Timber Frame Competency Award Scheme
Timber Frame Erector Practical Skills Workbook

Silver Level
Section 1
Introduction and Welcome

1.1 The Timber Frame Erector Training Programme
1.1 The Timber Frame Erector Training Programme

Welcome to your Practical Skills silver workbook.

The production of these workbooks has been supported financially by CITB. The Structural Timber Association (STA) is extremely grateful to them.

The Structural Timber Association (STA), on behalf of the industry, has developed this training programme with CITB to provide recognition of the skills and competences of existing timber frame erectors together with raising the skill levels of any unskilled or untrained timber frame erectors to an acceptable level of competence.

The programme will also provide career paths for timber frame erectors and assist young entrants to the timber frame industry. Over time the intention is to allow only those erectors who are qualified to erect timber frame buildings.

A structured training programme has been devised at three levels:

- **B** Bronze
- **S** Silver
- **G** Gold

Each of the three levels is split into three modules – Health and Safety Skills, Knowledge Skills and Practical Skills.

For most of us, our home is our largest expense and we expect it to be built to the highest standards by well-trained and suitably qualified people. By using these workbooks, we, as an industry, can now provide you with the opportunity to achieve this goal. Also by having a qualified workforce we can compete with the rest in quality and workmanship.

We hope you enjoy working through this workbook. Please add to it in any way you wish and we look forward to awarding you with your Timber Frame Competency Award qualifications in the near future.

Andrew Carpenter,
Chief Executive, STA.

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**Education and training STA/CITB**

If you have any queries or require further information on this or any other education and training matter, either seek advice within your company, or contact the CITB directly:

**National Specialist Accredited Centre**

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Section 2
Aims and Objectives of Training

2.1 Aims and Objectives of Training
2.1 Aims and Objectives of Training

Practical skills

Welcome to the Practical Skills silver workbook.

The aim is to give you the necessary practical help to develop your skills by guiding you through the many jobs for you to become a competent erector on site.

Silver level is what we plan our timber frame erectors to reach over time and this will be the standard expected of all on site erectors in the future.

What is in this workbook?

The workbook has 10 sections:

1. Build Sequence
2. Foundations and Soleplates
3. Site Delivery and Storage
4. Panels
5. Floors
6. Erecting Roof Structures
7. Installing Fixtures and Fittings
8. Using Hand Tools
9. Metalwork
10. Component Recognition

Each section follows a similar pattern:

- you will be given information to read followed by practical examples to complete
- where you see a white ‘Activity’ box (example below), this will indicate that there is a task for you to do. If you can’t fit your answers in the space provided, please use a separate sheet
- the activities are designed to help you find out about different topics within the workbook
- at the end of each section there are some questions for you to answer. These are designed to check your understanding and to identify any areas that you may need to brush up on
- the workbook has been designed to be enjoyable as well as informative
- on completion of this course you will gain suitable recognition that employers now expect

Please follow the steps in the activity boxes when shown, making sure you complete every one correctly. A certain degree of trust is expected with these exercises in that you are asked to tick the box – only when each task has been completed and you feel confident you have mastered the skill required.

At the end you will need to be assessed in order to gain the appropriate recognition that employers now expect of all timber frame erectors.

What qualifications can be obtained?

The workbook will help you to gain the STA/CITB silver award, and provide evidence towards your vocational qualification.
Outlining of training programme:

The training programme consists of three levels:

Bronze  Silver  Gold

The silver training programme incorporates all of bronze as demonstrated by the pyramid.

Each level of programme has three modules as shown below – each of the levels follow the same structure:

Health and Safety Skills  
Practical Skills  
Knowledge Skills

Please note

1. This workbook does not replace your own company’s documents and/or the main contractors site rules.
2. Furthermore it supports the small handbook titled: A Pocket Guide to Timber Frame Construction.
Section 3
Build Sequence

3.1 Build Sequence
## 3.1 Build Sequence

### General

The sequence of work for timber frame buildings is divided into the following stages.

The further your career progresses the greater the understanding you will require at each stage.

| STAGE 1 | Before work starts |
| STAGE 2 | Before timber frame kit arrives |
| STAGE 3 | Upon delivery |
| STAGE 4 | Storage |
| STAGE 5 | During erection |
| STAGE 6 | After erection |
| STAGE 7 | Before dry lining |
| STAGE 8 | After dry lining |
| STAGE 9 | After external cladding |
| STAGE 10 | Key areas needing special attention |
Section 4
Foundations and Soleplates

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Section 4 | Foundations and Soleplates

4.1 Introduction

For silver level you are required to achieve the following:

- carry out foundation checks prior to laying soleplates
- identify the soleplate
- fit Damp Proof Course (DPC) to all ground floor soleplates
- grid out the soleplate
- check all dimensions and mark out all room dimensions on the soleplate
- fasten all soleplates together
- re-check all dimensions and diagonals
- level and pack all soleplates
- line and fix all soleplates

Acceptance will mean that the following have been satisfied:

- foundations are level
- foundation sides are parallel and diagonals have been checked
- foundations are dimensionally correct as given by the drawings

Badly laid and inaccurate foundations are the single biggest problem faced on site by the timber frame erector.

Extreme care must be taken to rectify faults before construction begins.

4.2 Foundations

Before you do anything with the soleplate you must make sure the foundations and slab are of the correct size and suitable for erecting timber frame buildings.

Nothing is ever built without having good foundations, and that applies to life as well as timber frame houses.

In timber frame it is vital you start with the foundations and that these are properly prepared. If not, you are wasting your time erecting panels as you will have to dismantle these at a later date.

Badly laid and inaccurate foundations as shown opposite are a well-known problem faced on site by the timber frame erector and are totally unacceptable.

Extreme care must be taken to rectify faults before construction begins.

At silver level – you are required to sign-off the foundation slab. You should look for obvious faults and determine in your own mind if you would accept it. If the slab is outside the tolerances do not commence to fix the soleplates. Inform the site agent of the problem.
You must carry out the following:

- check dimensions as shown

![Slab Diagram]

- measure diagonals – if they are equal then the base is square
  acceptable deviation:
  +/- 5 mm up to 10m
  +/- 10 mm over 10m

- measure the wall lengths:
  they must be within +/- 10 mm of the dimensions shown on the drawings.

Examples of good foundations.

Also you need to check all the slab edges:

- check edges
  the edge must be within +/- 5 mm of the straight-line measurement.

![Plan View Diagram]

Is this acceptable?

corner propped up by a piece of timber – totally unacceptable
You must also – check the foundation walls:

- check levels of foundation walls
  wall-heads must not be more than +/- 5 mm out of level:

Final check – make sure the concrete slab is level and flat.

- check the concrete slab for level:
  concrete slabs must be not more than +/- 5 mm from datum over the whole slab with the level not out by more than 10 mm in total:
Activity

Complete the following tasks and tick the box when you mastered the skill.

You must also get your supervisor to sign each page to say that you have completed each one to the required standard.

- Inspect the foundations and slab to ensure they have been laid correctly and have no visual defects
- Carry out all the checks to make sure the foundations are level
- Check foundations are square and diagonals have been measured and recorded
- Foundation dimensions comply with drawings and are correct for the timber frame structure
- Record below any defects you found and what further action was necessary

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Supervisor signature

You will need to complete the above tasks on at least four different foundations before construction starts, which also means four separate signatures.
4.3 Soleplates

The very first task when erecting a timber frame building is to prepare and lay the soleplates.

Soleplates are usually installed before delivery of the timber frame kit together with the Damp Proof Course (DPC) and the materials needed to complete this work have to be identified.

Now carry out each of the following to achieve,
Soleplate – silver level Practical Skill requirements

Please complete the tasks in the activity boxes below.

