

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

**Demonstrate knowledge of the
roofing industry within a BCATS
environment**

Unit Standard – 25334

Level 2, Credit 2

Name: _____



What you need to do

By the end of this module, you should be able to demonstrate knowledge of the roofing industry covering:

- major industry sectors
- industry work processes
- industry clients, supply and inter-trade relationships
- the impact of regulatory and trade bodies on the industry and
- industry jobs and their training requirements.

How you will be assessed

Your teacher/tutor will give you a worksheet that you need to complete, which your teacher/tutor will mark.

Published by: Built Environment Training Alliance

Level 5, 234 Wakefield Street
PO Box 2615
Wellington

© Built Environment Training Alliance

All rights reserved.

No part of this work may be reproduced, adapted, modified, copied or transmitted in any form or by any means, including by way of example only, written, graphic, electronic, mechanical, reprographic, photocopying, recording, taping or information retrieval systems, without the written permission of the publisher.



Glossary of Terms

Term	Meaning
AS/NZS	Australian Standard/New Zealand Standard. A standard that applies in both Australia and New Zealand.
Industry bodies	Organisations that play a role within an industry in a regulatory, support or advisory capacity. This includes regulatory bodies, industry training organisations and trade or professional associations.
ITO	Industry Training Organisation. A tertiary education organisation which develops qualifications and arranges training for a specific industry.
Low pitched roof	A roof with a pitch of less than 10deg
Metal roof cladding	The weatherproof metal roof covering for a building providing protection from the elements. Eg. Galvanised Corrugated Iron
NZS	New Zealand Standard.
NZSTCF	The New Zealand Specialist Trade Contractors Federation.
Pitch	The angle of incline the rafters make with the horizontal, expressed in degrees.
Pitched roof	A roof which has a pitch greater than 10deg.
Profile	The shape of design of a roofing product.
Purlin	A horizontal framing member spanning rafters or trusses, providing fixing for the roof cladding
Rafter	Parallel sloping framing members of a roof which support the purlins and roof cladding
RANZ	The Roofing Association of New Zealand - the trade association for the roofing industry.
Regulations	Regulations are rules that tell companies how work should be done or what the finished product should be like.
Ridging	The flashing that provides weather protection at the top or apex of two intersecting roof planes.
Roofing underlay	Underlay is an absorbent permeable membrane, installed underneath the roofing material, that absorbs or collects condensation
Shingles	Flat, rectangular timber, asphalt or other materials that are overlapped to provide a weatherproof covering for roofs or walls
Valley	The lower intersection of two adjacent roof planes.

Introduction

As part of what is known as the “building envelope” the purpose of roof cladding is to protect occupants from the weather.

The type of roof cladding selected will depend on the location as different materials are needed in different areas to achieve the same aim of keeping moisture – and sometimes snow – out.

Cladding types also vary with the slope of the roof.

Only in recent times in New Zealand has roofing become a specialist trade. Roofing work was - and still is - also carried out by some plumbers and some builders. However, as the roofing materials and practices have become more varied and complex, a separate qualification for roof installers has been developed.

This learning material provides an introduction to the specialist trade of roof cladding.

 **Sectors****Installation**

This involves installing roof cladding on new buildings, and includes all the work required to complete the installation of the roofing materials. Most roofers are involved in this sector but often specialise in installing one or more roofing cladding material types.

Reroofing

This refers to the complete replacement of an existing roof, or a large section of a roof. This is usually when the roof has come to the end of its useful life or has become uneconomic to maintain.

The scope of work may vary depending on the exact terms of the contract, but would generally include removal of the existing roof, any preparation required for installation of the new roof, and installation of the new roof.

Insulation

Insulation is material installed to reduce the amount of heat escaping from the building in cold weather, and to reduce the amount of heat from the sun entering the building during warm weather.

Often insulation is not part of the roof installation and is not installed by the roofer. In some situations insulation is installed as part of the roof, and may be installed by the roofer or by a company specialising in insulation.

Flashing

A flashing is a covering used to weatherproof or seal a roof at corners, edges and other places where the roof covering is interrupted. Usually roofers install the required flashings themselves as part of the roof installation.

