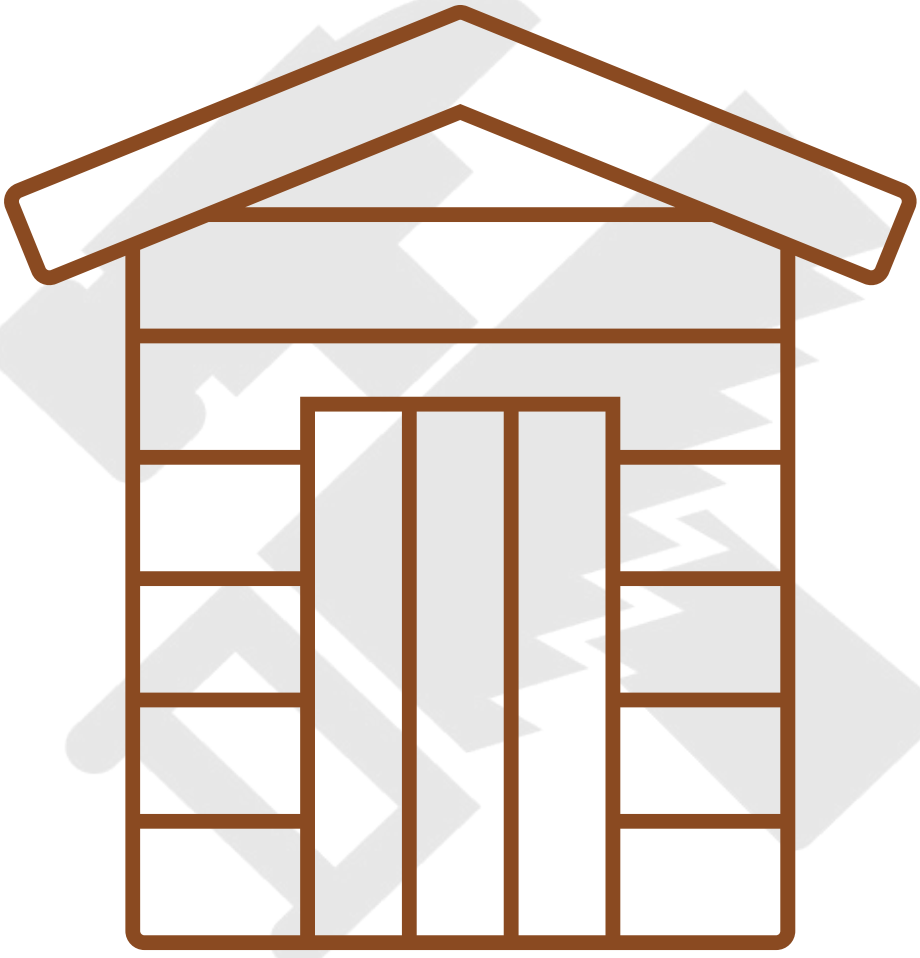
BCATS

BUILDING, CONSTRUCTION AND ALLIED TRADE SKILLS

Non-consent building



Unit Standard 12936 (v6), **Level 2**

Construct a non-consent timber framed utility building as a BCATS project

8 CREDITS

BCITO buildingpeople

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Introduction

This handbook uses a non-consent timber frame utility building 2.6m x 2.4m x 2.1 high clad in 9mm CD H3.2 plywood to provide guidance on how to construct one. It was designed to be able to be taken apart for transporting as a flat pack and reassembled and completed on-site. This particular example was constructed in a workshop environment but could have been constructed in a yard or on site.

Remember:

This handbook's non-consent timber framed utility building is an example only. Your teacher/tutor will provide you with guidance specific to your building.

How you will be assessed

You need to show your teacher/tutor that you can follow a given plan to construct a non-consent timber framed utility building.

Your teacher/tutor might give you a work diary to help you record how you constructed the non-consent utility building. If you can, take photos as you go, including a photo of it completed.

You will need to use project documentation to:

- calculate quantities of materials and prepare an order form
- mark out, cut, and fit all framing
- fix external wall and roof cladding
- fit exterior joinery
- finish the project
- complete everything safely
- keep your work area, tools, plant, and equipment clean and tidy.