**Activity**

1. **Identify the material to be used for the soleplates when arriving on-site.**
   Soleplates identified correctly

2. **Identify the first soleplate.**
   Identified the first soleplate materials correctly

3. **Identify the second soleplate.**
   Identified the second soleplate materials correctly

4. **Check size of timber against specification.**
   Check the soleplate measurements – for example, if it should be 89 mm x 38 mm then make sure it measures 89 mm x 38 mm.
   - Take your tape measure, pull out random lengths of soleplate and measure the dimensions of the timber
   - If the soleplate does not measure 89 mm or 38 mm you should inform your immediate supervisor
   - If the soleplate does measure 89 mm or 38 mm you carry on working as normal
   Size and grade of timber checked and are correct
5 Check the soleplates are preservative treated.
   Soleplates checked and are preservative treated

6 Identify DPC to be used.
   Identified DPC correctly

7 Identify fixings.
   After studying the manufacturer’s drawings please list the fixings you are going to need for the soleplates and DPC:
   Identified all fixings and their use correctly

8 Identify tools needed.
   Please list the tools you are going to use to lay down the soleplates and fix the DPC:
   Identified all tools needed correctly
Fit DPC to all ground floor soleplates.

The DPC is rolled out along the length of the soleplate and usually fixed with a pair of staples at every 600 mm centres. Make sure you leave an overhang of 150 mm where necessary as shown below.

Dry pack soleplates to level with packers supplied by manufacturer. Packers should not exceed 20 mm.

Grid out the soleplate.

Collect the appropriate drawing and working from a pre-determined point marked on the drawing, place the pre-cut soleplates in the positions as marked on the drawing.

Align accurately with 90° corners. No overhang or undersail on the slab to be more than 10 mm.
11 You must now check all dimensions and mark out all room positions for the soleplate.
- Collect the appropriate drawing
- Take your tape measure and transfer the measurements to the soleplate
- Double-check all measurements to make sure they are right

Soleplate is correctly positioned and all rooms marked out with correct measurements as stated on the drawing

12 Fasten all soleplates together.
Check how the soleplates are to be connected with your supervisor. Starting from the pre-determined point connect all lengths of soleplate together making sure you connect them correctly (i.e. to the correct side of the line).

Re-check all dimensions
Once the soleplate has been fastened together re-check all dimensions and check that the diagonal measurements correspond to the drawing.

When you are satisfied it is gridded-out and connected correctly you must then check that the soleplate does not over-hang or under-sail the slab by more than 12 mm.
If the soleplate does over- or under-sail the slab by more than 12 mm inform your supervisor.

Soleplates fastened together correctly with all measurements and diagonals as per drawing

13 Constructing the first soleplate
When constructing the soleplate, especially at the corners, then the two most common methods used are as shown.

However, make sure you check and secure them at 90° right angles.

Methods for constructing soleplates

1.

2.

Connected soleplates using – 1. Dog clip
2. Nails
Level and pack all soleplates.
Collect the appropriate drawing.

Using the correct equipment, start to level the soleplate from the high point by placing plastic packers under the soleplate at the recommended centres.

You must make sure that the soleplate is level.
If there is any discrepancy from the survey drawing inform your supervisor.
Using lines and levelling instruments when securing soleplate to base.

**Line the soleplates**

You will need to know exactly how the soleplate is to be laid by referring to the correct drawings. You can now start to layout the soleplate by using a string line and spirit level but make sure it is laid out within the tolerances allowed.

![Diagram of soleplate layout with string line and spirit level](image)

**Nail for string line**

**String line – must be tight**

**Unacceptable**

Soleplates lined and levelled correctly

Please list other methods of how soleplates might be lined and levelled:
Methods for fixing – Soleplates to the concrete base.

Typical methods to provide a good and secure fixing between the soleplate and concrete base are shown below.

If you are in any doubt about the fixing not being secure then stop and inform your supervisor.

Tick the box when you have completed each type of fixing.

After fixing check the level is within + or - 5 mm.
Examples of other fixing methods.
Tick when you use these methods?

Fixing the second soleplate.
Note: When fitting a second soleplate IT MUST BE lapped at the joints as shown below to avoid straight through joints. The joints must never be in line!
19 Tick the boxes below as a final reminder and review to show you have carried out laying soleplates and the DPC.

Please tick the box when you have covered:

- Measuring and marking out
- Initial planning
- Any packing, chiselling and fitting
- Screw fixings
- Hammering and nailing
- Alignment and levering
- Completion and finishing

Please list other tasks you have mastered and any power tools you have used:

20 Final section checks before moving to the next stage.

- You must ensure that any defects are corrected and your work must comply with the specifications and drawings
- Make sure your supervisor is happy with your work
- It is also advisable to keep a record of the time it takes you to complete the job. It is not a race but you should be able to work at a satisfactory speed and still get it right
- All of the above must comply with the Health and Safety requirements
Section 5
Site Delivery and Storage

5.1 Site Delivery and Storage
5.1 Site Delivery and Storage

For silver level you are required to achieve the following:

- pre-planning
- check timber components
- check quality
- wall, floor and roof panels
- trussed rafters
- scaffolding

Pre-planning

This is key in maximising timber frame’s ‘fast track’ capabilities.

Actions to be taken are:

- manufacturer and client to agree delivery schedules, at least four weeks in advance
- check site access for delivery vehicles and crane (if being used)
- if components are to be stored on site; make sure the area is clear, with suitable hard standing and that they can be kept off the ground

The site erection team is key to achieving the above. The important issues for you to grasp throughout are:

- need for accuracy
- reasons for differential movement in the structure
- impact of detailing on fire and acoustic performance

Check timber components and their quality

As the timber frame kit arrives on-site you will be responsible for the safe storage of all the materials. You must ensure that:

- materials are checked and kept off ground
- panels are stacked flat sheathing side up and all timber checked for quality and strength class stamps
- roof trusses are positioned vertical on bearers at node points or laid flat on adequate bearing where appropriate keep ALL materials under cover, but maintain ventilation

Also the following will be supplied with the timber frame kit:

- a full drawing pack
- detail booklet and erection instructions
- nailing schedule
- method statements and risk assessments
- crane lifting plan

The golden rule

Keep the timber dry and off the ground, but loosely covered.

Good examples of storage
You must check the quality of all delivered goods:

- correct dimensions and they fall within stated manufacturing tolerances
- correct nailing and jointing schedules
- moisture content is within allowable tolerances – but never more than 20%
- components are preservative treated where appropriate

**Scaffolding**

**Note**

Please make sure you have completed the Health and Safety workbook at silver level (in particular the section on scaffolding) before proceeding further with this section.

In many cases it is preferable to use quick stage type:

- it should be fully erected and battened out prior to delivery
- incorporate re-usable hop-ups for follow-on trades
- must be certified and signed off by an authorised person from the main contractor/scaffolder
- must comply with all HSE requirements

**Scaffolding must be:**

- erected on all four sides if frame is crane erected
- erected on three sides if forklift access needed with fourth side finished prior to frame erection
- level and stable
- only altered by qualified personnel

**Critical elements of scaffolding to be aware of are:**

- working platforms must provide you with a good base from which to work
- hop-up heights are comfortable without stretching or climbing
- handrails are fixed at correct heights
- erected prior to timber frame delivery
- only altered by qualified person
- designed to suit the building
- ladders are secured correctly
- access to scaffold is not restricted by stored materials
Section 5 | Site Delivery and Storage

Activity

Please check and complete the following activities with regards to site delivery and storage?

- Site access is made suitable for delivery vehicles and crane (if being used)

List any problems encountered:

- Site is prepared for storage of timber frame kit and area is clear, with suitable hard standing so that it can be kept off the ground

- Check timber components to make sure kit is complete

- Check quality and that panels are stacked flat sheathing side up

- Wall, floor and roof panels stored correctly and sheeted

- Trussed rafters stored correctly

Please state how the rafters have been stored:
Section 6
Panels

6.1 Panels
Section 6 | Panels

6.1 Panels

For silver level you are required to achieve the following:

- identify the panel packs
- crane panel packs onto slab
- stand and fix external panels
- bracing details (temporary)
- fixing details

This is the stage where the erection process begins, having laid the soleplates on good foundations and all the timber frame kit has been delivered to site and checked.

