle head

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Hexagon (hex) head

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

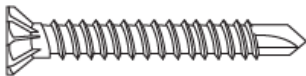


### Screw Thread Types

As you worked through the last activity, you may have noticed that the shanks are different on some of the screws. As you can see below, certain thread types suit particular carpentry tasks.



- For fixing into timber
- Coarse thread
- Sharp point



- For fixing into metal
- Full-length, finer thread
- Self-drilling
- Blunter point



- A variation of the screw thread above is the WingTek
- Tighter thread for fixing timber to steel
- Wings drill a clearance hole through the timber and snap off when the steel is encountered

### Remembering the right screw for the job

Because of the wide range of types and sizes of screws for both hand and power tools, it can be hard to remember all the different types and which job they go with.

Manufacturers provide charts and booklets to help you choose the correct screw, and you can find a lot of useful information on the internet.

### Bolts

Because bolts have higher load-bearing abilities than nails and screws, they're the right fixing to choose for jobs where large and/or structural loads are involved.

Bolts are identified by the type of head they have - and as with nails and screws, different bolts go with different jobs.

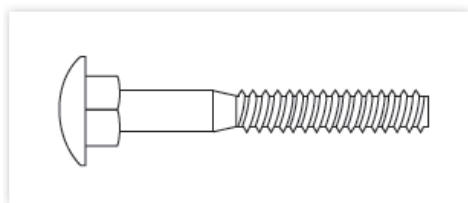
Most bolts are made of steel, with the usual coatings available, e.g. galvanised, cadmium-plated. Stainless steel bolts are used in areas where greater corrosion resistance is required.





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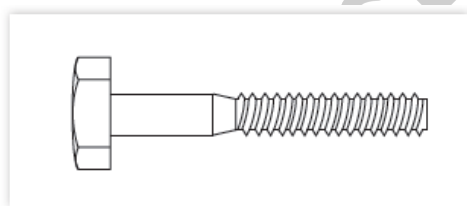
The bolt most commonly used in the construction industry is the cup head type shown below, which is used mostly for fixing timber to timber.



It has a dome-shaped head with a square section just beneath it. The purpose of the square section is to prevent the nut from turning while it's being tightened.

Once installed, the cup head protrudes only slightly above the surface of the timber, giving a neat finish.

The other type used is the hexagon (hex) head shown below.



Because of its shape, the hex head can be gripped easily. This prevents the nut from turning when it's being tightened. Hex head bolts are often used when fixing steel fittings to timber structures, e.g. in decking or fencing. They're also used in conjunction with masonry fixings to bolt timbers to brickwork and concrete.

### Washers

Washers are flat metal discs that are placed under the head of a screw or bolt. They're used because they help to distribute load and strengthen the connection between the fixing and the surface.

Together they help make the fixing stronger, and the screw or bolt is less likely to pull through.



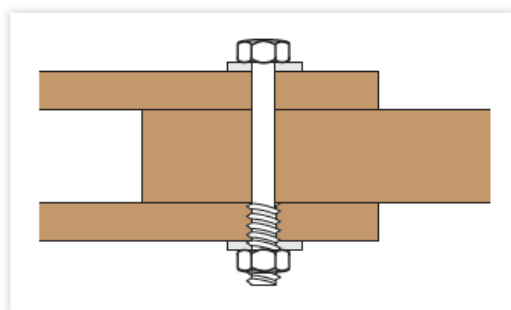


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### Nuts

The final piece that completes the bolt fixing is the nut. This goes onto the thread of the bolt, all the way up to the underside of the material being fixed.

In the following picture, you can see that a hex head bolt has been used to create what's called a bolted joint. Note the use of two washers - one under the head of the bolt and another at the base of its shank (above the nut).



### Other Types of Fixings

In carpentry, you'll be working mostly with timber which will require a fairly limited range of nails, screws and bolts. However, there will be other jobs where you'll need to use specialist types of fixings.

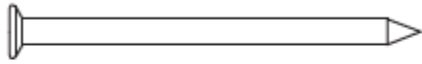


### Other Fixings

2 Hrs

Look at the types of fixings shown here. With the help of your trainer and classmates, work out what types of fixings are shown then come up with two or three points about their features and how they're used. The first type has been done for you as an example.





High tensile steel nail

Features and Applications

- Strong
- Used with normal hammer
- Goes through timber into brickwork



Expanding sleeve anchor

Features and Applications

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Nail plate

Features and Applications

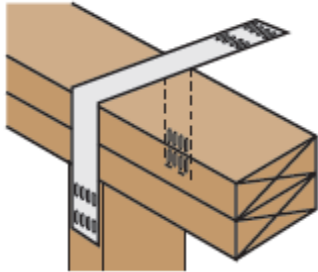
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Spring toggle

Features and Applications

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Wall plate tie-down strap

Features and Applications

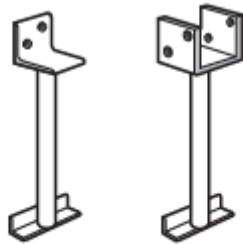
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Wall plug – also known as raw plug or star plug

Features and Applications

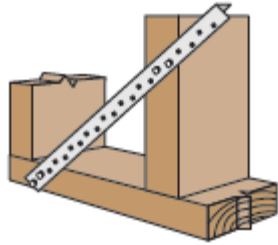
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Post stirrup

Features and Applications

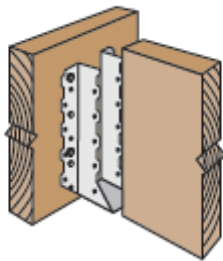
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Metal wall bracing

Features and Applications

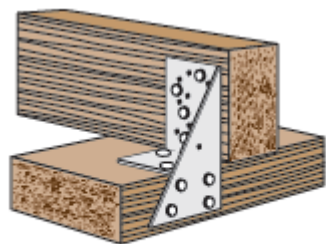
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Truss boot/joist hanger

Features and Applications

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



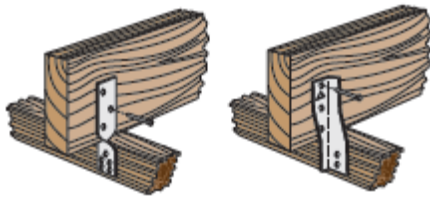
Multigrip connector

Features and Applications

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



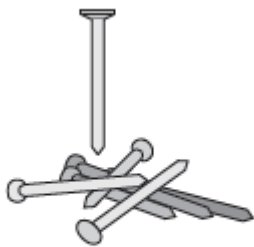
Features and Applications



Hanger straps

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Features and Applications



Reinforced head galvanised connector nail

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



## Adhesives

30 Minutes

A lot of jobs don't require nails or bolts. Sometimes, an adhesive is the perfect material for the job. As with other fixings, particular adhesives are made for certain applications and it's important that you select the correct one and know how to handle it. No one type of adhesive is suitable for all applications.



## Types of Adhesives and their Uses 2 Hrs

The most common types of adhesives are shown here. With the help of your trainer and classmates, come up with two or three points about the features and uses for each adhesive.

You can also do research online. The first adhesive has been done for you as an example.

### Polyvinyl acetate (PVA)

#### Features and Uses:

- Water-based, non-toxic
- Cheap, easy to use and easy to clean up
- Good for general purpose timber-to-timber and gap filling; must be waterproof PVA for external use
- Dries clear



**Urea formaldehyde (UF)**

**Features and Uses:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Resorcinol formaldehyde**

**Features and Uses:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Polyurethane-based contact adhesive**

**Features and Uses:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



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### Epoxy

#### Features and Uses:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Contact adhesives

#### Features and Uses:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Tips for Use

As with any other material, there are some things you should be aware of when you're handling adhesives.

- The surfaces being joined must be clean, dry and dust-free before you apply the adhesive.
- Because adhesives will 'go off' if exposed for long periods, get everything else ready for the job before you open the container.
- Use just enough adhesive to cover the surfaces. If any adhesive squeezes out of the joint when it's clamped, you've used too much.
- Clean up any excess and/or spilt glue immediately. The longer you leave it, the harder it is to clean up.
- In external situations, don't rely on paint to weatherproof the joint. Always use a waterproof adhesive.





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