Glossary of terms

Term	Meaning
Bottom plate	The horizontal framing timber that forms the bottom of a framed wall to which studs are fixed.
Bracing	A method employed to provide lateral support to a building.
Cladding	The outside or exterior weathering surface of a building.
Dwang/noggin	Horizontal timber framing between studs.
Foundation wall	The part of a building which provides support for both the static and environmental forces which may be applied to the building and transfers those forces into the supporting ground.
Framing	The fitting together of pieces to give a structure support and shape, and to which lining, cladding, flooring or decking are attached.
Galvanised	A zinc coating used to protect metal.
Pile	A block or column-like member embedded in the ground and used to transmit loads from the building and its content to the ground.
Plant	Fixed equipment.
PPE	Personal protection equipment.
Rafter	A beam at an angle to the horizontal, running at right angles to the line of the eaves and the ridge, providing support for purlins, sarking and roof covering.
Soffit	Underside external cladding of roof fitted between fascia board and wall cladding.
Stud	A vertical framing timber.
Top plate	The horizontal framing timber that forms the top of a framed wall to which studs are fixed.

Health and safety

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

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

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

One way you can help ensure your own safety is to use personal protection equipment (PPE). For this project you will need to use:

- hearing protection
- safety boots or covered shoes
- dust masks
- safety glasses (even if you wear prescription glasses, you must still use safety glasses)
- apron or overalls.

The machinery and other equipment you use can cause serious injuries. You **must** use appropriate guards and safety devices. You **must not** use any machine without the safety guards fitted correctly. You **must** receive training in the use of machines and equipment and apply it when you use them.

Before using a machine or portable power tool, check to see if all cords are in good condition. Also check that the compliance tags are current.

Use the machine guards and clamps

Use a residual current device (RCD) if working outside no matter what the weather conditions are

If you not sure that a machine is safe to use, don't use it. Ask your teacher/ tutor to check it out.

Project overview

The example in this handbook was constructed under cover. The timber framing used was 150x 50 H3.2 for the sub-frame and 90 x 45 H1.2 framing for the walls and roof framing. The walls are clad in 9mm CD plywood. The roofing material is butyl (synthetic rubber) laid over 17mm CD ply. All hardware is stainless steel.

Your teacher/tutor will help you adapt the processes or materials according to the design and specifications of your project.

To produce good workmanship, you should follow any plans and instructions carefully at every stage of your project.

- Make sure you understand the drawings and specifications. If you aren't sure, ask your teacher/tutor.
- From the drawings and specifications, identify and select the correct materials.
- Create a cutting list. Make sure you have enough of the correct materials and plan any cuts so you don't waste materials.
- Cut all framing components accurately.
- Assemble all framing accurately.
- Cut and fit all exterior wall and roof cladding accurately.
- Cut and fit all trims and hardware carefully.

The completed utility building should look good and stand up to the conditions it's used in.

For each construction job you carry out, it's also important to:

- choose and use appropriate personal protective equipment (PPE)
- use tools correctly and safely
- keep the work area clean and dispose of waste
- clean, store and maintain tools, plant and equipment correctly.

Common resources

Getting started

The first step is to get the job specifications and drawings from your teacher/tutor. These will include the size and design of the utility timber framed building and the materials to be used.

What tools/equipment will I need?

You will need to use a wide range of hand tools, portable power, and fixed machinery found in BCATS environments. The range will depend on the approach taken as well as the physical resources available to you.

Make sure all the tools/machines are available and ready for use when required. Remember to put the battery on to charge after use if you use battery power tools.

LIST OF TOOLS AND EQUIPMENT USED FOR SHOWN EXAMPLE		
Hand tools	**Portable power tools**	**Fixed machinery**
→ tape measure	→ nail gun	→ compound mitre saw
→ steel ruler	→ battery drill	
→ set-square	→ impact driver	
→ sliding bevel	→ portable power saw	
→ plumb bob	→ jig saw	
→ claw hammer		
→ spirit level		
→ laser distance meter		
→ chisels		
→ F clamps		

Depending on your school's policy, you might not be able to use some fixed machinery (such as the compound mitre saw) on your own. If this is the case, you must still set up the machine for your teacher/tutor to use and be on hand to be talked through how to use the machine safely as well as to see the process completed.

Preparing an order for materials

Use your project documentation to calculate the quantities of materials you need. Clearly write or type the order for the materials and include the following information:

- date of order
- customer's name, account number and billing address
- job identification or number
- order number
- supply merchant's name
- description of goods required and quantity
- address where the order should be delivered
- date and time required
- any other delivery details
- authorised purchaser's signature.

Send the order to the supplier, allowing enough time for them to prepare and deliver it. (You should also keep a copy of the order for your records.) It's a good idea to follow up with a phone call if you don't receive confirmation that the order has been received.

Once your timber is delivered, prevent it bowing or deteriorating by stacking it flat and clear of the ground and keeping it covered.