The important points for you to remember are:

- make sure panels go in the right place and the right way up
- lift panels onto the soleplates and fix temporary bracing and loose tack
- line panels within +/- 3 mm on the soleplate
- plumb within +/- 10 mm over any storey height – but no more than 10 mm cumulatively over the full building height
- make sure panel junctions are flush

Procedure for the erection of panels

Identify panels

- Panels will be stacked and each pack will have either a code or number identifying its contents and location
- A schedule will have already been drawn up to show where each pack is to be positioned. Follow the schedule
- Each panel in every pack will have its own reference number that corresponds to the panel layout drawing. Follow the drawings

Stand and fix the external panels

- Collect the appropriate drawing
- Check to see what the nailing schedule is before you start

- Starting from a corner systematically stand the external panels, bracing and nailing into position as you go
- As a guide bracing needs to be placed 1.2 m in from each corner and then at 3 m centres thereafter
- All panels must be checked to make sure they are correctly fastened together and are not bowed (+ or - mm) and braced securely and are plumb (+ / - 10 mm)

Typical bracing detail

Please note the diagram below is not to scale and the temporary racks should be in practice between 400 – 500 mm longer than the panel height.
Fixing wall panels and head binder
- Collect the appropriate drawing
- Starting from an external wall and working inwards place internal partitions
- Check to see what the nailing schedule is
- Stand the internal partition, again bracing and nailing into position as you go
- Once all the panels have been nailed into position recheck that all panels are plumb and securely nailed adding extra studs and noggings as required

During the above make sure you:
- tightly butt all joint panels together
- adjust temporary bracing to maintain accuracy
- nail panels together and to the soleplate as given on the schedule
- nail head binder (if specified) to the top of the wall panels

And make sure:
- the binder covers all panel joints
- the binder joints are over studs
- the binder is staggered at junctions and load-bearing walls. Good practice is to lap the head binder by a minimum of 600 mm

Connecting top panels together
- Fix the head-binder (if specified) to top of wall panels

Check to see how the head-binder is to be connected and proceed in accordance with the instructions.
Fitting the waist band (if supplied)

The waist band refers to the gap produced when a floor separates two panels.

The diagram below shows the gap (looking from the outside) that needs to be covered with a waist band and then the paper/membrane.

Fixing external wall panels checklist

- Make sure the panels go in the right place and right way up
- Lift the panels onto soleplate’s and fix temporary bracing and loose tack
- Line within +/- 3 mm on the soleplate
- Plumb within +/- 10 mm over storey height – but no more than 10 mm cumulatively over the full building height
- Make sure panel junctions are flush

Fixing internal wall panels

- Tightly butt joint panels together remembering to adjust temporary bracing to maintain accuracy
- Nail panels together and to soleplate as per schedule
- Nail head binder (if specified) to top of wall panels

Make sure:

- Binder covers all panel joints
- Binder joints are over studs
- Binder is staggered at junctions and load-bearing walls

Method

Make sure the waist band is the correct size for the gap it has to cover.

It will normally be supplied cut to width.

If it appears to be oversize, check that you have not missed out a head-binder or starter plate before cutting.

Always start at a corner and place the plywood strip over the gap between the ground and first floor panels. Nail the strip in place by nailing the top edge first. Having nailed the top edge go back and start to nail the bottom edge until the waist band is secure. Repeat this process until the waist band is fitted to all sides of the building. Nails are normally placed at 600 mm centres.

Once the plywood waist band has been fitted it must be covered with the breather paper/membrane and top and bottom laps stapled.
**Attaching the breather paper/membrane**

The breather paper/membrane is fixed to the waist band using stainless steel staples.

Start by stapling the end of the roll to the waist band making sure you keep it flush with the top edge.

Then roll-out roughly five metres of breather paper/membrane and lift the unrolled paper and go back to the end you have already stapled and staple the lifted paper to the waist band.

When you reach the roll repeat the above steps until the entire waistband is covered.

Breather paper/membrane is often usually pre-fixed to the panels in the factory. Therefore, the paper only has to be fixed to the waist band on-site.

But, if it has to be applied on-site – it must be fitted and lapped according to the manufacturers instructions.

**Laps vary but are usually:**

![Diagram of breather paper/membrane laps]

Note: the breather paper/membrane should extend below the soleplate by at least 25 mm.

Banding tape may be required and if you use it then it should be stapled over the panel studs as this will help reinforce the membrane and pinpoint the location for the wall ties.

None of the timber frame structure should be visible once the membrane is fixed and any tears must be made good.

NHBC require that the DPC is over the timber cavity closers at mid floor junctions.

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**Activity**

**Check that:**

- Waist band fitted correctly to exterior of building
- Breather paper/membrane fitted and stapled correctly with no gaps (all paper laps correct and secured at every joint and corner)
Repairing tears
Make sure that any tears in the paper/membrane are properly repaired.

Tears in the paper will occur and are in fact quite common so you will need to repair the damaged areas with the correct replacement material making sure it is sealed and lapped correctly.

The normal procedure to repair tears is:
- first cut a diamond shape of the replacement breather paper/membrane
- the repair patch should be at least 200 mm larger than the tear
- then insert half the diamond behind the tear and staple in place
- the front half of the patch can then be stapled to cover the tear

The following shows you how to repair any tears in the breather paper/membrane.

Activity

Patching tears in breather paper/membrane
Please tick the box only when you have made six paper/membrane repairs
Section 7
Floors

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7.3 Loose Joists and Floors 40
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7.5 Floor Decking 45
7.1 Introduction

With the ground floor panels erected you can start to lay the floors, but you must:

Check that the walls are correctly aligned and plumb before installing the floors.

Floors will either be:

- supplied as a manufactured unit (cassette floor panels)… or laid loose
- you are expected to be competent at laying both
- we will take the manufactured unit first

7.2 Cassette Floor Panels

Things to check before platform floors are installed:

- ensure a fall arrest system is in place
- check clearance of timber
- make sure non-load bearing internal walls are properly supported
- make sure the strutting is not oversized which could cause the joists to belly
- utilise temporary bracing, stated by the manufacturers’ guidance, when using I-beams or metal web joists
Procedure for laying cassette floor decks

Activity

The following step-by-step procedure will help you when installing these floors.

Tick the boxes as you go.

1. The floor decks will be stacked in packs and each will have a reference number that corresponds to the floor deck layout so make sure you follow the appropriate drawing and identify the correct floor

2. You will require some form of fall arrest system so make sure you use an approved type and are fully trained in its operation. I should not need to stress the importance of working safely because if you do your job correctly then safety is built-in by definition. Cut corners and face the consequences. The spanset system is probably the most common method used in the industry

3. Prepare to move the floor decks into position as shown on the drawings and identify the start point that will also be marked on the drawing

4. Ensure the walls are accurately aligned, braced temporarily and stable before installing floors. Bracing should remain until the flooring is complete

5. Crane the floor decks into position following the correct sequence as five indicated on the floor deck layout drawing

   Make sure – only qualified personnel are involved with crane operations…

   If you are not then walk away and stand well clear!

6. Make sure that the floor decks do not over-hang or under-sail the six panels below by more than 12 mm

7. When the floor deck is in position and within the specifications the decks can then be nailed together

8. Nail the decks together from underneath following the nailing schedule eight and then nail the panel heads to the floor decks
7.3 Loose Joists and Floors

Before starting you must check that the walls are:

- accurately aligned
- braced temporarily and stable

Before installing any floors:

- ensure a fall arrest system is in place, which should remain until the flooring is complete
- make sure joists are set out and spaced correctly and span in the right direction in accordance with drawings and details
- check trimmed openings for staircases and ducts are the right size and in the correct position
- make sure multiple stud supports are provided as design drawings
- make sure double joists are located correctly as trimmers and that they are securely fixed together

Activity (continued)

9 Always check as you go that all panels are still plumb

10 Once all decks are permanently nailed you can then remove all panel bracing and other debris to a pre-determined area in order to keep your workplace tidy
Make sure
- Metal joist hangers are the right type for their location
- Timber joists must be notched and firmly seated in hangers, with all holes nailed
- Do not cut the bottom edges of joists, other than for hanger seating

Note
Do not notch flanges of I-beams for hanger seating.

