

CPCCBC4010

APPLY STRUCTURAL PRINCIPLES TO RESIDENTIAL AND COMMERCIAL CONSTRUCTIONS

ASSESSMENT SUMMARY

The assessment activities for *CPCCBC4010 Apply structural principles to residential and commercial constructions* cover all aspects of the unit of competency. For Apprentices/Trainees, this includes supervisor completion of the Apprentice/Trainee Record (ATR).

Participants must read all the information given before starting any assessment task. The assessment tasks are intended to be fair, flexible, valid and reliable. If a Participant has any questions or requires alternative arrangements to be made such requests should be directed to their Trainer/Assessor, who should note such arrangements in the 'Assessor Comments' on the affected assessment. If a Participant feels they are not yet ready to be assessed, they should discuss their options with their Trainer/Assessor.

To satisfactorily complete the assessment, the Participant is required to answer all questions correctly and demonstrate their skills to industry standards. If a Participant does not answer all questions or perform all tasks, they will be deemed 'Not Satisfactory' for the task and 'Not Yet Competent' for the unit of competency.

The Trainer/Assessor can provide the Participant with additional information on interpreting the assessment outcomes and guide the Participant's options. If a Participant is still deemed 'Not Satisfactory' they will have the opportunity to undertake a supplementary assessment or appeal the result as per the process in the Student Handbook.

By signing below, the Participant acknowledges:

- They understand the assessment instructions and requirements, and consent to being assessed.
- The work submitted is to be their own work – with the work of/with others needing to be clearly acknowledged and documented.
- They consent to any photo/video recording of their work that occurs during assessment.

Participant name	Rex Henderson
Participant signature	

Pre-requisite unit(s) to be achieved and authenticated prior to undertaking assessment

- ☐ CPCCBC4053 Apply building codes and standards to the construction process for Class 2 to 9 Type C buildings
- ☐ CPCCBC4001 Apply building codes and standards to the construction process for Class 1 and 10 buildings

Task	Date completed	Assessment Results	
Theory Exam	Select Date.	☐ Satisfactory	☐ Not Satisfactory
Workbook	Select Date.	☐ Satisfactory	☐ Not Satisfactory
Practical Assessment	Select Date.	☐ Satisfactory	☐ Not Satisfactory
Outcome for CPCCBC4010	Select Date.	☐ Competent	☐ Not Yet Competent
Evidence requirements checklist (ticked by assessor and evidence supplied to RTO)			
☐ Theory Exam		☐ Practical Assessment	
☐ Workbook		☐ Documentation of design and construction (suitability or evidence of suitability)	

Assessor name	
Assessor signature	

CPCCBC4010

APPLY STRUCTURAL PRINCIPLES TO RESIDENTIAL AND COMMERCIAL CONSTRUCTIONS

THEORY EXAM

Participant name	Rex Henderson
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FOR THE PARTICIPANT
Instructions - You will complete written questions as outlined on the following pages. You must attempt all questions and provide enough detail in your responses to demonstrate your knowledge. - It is anticipated that you should complete this assessment within two (2) hours, but additional time may be allowed upon negotiation with the Assessor. - You must complete all questions unassisted by the Assessor or other personnel but may refer to reference material as needed. All questions must be answered correctly for a 'Satisfactory' assessment outcome to be awarded. - An oral examination may be allowed under certain circumstances, whereby your answers will be documented by another party. - Any written questions that are incomplete, or not answered satisfactorily will need to be completed again after further training support. - If you answer a question incorrectly but modify your response, put your initials next to the written change (or the Assessor must initial a verbal change).
Resources required
Pen

FOR THE ASSESSOR
Instructions - Where oral examination has occurred, ensure that this is acknowledged in writing (e.g. FT001 and Assessor Comments) - All questions must be satisfactorily demonstrated by the Participant for a Satisfactory determination (indicated by an Assessor tick to the right of the question). - Assessors are to complete marking in pen of a different colour to the Participant. - If the Participant verbally modifies their response, write in the modified response verbatim and put your initials next to the written change.