Note:
An order form template is available in the resources for your use. It can be downloaded and completed as an Excel document or printed off to complete by hand.

Project - Non-consent timber framed utility building

This section provides an example of a non-consent timber framed building constructed in a workshop. Your non-consent utility building may be of a different design and could be constructed instead in a yard or on site. This may require some variations in the order of tasks and techniques. Your teacher/ tutor will provide guidance.

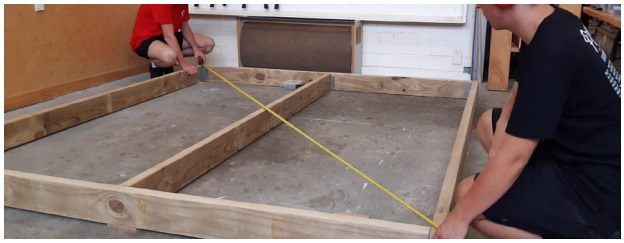
Many small utility buildings, such as garden sheds, do not sit on traditional foundations. The sub-floor should always be protected from the ground where possible. It is common for them to sit on an existing concrete pad.

Creating a sub frame

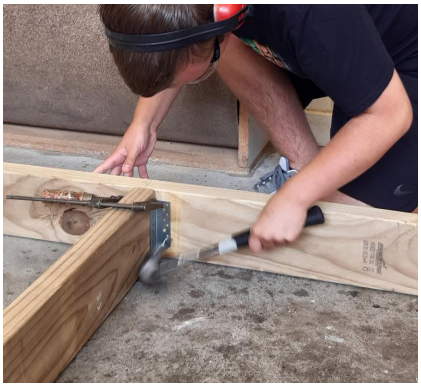
A sub-frame is first constructed to position the floor on and to attach the wall frames to.

1. Measure, cut and assemble the outer sections of the sub-frame. As shown below the centre bearer is also fitted at this point.

   It is important to ensure the sub-frame is level. Use a spirit level and use packers on the underside to do so. Take time to check that all measurements are accurate.



2. Mark out the centre position of all the joists. Once marked and checked for accuracy, position the joist hangers.

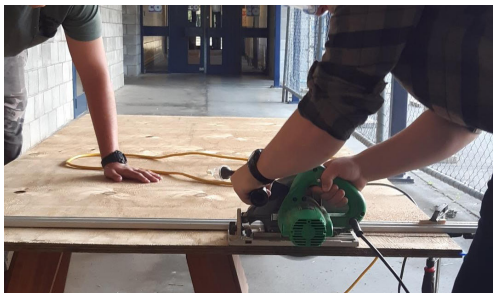


Laying out and competing the sub-frame on the floor can present a tripping hazard. The hazard can't be eliminated but it can be isolated by erecting a physical barrier as shown above

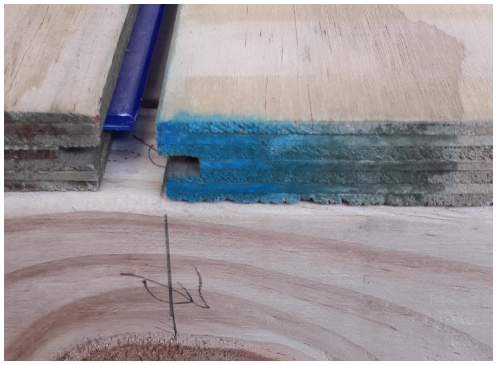
Completing the floor

Once the sub-frame is completed the floor can be fitted.

3. In this case the ends of each sheet needed trimming. This was done using a portable power saw and a guide bar. While the guide bar has its own clamping system, a secondary clamp was positioned at each end as a precaution.



4. The floor was then fitted by bringing the plastic inserts together on the centreline of the middle bearer.

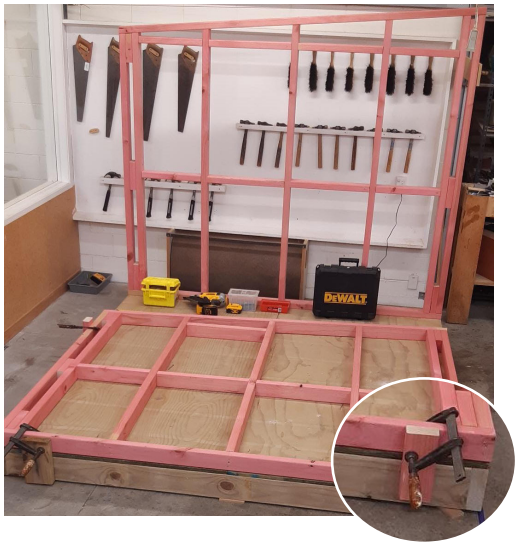


5. The floor was then screwed down using 8g x 40mm galvanised square drive screws at 300mm centres.

Constructing the wall framing

The framing for the walls can now be constructed and attached to the floor. Your teacher/tutor will teach you how to do this.

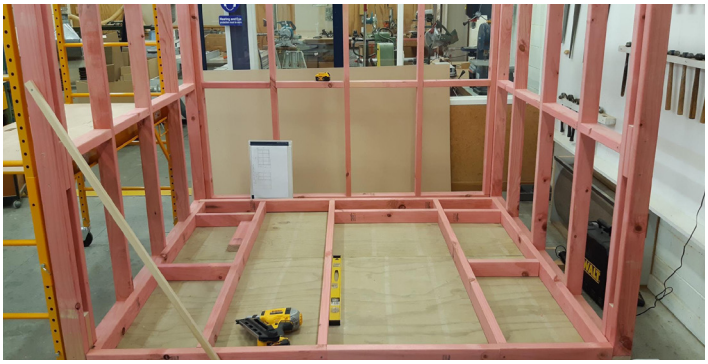
6. This building used the floor as a platform to build the end frames first. This had the advantage that the builders knew they were working on a dimensionally correct platform.



Framing was put in position by clamping and screwing into floor frame bearers. This method assists in maintaining accuracy as well providing a degree of steadiness when joining framing parts.

A misfired nail has the potential to cause serious injury. Every single time you use one, first check what is known as the 'line of vision'. This means that you take a moment to look and confirm that no part of your body or another person is in front of the nail gun. Fire the gun only when you know that all is clear.

7. Once the end frames are constructed the side frames can be constructed in the same way.



8. Connect the frames together once they've all been constructed.

   Case screws were used for this building. This was because it was being constructed as a kitset that would need to be taken apart, transported, and reassembled on site.

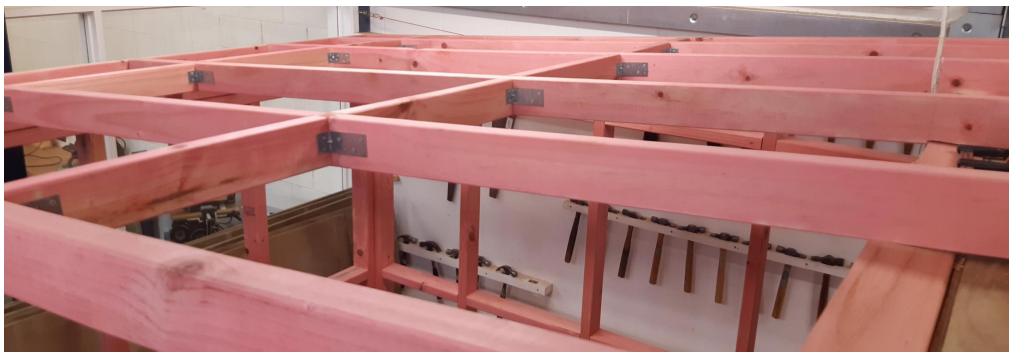
As shown on here (right) a trestle is used as a working platform. After positioning the trestle, make sure you apply the brakes on the castors.

This trestle is set at less than 1m to ground level and so no safety rail is required. When working on a platform like this, keep all the equipment required stored at one end. This helps to avoid tripping over it.

Constructing the roof framing

9. The next stage is constructing the roof framing. The rafters should be notched (birdsmouth cut) over the top plate as shown below. This keeps the rafters level with the rafter placed directly on top of the end frame top plate.

10. The purlins can be fitted once the rafters have been positioned according to the plans and specifications. In this example the purlins were fitted between the rafters to reduce the overall height of the utility building.



Completed roof framing

Completing the roof

The roof would next be completed in full if the non-consent building was being constructed on site. Completing the roof as soon as possible assists in keeping the framing and floor dry.

11. Building paper positioned above netting would normally be fitted on top of the roof frame before the roof cladding is fitted. Building paper is designed to prevent the transfer of moisture from the exterior cladding to the framing material.

17mm CD plywood roofing being fitted

A wide range of roofing materials is available. The most common roofing materials include: profiled long-run metals, membranes, tiles, shingles or similar overlapping materials, and translucent materials.

The roof in this example is a butyl (synthetic rubber) laid on top of 17mm H3.2 plywood. This material was specified by the client.

12. The butyl membrane will be fitted in one piece once the utility is fully assembled on site. Flashings will also be installed then. Your teacher/tutor will provide you with guidance on what is required for your project and the chosen materials.

Fixing the exterior wall caldding

13. Attach building paper to the framing before fitting the cladding.

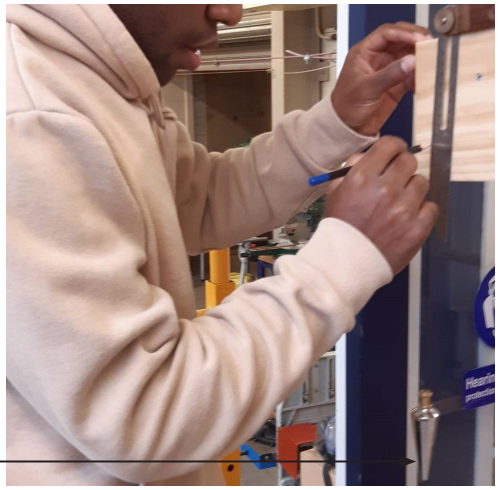
14. The exterior wall cladding (9mm CD ply) can be cut and fitted with the smooth side facing to the exterior of the building. The ply in this example was attached to the framing with 8g galvanised screws.

    There are other fixing options, such as using galvanised clouts. If the building will be in an area where salt from the ocean may be blown onto it, you will need to use stainless steel fastenings. The building's specifications should specify what you will need to use. If in doubt, check with your teacher/tutor.

F clamps located at either end of the over-centre locking guide bar for extra security

15. Corner caps and vertical batons can be fitted once the cladding is on. The backs were pre-painted before fitting to increase their life-span. This is the time to also place the soffit in position, with the corner cap and vertical batons butting up against the underside of the soffit.

16. Next, prepare and fit fascia boards and barge boards. These were also painted on the inside face to extend the life span of the timber.



A plumb bob has been set up to determine the vertical and adjustable bevel is being used to record this angle on the barge board ready for cutting

Plumb bob

Installing exterior joinery

17. The last workshop-based stage of this building was to construct and fit the door.

18. The client specified that the door needed to open 180 degrees. This required stainless steel barn hinges.

19. The diagonal brace, shown in the photo below, keeps the door framing square until its exterior cladding is fitted. Because the plywood cladding acts as a brace, the diagonal brace was removed once the plywood was fitted.

Barn hinges

Door frame fully opened

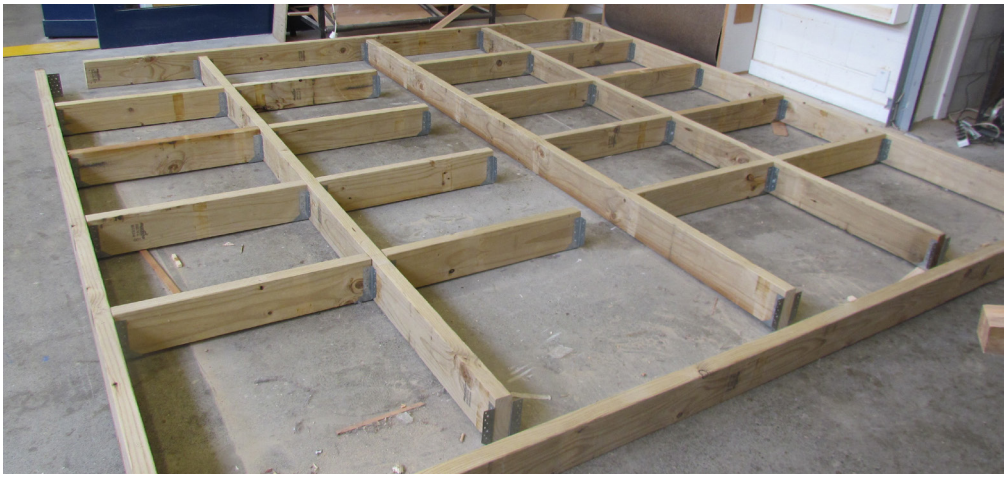
Door panelled

Finishing touches

20. The utility building is now complete and ready to be disassembled and moved in sections on trailers for reassembly. Once on site the roof will be completed, the shed will be painted, and the guttering installed.

Project

Below is an image of a kit-set build loaded on a trailer ready for long haul trip. Note how the floor framing on top was built in two sections to avoid being over-width on the trailer.



Floor framing was constructed in two sections. A similar process was used for the roof framing.