7.4 Loose Floor Panels

Procedure for laying loose floor panels

Work through the Activities below

Activity
The following step-by-step procedure will help you when installing these floors.

Tick the boxes as you go.

Identify what you will need.

1. The floor joists will be pre-cut and numbered for identification and will use either the length of the joist or a code marking. The drawing will identify the correct location for each joist

2. You may also need an edge binder around the perimeter of the building
Section 7 | Floors

**Activity (continued)**

3. There will be packs of noggings pre-cut to fit inbetween the joists at specified centres and locations

4. There will probably be some metalwork such as connector plates, for fixing joists at either end and over load bearing partitions. Also ensure the metal joist hangers are of the correct type

Safety and working platforms.

5. Make sure you use an approved Fall Arrest System and it is set-up correctly

6. Your working platform could be one of many but always ensure you feel comfortable when working from it and risks to injury or falls are kept to an absolute minimum

Spreading the joists before fixing.

7. Make sure you work from the correct construction drawing

8. Lay the joists approximately in their position

9. Ensure the joist dimensions, grading, spacing and direction of span are correct and that trimmed openings for staircases and ducts are vertically aligned and of the right size

10. Ensure that the header joist align with the wall panels and do not protrude into the cavity

Fixing the joists.

11. It is more than likely that an edge binder will be fixed around the perimeter of the building, if so, the joists are nailed to this edge binder at specified centres

12. Noggings are placed inbetween the joists at specified positions and nailed to the joists
### Activity (continued)

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<td>When joists are to be extended and joined you do so by using cam plates or ply gussets, with the joint being located over a loadbearing wall</td>
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<td>14.</td>
<td>Double joists must be correctly located in positions as shown, e.g. under partitions or as trimmers, and securely fixed in accordance with manufacturers recommendations. Stairwell openings are formed using double joists and double trimmers supported with the supplied hangers</td>
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<td>15.</td>
<td>Ensure metal joist hangers are of the correct type for their location and are firmly fixed in accordance with manufacturers recommendations</td>
</tr>
<tr>
<td>16.</td>
<td>Avoid cutting the bottom edge of the joists other than for hanger seating or unless a notch has been specified by the engineer</td>
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<tr>
<td>17.</td>
<td>Install strutting as specified but within the depth of the joist and ensure that it is not oversize causing distortion of the joists</td>
</tr>
<tr>
<td>18.</td>
<td>Ensure that solid blocking is used as fire stops between joists where they bear onto the compartment wall</td>
</tr>
<tr>
<td>19.</td>
<td>Non load-bearing walls must be adequately supported by joists</td>
</tr>
<tr>
<td>20.</td>
<td>Ensure joist notching and drilling is within limits specified</td>
</tr>
<tr>
<td>21.</td>
<td>Check clearance of timber components adjacent to flues and chimneys</td>
</tr>
</tbody>
</table>

**Fix and lay the chipboard to the joists.**

| 22. | The chipboard is laid on top of the floor joists, glued and nailed in position with all joints staggered and all ends supported |
Activity (continued)

Nail all panel heads to the floor joists.

23 Ensure that all panels are still plumb

24 Fix all panels to the floor joists following the nailing schedule

25 Once all joists are permanently nailed remove all panel bracing and debris to a pre-determined area

Checking clearances of timber components adjacent to chimneys

- Flue pipe adjacent to combustible material:
  - 3d – from any combustible material
  - Diameter of flue, ‘d’
  - FLUE

- Flue pipe adjacent to combustible material but with shield:
  - 1.5 d minimum distance from combustible material
  - Non-combustible SHIELD
  - 1.5 d minimum on each side of the flue to combustible material
  - 12.5 minimum air space
  - ‘d’
  - FLUE

Remember:

A flue pipe should only be used to connect an appliance to a chimney and should not pass through any roof space
Check Clearance of Timber Components adjacent to Chimneys

Floors | Section 7

**7.5 Floor Decking**

Decking will either be:

- tongue and groove or
- chipboard panels or
- OSB boarding

---

No metal fixing for combustible material within 50 mm of inner surface of the flue.

Masonry chimney 40 mm minimum in England, Wales and Northern Ireland only.

In Scotland, joists etc should be at least 200 mm from the inner surface of the flue.

No combustible material nearer than 200 mm from flue or 40 mm from face of chimney if the flue wall is less than 200 mm except floorboards, skirting, architrave or mantle shelf.
When laying the floor decking the following points need to be observed.
Tick the box when you cover each one.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>The softwood used must be to BS 1297</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Chipboard must be grade P5 or P7, to BS EN 312</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Plywood must be to BS EN 636</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>OSB must be OSB 3 or OSB 4, to BS EN 300</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Do not fix flooring if joists are more than 18% moisture content</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Flooring should not be overloaded with stored materials</td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>A 10 mm expansion gap is needed around the perimeter of each area when over 10 m in width</td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Floor decking may be taken under wall panels in platform construction, if less than 10 m in width</td>
</tr>
</tbody>
</table>
Tongue and groove edged boards are laid across the joists with short edge joints supported on joists (or noggings). All tongue and groove joints should be glued with PVA adhesive.

Square edged boards need support on noggings between joists. BS7916 requires boards to be glued with PVA adhesive to the joists. Pull board tight before fixing and nail or screw along edges and intermediate supports – Usually at 300 mm centres. Boards should be fixed at each corner with fixings at least 8 mm from board edges.

All edge perimeters should be supported on noggings or similar.

Boards are temporarily protected to minimise risk of excessive or prolonged wetting and damage.

Floor decks should always be installed in accordance with manufacturers’ recommendations.
You must also make sure that non load-bearing internal walls are properly supported:
You need to be aware of the two most common options.

**Option A**

Additional joist for support partition above

**Option B**

Noggings at 600 mm centres to enable fixing of head partition

Also make sure that the strutting is not oversized which could cause the joists to belly.

**Note**

Utilise temporary bracing, stated by the manufacturers’ guidance, when using I-beams or metal web joists.
Floors – final checks and review

<table>
<thead>
<tr>
<th>Activity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> Before installing any floors check that the walls are:</td>
<td></td>
</tr>
<tr>
<td>• accurately aligned</td>
<td></td>
</tr>
<tr>
<td>• braced temporarily and stable</td>
<td></td>
</tr>
<tr>
<td><strong>2.</strong> Bracing should remain until the flooring is complete</td>
<td></td>
</tr>
<tr>
<td><strong>3.</strong> Joists are fitted in accordance with design drawings</td>
<td></td>
</tr>
<tr>
<td><strong>4.</strong> Joists have adequate bearing</td>
<td></td>
</tr>
<tr>
<td><strong>5.</strong> Joists are correctly nogged or blocked out</td>
<td></td>
</tr>
<tr>
<td><strong>6.</strong> Joists nailed with tight connections as per schedule</td>
<td></td>
</tr>
<tr>
<td><strong>7.</strong> Joists are tight and even</td>
<td></td>
</tr>
<tr>
<td><strong>8.</strong> Flooring protected or cleared of excessive moisture</td>
<td></td>
</tr>
<tr>
<td><strong>9.</strong> Stair trimmed correctly</td>
<td></td>
</tr>
<tr>
<td><strong>10.</strong> Notching or drillings ONLY as per detail</td>
<td></td>
</tr>
<tr>
<td><strong>11.</strong> Joist hangers fully nailed</td>
<td></td>
</tr>
</tbody>
</table>
### Activity (continued)

- **12** No excessive loads applied, i.e. plasterboard stacks, etc.
- **13** All joints to be sealed with filler, tape or jointing compound
Section 8
Erecting Roof Structures

8.1 Introduction 52
8.2 Common Roof Shapes 53
8.3 A Guide to Some of the Trussed Rafter Shapes 54
8.4 Handling and Storage of Roof Trusses 55
8.5 Common Metalwork in Roof Trusses 56
8.1 Introduction

The roof can present many challenges but provided you follow the correct procedures as detailed in the drawings and work accurately then putting roof’s on will become less daunting.