ASSESSOR COMMENTS

As necessary, outline:

- Details on reattempts, alternative arrangements or reasonable adjustments made.
- Where a Participant is deemed 'Not Satisfactory', provide recommendations for future training.

Specify the State or Territory you are responding to when responding to Q1. Q2. & Q3.

State/Territory: Queensland

Q1. Identify one current building and construction legislation relevant to the application of structural principles. (*Legislation identified may be national legislation or be specific to your state/territory.*)

Briefly explain how the identified legislation applies to the following:

- Residential construction
- Commercial construction

Answer

Building and construction legislation relevant to the application of structural principles	The Building Act 1975 governs all building work in Queensland, empowering the regulation of certain aspects of buildings and structures. It includes the administrative terms necessary to give effect to the laws.
How does it apply to residential construction?	It applies as the Act does not discriminate upon class of building except for warranty and insurance.
How does it apply to commercial construction	It applies as the Act does not discriminate upon class of building except for warranty and insurance.



Q2. Name one (1) current building and construction regulation applicable to your state/territory. Briefly explain how this regulation is relevant to the application of structural principles.

Answer Australian standard AS/NZS 1170.2:2021 - Structural Design Actions - Wind Actions



Q3. Identify the following current standards.

Answer

Standard	Description
One current standard relevant to the installation of roof trusses	The purpose of AS 4440 is to prescribe the requirements and specifications for the installation, bracing and connection of nail plated timber trusses.
One current standard relevant to timber framing	AS 1684 – Four parts. AS 1684 Residential Timber Framed Construction has four parts: Part 1 relates to design criteria that can be used as a basis for the preparation of span tables and design data for the other parts. This is the document commonly used by engineers



Q4. Discuss why builders must refer to the NCC to confirm appropriate application of structural principles relevant to the build.

Answer

Building work in Australia must conform and comply with the National Construction Code (NCC), relevant technical standards, and local laws. This ensures our buildings are safe, healthy and durable. The products and materials you choose and how they are used must also be 'fit for purpose'



Q5. Provide a brief description for each of the following building classes.

Answer

Building Class	Description
Class 1a building	Class 1a – a single dwelling or one of a group of attached dwellings, e.g. a terrace house. Class 1b – a boarding house, guest house or hostel with a floor area less than 300 m2.
Class 1b building	class 1b—is a boarding house, guest house or hostel that has a floor area less than 300 m2 , and ordinarily has less than 12 people living in it. It can also be four or more single dwellings located on one allotment which are used for short-term holiday accommodation.
Class 5 building	Class 5 buildings are office buildings used for professional or commercial purposes. Examples of Class 5 buildings are offices for lawyers, accountants, government agencies and architects.
Class 6 building	Class 6 buildings are typically shops, restaurants and cafés. They are a place for the sale of retail goods or the supply of services direct to the public. Some examples are: • A dining room, bar, shop or kiosk part of a hotel or motel. • A hairdresser or barber shop.



Q6. Explain why a determination of the climate zone is important when ensuring the structural integrity of the building.

Answer

Each zone performs differently throughout the seasons. By paying attention to your climate zone when buying, building or renovating, you can ensure that your home will keep you comfortable while using the least possible energy for heating and cooling.



Q7. You are involved in preparing for the building of a 16-level apartment building where the carpark is underground, and the ground floor consists of shops and cafés/restaurants/bars. Specify the classifications that you will apply to this building.

Answer

Multiple Classifications

Multiple classifications apply when a building serves more than one function. A perfect example is mixed-use buildings, wherein the ground level may be utilised as a carpark (Class 7a), and the upper storeys may consist of shops (Class 6) and apartments (Class 2). In such a case, the different parts must comply with the requirements that apply to their corresponding classifications



Q8. Explain why sectional properties are important in structural design.