Materials used for roofing

There is a range of different types of roofing, and these are manufactured from a number of different materials. The roofing industry can be divided into sectors according to the material type, and roofers often specialise in one type of roofing material. The main types and materials are:

Metal cladding

This refers to metal sheets of roofing material. These are manufactured using a number of different metals and a range of profiles. Sheets are often manufactured in specific sizes to suit individual roofing jobs.

The most common metals used are:

- Aluminium
- Metal coated steel. The steel is coated with zinc (galvanised), or with a zinc aluminium alloy coating to prevent it from rusting.
- Zinc
- Copper
- Stainless steel

Metal sheets are generally painted to give added protection and for appearances.

Translucent cladding

Clear (translucent) roofing sheets are used to allow light into the interior building space below and can be manufactured in clear, opaque or tinted colours. They are available in a large range of shapes and profiles to match other roof coverings. These are generally made from glass reinforced plastic (fibreglass), polycarbonate or unplasticised polyvinyl chloride (UPVC).

Metal tile

Metal tiles are interlocking metal sheets (usually steel) that have been pressed into shapes that resemble tiles, shakes or shingles. The metal can be pre-painted or coated after pressing.

Metal tiles are manufactured in a wide range of shapes and finishes, including textured finishes.

Concrete tile

Concrete tiles are manufactured in a range of profiles, colours and finishes.

Terracotta/Clay tiles

A durable unglazed roofing material manufactured from high grade clay and fired at a high temperature. A special water-resistance treatment is added giving additional protection to the tiles,

Shingles and Shakes

A shingle roof consists of individual pieces of (usually) oblong material laid in overlapping rows to form a weatherproof covering.

Traditionally, shingles were made from timber however there are now a range of materials available to shingle a roof including:

- Metal
- Slate
- Fibre reinforced asphalt
- Concrete

Timber shingles (from sawn logs) or shakes (machine or hand split) are now treated with a fire retardant and also treated for durability.

Membrane

Membrane is a non-metallic material generally used on flat or nearly flat roofs. As it is not self-supporting it must be applied to a substrate (the underlying roof structure) that provides the necessary structural support.

Membrane roofs are most commonly made from synthetic rubber, thermoplastic (PVC or similar material), or modified bitumen ('torch on'). These types of materials have become the replacement for asphalt roof systems, an older, less effective type of flat roofing system.

Work Processes

A range of work processes are involved in completing a roofing job. Common work processes carried out by roofers are described below.

Planning

Before work can commence, the job must be planned. This is necessary to work out or check the materials, and the number of roofers, tools and equipment that will be needed to complete the job within the required time. Arrangements must be made to ensure these are available on site when required.

Planning will generally include a visit to the site to check whether there are any particular hazards, what equipment will be required (eg, lifting equipment), and any other specific requirements for the job.

Part of the planning process is to work out the order in which work needs to be done. Planning must be sufficiently detailed to understand all the requirements for the job and to ensure that the job can be completed without any unnecessary delays.

Ordering

The materials required for the job need to be ordered from the roofing supplier and delivered to the site. The materials required and the quantity of each item is generally detailed in a material schedule.

Once the materials have been delivered to site, roofers need to check that all the items ordered have been delivered, the quantity of each item is correct, and that all items are in good condition.

Lifting materials to roof

Part of the planning process is arranging for suitable lifting equipment on site to lift the materials onto the roof. The lifting equipment used will depend on factors such as the type and packaging of the roofing material, the availability of suitable lifting equipment, and the site.

Safety checks must be made to ensure that all the lifting equipment is in good condition, that the lift can be completed safely, and that roofing material is secured once lifted onto the roof.

Installing the roof

Installing the roofing material is only part of the overall process of installing a roof. Depending on the type of roof, other components such as underlay, netting or safety mesh to support the underlay, battens, insulation, etc must be installed first.

Underlay is an absorbent permeable membrane, installed underneath the roofing material, which absorbs or collects condensation. Not all roof types require underlay. Underlay generally requires support which is often provided by lightweight netting installed underneath the underlay.

Sometimes a heavier safety mesh is used. As well as supporting the underlay, this also prevents workers from falling during installation.

Battens are narrow timber, steel or polystyrene members attached to a roof used to space or attach metal cladding, metal tiles or shingles to the structure. Battens are solely for spacing or fixing purposes and are not a structural component of the roof.

Fastening

Fasteners are nails, screws, clips, bolts, rivets and staples which are used to fix components of a roof assembly together. Nails and screws are called primary fasteners because they attach the roofing material to the building frame. Secondary fasteners are used to attach the roofing components together.

There are many different types and sizes of fasteners. The roofing manufacturer will generally recommend fasteners suitable for the installation, and the fasteners must be installed correctly. In some situations metal load spreading washers need to be used with the fasteners to provide sufficient strength at the fixing points. In these situations sealing washers are also required to ensure that the fixing points are weatherproof.

Sealing

Sealing refers to making joins watertight and airtight. Silicone sealants are often used but other sealants such as solder can also be used. Silicone sealers need to be neutral-cured. This means that the sealer has a neutral pH so it does not corrode metal. The residue from flux used in soldering must also be cleaned away to prevent corrosion.

Sealed joints must also be mechanically fastened as sealants do not provide strength.

Flashing

A flashing is a covering used to weatherproof or seal a roof at corners, edges and other places where the roof covering is interrupted, e.g. around penetrations in the roof for chimneys, roof lights, etc. Generally sealants are used in conjunction with a flashing, and particular care must be taken to install the flashing and sealant correctly to ensure a watertight seal.

A variety of flashings are used to cover the very wide range of situations encountered in roofing jobs, and flashings are often manufactured to meet the specific requirements of individual roofing jobs. Some companies specialise in the manufacture and/or installation of flashings.

Finishing

Finishing is the final step in completing the job. It includes checking to make sure all work has been completed to the required standard, checking to make sure installation of accessories has been completed, cleaning up and removing any debris or left over materials, and ensuring that the job is left in a clean and tidy condition.

Reroofing and Repair

Reroofing refers to the complete replacement of an existing roof, or a large section of a roof.

Repairs to a roof are carried out as part of the normal maintenance, in situations where damage has occurred (e.g. storm damage), or where alterations are made such as the removal of a chimney. If, for example, several sheets of roofing material are blown off in a storm, this would normally be repaired by replacement of the sheets. In this situation re-roofing would only be considered if the roof had reached the end of its economic life.

Client Base

Subcontracting

Some roofers are contracted by roofing companies to carry out roofing installation work. In this situation the roofer's client is the roofing company. The roofer is responsible to the roofing company, and does not normally deal directly with the client.

The roofing company deals with the client and carries out all estimating and quoting for the job. The client could be a private individual, a builder or a company. The client contracts the roofing company to supply and install the roofing materials, but the installation work is sub-contracted to the roofer.

Many roofers are contracted by a builder who has been contracted by the client to carry out the construction work. In this case the roofer is a subcontractor of the main contractor (the builder), and the roofer doesn't normally deal directly with the client. In this case the roofer's client is the builder.

Direct to client

Many roofers do deal directly with clients. In this situation the client contracts the roofer to supply and install the roofing materials. The roofer arranges for a roofing company to supply the materials required for the job, but the roofer is responsible directly to the client.

Supply Relationships

A roofer who works only under a sub-contracting arrangement with a roofing company, where the company supplies all the materials required for the job, may have little need for relationships with other suppliers. Under such an arrangement the roofing company is responsible for providing product support such as a manufacturer's guarantee, and product training (to the roofer) to ensure that the roofing material is installed correctly.

A roofer who works directly with clients will require arrangements with suppliers, and the following sections apply mainly to that situation.

Trade accounts

This is where a manufacturer or supplier agrees to sell trade goods to approved customers on the basis that the customer promises to repay on or before a stipulated date in the future (generally the 20th of the month following invoice).

Trade accounts allow contractors requiring materials the ability to get them without having the money up-front – therefore benefiting from the credit given to them by the supply company. Suppliers have the benefit of selling more of the products they supply over those same or similar products that may be supplied by their competitors. Realistically, the relationship has to be mutually beneficial for it to work and so by and large, both the contractor and the supplier need to work together to ensure that they both get what they need out of it.

Trade discounts

Most suppliers reward their loyal customers with a discount and this applies to trade accounts. From a supplier perspective, they want repeat business and the ability to be able to sell larger quantities than retail customers would normally purchase.

Trade discounts are usually expressed as a percentage of the retail price and may vary depending on the type of product and quantity ordered. Other terms and conditions applying to a trade account may also be more favourable than would apply to a retail customer.

Manufacturer guarantee systems

Some manufacturers issue guarantees or warranties for their products subject to certain conditions, especially environmental.

Manufacturer guarantee systems are written assurances from manufacturers that their goods or services meet a certain standard of quality and durability so long as manufacturer's instructions have been followed.

- Sometimes the manufacturer guarantees only their products/systems to be manufactured to a specific quality level.
- Sometimes the manufacturer also guarantees the use of their products/systems in their installed state by a contractor whose work they are prepared to stand behind.

Either way, manufacturers have a vested interest in ensuring their good name remains at the forefront of a person's mind when thinking of purchasing or specifying the use of their products.

Where a roofer deals directly with the client, the roofer handles any issues relating to faulty materials. The roofer liaises with the material supplier to arrange replacement or repair under the manufacturer's guarantee, and the roofer will generally carry out any repairs or install replacement materials.

Product training

Manufacturers of roofing products may provide training to ensure that roofers are aware of the correct methods for handling and installing their products. This is important to avoid problems caused by faulty workmanship in the installation process and resulting claims against the manufacturer's guarantee.

Product failures can quickly damage the reputation of a product. It is important for manufacturers to ensure that roofers install their products correctly, not only to reduce guarantee claims but to also avoid damage to the reputation of their product. In some cases manufacturers and suppliers will only supply materials to roofers who have completed product training.

Accredited supply networks

Sometimes product manufacturers and suppliers form an accredited supply network. The network generally includes all stages of the supply chain including design, specification, manufacture, supply and installation. This ensures that everyone involved at any stage of the supply process is familiar with the product and is properly trained. Only accredited members of the network can handle the product at any of these stages.

Often members of an accredited supply network pay a levy for membership. This provides funds to follow up on any problems with work done by network members.

The benefit to clients is the assurance that all network members have the required training, and that the network will correct any problems that may arise. The benefit to network members is that they have the support of the network, and that they can be confident that all network members have the required product knowledge and training.



Relationships with other Trades

The successful completion of modern construction project, large or small, relies on good organisation, quality control, coordination and clear lines of communication. All trades have a duty of care to respect and avoid damage to the work of other trades that have preceded them.

The planning, organising and coordinating operations for a construction project will usually be the responsibility of the main contractor. For a large project they may be a specialist team of people working in overseeing roles whereas for a small project it may just be the builder themselves.

To ensure that everyone involved in the project is fully aware of their roles and responsibilities, the main contractor will need to establish clear avenues of communication with each of trades they will be associated with.

The complex task of planning and the organisation required to produce the completed project, on time and within budget, will require the coordination and cooperation of all construction trades working together.

This will also require cooperation of their material suppliers and other companies and individuals associated in any way with the project.

As well as liaising closely with the builder, roofers need to coordinate with other trades where their work impacts on the roof installation. For example, fixtures such as flues which penetrate the roof will be installed by the plumber. In some situations there will be equipment such as air conditioning units which are installed on the roof. Sometimes items such as flashings and insulation are installed by specialist companies. Coordination will be needed with any installer of equipment which has any effect on the roof installation.

Requirements of Industry Bodies

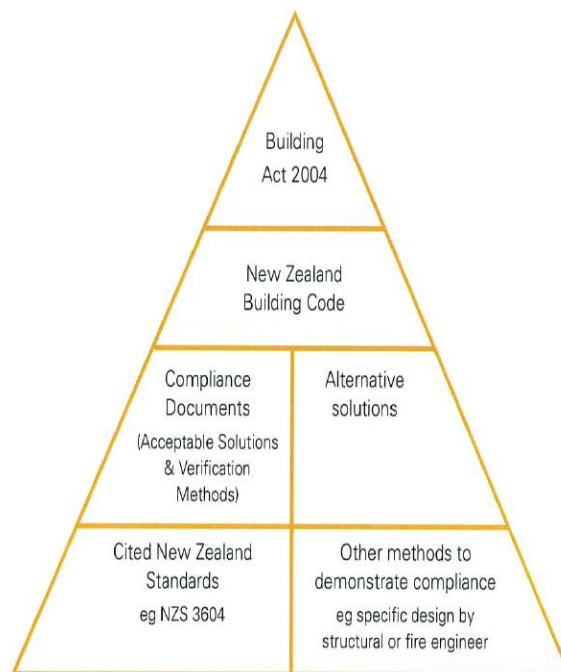
Construction and building work in New Zealand is primarily governed by the following legislation:

- The Building Act 2004; and
- The Building Regulations (which includes the Building Code)

All new building work must comply with the Building Code. Its purpose is to ensure that buildings are safe and healthy for the people who use them, and it identifies the minimum requirements to be met to guarantee this.

Ministry of Business, Innovation and Employment The Ministry of Business, Innovation and Employment (MBIE) administers the Building Act and Building Code and also oversees a range of other building and housing related acts and regulations (including occupational licensing in the building trades).

The diagram below shows how various documents fit within the regulatory environment.



Occupational licensing aims to ensure that people in the building industry who are responsible for the work done are competent and accountable, so that homes and buildings are designed and built right the first time. The main occupational licensing that impacts on the roofing trade is the Licensed Building Practitioners scheme and the Building Practitioners Board is closely related to the scheme.

Licensed Building Practitioners Scheme

The Licensed Building Practitioners Scheme was introduced in November 2007. Along with a series of licence classes covering carpenters, site supervisors, construction managers, designers and architects, there are also a number of specialist trade licence classes – of which one is for roofing.

All roofing work needs to be carried out or supervised by a licensed roofer. That doesn't mean that every single roofer will need to be licensed – it does however mean that a licence holder will need to be responsible for, and sign-off, every job that is completed.

Building Practitioners Board

The Building Practitioners Board plays a key role in the Licensed Building Practitioner Scheme. The Board's role is to:

- recommend to the Minister for approval the rules relating to licensed building practitioners – including licence standards;
- consider appeals against decisions made by the Registrar; and
- hear complaints about licensed building practitioners.

WorkSafe New Zealand (WorkSafe)

WorkSafe is the work health and safety regulator and is responsible for implementing the Health and Safety at Work Act 2015.

WorkSafe's functions include:

- Monitoring and enforcing compliance with work health and safety legislation
- Providing guidance, advice and information on work health and safety
- Fostering a co-operative and consultative relationship between the people who have health and safety duties and the persons to whom they owe those duties and their representatives.
- Collecting, analysing and publishing statistics and other information relating to work health and safety.

The main safety issues that Worksafe will look out for in the roofing industry include:

- manual material handling (safe lifting);
- safe use of plant, equipment and tools;
- working at heights (ie above ground level, ladders and scaffolds);
- chemical hazards (adhesives, sealants and grouts); and
- noise.

Building Consent Authorities

A Building Consent Authority (BCA) is an organisation or individual accredited to administer building control functions. BCAs are most commonly Territorial Authorities (local authorities or councils).

BCAs administer the requirements of the Building Code. They make sure that the work that has been done meets the Building Code.

They have to check the work before it starts, while it is underway and when it is finished. This is shown in the table below.

What the BCA does	When	What they are checking
Issue building consents	Before any building work starts	Checking that the details shown on drawings meet the Building Code
Perform inspections	As building progresses	Checking that construction, insulation, lining, bracing, weather tightness, plumbing, and electrical work complies with the Building Code
Issue Code Compliance Certificates	When the building is completed	Checking that all the requirements of the Building Code are met.

Standards New Zealand

Standards New Zealand is the operating arm of the Standards Council, an organisation set up under the Standards and Accreditation Act 2015. The Standards Council is the governing body for Standards New Zealand.

What is a Standard?

Standards are agreed specifications for products, processes, services, or performance. New Zealand Standards are used by a range of trades, including roofing, to enhance their products and services, improve safety and quality, and meet industry best practice.

What are Standards for?

- Standards help to keep homes, buildings, playgrounds, and health services safe. They help to prevent accidents and injuries in a broad range of areas.
- Standards minimise the impact of potential disasters such as earthquakes, or fires and electrical hazards, and also improve the quality of goods and services. They help to protect the environment, and they boost the country's economic growth and our trade opportunities.

Trade associations

These are organisations established to represent a trade or professional group or industry, and to promote the interests of the group or industry and the members of the association.

The trade association for the roofing industry is the Roofing Association of New Zealand (RANZ). The RANZ website (www.roofingassn.org.nz/) has a lot of information you may find useful.

Industry Training Organisations

Industry training organisations (ITOs) set the skill standards and arrange training for people employed in the industries the ITO is responsible for. Almost all apprentices in New Zealand are enrolled with an ITO.

The industry training organisation responsible for developing and maintaining qualifications for the roofing trade is the Skills Organisation. The main qualification for roofers is the National Certificate in Roofing (Installer) with strands in Concrete Roof Tiles, Metal Roofing and Wall Cladding, Metal Roof Tiles, Roof Membrane, Liquid Roof Membrane, Torch on Roof Membrane, and Roof Shingle, and with an optional strand in Foreperson.

This qualification structure of strands enables trainees to gain a qualification relevant to the industry sector in which they are working.

More information about the Skills Organisation and the opportunities for training as a roofer can be found on the ITO's website at skills.org.nz.

Job Roles and Training

The roofing industry offers a range of jobs and a progressive career structure so you can grow and develop with experience.

We list most of them below, starting from the more junior roles and working upwards towards those that require more qualifications and experience but have subsequently greater rewards.

Unskilled labourer

This is the most junior position in the trade. The labourer does a lot of the general basic “lifting, carrying, loading and unloading” sort of jobs and is not expected to have a qualification although if they remain on the job long enough they can pick up good experience.

Often their job may be on a casual contract basis and they can be easily out of work if the industry goes through a lean time.

Apprentice

To become qualified, roofers complete a formal apprenticeship. An apprentice is a person who has signed into a Training Agreement with an employer to learn the range of knowledge, skills, and competencies that are required for a career in roofing.

Apprentices receive on the job training and are assessed for a range of theory and practical plastering work. Apprenticeships are "competency based" which is all about demonstrating the ability (both in terms of knowledge and skill) to complete a range of tasks to a recognised industry standard.

Apprentices graduate once they have a broad knowledge and skill base to work as a competent tradesperson as well as the more specialised skills relating to the roofing industry sector in which they are working.

Roofing tradesperson

A roofing tradesperson is a skilled person who is able to perform all the tasks required for the installation of a roof of the type for which they have been trained. If they wish to work on another roof type they may need some additional training in the specific skills and practices relating to that roof type.

Once qualified, there are a variety of career paths to choose from - some requiring further experience and extra training including:

- Specialising in the residential (housing) or industrial sector.
- Starting up in business as a sole trader, either subcontracting to a roofing company or working directly with clients.
- Working for a roofing manufacturer.

Depending on the area of the trade that the tradesperson has chosen to work, they may report to different people.

If they are working on large projects they may be part of a team and report to the foreman (leading hand).

If the tradesperson is an independent business person (sole trader) they will be responsible for their own work performance but will have to perform to the contract and/or expectations of the client or client's company.

Foreperson (Leading hand)

A foreperson is usually an experienced tradesperson who is responsible for the day to day organisation of a team generally made up of team members who may have varying levels of experience. They are also responsible for making sure material and equipment is available as needed by their team, and for organising the work flow of the team.

As well as organisation of the team the foreperson will also work as a team member carrying out 'hands-on' installation tasks. They will often also have responsibility for training members of their team.

The foreperson will report to a head foreperson on a large site, or on smaller projects will report to the site supervisor or project manager.

Site Supervisor

The site supervisor (also known as the roofing contract supervisor), is the person in charge of the roofing contract. They are responsible for managing the roofing project. In larger companies they will be responsible for more than one roofing project at a time, and will share their time between sites.

They are responsible for making sure materials, equipment and people are on site when required, liaising with the main contractor/builder/owner, and for the overall management and administration of the project.

Foremen/supervisors report to the project manager on large sites or to the main contractor/builder on smaller sites.

The National Certificate in Construction Trades (Supervisor) (Level 4) is designed to recognise the skills and knowledge required to be a supervisor/foreman in the construction industry.

Training enquiries

If you are interested in a career in the roofing industry, contact the Skills Organisation (skills.org.nz).

For more experience at school contact your school Gateway supervisor or careers advisor.