First step as always is to:

- check what went before and in the case of the roof you will need to ensure that the head-binders and walls are plumb, level and properly aligned before starting work on the roof

In this section on roofs you will be expected to erect timber frame roof structures such as:

- gable trussed rafter roofs including verge and eaves finishing’s
- flat roofs including decking and finishing
- hips and valleys
- dormers

There are several options on how the many different roof types will be supplied, constructed and fitted and to cover all these possibilities is not realistic in this workbook.

However, what is possible is for you to follow the main stages and tasks given below, but you must record each activity as you go by adding your own work experience and methods followed that need to be signed by your supervisor.

Roofs will either be site constructed or will be provided in truss form, both of which will need some form of jig to be made to keep the structure within the specifications and angles.
8.2 Common Roof Shapes

**Gable ended roof**

The simplest roof shape. Gable can have gable ladders or brick detail.

**Barn hip roof**

Useful on narrow buildings to provide a roof feature without limiting roof storage space.

**Hipped roof**

A common, and with trussed rafters, relatively simple design to construct.

**Gabled intersection (valley)**

Usually formed using girder trusses (2 or 3 ply multiple trusses) and a set of valley frames (reducing frames).

**Right angled roof**

Different to either intersection as the rear elevation is pitched. A more complex design is required.

**Hipped intersection/overlaid hip**

Problems can occur in large spans if, as above, the ridge of the hip is above the main roof.

**Gablet roof**

Similar to a barn hip, it can provide a feature without using too great a length of roof.

**Dogleg roof**

Ideally the two spans should be identical allowing easy matching of eaves and ridge height.
Section 8 | Erecting Roof Structures

8.3 A Guide to Some of the Trussed Rafter Shapes

- **FINK**
- **DOUBLE W**
- **CANTILEVER**
- **KING POST**
- **FAN**
- **QUEEN POST**
- **BOBTAIL/STUB END**
- **HOWE**
- **RAISED TIE**
- **MONO 2/1**
- **SCISSOR**
- **MONO 2/2**
- **ATTIC**
- **MONO 3/2**
8.4 Handling and Storing of Roof Trusses

It is important that those working on the site follow the rules when the roof trusses arrive on-site.

You should now be very familiar with the following.

Handling

It is imperative to prevent damage or deformation to trusses awaiting erection. They should be stored as illustrated below and protected from sun and rain. Adequate allowance must be made for ventilation.

Typical manhandling method

Correct manhandling: not less than three persons are advised.

Typical mechanical handling method

Site storage

It is imperative to prevent damage or deformation to trusses awaiting erection. They should be stored as shown below and protected from the sun and rain. Adequate allowance must be made for ventilation.

Vertical storage

1. Trestle prop
2. Bearer height to allow overhang to clear ground.

Horizontal storage

1. Bearers vertically in line and at close centres.
8.5 Common Metalwork in Roof Trusses

Girder to girder hanger

Medium girder hanger

Girder truss shoe

Mono truss hanger

Angle plate

Truss clip
The following steps cover all the main tasks for fitting and framing roofs

Read through the various tasks before each one is taken in turn:

- Ensure top story walls are correctly aligned, temporarily braced and stable before installing the roof. Bracing should remain until roof is wind braced and battened.
- Temporarily brace gable end wall panels and first truss.
- Do not distort or strain trussed rafters during installation, or damage the truss plates in any way.
- Fix rafters or trussed rafters, parallel at specified centres and plumb within 10 mm within overall height.
- Ensure that roof bracing is installed in accordance with trussed rafter suppliers’ instructions. All bracing should be fixed with a minimum of two nails at each connection.
- Ensure that hatch openings are correctly formed and located, and that tank supports are positioned in accordance with trussed rafter suppliers’ instructions.
- With site constructed roofs ensure that the whole of the roof structure is fabricated and fixed in accordance with the specifications and that rafters are bird mouthed correctly.
- For flat roofs ensure that the correct thickness of decking is used and that ventilation is as specified.
- Do not install trussed rafters if incorrectly dimensioned, as they may distort the wall panels. Trussed rafters must not be trimmed, cut or notched in any way without permission of the trussed rafter supplier or structural engineer.
- Check roof space ventilation is as designed.

List some other common fixings you would expect to find in the roof.
Procedure and tasks for fitting roofs

Activity

The following step-by-step procedure will help you when constructing and fitting roofs. Tick the boxes as you go and remember to expand each task by adding to it exactly what you did on-site to achieve it. (Inserting drawings will also help).

1. Ensure top story walls are correctly aligned, temporarily braced and stable before installing roof. Bracing should remain in place until the roof is wind-braced and battened.

2. Temporarily brace gable end wall panels and first truss.

3. Do not distort or strain trussed rafters during installation, or damage the truss plates in any way.
Fix rafters or trussed rafters, parallel at specified centres and plumb within 10 mm within overall height

Ensure that roof bracing is installed in accordance with trussed rafter suppliers’ instructions. All bracing should be fixed with a minimum of two nails at each connection.

Ensure that hatch openings are correctly formed and located, and that tank supports are positioned in accordance with trussed rafter suppliers’ instructions.

With site constructed roofs ensure that the whole of the roof structure is fabricated and fixed in accordance with the specifications and that rafters are bird mouthed correctly.
For flat roofs ensure that the correct thickness of decking is used and that ventilation is as specified.

Do not install trussed rafters if incorrectly dimensioned, as they may distort the wall panels. Trussed rafters must not be trimmed, cut or notched in any way without permission of the trussed rafter supplier or structural engineer.

Check roof space ventilation is as designed.
Roof structures – final checks and review.
Tick each box only when you have made your checks to the building.

<table>
<thead>
<tr>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Trusses correct spacing and plumb to tolerance</td>
</tr>
<tr>
<td>2. All trusses have clips fitted to wall-head and are fully nailed</td>
</tr>
<tr>
<td>3. Trusses are correctly braced</td>
</tr>
<tr>
<td>4. Loose infill tight and well connected</td>
</tr>
<tr>
<td>5. Girder trusses are bolted or well nailed</td>
</tr>
<tr>
<td>6. Multiple studs fitted under point loads</td>
</tr>
<tr>
<td>7. Locating plate and head-binder plate fitted if required</td>
</tr>
<tr>
<td>8. Eaves plumb cuts straight and true</td>
</tr>
<tr>
<td>9. Soffit supported with noggings, if required</td>
</tr>
<tr>
<td>10. Valley boarding fitted to detail by manufacturer</td>
</tr>
<tr>
<td>11. Ladder sections connected to spandrel panels</td>
</tr>
<tr>
<td>12. Roof bracing connected to spandrel panels</td>
</tr>
</tbody>
</table>
Activity (continued)

13 All shoe metalwork is fitted and fully nailed

14 Water tanks placed, any platforms installed

15 Eaves vent ducts fitted to airflow as specified
Section 9
Installing Fixtures and Fittings

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9.2 Noggings or Dwangs 64
9.3 Cavities and Cavity Barriers 65
9.4 External Door and Window Frames 72
9.5 Floating Floors 74
9.6 Staircases (Straight Flights) 76
9.1 Introduction

Topics to be covered in this section

- Noggings
- Cavity barriers
- External doors and window frames
- Floating floors
- Staircases (straight flights)

If you have successfully completed the Practical Skills workbook at bronze level then only the following sections apply to you.

- External door and window frames
- Floating floors
- Staircases (straight flights)

9.2 Noggings or Dwangs

The term nogging (or dwang if in Scotland) refers to a piece of timber to be added to provide a fixing support. These are normally added by following trades but occasionally may form part of the erection process.