Answer

These sectional properties are essential for the design, analysis, and evaluation of civil structures, and are crucial in predicting the behaviour of structures under various load conditions such as bending, compression, and buckling



Q9. Considering sectional properties, what will occur if the structural engineer increases the second moment of area on a beam?

Answer

Second moment of area, also known as area moment of inertia, is used in calculating the efficiency of the cross-section of a beam against bending stresses and deflection.

The Second Moment of Area is used to predict how a beam will behave under bending stress. Therefore, the larger the Second Moment of Area, the more resistant the beam is to bending



Q10. Identify if the following are examples of either:

- Dead load
- Live loads
- Wind load

Answer

Example of load	Type of load
Reinforced concrete beams	Dead load
Strong winds blowing against a building	Wind load
People walking around	Live load
A soft breeze on a fence	Wind load
A vehicle being parked	Live load
Stone columns	Dead load



Q11. What is the purpose of AS 1684 Residential timber-framed construction?

Answer

AS 1684 Residential Timber Framed Construction is a four-part Australian Standard covering design criteria, building practices, tie-downs, bracing and span tables for timber framing members. It is also referred to as the Timber Framing Code.



Q12. Self-healing concrete is one emerging material. Using special bacteria, this material has the ability to “heal” itself if it cracks. This is intended to extend the concrete’s lifespan. Describe the assessment methods you would apply before using this material.

Answer

Before using self-healing concrete, conduct thorough tests to verify its chemical composition, bacteria viability, healing efficiency, and long-term durability under various conditions. Additionally, assess its environmental impact, economic feasibility, compliance with standards, and safety to ensure it meets all necessary performance and regulatory criteria.



Q13. Which industry professionals would you consult before the site inspection, to discuss if structural performance meets the General Requirements and Performance Requirements of NCC? Provide two (2).

Answer

1. Structural engineer
2. Building surveyor



Q14. Explain the importance of having project plans and specifications approved.

Answer Specification in design and architecture plays a key role in project fulfilment. Not only does it facilitate the exchange of information between client, designer and contractor, but having accurate and up-to-date building information across a project timeline can protect stakeholders from risk.



Q15. Describe how you apply structural design and specification documents.

Answer . This document is meticulously structured, devoid of visual elements and typically comprises performance criteria, workmanship standards, quality expectations, references to building codes, requested samples, regulatory requirements and product selections.



Q16. What information is provided in the engineer's footing design and specifications documents?

Answer AS 2870 sets out the method for determining the classification of a site and the design and construction requirements for slab on ground, stiffened rafts, waffle slab, strip footings, pad footings and piled footings



Q17. Discuss cadastral survey plans, what they contain and who is responsible for preparing these.

Answer

In the identification of building location boundaries, one important legal document to be used is a registered plan, also known as a cadastral survey plan. This document is prepared by a registered cadastral surveyor and provides the details of the property such as the boundary lines, distances, bearings, and property area. Land contours are not contained in the registered plan but rather in the contour site plan discussed previously in Section 2.2.



Q18. What is determined from the contour site plan?

Answer

Contour Site Plan

A contour site plan consists of a map or drawings that represent the physical features of the ground on the site. These physical features include the profile of the land (e.g. steepness of slope) and the corresponding elevations of points defined by contour lines which are based on an arbitrary datum or reference elevation. Contour site plans possess the following characteristics:

- ☐ Flat surfaces are represented by widely spaced contour.
- ☐ Steep ground is represented by closely spaced contour.
- ☐ Uniform slope is represented by equally spaced contour.
- ☐ Uneven surfaces are represented by irregular contours.
- ☐ A pond is represented by approximately concentric closed contours with decreasing values towards the centre.
- ☐ Hills are represented by approximately concentric closed contours with increasing values towards the centre.
- ☐ Ridges are represented by contour lines with U-shape with convexity towards lower ground.
- ☐ Valleys are represented by contour lines with V-shaped with convexity towards higher ground.
- ☐ Contour lines generally do not meet or intersect each other. However, if they intersect at a common point, it indicates the presence of vertical cliffs. If contour lines cross each other, it indicates the presence of an overhanging cliff or a cave.

