

National Certificate in Building, Construction and Allied Trades Skills (BCATS)

**Plan and monitor the construction
of a BCATS project, and quality
check the product**

Unit Standard – 24358

Level 2, Credit 2

Name: _____



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What you need to do

By the end of this module, you should be able to:

- plan the manufacturing process for a BCATS project;
- implement that plan and monitor progress and quality; and
- compare the final product against job specifications and identify any differences.

How you will be assessed

To achieve this unit standard, you need to complete a basic construction project (such as wooden garden furniture, a dog kennel, a pergola) where you can plan and carry out quality check procedures. Your teacher/tutor will tell you which project to complete.

You need to show your teacher/tutor that you can:

- read and/or listen to the instructions for a job and check anything you are not sure about;
- work out the steps involved and write a project plan;
- work out how you will check how well you are doing the job at each step (the quality control methods) and write these in the project plan;
- work out what materials and equipment you need and write these in the project plan;
- follow the project plan to construct the project;
- use the quality control methods to check your work and make notes about this in the project plan; and
- check the finished project, compare it to the job instructions and identify any differences you find, and make notes about this in the project plan.

Your teacher/tutor will also give you a Project Plan Assessment Record sheet that you need to complete, which your teacher/tutor will assess.

Glossary of Terms

Term	Meaning
Accident	An event that causes a person harm
Decibel	The unit for measuring noise
Eliminate	To remove completely
Emergency	A sudden unforeseen situation requiring immediate attention
Eye protection	Safety goggles or face masks worn to protect the eyes from injury
Hard hat	A helmet designed to protect the head from injury
Harm	Illness, injury, or both; includes physical or mental harm caused by work-related stress.
Hazard	Anything that can cause harm, including a person's behaviour
Hazard identification	Recognising that a hazard exists and identifying a method for controlling the risk. It is part of the risk management process
Hearing protection	Ear plugs or ear muffs worn to protect the wearer's hearing from exposure to excessive noise levels
Isolate	To prevent people from being exposed to a hazard.
Minimise	To reduce the risk of harm to a person
Sun protection factor (SPF)	Is a measure of protection against sun-burn producing rays that reach the skin

Introduction

The icon for the Introduction section, consisting of a solid black circle with a white circle inside it, positioned to the left of the title.

There are two "enemies" of project quality: (1) deviations from job specifications, and (2) excessive variability around job specifications. All construction industry students/trainees therefore need to develop the ability to work to specifications while meeting deadlines.

This module is based around meeting quality requirements across all aspects of the construction process, from the initial instructions through to the final result.

It is structured to provide opportunity for the wide range of construction industry-related experiences required to develop, knowledge insight and a diverse range of skills including:

- planning work;
- confirming sizes and specifications;
- identifying potential problems; and
- checking and confirming that the construction project meets the requirements of the job specifications.

Planning

Planning is the key to success. A properly organised project will generally progress smoothly, generate few mistakes and satisfy all parties – worker, employer and client.

Good planning includes:

- detailed job specifications;
- a time activity programme; and
- health and safety considerations.

Job specifications

The ability to read and understand job specifications has a direct effect on quality and productivity.

Fast work and high output is of no value if the finished project fails to pass the quality control check. True productivity is restricted to that which meets quality assurance requirements because:

- rework takes extra time, adds cost to the project and delays deadlines; and
- colleagues often have to fix or repair mistakes that are often not picked up until the end of the production process.

Before starting any project it is important to be clear about what is required so that each stage can be planned and equipped. The job specifications detail:

- the project;
- materials to be used;
- sizes or dimensions of each component;
- any allowable tolerances; and
- the required quality of the finished product.

They convey this information through:

- plans;
- working drawings; and
- written and verbal instructions.

These must be sufficiently clear so that the tradesperson can interpret and understand them and, before commencing the project, visualise the final product. They should be able to make a quick sketch of it with sizes, key notes and other information relevant to satisfactory completion of the project. If any part of a job specification raises questions or is unclear it must be checked and clarified with the person who wrote the specification.

This information is used to plan the ordering and delivery of materials and the scheduling of people, plant and equipment.

Checking specifications against the plans and dimensions

To ensure the job specifications fit the specified requirements, it is good practice to systematically check:

- all dimensions;
- that all measurements on the cutting list match the working drawings to ensure:
 - the measurements correspond with the overall sizes; and
 - the positions and proportions of components for the task e.g. drawers, cabinets, windows and doors, are correctly positioned;
- for allowable tolerances; and
- that the materials identified in the specifications are actually suitable.

Tolerances

Tolerance is the stated range of allowable variation within the job specifications. It is usually included when the overall size of the item is not crucial.

A tolerance around the given dimension is indicated by +, which means greater than, or -, which means less than. For example, **+/- 1mm** means the measurement can be 1 millimetre larger or 1 millimetre smaller than the specified dimension.

A kitchen designer will often show a nominal dimension on a drawing and write on it the letters **C.O.S. (check on site)**. This means that the dimension on the plans is approximate and needs to be checked before the construction takes place.

Planning the stages

The initial impression of a project can be quite daunting. However, the biggest project is just a series of small projects that, when correctly planned and co-ordinated, result in efficient completion.

Reduce the main task to a series of separate stages to help with work out the most logical and efficient sequence. This contributes to:

- clearer thinking;
- effective planning;
- better use of materials and less wastage; and
- better tracking of personal progress.

Specific task requirements

Identify the specific task requirements for the different stages. Consider:

- health and safety requirements;
- equipment needed;
- additional instruction or training requirements;
- any need for extra help; and
- deadlines.



Time Activity Programme

A Time Activity Programme is a record of the order in which the various stages of a project should occur. It is a means of effectively monitoring the actual progress of a construction project. See the Time Activity Programme on page 9 for a typical single storey house. The Time Activity Programme is designed before any work on the project is undertaken.

It involves:

- a list of the construction activities and operations;
- the order in which each construction activity or operation should be undertaken; and
- a careful estimation of the timescale required to complete the different construction activities and operations.

The Time Activity Programme also provides an effective means for monitoring the actual progress of a construction project:

1. The time for each activity or operation is documented.
2. The actual time taken to complete each particular operation is entered against the original programmed time allocation.
3. A visual comparison of the actual progress of the combined operations can be made.
4. This comparison will highlight areas for concern.
5. Effective steps can be taken to remedy the situation.

Preparing a Time Activity Programme

In order for the objectives of a Time Activity Programme to be met, it must be carefully planned and organised. It will form a timetable for construction operations, and must be easily interpreted and accessible to all people involved in the construction process.

A Time Activity Programme will show:

- the contract start and finish date;
- where each activity or operation is phased in;
- when tools, plant, equipment, machinery and vehicles will be needed;
- material delivery dates;
- start and finish dates for subcontractors;
- holiday periods;
- quantity of work completed; and
- inspection dates.

Once the project sequence has been developed, it is relatively easy to manage an efficient construction process.

Time allocations, which can be used for costing the project, can also be used to co-ordinate people and services; for example, determining when the ready-mix concrete delivery should take place.

The next page shows a typical Time Activity Programme for a single storey house.

Time Activity Programme

Illustration of a typical time frame for a ground floor house construction

Activities	Start Week	Finish Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34				
Preliminary	1	4	1			4																																		
Setting out	4	5				4	5																																	
Excavation	6	7						6	7																															
Foundations	7	11							7				11																											
Floors	12	14												12		14																								
Wall framing	15	18															15			18																				
Roof framing	19-22	17																			19			22																
Exterior lining	18	19																						22				25												
Exterior joinery	19	19																										26	27											
Exterior trim	20	21																											27		29									
Insulation	22	23																																	30					
Interior linings	24	27																																	30		32			
Interior doors and trim	26	27																																		32		34		
Electrical	26	27															15	16	17																	31	32			
Plumbing	28	32				4	5																																	
Inspection	28	34			X																															X				X
			Month 1				Month 2				Month 3				Month 4				Month 5				Month 6				Month 7				Month 8									

Check, Check and Check Again

Ensure that all aspects of the project are checked at each stage of the construction. It is much easier and less expensive to correct mistakes as the job progresses than when the project is complete.

For example, an incorrectly positioned wall partition could mean that the plumbers, electricians, plasterers, painters, flooring specialists and other construction-related people have to be called back to rectify the mistake. This can be very expensive for the person or company that made the mistake because they can be held liable for the cost of rectifying it.

Checking at the end of each stage will ensure that the completed work has met the quality standards required.

Set up the job

Mark out the project to specifications as accurately as possible.

- Lay out the project in a logical sequence so that identifying and checking setting-out can be done easily.
- Use storey rods or templates wherever possible.
- Check that all timber and materials meet the project requirements.
- Check that marking-out is correct, especially for crucial parts, then move onto cutting and assembling.
- Remember the old saying: “Measure twice, cut once.”

Preventing emergencies

The project specification and worker experience are usually combined to identify potential problems and put in place a range of precautions, preventative actions or strategies for preventing the problem or dealing with any emergency.

Problems could arise as a result of:

- lack of experience;
- lack of materials;
- relying on other people;
- relying on suppliers;
- deadlines not being met;
- sickness; and/or
- needing extra support or help.

Work habits

Relaxed and methodical work habits, avoiding distractions and not trying to do several projects at once, will reduce the likelihood of confusion and errors. Skill only develops with experience and choosing to be patient usually improves work quality and speed more quickly than shortcuts or omitting important steps in a process.

Bypassing proven construction processes will, in many cases, create expensive problems in the longer term. Leaking houses, where costs were reduced by not applying finishing materials according to the manufacturer's specifications or omitting flashings over windows and doors, are modern examples of this practice. The outcome has been a plague of leaking homes and a repair bill that far exceeds the time and money initially saved.

Tools, equipment

It is the responsibility of the employer to ensure that the plant and equipment are in good working order, however, maintenance of personal tools is the responsibility of the worker.

Tools and equipment should be appropriate for the task, maintained and checked before use. It is almost impossible to meet quality requirements with incorrect, damaged or blunt gear. Appropriate safety guards should be fitted and working properly, and appropriate safety equipment used.

Health and Safety on the job

It is the employer's responsibility to develop and document safety processes. It is the employee's responsibility to know and follow these safety management plans and site instructions.

To work safely and effectively a worker must:

- know what to do;
- know how to do it safely;
- keep their mind focused on the project;
- consider the wellbeing of their workmates; and
- take action to reduce the likelihood of accidents if they see signs of fatigue, illness etc., in their workmates.

A clean work area is generally a safer and more productive work environment because people are able to move around, locate tools and work more efficiently in a tidy space. Tools are also less likely to be damaged. To maintain a clean and efficient working environment:

- ensure tools are always stored away in the correct place;
- clear the area of rubbish;
- dispose of off-cuts in the appropriate place and manner; and
- eliminate, or minimise the risk from all hazards.



Activity

- 1. Once the job specifications have been received and confirmed, what should we look for when checking them in detail before commencing the production of the job?

- 2. Why is it important to maintain a clean and efficient working environment?

- 3. The top of a saw stool has to be cut to a length of 700 mm +/- 10mm. What range of sizes would be acceptable to meet the requirements of the job specifications?

- 4. Identify the range of sizes that would be deemed acceptable for the following specifications within tolerances as specified.

500mm (with a tolerance of -5mm):

720mm x 265mm (with a tolerance of +/- 5mm):

- 5. What information is contained in the specifications?

6. What must be done if a person is unsure of any part of a job specification?

7. Why is it necessary to implement quality checks at each stage of the job?

8. List 4 quality control methods that could be used during the construction of a project.



Planning for the construction of a fence

1. For the construction of a fence, organise the tasks below into a logical sequence. Write your sequence in the left hand column of the table on the next page.

- Identify boundary and set up string line.
- Fit cladding.
- Order timber and building materials.
- Concrete in posts.
- Mark out and dig holes.
- Receive and confirm job specifications.
- Clean up rubbish and waste material.
- Cut rails to length and nail to posts.

2. Identify the tools and equipment required to complete each stage from the list below. Write the answer in the centre column of the table on the next page. Add additional tools or equipment if needed.

Eye protection	Earmuffs	Saw	Hammer
Shovel	String line	Tape measure	Spirit level
Spade	Concrete mixer	Pencil	Square
Carpenter’s apron	Trailer	Post-hole borer	Hose
Gumboots	Extension lead	Wheel barrow	Nail gun
Safety goggles	Residual current device (RCD).		

3. Identify the materials required to construct each stage of the fence. Write the answer in the third column of the table supplied on the following page.

Builder’s mix	Posts	Cement	Rails	Nails	Braces	Cladding	Water.
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4. Identify 4 quality control checks that can be carried out to ensure that the project is correct and meets specifications.

e.g. Check that the holes are drilled to the correct depth.

1. _____
2. _____
3. _____
4. _____

5. Estimate the time each section will take. Write your answers in the fourth column of the chart on the next page.

Fence construction sequence

Stages of the task – determine a logical sequence of events	Tools required	Timber and hardware	Expected duration	Actual time
1				
2				
3				
4				
5				
6				
7				
8				