Noggings are typically used:

- between joists and trusses to provide a fixing for plasterboard
- within panels or partitions for plumbing and electrical fittings
- as additional fixing positions for kitchen wall units, etc.

The important factors are that the nogging is:

- of the correct material and size for its intended purpose
- fitted in the correct location
- securely fixed, square and not proud of adjacent timbers

The diagram shows a nogging fitted between two panel supports

Activity

Tick the box only when you have completed the following actions correctly and your supervisor is satisfied with your work.

- A full depth nogging fitted in-between floor joists as part of the floor
- A nogging fitted in-between roof trusses at the perimeter of the building for a plaster board fixing
- A nogging fitted in a partition for an electrical socket to be fitted
- A nogging fitted for some other purpose. Please state:
9.3 Cavities and Cavity Barriers

Fitting cavity barriers are essential elements of the construction process and are installed to prevent the spread of fire through the buildings cavities.

You are required to fit these barriers.

Before fitting the barriers make sure you know their exact locations within the building you are working on.

The positions for the cavity barriers will be on a construction issue drawing and/or details.

These cavity barriers are non-combustible board or mineral wool.

Cavity barriers can be:
- flexible types: based on mineral wool
- non-combustible board
- rigid: preservative treated timber battens butt jointed. Cut ends to be treated onsite – note, when used in external cavities these need protecting with DPC

Generally speaking cavity barriers are fitted:
- around every opening in the timber frame (door and window openings for example)
- and at the roof eaves and panel junctions round the whole of the building

Cavity barriers should be treated with a suitable preservative before installation.

Where cavity barriers butt-up to each other the joint must be tight and the cut ends treated by applying a preservative with a brush.

Cavity barriers should also have a DPC attached to the outside face and held by stainless steel staples at the correct centres specified. The DPC is usually fitted by the bricklayers.

Cavity barriers are fixed using the correct fixings at specified centres as detailed on the drawing.

Typical cavity barrier detail within cavities

Cavity barriers

They must be fixed accurately in all positions as shown on the drawings.

Generally speaking the timber frame manufacturer will provide all the cavity barriers that are required with the kit.

If you are in any doubt about the positions – ask your supervisor.

For timber frame houses, cavity barriers are required:
- around all openings in external walls
- at the top of the external wall cavity
- at the junction between compartment walls or floors and external walls
- at the junction between a compartment wall that separates buildings and an external wall
- at the junction between any floor and an external wall
- at vertical or horizontal centres not exceeding 15 m in Scotland 8 m in Northern Ireland

The diagrams indicate cavity barrier position for a typical semi-detached or end terrace dwelling. Full details of positions of all cavity barriers will be found on the design drawings.
Fire in cavities

When a fire occurs in a completed building, cavities can act in a similar way to chimneys, allowing smoke, hot gases and flames to travel quickly and undetected around a building.

The role of a cavity barrier is, to prevent a fire from travelling unrestricted through the cavity and to stop it escaping or travelling into an adjacent cavity space.

By containing a fire within a relatively small cavity section, thereby reducing the availability of oxygen for the fire, damage will be greatly reduced and time bought to allow occupants to escape safely.

Correct installation of barriers

The correct installation of cavity barriers in any building is of paramount importance to increasing the safety of its occupants. Many of the cavity barriers in timber frame buildings can only be installed as the building is erected and this guide advises on the correct approach to ensure proper performance.

The following diagrams and notes provide best practice for standard cavity barrier installation.

External walls

The cavity barrier must close the cavity. Cavity barriers must therefore be sized correctly to suit the designed cavity width.

Key points

- Ensure that cavity barriers are tightly fitted
- Fully close cavity
- Do not leave gaps
- Ensure cavity barriers are located at the edges of cavities where there is solid timber
- Ensure cavity barriers are positioned against solid timber. Do not fix to sheathing alone
- Cavity barriers should be fitted without gaps which would allow a fire to pass by
**Key points**

- Cavity barrier in cavity – to be secured to timber studs at 1 and 2 in the frame and to be tight fit to the cladding material at 3 and 4
- Fire stop to party wall cavity at external wall junction. Ensure tight fit to timber stud work

**Alternative detail (plan view)**

**Key points**

- Extended width cavity barrier in cavity, secured to timber studs detailed to be tight fit to the cladding material. This detail is only appropriate if there is sufficient studwork for 30 minutes fire resistance along path “A” to prevent the development of a fire path between properties

**Corner details**

**Typical fire stops**

**Typical fire stops to a block of flats**

**Typical fire stops to a pair of semi detached houses**
Remember

All junction connections whether horizontal or vertical to be tightly butted.

Cavity barrier at external wall at floor levels – compartment floors only in England, Wales, and Northern Ireland... all floors in Scotland.

If in doubt, ask!

Cavity trays

When fitting cavity barriers in horizontal cavities then you need to protect the timber barriers (except under eaves) with a DPC tray. The up-stand or depth of tray must be at least 100 mm.

When using polythene encased cavity barrier which provides a minimum 100 mm up-stand no extra DPC tray is required.

Where possible lap the DPC tray behind the breather membrane to shed moisture away from sheathings.

Fitting barriers

All cavity barriers should be positioned against solid timber members e.g. studs, floor joists etc. to provide a solid fixing.

When fitting cavity barriers the following MUST BE satisfied:

- barriers should completely close cavity
- flexible cavity barriers must act in compression i.e. be a tight fit in the cavity. Therefore, the correct thickness of material should be used
- rigid cavity barriers must be exact cavity width. If too small then the discrepancy may be made up with a suitable flexible material
- at cavity barrier junctions there should be no gaps whatsoever
- where possible lap the breather membrane over the cavity barrier to shed moisture away from the sheathing

Installing cavity barriers

The example below describes a window opening you need to protect.

Cavities on timber frame buildings can vary so let’s say that our cavity is 60 mm.

First you need to identify and check the cavity barriers to be used as follows.

- The cavity barrier should have a measurement on one face equal to 60 mm
- The cavity barrier should be treated with the appropriate preservative
- There should be sufficient barriers to complete the whole job
- They should enable you to carry out the work without any difficulties

Diagrams showing the positions and fitting of timber cavity barriers around windows.

Measuring and checking the size and lengths of barriers to be used.

- Measure the opening to which the window will be fitted for height and width
- Because the cavity barrier must fit around the opening the top and the bottom lengths need to be longer as shown above, by two thicknesses
- If the opening is 1000 mm high and 1200 mm wide you will need:
  - two pieces cut at 1000 mm and
  - two pieces cut at (1200 mm + two thicknesses)
- Next measure the cavity barrier itself, you know that one side measures 60 mm but the other side could be larger or smaller than this – so check
- Let’s say the cavity barrier measures 60 mm x 60 mm so your top and bottom cavity barriers would need to measure \(1200 + 60 + 60 = 1320\) mm
- If you had 20 windows of the same size to fit barriers to, your cutting list will be 40 lengths at 1000 mm and 40 lengths cut at 1320 mm long
- Place the cavity barriers next to every window opening

### Activity

**Fixing the cavity barriers tick box only when task completed**

1. Fix the side of the window cavity barriers first

2. Lay the cavity barriers on a flat surface with the side that is going to touch the building face up

3. Check the schedule for the centres that the screws/nails/staples will fasten the cavity barriers to the building

4. Mark and drill the holes slightly larger than the screws you are going to use

5. Hold the cavity barrier flush with both the side and bottom of the opening and screw into position. Repeat the process for the other side opening

6. Next you need to fit the top and bottom barriers following the same procedure making sure to hold and fix the cavity barrier flush with the edges of the opening

7. As a final check make sure there are no gaps in the barriers you have fitted and they are firmly attached and secure
Cavity barriers review

- They are installed to prevent the spread of fire through cavities
- Cavity barriers are used within cavities to prevent fire spread. They can be rigid:
  - preservative treated timber battens or non-combustible board or flexible types:
  - based on mineral wool
- They must be fixed accurately in all positions shown on drawings

If you are in any doubt about the positions of these – Ask your supervisor.

For houses and flats, cavity barriers are required:

- around all openings in external walls
- at the top of the external wall cavity
- at the junction between compartment walls or floors and external walls (flats only)
- at the junction between a compartment wall that separates buildings and an external wall
- at the junction between any floor and an external wall
- at vertical or horizontal centres not exceeding:
  - 15 m in Scotland
  - 8 m in Northern Ireland

Cavity barriers

Install non-combustible cavity barriers where specified.
## Activity

Tick the box only when each task has been completed.

<table>
<thead>
<tr>
<th>When fitting cavity barriers, you must have been involved in the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Using the drawings locate the exact positions for the cavity barriers</td>
</tr>
<tr>
<td>• Install cavity barriers where specified on the drawings</td>
</tr>
<tr>
<td>• Barriers should completely close cavity</td>
</tr>
<tr>
<td>• Flexible cavity barriers must be a tight fit in cavity. Therefore the correct thickness of material should be used. (i.e. 15 mm greater than the cavity width)</td>
</tr>
<tr>
<td>• Fix flexible cavity barriers with stainless steel staples at the specified spacing and fixing points</td>
</tr>
<tr>
<td>• Rigid cavity barriers must be exact cavity width. If too small the discrepancy can be made up with a suitable flexible material</td>
</tr>
<tr>
<td>• At cavity barrier junctions there should be no gaps between the materials</td>
</tr>
<tr>
<td>• Horizontal cavity barriers to be overlapped by the breather membrane</td>
</tr>
<tr>
<td>• The mineral wool in flexible cavity barriers must be tightly butted or lapped by 100 mm at each junction</td>
</tr>
<tr>
<td>• All cavity barriers to be positioned against solid timber members e.g. studs, floor joists</td>
</tr>
<tr>
<td>• Around all types of openings in external walls</td>
</tr>
<tr>
<td>• At the top of the external wall cavity</td>
</tr>
<tr>
<td>• At the junction between compartment walls or floors and external walls</td>
</tr>
<tr>
<td>• At the junction between a compartment wall that separates buildings and an external wall</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tick the following tasks which you have been involved in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Checked building is plumb and ready for cladding to begin</td>
</tr>
<tr>
<td>• Made adjustments necessary to bring cavity within tolerances</td>
</tr>
<tr>
<td>• Checked cavity width tolerances and cleared of obstructions</td>
</tr>
</tbody>
</table>
**Cavities in timber frame buildings**

One of the key aspects of ensuring good long-term durability of the structure involves keeping the timber dry by providing a drained and vented cavity between the timber frame and the cladding.

Before the external cladding is started you must plumb down from the eaves and gables of timber frame to check that the cavity widths fall between the minimum and maximum tolerances.

- Make sure that the cavity between the sheathing and masonry cladding is a nominal 50 mm
- Also just as important – Keep cavities clear of debris and mortar droppings

**Cavity widths can vary by the following tolerances**

**IF THEY DO NOT THEN CONSULT YOUR SUPERVISOR**

Keep cavities clean and ventilated.

**On no account must the following be damaged:**

- breather paper
- cavity trays
- cavity barriers be damaged

**Final points on cavities**

- Most half brick walls are not watertight against driving rain. Therefore:
  - **MAKE SURE** Breather membrane is repaired.
  - **AVOID** Bent down ties.
  - **AVOID** Mortar droppings bridging cavities.

**Remember**

The more accurate the plumb and alignment of the timber frame, the more constant the cavity width.

---

### 9.4 External Door and Window Frames

**External doors and windows** are normally fitted to a timber frame building prior to the brickwork.

The main reason being that the building can be made secure and water tight at a much earlier stage than if the building had been constructed traditionally.

**Method for fitting windows (and doors)**

First job is to fit cavity barriers around every opening.

If there is more than one window and the window heads are in line then you should use a string line which is fitted across the whole elevation as shown below.
Tools you will be required to use are:
- saw
- tape measure
- pencil
- drill (cordless or 110v)
- screwdriver (or cordless driver)/hammer
- nuts/screws for both fitting the cavity barrier and for fitting the doors and windows to the cavity barriers

Cut and fix the cavity barriers
The cavity barriers should be fitted as described earlier in this section.

Prepare windows and doors ready for fixing
Place a window and door next to every opening.
Remove all packaging from doors and windows.

The methods of fixing can, and will, vary but the most common way is a series of steel plates attached to the side of the window itself and protruding into the opening at pre-determined centres as shown.

Generally the correct setting or position of the windows is when the back of the window frame touches the face of the cavity barrier, as shown.

To secure the window (or door) hold it in position so that the head of the window is in line with the string line and proceed to fix in position with screws/nuts as specified.
9.5 Floating Floors

These are usually fitted to reduce noise in a building.

Floating floors are fitted whenever a party or compartment floor is required in a building and as such are covered by regulations regarding the transmission of sound/noise through the floor.

They must be fitted to provide a good performance in sound insulation.

Before fitting floating floors it is important that all areas are dry and protected from the weather and all areas are clean and free from obstacles.

A standard floor

A standard domestic floor/ceiling construction with square edged floorboards will only give around 36dB of airborne noise reduction and let through around 82dB of impact noise reduction. This can be improved on greatly if the following measures below are implemented.

Basic principles behind a floating floor

A standard domestic floor/ceiling construction with square edged floorboards will only give around 36dB of airborne noise reduction and let through around

Activity

Complete the following tasks

Correctly fitted and installed

6 window frames

6 doors

Please state the types of fixing used if different from the steel plates shown above:
Installation of a basic floating floor

Before laying the insulation it is important to ensure that the floor itself is perfectly dry.

The insulation should be laid out across the sub deck with an up stand formed by using the insulation around the perimeter of the room. The up stand should be the depth of the floor makeup.

One or two layers of 19mm plasterboard plank will then be laid on top of the insulation ensuring that each subsequent layer is laid perpendicular to the layer below. Acoustic adhesive is used to bond each layer of the plasterboard plank together. Ensure the manufacturer’s instructions are followed.

The 18 mm chipboard is then laid perpendicular to the last layer of plasterboard plank, again using acoustic adhesive to bond the boards together. The T&G boards must be glued together using acoustic adhesive wood adhesive or similar.

The 18 mm chipboard decking must not contact the timber frame panels or a partition, which is why an up stand, is formed using the insulation.

Load bearing and stud partitions should be constructed from the base floor before the installation of floating floors. Under no circumstances should a floating floor be used as a loadbearing component.

Further reductions in airborne noise travelling through timber joisted floors from above and below can be achieved by:

- increasing the mass within the floor
- adding acoustic mineral wool infill
- increasing the mass within the ceiling below

Typical make-up of one type of floating floor

Activity

Complete the following tasks

Construct and correctly fit a floating floor

Please describe each step in turn and say what was involved in each and the materials used:
9.6 Staircases (Straight Flights)

Always check the manufactured staircase to make sure that:

- the treads of the staircase are level
- the rise of the treads are of the same depth

A basic flight of stairs consists of:

- two strings – these are the solid sides of the staircase
- treads – these are the steps you stand on
- risers – these are the upright pieces of timber underneath the treads
- nosing – these are fixed to the front of the treads or are machined on the tread edge as one piece
- other basic components are shown on the drawing below
Fitting a straight staircase

A notch is cut on both the strings at the top

The notch is governed by the top nosing on the flight of stairs.

The majority of staircases are made so that the top nosing sits flush with the finished floor level at the top of the landing.

Drawing showing where the notch is cut into the strings

If you study this drawing you will see that the chipboard on the landing has been cut to allow the top nosing to sit correctly.

Fixing brackets are then attached to the top of the strings and secured to the trimmer of the landing

You may sometimes have to fit the staircase against a finished wall

(i.e. – already plaster boarded and decorated). If this is the case additional fixings can be used by drilling and screwing or nailing the strings direct to panel studs from underneath the stair treads as shown below.

One very important consideration when fitting a staircase is that the top nosing sits flush with the finished floor and that it is glued in place with a suitable adhesive (normally small blocks and wedges are attached using a hot melt glue).
Activity

Complete the following tasks

Tick when completed the following task.

Correctly fitted a straight staircase

Please describe each step in turn and say what was involved in fitting the staircase:
10.1 Using Hand Tools

By now you will have used a variety of hand tools to complete the work outlined so far in this workbook.

The saying – ‘A craftsman never blames his tools’ is forever true.

Make sure you master the skills of the tools required to become a good timber frame erector.

The list below highlights many you will have used and tick only when you have mastered each one correctly.

If you use hand tools correctly – then by definition you will use them safely. Make sure you do.

When using a tool for the first time make sure you receive sufficient training and instruction from your supervisor or whoever has the responsibility of teaching you.

Never use a tool for purposes other than what it is intended for and always maintain it in the best possible condition.

List below in the activity box the tools you have mastered correctly?

Activity

Please list all the hand and power tools you can use correctly

<table>
<thead>
<tr>
<th>Hand tools</th>
<th>Power tools</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 11
Metalwork

11.1 Metalwork
11.1 Metalwork

Within the timber frame kit there will be a wide selection of metal brackets, plates, clamps and clips that are needed to secure several joints and fixings throughout the structure from the soleplate to the roof.

At silver level, you should be able to identify them and then secure them correctly throughout the building as directed by your supervisor.

The majority of the ‘metalwork’ is required in the roof and joist sections together with the ceiling rafters.

The metalwork (or metal) brackets, fixings, clips, straps and clamps will either be galvanised or stainless steel with all holes pre-drilled. They will be fixed by using twist nails or screws to join and secure the relevant parts together.

Examples of soleplate fixings

Platform floors

Make sure metal joist hangers are the right type for their location. Solid timber joists must be notched and firmly seated in hangers with all holes nailed.

I beam joists must not be notched without specific instructions from designers.
Tick the boxes below when each task has been completed.

When fitting cavity barriers, you must have been involved in the following:

- identify soleplate metalwork
- identify platform floor metalwork
- identify roofing metalwork
- fit and secured soleplate metalwork correctly
- fit and secured floor metalwork correctly
- fit and secured roofing metalwork correctly

Please list below any other metalwork you have fitted together with its purpose:
### Section 12 | Component Recognition

#### 12.1 Component Recognition

This final section will help you identify the main components in a timber frame kit. You should be able to recognise and distinguish all of the following components.

**Activity**

Identify component, then tick the box when completed.

<table>
<thead>
<tr>
<th>DPC for soleplates</th>
<th>Trimmers to joist zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soleplate fixing plates</td>
<td>Beams to joist zone</td>
</tr>
<tr>
<td>Soleplate fixing nails etc.</td>
<td>Steelwork within frame</td>
</tr>
<tr>
<td>Soleplate packing material</td>
<td>Temp. crash decks</td>
</tr>
<tr>
<td>Soleplate timbers</td>
<td>Starter plates</td>
</tr>
<tr>
<td>External panels including spandrel panels</td>
<td>Pre packed spandrel panels</td>
</tr>
<tr>
<td>Internal partitions</td>
<td>Roof trusses various</td>
</tr>
<tr>
<td>Temporary bracing materials</td>
<td>Roof trusses infill</td>
</tr>
<tr>
<td>Cavity barriers</td>
<td>Head binders</td>
</tr>
<tr>
<td>Waist band material</td>
<td>Roof bracing material</td>
</tr>
<tr>
<td>Breather paper for waist band</td>
<td>Facia material</td>
</tr>
<tr>
<td>Correct nails for different locations</td>
<td>Soffit material</td>
</tr>
<tr>
<td>Correct staples for waist band</td>
<td>Roof ladders</td>
</tr>
<tr>
<td>Correct metalwork</td>
<td>Eaves material</td>
</tr>
<tr>
<td>Joist hangers</td>
<td>Eaves/soffit vent kits</td>
</tr>
<tr>
<td>Truss shoes</td>
<td>Add others as you wish</td>
</tr>
<tr>
<td>Truss clips</td>
<td></td>
</tr>
<tr>
<td>Soleplate clip</td>
<td></td>
</tr>
</tbody>
</table>
13.1 Final Review

On behalf of the STA and CITB we hope you have enjoyed this workbook on Practical Skills.

This is now the benchmark for everyone at silver level in the industry.

As a reminder we have included below a simple checklist for you in this final review. When arriving on-site you should now know what key points to consider before you start work.

Here are a few we hope you will remember:
- the build sequence
- foundations and soleplate
- site delivery and storage
- wall panels, floor panels and roof structures
- disproportionate collapse
- cavity barriers and fire stopping
- quality control
- programme management and content administration

Most importantly, once you have been assessed on these Practical Skills in combination with the silver level Health and Safety Skills and Knowledge Skills training, you will have reached a level of qualification the industry wishes all timber frame erectors to achieve over the next few years.

Congratulations!

In addition, from a combination of this training and the knowledge and experience you have already acquired, you are well on your way to reaching gold level, which is the highest level of qualification available to timber frame erectors in the UK.

We also hope that you will feel sufficiently pleased with your training experience to encourage other colleagues to use this training and to continue their own personal development to become as similarly qualified as yourself.

For most of us, our home is our largest expense and we expect it to be built to the highest standards by well-trained and suitably qualified people. By using these workbooks, we, as an industry, can now provide you with the opportunity to achieve this goal. Also by having a qualified workforce we can compete with the rest in quality and workmanship.

Thank you for taking part in this training experience and we hope you will enjoy a successful and satisfying career in our timber frame industry.

Timber frame erector training workbooks

These workbooks have been prepared by the Structural Timber Association, in conjunction with CITB, on behalf of the industry.

STA and CITB operates a continuous improvement policy and would therefore be very grateful to receive any review comments for further editions – you will find a learner feedback form on the next page.

Thank you.
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The production of these workbooks has been supported financially by CITB and, without their help, would not have been possible. The industry acknowledges this fact and is extremely grateful to them.

Whilst the STA/CITB have had these workbooks prepared to provide guidance on timber frame construction, the STA/CITB accepts no liability and offers no warranties in relation to them and their contents to the fullest extent applicable law can exclude such liability. Users therefore are required to satisfy themselves as to the suitability of the contents of this guidance for their specific intended purpose.

Structural Timber Association/CITB 2013.
13.2 Learner Feedback Form

The STA and CITB would appreciate it if you could take the time to complete the following questions as this will enable them to ensure that future training and training materials are of good quality and relevant to the participant. Please tell us what was good as well as bad about your training and any ideas on how you would like to see it develop or improve. We have included comment boxes for this purpose.

Name: *not mandatory

Company: *not mandatory

Level of award: Silver Practical Skills

Please indicate your score of each section by ticking the appropriate box – 1 being the lowest through to 5 being the highest.

Sections:

Build Sequence

Comments:

Foundations and Soleplates

Comments:
Site Delivery and Storage

Comments:

Panels

Comments:

Floors

Comments:

Erecting Roof Structures

Comments:

Installing Fixtures and Fittings

Comments:
Section 13 | Final Review

Using Hand Tools

Comments:

Metalwork

Comments:

Component Recognition

Comments:

Please tell us what was most helpful during this training – again there are tick boxes rating from 1 to 5.

Assessor

Comments:
Final Review | Section 13

Workbooks
Comments:

On-site tuition/advice
Comments:

Support of organisation
Comments:

Overall how did you feel the process helped you in gaining knowledge and skills at the required level?
Comments:
Many thanks for taking the time to fill in this learner feedback form.

Please return the completed form to your Assessor for forwarding to the CITB or alternatively if you wish, send it direct to:

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