Contour site plans are utilised for the following purposes:

- ☐ To have an idea of the nature of the ground (i.e. ridges, valleys, cliffs)
- ☐ To determine the ground profile for cut and fill calculations and procedures to be undertaken
- ☐ To determine ground slopes which direct the flow and quantity of water. This is important in the planning and construction of appropriate drainage systems.



Q19. Discuss who prepares and geotechnical report and what this report contains.

Answer Prepared by a geotechnical engineer (a professional with specialised knowledge of earth materials and their interaction with structures), the report is an essential component of any construction project that involves excavation, foundation work or other types of earthwork. ☐

Q20. The plans and specifications include underpinning design and specifications due to a change in the imposed loading. Why are these included?

Answer Underpinning is done to deepen the existing foundation (resting on poor strata) and make it rest on deeper soil strata of higher bearing capacity. To strengthen a settled foundation that may be caused by cracks in the wall. ☐

Q21. Specifications are included for temporary rock anchors to be used for securing a retaining wall. What is the purpose of these?

Answer Anchors are often used for excavation support, or as a part of permanent retaining walls, or to resist up-lift forces on foundations. Rembco uses rock anchors to stabilize slopes and walls, provide tiebacks for bridges and towers, to stabilize dams, and to secure caisson bottoms.



Q22. Explain how shoring specifications differ to specifications for temporary rock anchors.

Answer Rock anchors are designed to support structures, retaining and shoring systems, excavations and embankments and are generally used in geotechnical and construction settings. The developer and builder are concerned with ensuring the excavation works and any stabilisation using rock anchors on/below the neighbouring property proceed as quickly as possible to avoid delays that typically occur in discussions between the builder and the owner(s) of the neighbouring property(ies)



Ground anchors or tie-backs are versatile devices used to hold, restrain and support building and civil engineering structures either temporarily or permanently. The method of installation varies depending upon the ground conditions.

Temporary shoring is an emergency band-aid that provides a shelter for structural integrity when a building has lost its stability. Not a "fix," it is a way to hold the problem steady until a repair can be made and it helps to stop any further insult to the building in the interim.

Q23. Describe what tanking is and methods used.

Answer**Tanking Design Specifications**

Tanking is the process of applying waterproofing or moisture barrier on structural elements (e.g. basement walls, retaining walls). This is to protect the structure from the penetration of water into the interior. This process takes form in two methods: membrane or coating.

Tanking membranes are composed of plastic sheets fixed onto the internal wall face. On the other hand, coatings may be in the form of liquid applications of bitumen or asphalt, epoxy resins, or cement slurry. The design specification for retaining walls and tanking procedures can be found in the Engineer's footing design and specifications document, which is based on the provisions set by the National Construction Code.



Q24. Briefly explain the expected deflection of the following beams. In your explanation, identify the point of maximum and minimum deflection.

Answer

Beams	Expected deflection
Cantilever beams Beam length = 10 m Fixed support at 0 m Point load at 5 m Load magnitude = 5N	No deflection occurs at the left endpoint since the beam is fully fixed at this point. The beam tends to deflect the most at the right end, which is the free end. The degree of deflection increases as the length travels from the fixed end support towards the free end.



Beam with overhang Beam length = 10 m Support #1 = 0m Support #2 = 8m Point load at 4m Load magnitude = 5 N	Simple beams with a span extending beyond one end support Depends on span lengths (either on the simple span or the overhang end)
Beam fixed at both ends Beam length = 10 m Fixed support at 0 m Point load at 5 m Load magnitude = 5 N	Centre span Beams with end supports that do not allow rotation (moment resistance)

Q25. Briefly explain the performance of the following columns when put under compressive loads.

Answer

Beams	Expected deflection
Steel column	Generally, there is a rule of thumb that says deflection should not exceed $L/360$. This means that the maximum deflection should not be more than span divide by 360. For example if you have a 10 meter beam, then the deflection should not be more than $10000/360 = 27.8\text{mm}$.



Masonry column	One of the requirements for durability is that each brick must be able to carry a compressive load of at least 2500 pounds per square inch (PSI). This means you should be able to put a load of at least 69,000 pounds on a normal modular size brick without it crushing
Reactive powder concrete columns	As reported in literature, the Reactive Powder Concrete (RPC) with quartz powder substitute has a high compressive strength of 180 MPa and has a fairly high tensile strength.

Q26. Briefly explain the safety factor in design of the following types of roof trusses.

Answer

Beams	Expected deflection
Timber trusses	Deflection of a truss is generally based on the amount of vertical movement from its original position due to the loads applied to the members. The amount of deflection depends on the span and stiffness of the members, and the magnitude of the loads applied.



Metal trusses	Generally, for roof trusses, the deflection in inches due to live load cannot exceed the span in inches divided by 240 ($L/240$) and due to total load $L/180$. For floor trusses, the deflection in inches due to live load cannot exceed the span in inches divided by 360 ($L/360$) and due to total load $L/240$. More for fire threat due to the behaviour of metal when in close proximity to heat
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Q27. Describe wind bracing and four (4) types of wind bracing applied.

Answer 1. Single Diagonals

2. Cross-bracing

3. K-bracing

4. V-bracing



Consider the rafter that the pots are hanging from in the photo below when responding to Q28. Q29. & Q30. Assume that it is a rafter tie also connected to walls on either side.



Q28. Identify the force system that is acting on the rafter. Explain your answer.

Answer Downward forces will cause the rafters to spread apart and push the walls. A rafter tie will prevent this from happening and hold the rafters at their origin



Q29. Describe what would happen to the rafter if the force applied by the hanging pots were too heavy to be held up by the rafter.

Answer Inevitably the downward force of the pots will cause the rafter to bend and break



Q30. Identify the force system that would be applied if all the hanging pots are removed from the rafter.

Answer Downward force would continue to transfer the weight of the roof to the walls or other load-bearing elements of the structure.



Q31. Describe the general details contained in the project documents for each structural system stated below.

Answer

Structural system	General details
Floor system	Joists. At the very bottom of the layers that make up your floors is what we call joists. ... Subfloor. After the joists, you'll find the subfloor. ... Underlayment. On top of the subfloor is the underlayment. ... Floor Covering. ... Adhesive.
Wall system	Structural elements may include external and internal load-bearing brick or masonry walls, mud walls or timber-framed walls; columns of stone, cast iron or concrete; stone, brick or concrete vaults; timber, iron or steel beams, trusses, girders and many others
Roof system	The roof consists of common rafters fixed at the ridge and at the wall plate. When subjected to any type of load or force acting vertically downwards the rafters will move outwards at their feet thus exerting thrust to the walls forcing them outwards and causing possible failure of the wall structure.



Q32. What must be covered by the site environmental management plan?

Answer

The environmental management plan should include procedures for addressing:
monitoring results which exceed the trigger values for corrective action.
potential corrective actions.
reporting non-compliance with approval conditions to the relevant authority.
environmental incidents and emergencies.



Q33. Discuss what type of information is included in the site safety plan.

Answer

Developing a site safety plan for construction work, will assist you to set out the arrangements to manage occupational health and safety on a construction project. In simple terms, it sets out how you will identify, assess and control the risks related to the construction work you will undertake.



Q34. Discuss the different contracts a builder or building company must organise before beginning a residential or commercial construction project. What are the legal requirements for such contracts?

Answer

The 4 Different Types of Construction Contracts
Lump Sum Contract. A lump sum contract sets one determined price for all work done for the project. ...
Unit Price Contract. ...
Cost Plus Contract. ...
Time and Materials Contract.



Q35. Identify one (1) potential structural issue for each of the following footing systems.

Answer

Footing system	Potential structural issues
Concrete slab floor	To ensure longevity and structural integrity of the slab, control cracking with: proper preparation of foundations. appropriate water content; excess water causes cracking and weakens the slab. appropriate placing and compaction.
Mass concrete piers	Uneven or Cracked Foundation: Visible cracks or shifts in the foundation itself are clear signs of underlying structural problems. Sinking or Settling: If you notice certain areas of your structure sinking or settling, it could be due to foundation issues causing uneven weight distribution.



Q36. Describe how the following footing systems perform when bearing structural load.

Answer

Footing system	How they perform when bearing structural loads
Bored pier footing	Bored piers are an effective solution for supporting significant/heavy vertical and horizontal structural loads, with an allowable bearing capacity of up to 13,800 kN.
Column footing	Essentially, footings create an additional load-bearing point between the structure and the ground. This is especially helpful when building with shallower foundations. As a result, they help transfer weight into the ground so that the structure doesn't bear as much weight.
Stump footing	The foundation of load-bearing walls consists of a linear or continuous footing – that is, a foundation (usually made of concrete) located under the pillars of the structure.
Drilled pile foundation	Piling foundations are long, cylindrical columns of timber, steel, and concrete drilled into the ground until they reach a stable layer of rock or soil. These columns, known as piles, transfer the structure's load to the underlying rock or soil, providing a stable foundation
Driven pile foundation	This type of building pile foundation is mainly used to transfer the vertical loads from the structure to the soil. These load-bearing pile foundations transmit loads through the soil with poor supporting property onto a layer that is capable of bearing the load



Q37. Identify the structural advantages of each of the following footing systems.

Answer

Footing system	Structural advantages
Reinforced piers and beams	The advantages of pier-and-beam foundations often come down to cost, flood protection, and flexibility. Protection from flooding. Since the house is elevated above the ground, sitting atop posts, it will be protected from flooding. Access to pipes and wiring
Screw piles	One of the key advantages is its exceptional load-bearing capacity and stability, particularly in challenging soil conditions. Whether it's sandy, clayey, or rocky soil, screw piles provide reliable support, ensuring the structural integrity of the building.
Brick bases	The uniformity of the shape of a building brick makes it a more reliable material for a building's foundation as the load bearing nature of the bricks can be better determined when stacked together. This is especially true if you are trying to decide between bricks and crushed stone



Q38. Why must foundation movement be considered when designing and constructing on-ground concrete slab floors?

Answer

In both newly built and older homes, it can be common for cracks appear in the walls and floors. This sometimes happens as a result of foundation movement, also known as slab heave. When the footing lifts excessively (heaves) in one section of the house and not another, your walls will usually develop cracks.



Q39. Identify the structural advantages of the following floor systems.

Answer

Floor system	Structural advantages
Suspended concrete floors	Fast and easy to install. Time is money, so a fast and easy installation matters. ... Lightweight, less materials. ... Cost-effective. ... Environmentally Responsible. ... Smart integration of services. ... Building standards.
Timber floor frames	Timber frames are tried and tested. Lightweight timber framing is a popular choice for Australian homes. ... Strong, stable, and quiet. ... Speed to build. ... Easy to renovate. ... Simple to install services in timber framing. ... Timber is cost-effective. ... Environmental advantages of timber framing.
Steel floor frames	Strength & Durability. ... 2) Easy Fabrication In Different Sizes. ... 3) Fire Resistance. ... 4) Pest & Insect Resistant. ... 5) Moisture & Weather Resistance. ... 1) Thermal Conductivity. ... 2) Reduced Flexibility On Site.
Aluminium raised floors	Raised access flooring offers numerous advantages, including enhanced flexibility, easy access to utilities, improved airflow, reduced maintenance costs, and enhanced aesthetics.
Solid hardwood fitted floors	Crafted from a single piece of timber, solid timber floors are inherently sturdy and robust, capable of withstanding heavy foot traffic and everyday wear and tear without losing their structural integrity.
Engineered wood fitted floors	Greater stability: The structure and hevea core of engineered timber is specifically designed to mitigate the effects moisture can have on the wood, meaning engineered hardwood is more stable in high-humidity environments.



Q40. Identify two (2) actions during the installation of I-joists that may negatively affect their structural integrity. Explain your response.

Answer

1. I-joists' dimensional soundness and little or no shrinkage help eliminate squeaky floors. The disadvantage of I-joists is very rapid structural failure when directly exposed to fire (much like trusses), reducing the time available for residents to escape and increasing the danger to firefighters.

2. If the hole is cut too large, too closely spaced to adjacent holes, or too close to flanges it can weaken the performance of the joist.



Q41. What are the structural disadvantages of using platform floors?

Answer

It is particularly important to ensure adequate ventilation beneath fitted and platform floors as a build-up of humidity or moisture in the under-floor space can adversely affect the timber: chronic moisture build-up can lead to increased expansion, cupping or doming of the boards.



Q42. Why are compressed sheets commonly used in the flooring of wet areas?

Answer

When lining floors in kitchens, bathrooms, laundries, and other 'wet areas', compressed sheeting needs to be used. In both domestic and commercial applications, this cement sheet is immune to water damage and will not rot. Compressed sheet is a fast, economical and versatile flooring panel which is ideal for tiling.



Q43. What is one (1) benefit of using vinyl sheet flooring in areas with high foot traffic?

Answer Vinyl flooring is made of highly durable plastic; if properly installed, the flooring can last two decades or more. This makes it ideal for any area of the home with high foot traffic. Products also come with a warranty. Vinyl flooring can be cushiony and soft for your feet.



Q44. Describe one (1) structural advantage of using tongue and groove boards for flooring.

Answer The tongue and groove joinery adds to this stability, ensuring a tight and secure fit that stands up well to daily wear and tear. This makes engineered wood flooring a long-lasting option, maintaining its shape and appearance over the years.



Q45. Discuss the structural capability of autoclaved aerated concrete (AAC) flooring panels.

Answer The compressive strength of AAC is very good. Although it is one-fifth the density of normal concrete, it still has half the bearing strength, and loadbearing structures up to 3 storeys high can be safely erected with AAC blockwork



Q46. What are the structural limitations of using lightweight AAC as part of a composite loadbearing wall?

Answer AAC panels have limited structural capacity only due to their low compressive strength capacity (approximately 4Mpa). As a result, most commonly AAC panels are not used as structural elements but used as infill walls in a multi-level apartment building.



Q47. Discuss one (1) structural factor that must be considered when integrating tilt-up slab panels into composite walls. Explain your answer.

Answer Tilt-Up construction features series of concrete panels tilted up into place to form a building's exterior wall. These panels are created at the work site using wood forms, rebar and concrete. The forms are shaped and rebar cut to match final designs. Next, concrete is poured into the forms and finished.

Connections are made with bent dowel bars cast into the panel or threaded inserts cast into the panel during concrete placement; dowel bars epoxied into a panel already cast; attachments to embedded plates or angles cast into the panel and floor slab; or, any combination of the above approaches



Q48. Identify the structural advantages of using the following products in composite walls.

Answer

Products	Structural advantages in composite walls
Glue-laminated lumber	Stronger than solid timber. Straight and curved members for design and architectural benefit. Large section and long length sizes. A high degree of dimensional stability. Structural capabilities. Fire-resistant. Easy to erect and install. Sustainable.
Mass concrete piers	Reinforced pre-cast concrete provides strength and stability. Concrete pile foundations therefore have a much higher load-bearing capacity than those made from materials like wood. This makes them an ideal choice for particularly heavy structures, like large buildings and bridges.



Q49. What makes a cavity brick masonry wall a good choice for areas that often experience rain?

Answer

Masonry is an absorbent material, and therefore will slowly draw rainwater or even humidity into the wall. The cavity serves as a way to drain this water back out through weep holes at the base of the wall system. The cavity is initially empty but can be filled with insulation by various methods.



Q50. Discuss disadvantages of using single-leaf masonry walls.

Answer

The thickness of insulation is restricted by the width of the cavity.



Q51. What behavioural properties make AAC a good choice for masonry walls?

Answer

Autoclaved aerated concrete (AAC) block is used in the construction of load-bearing and masonry walls due to its low thermal expansion coefficient, high fire resistance, and low weight.

AAC blocks are lighter and more efficient than clay bricks. AAC blocks are not only economical but also good for the environment. AAC blocks reduce outside noise and heat, making your home noise-free, and keeping it cool in the summer and warm in the winter.



Q52. Discuss structural disadvantages of using timber weatherboards as wall cladding.

Answer Lack of insulation from the material



Timber weatherboard panels have lower thermal mass compared to bricks, which reduces their ability to store and release heat efficiently. Also, weatherboard materials tend to have higher thermal conductivity, making it easier for heat to transfer through each panel.

Q53. Discuss how wall coatings differ from regular paint.

Answer Coatings, on the other hand, are used for protection. They look like paint on the surface, but their real purpose is to provide a physical barrier between the metal and the environment, reducing the chance that it will come into contact with oxygen and moisture that lead to corrosion.



Q54. What structural factors must you consider when using compressed wood panelling as cladding?

Answer Weather resistance. ...
Air and moisture management. ...
Thermal performance. ...
Aesthetics. ...
Sustainability. ...
Compatibility. ...
Fire safety



Q55. Identify the structural advantages of the following products used in wall cladding.

Answer

Products	Structural advantages in wall cladding
Corrugated metal sheeting	Metal cladding panels protect the inside building components from the weather while also increasing the structure's mechanical stability. The coating guards against temperature variations, wind, water absorption, sunshine, and pollution, all of which can harm a building's structural integrity and attractiveness.
Fibre cement cladding	Fibre cement cladding is a hardwearing material that is easy to maintain. Capable of withstanding impact, harsh weather conditions and general wear and tear, it lasts longer and requires less maintenance than many other cladding types.
Tilt-up concrete panels	Naturally, tilt-up wall panels are less prone to damage than lightweight systems providing durability. Tilt panels can also be used as structural members to brace the building and provide the fire rating for the construction type required
Fired bricks	Fired clay bricks offer high compressive strength. Both clay and concrete brickwork walls can readily support relatively high loads, such as suspended concrete slabs
Unfired bricks	Sustainability: Unfired bricks are generally more sustainable because they do not need to be baked in a high-temperature kiln that releases a lot of greenhouse gases. Cost-Effective: Unfired bricks are generally also much cheaper than their fired counterparts, making them a more cost-effective option
AAC bricks	Some of the benefits of using AAC blocks include their lightweight, thermal insulation properties, fire resistance, durability, sound insulation, ease of cutting and shaping, and environmental friendliness



Q56. Discuss one (1) structural advantage and one (1) structural disadvantage when using timber prefabricated roof trusses.

Answer

Roof trusses have several advantages over traditional timber framing, including their strength, cost-effectiveness, and quick installation. However, they also have some disadvantages, such as less visual appeal and less attic space.



Q57. Provide one (1) structural advantage and one (1) structural disadvantage when using steel prefabricated roof trusses.

Answer

Steel frames and trusses offer long-lasting durability for your construction needs. Steel is light weight yet strong and can endure extreme conditions. Corrosion resistant, chemical free and termite resistant makes it the ideal material for both interior and exterior structures.



Q58. Name five (5) structural components of a hand cut timber roof.

Answer

1. