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SAMPLE MATERIAL

The City & Guilds textbook

Carpentry & Joinery

LEVEL 1 DIPLOMA (6706)

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HODDER EDUCATION
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Contents

This sample contains selected material only from Chapter 5.

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Selected pages from Chapter 5

CHAPTER 5

FIXINGS AND IRONMONGERY

INTRODUCTION

Your choice of fixings and ironmongery not only impacts on the finished look of the project, but also, perhaps more importantly, the effectiveness of the fixings or ironmongery to perform the tasks for which they were chosen.

The vast variety of fixings and ironmongery available, often used for similar types of tasks, offer more choice in design, material they are manufactured from, as well as colour options.

This chapter will outline the types of fixings and ironmongery that are available for use today within the construction industry and more particularly within carpentry and joinery. This includes details of suitable locations for fixings and ironmongery, along with their specific uses. This chapter will also discuss how to select appropriate types of fixings and ironmongery, as well as fixing techniques.

LEARNING OUTCOMES

By reading this chapter you will learn about:

- Types of material used in the manufacture of fixings and ironmongery
- Different types of fixings used within carpentry and joinery
- Type of applications that fixings are suitable for
- Adhesive types and uses
- Types of ironmongery
- Locations suitable for specific types of ironmongery
- Fixing and positioning details for common types of ironmongery.

Chapter section	Level 1 in Carpentry and Joinery (6703-13) Unit 113	Level 1 Awards, Certificates, Extended Certificates and Diploma in Construction Skills (6219) Unit 110
1. Know how to fit locks and latches.	n/a	1.1; 1.2; 1.3; 1.4
2. Be able to fit locks and latches.	n/a	2.1; 2.2; 2.3; 2.4
3. Be able to set up and maintain a clean and safe working environment.	n/a	n/a

Features in the book

Key Terms provide concise definitions for learners to help them quickly pick up industry terms.

Industry Tips provide practical pieces of advice for learners to use in their future careers.

KEY TERMS

Fixings: types of screws, nails, adhesives and sealants, etc.

Ironmongery: types of handles, knobs, hinges, locks and letter plates, etc. that are used to help support, protect, operate or otherwise help with the operational functions of items.

INDUSTRY TIP

Ferrous metals contain iron while non-ferrous metals do not. Metals containing iron and steel are prone to rusting.

INDUSTRY TIP

Do not use iron and steel with acidic timbers, such as oak, which can cause unsightly staining to the joinery.

MATERIALS USED IN THE MANUFACTURE OF FIXINGS AND IRONMONGERY

Fixings and **ironmongery** are general terms used to describe the different types of hardware used in the construction industry.

Fixings and ironmongery are usually made from either ferrous or non-ferrous metal. The type of material used to make the fixings and ironmongery will determine the most suitable location to use them, along with their suitability for the specific task.

Ferrous metal

This type of metal contains iron and unless it is protected in some way is liable to rust if exposed to damp conditions or used in external environments. Ferrous metals are the most widely used material in the production of ironmongery and fixings and usually take the form of mild steel, which is also often the cheapest material. The appearance of the mild steel can be enhanced by a process called electro-brass or zinc plating, which also adds protection to the mild steel, enabling it to be used in external situations. Heavy duty iron or cast-iron ironmongery is suitable for heavyweight doors but cast iron can be brittle. Although stainless steel does contain iron, the manufacturing process for this type of steel makes it very resistant to rusting or staining and as a result is commonly used in damp or external situations.

Non-ferrous metal

Non-ferrous metal does not contain iron and includes aluminium and brass, as well as other metals such as copper, lead, gold and silver. Such metals are extremely resistant to rusting and staining and are suitable for both internal and external use. Brass and aluminium, which are often used in the production of screws and ironmongery, are two soft metals that can be easily damaged. If great care is not taken, brass screws will break when being screwed into hard materials such as beech and oak.

FIXINGS USED IN CARPENTRY AND JOINERY

Fixings used within carpentry and joinery usually fall into one of the following categories:

- Nails
- Screws
- Coach screws and bolts
- Wall plugs and cavity fixings
- Adhesives.

Screwdriver bits

There is a wide range of screwdriver bit designs that correspond with the shape of the **recess** cut into the head of the screw. It is important that you select the correct bit to match the type used on the head of the screw; using a different bit design to that intended for the screw head can result in damaged screw heads. This in turn can make it difficult to either fully drive the screw home or remove it. It also leaves an unsightly damaged screw head, which gives a poor impression of the quality of your work.

KEY TERM

Recess: sunken area.

The most common types of screw heads are: Pozidriv (PZ), Philips (PH), slotted, Torx, square recess and Hex. See Table 5.1 for the corresponding types of screwdriver bits.

▼ Table 5.1 Types of screwdriver bits

Type of screwdriver bit	Description
Slotted 	Traditional screw head design consisting of a single slot used mainly with imperial screw sizes and some forms of ironmongery. This type of screwdriver bit can easily slip out of the screw head in use, resulting in damage to both the screw head and the surrounding material. The slot in the screw head should always end up with the slot running vertical (i.e. upwards).
Philips (PH) 	This head design is an improvement on the slotted head. The single cross-shaped recess gives better contact with the screw head and better resistance to the screwdriver head slipping on the screw.
Pozidriv (PZ) 	This is the most common form of screw head, with two sets of cross recesses into it: one smaller shallower set rotated at 45° to the larger and deeper set. The screw heads require screwdriver bits ranging from the smallest, size 0, to size 3, with size 2 being the most common.
Torx 	The Torx head has a six-point star design and allows for higher torque, better grip and improved driving angles than the Pozidriv head. It is ideal for use with combi drills and impact drivers for fast driving of the fixing.

Tables of information help learners identify the purpose for tools and equipment.

Features in the book

Additional activities encourage learners actively to build up skills and knowledge.

Improve your English activities help your learners hone their skills so that they can confidently set about tasks they will regularly need to perform in the workplace.

ACTIVITY

Compare how the appropriate type of screwdriver bit locates in the screw head and resists slippage for the following types of screw head:

- slotted screw heads
- PZ screw heads
- torx head.

IMPROVE YOUR ENGLISH

Outline the main differences between ferrous, non-ferrous and zinc-coated screws. Identify which types are the most suitable for external uses and present your recommendations in a simple information leaflet that could be placed in your ironmongery stores.

INDUSTRY TIP

Ironmongery should be fitted in accordance with Building Regulations Approved Documents.

Type of screwdriver bit	Description
Square recess head 	This type of screw is also known as a Robertson screw. It has a square-shaped socket in the screw head and a square protrusion on the driving bit, with both the screw head and bit having a slight taper. It is often used in furniture manufacturing and pocket screw jigs.
Hex recess heads 	These types of heads have a six-sided recess in the head of the screw and can be driven in with hexagonal driver bits or 'Allen Keys'. These types of screws are like hex bolts. They are commonly used with a corresponding nut and washer as well as being a type of fixing often found on kitchen appliances, such as fridge doors, where it is often necessary to change the hanging side of the door.

It is important that you use both the correct shape and size of screwdriver bit to prevent slippage and for ease of use.

Typical screwdriver sizes needed for their corresponding screw sizes are set out below. Screws measuring:

- 3.0 mm and smaller require size 0
- 3.5 mm require size 1
- 4.0 mm to 4.5 mm require size 2
- 5.0 mm and above require size 3.

TYPES OF IRONMONGERY

Traditionally, ironmongery was made from iron, but modern manufacturing techniques now enable an almost unlimited choice of design, colour and materials to be used in its manufacture. Ironmongery is sometimes referred to by its locations – for example, door, window, gate and kitchen furniture – as well as by its type, such as:

- Hinges
- Locks and latches
- Handles and knobs
- Bolts and security devices
- Door closers
- Cabinet hardware.

On larger building projects the ironmongery may be listed on an **ironmongery schedule** identifying the specific type of ironmongery to be used in specific locations. For example, an ironmongery schedule may state the following: door A should use one and a half pairs of 100 mm high-performance ball-bearing stainless steel hinges, a cylinder night latch and a security viewer. There will also be further details given on the positions of the ironmongery on the door.

The main types of ironmongery, along with the locations where they are typically used, are set out below.

Hinges

Hinges are commonly used to hang doors and are available in a wide range of sizes, materials and designs to suit different applications.

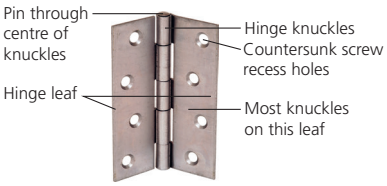
When selecting a size and style of hinge, also consider what size and type of screw to use with the hinge.

As a guide, use the following lengths of screw when fitting butt hinges to doors. For doors with a thickness of:

- 35 mm use 25–32 mm long screws
- 44 mm and 54 mm use 32–40 mm long screws.

Whatever length of screw you use, it is important to ensure that the countersunk head of the screw matches the countersunk recess in the hinge. By doing so, this will prevent the screw head from either protruding above the hinge, which can cause the door to 'bounce' open, or from having too small a screw head that fails to properly hold the hinge in place.

One of the most common types of hinge you are likely to fix is the butt hinge (see Figure 5.1). There are several variations; some will have washers between the knuckles, while others have a small ball bearing. Butt hinges consist of two leaves joined by a fixed pin that passes through the knuckles that are formed on the inner edges of both leaves. Butt hinges should be fitted so that both leaves are recessed equally into the door and frame, leaving a small gap between them when the door is closed to help the door operate without binding. The knuckle is usually positioned to project just past the face of the door to give increased clearance for the door to swing open when it is being used. There is normally an odd number of knuckles on butt hinges. The leaf with the most knuckles is usually fitted to the door frame and the leaf with the least knuckles is fitted to the door.



▲ Figure 5.1 Parts of a standard butt hinge

KEY TERMS

Ironmongery schedule: a document used to list ironmongery that is used throughout a project, such as with new housing.

Butt hinge: a type of hinge consisting of two flat leaves revolving around a pin (hinge), the knuckle of which pivots. Used to support internal and external timber doors.

IMPROVE YOUR MATHS

List the different types and quantities for each type of hinge, latch and lock used to hang all the doors in your home.

Improve your maths sections give learners the opportunity to practice numeracy skills they will need to hardwire in the workplace.

INDUSTRY TIP

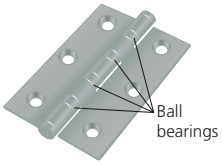
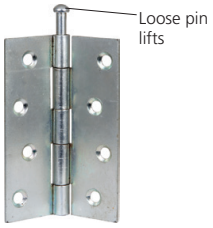
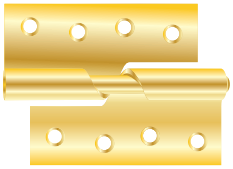
When fitting butt hinges, there is a helpful rhyme for remembering how to do it: 'The most to the post' means that the leaf with the most knuckles is fixed to the door frame.

Features in the book

Butt hinges are available in a range of sizes, from 25 mm to 100 mm. Brass butt hinges are susceptible to wear on the knuckles, so stainless steel or phosphor-bronze washers are fitted between the knuckles to prevent this. The washers also reduce squeaking.

Table 5.2 outlines some types of hinges in general use.

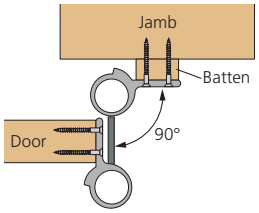
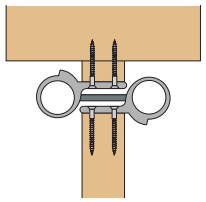
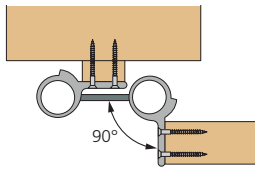
▼ Table 5.2 Types of hinges in general use

Type of hinge	Description and typical uses
Ball race butt hinge 	High-performance ball-bearing or ball-race hinges give a much smoother action and are much more durable and particularly good for use with heavy doors. They are available in sizes from 75 mm to 150 mm.
Loose pin butt hinge 	Loose pin butt hinges enable easy removal of the door by removing the pin from the hinge knuckle, enabling the door to be removed without having to remove the hinge from either the door or the **door jamb**. The pin can be tapped out (upwards) of the hinge to allow the door to be lifted away with little effort. This type of hinge should not be used on outward swinging exterior doors. A variation on the loose pin hinge is the lift off butt hinge. These hinges enable the door to be lifted off when the door is in the open position. The hinges are handed and incorporate one long pin hinge and one short pin hinge. The long pin hinge is positioned at the bottom of the door and the short pin hinge is the upper hinge.
Rising butt hinge 	Rising butt hinges have a spiral-shaped knuckle, allowing the door to rise as it opens. These are particularly useful in clearing uneven floors or mats and rugs. The shape of the knuckle also gives the door a self-closing action. The top of the door requires a taper on the hinge side called a leading edge. This allows the door to move past and to clear the head of the door frame as it opens and closes. These hinges are handed, i.e. right-hand opening door or left-hand opening door.
Parliament hinge 	Parliament hinges have wide leaves that allow the knuckles of the hinge to protrude away from the edge of the door. This type of hinge allows the door to swing open and away from the hanging side of the wall. They are particularly useful when the door needs to be folded back close to the wall.

➥

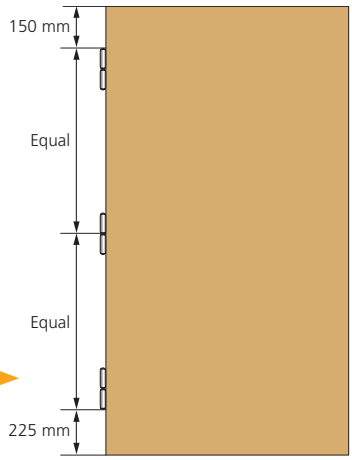
KEY TERM

Door jamb: the part of the door frame running vertically on either side of the door opening.

Type of hinge	Description and typical uses
Flush hinge 	Flush hinges are only suitable for lightweight doors, used when encasing services such as pipes and waste traps for easy access, furniture and hatches. These hinges are quick and easy to install, as they sit on the surface edge of the door and frame eliminating the need for time-consuming recess cutting into the door and frame.
Adjustable double-action spring hinge   Door open  Door closed  Door open	Adjustable spring hinges are designed to make a door self-closing. They have large cylindrical (tube-like) knuckles that can be tensioned to the required closing action. Single-action spring hinges have two leaves and are used to open and self-close to one side of the opening. Double-action spring hinges have three leaves, and open 360°. To correctly install double-action spring hinges, a plane strip of timber should be fitted to the hanging edge of the frame that is the same thickness as the door, to allow free movement of the cylindrical knuckles. Double-action spring hinges are often used in corridors of public buildings such as schools and hospitals, and between kitchen and dining areas in restaurants and public houses.

Features in the book

Type of hinge	Description and typical uses
Tee hinge 	Tee hinges are made from thin-gauge steel that is usually black japanned or galvanised. They are mainly used with matchboard doors and gates.
Hook and band hinge 	Heavy-duty hook and band hinges are made from stronger galvanised or stainless steel and are used for heavier industrial or garage doors, framed, ledged and braced doors, and farm gates. Hook and band hinges can be straight or cranked (bent) and can have a means of adjusting the hinge usually through a threaded bolt adjustment.
Concealed cupboard hinge 	Commonly used to hang kitchen unit doors. Kitchen cabinets are usually made with artificial boards, such as chipboard and MDF, which do not hold screws well on their edges. To overcome this problem a 'blind' circular recess is bored into the inside face of the doors to accept the hinge. The recess will have a diameter equal to the diameter of the concealed hinge – usually a standard 35 mm diameter, but smaller versions are available at 26 mm diameter. The concealed hinge is inserted into the blind recess and secured with 3.5 x 16 mm screws. This type of hinge ranges from the basic design with limited adjustment, to a soft-close (smooth and silent closing) fully adjustable version.
Invisible closers/hinges 	This type of concealed hinge is intended not to be seen when fitted unless the door is open. It is suitable for flush doors with timber, steel and aluminium frames. One of the most common types is the Soss hinge, which is available is several sizes suitable for full height doors down to small furniture doors. Soss hinges are suitable for both internal and external use, for heavy-duty doors as well as being suitable for fire doors.



▲ Figure 5.2 Standard door hinge position

Diagrams and commentaries gently introduce and familiarise learners with processes and concepts.

Selecting hinges for use

It is essential to select the correct type and number of hinges for hanging a door to ensure it works properly. If the door does not remain hanging perfectly within the frame, over time the door may sag and drop; this means the lock or latch may fail to locate correctly, and the doors will not shut and lock correctly.

The number and size of hinges required when installing specific types of door are as follows:

1. Lightweight internal doors, such as hollow core doors, usually require only one pair of 75 mm hinges per door (although bathroom and en-suite doors may be specified on the manufacturer's information to be hung on one and a half pairs of 75 mm hinges, i.e. three hinges).
2. 35 mm-thick timber doors, such as panelled and glazed internal doors, should be installed using one and a half pairs of 75 mm hinges.
3. All 44 mm-thick doors, whether internal or external, should be installed with one and a half pairs of 100 mm hinges.
4. Fire doors should also be installed using one and a half pairs of fire-rated 100 mm hinges.

INSTALLING A CYLINDER NIGHT LATCH

Cylinder night latches are mostly fitted to doors where entry to a room or building needs to be controlled. Only people who have keys are able to open the door, but anyone can exit. Cylinder night latches are usually only fitted to doors that open inwards, for example front doors to domestic properties or a room opening off a corridor.

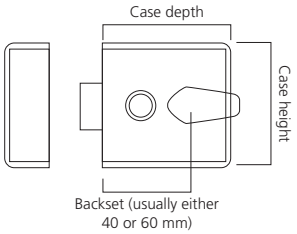
Most cylinder night latches are provided with a paper template and fitting instructions to make the installation straightforward. The following stepped guide outlines a simple procedure that can be used to fit a cylinder night latch:

HEALTH AND SAFETY

When using adhesives always follow the manufacturer's instructions and use suitable hand protection to prevent skin contamination.

Essential reminders of establishing safe and secure working conditions are embedded throughout the text.

Step-by-step diagrams help learners understand processes and how to set about tricky tasks.



Step 1 Mark the top of the cylinder night latch on both sides of the door, usually between 1200 mm and 1500 mm from the bottom of the door.

Step 2 Mark the required backset of the night latch from the edge of the door. This is the centre of the hole for the cylinder, usually 40 mm or 60 mm from the edge of the door.

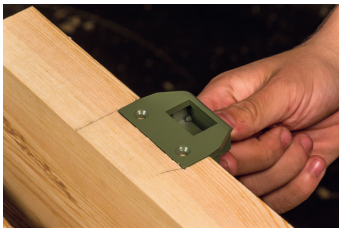
Step 3 Drill a 32 mm hole through the door, working from each side.

Step 4 Insert the cylinder in the hole from the outside and mark the end of the connecter bar as it passes through the door. Remove the cylinder and cut the connecter bar 8 mm to 10 mm longer than this mark.

Step 5 Refit the cylinder and tighten to the back plate, ensuring the key will be vertical.

Step 6 Locate the night latch onto the back plate and screw home.

Step 7 Measure and mark out the location of the keep on the door jamb. Chisel out a recess for the keep.



Step 8 When the recess is large enough to allow the keep to sit flush against the door frame, attach the keep.

Accurate photographs demonstrate processes in action.

Features in the book

Practical task

Fit a butt hinge

You are required to fit a 100 mm butt hinge in a section of softwood timber that represents a section of door stile.

Candidate information:

Before starting each task ensure you have been given permission by your tutor or trainer to proceed. As each task is completed you should be provided with feedback and notified of any retraining that may be required. Always work according to a risk assessment, together with environmental and health and safety regulations.

Task instructions:

You are required to:

1. Mark out the correct position of the butt hinge.
2. Set up marking gauges to the required sizes from the butt hinge.
3. Mark the location of the hinge using the marking gauges.
4. Chop out the hinge recess using the correct size of chisel and mallet.
5. Fit the hinge using correct size pilot holes, screws and screwdriver.

Equipment required:

- Completed risk assessment for fitting
- But hinges
- Selection of Personal Protective Equipment
- 1 length of softwood timber 450 mm × 44 mm × 94 mm
- Vice or clamps
- 100 mm butt hinge
- Marking knife
- Two marking gauges
- Selection of bevelled edge chisels
- Mallet
- Selection of drill bits
- Selection of screws
- Selection of screwdrivers.

Carve a way to success using end of chapter questions.

Test your knowledge

1 Which of the following is classed as a non-ferrous metal?
- **a** Mild steel
- b Iron
- c Brass
- d Cast iron

2 Which type of nail has small raised ridges around its shank?
- **a** Cut nails
- b Lost head nails
- c Bright steel round head nails
- d Annular ring shank nails

3 Which type of nail is most suitable for driving into brickwork?
- **a** Clout nails
- b Masonry nails
- c Brad nails
- d Cut nails

4 Which type of screwdriver bit has a six-point star head?
- **a** Pozidriv
- b Phillips
- c Slotted
- d Torx

5 Which of the following types of adhesive is a fast-acting adhesive considered to be suitable for joining mouldings such as architrave and cornice at joints?
- **a** Mitre bond adhesive
- b Polyvinyl acetate
- c Synthetic resign grade adhesive
- d Contact adhesive

6 Which type of screw has a black lacquered finish applied?
- **a** Brass wood screws
- b Black japanned screws
- c Zinc-plated wood screws
- d Yellow passivated wood screws

7 When installing butt hinges, which phrase is used as a reminder for positioning?
- **a** Least to the post
- b Down to the door
- c Most to the post
- d More to the door

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Carve out a career as a carpenter or joiner. Published in association with City & Guilds and suitable for the 6706 Diploma, as well as other Level 1 qualifications, this highly illustrated and accessible book will introduce the principles of construction, how to use hand and power tools, woodworking joints, and health and safety.

- Study with confidence, using the most up-to-date information and industry standards
- Enhance understanding of tools and concepts in carpentry with clear and accurate technical drawings and step-by-step photo sequences
- Test knowledge with practice questions and activities
- Get ready for the workplace with Industry Tips and guidance on values and behaviours
- Develop core skills with expert authors Steve Jones and Steve Redfern, who draw on their extensive teaching and industry experience

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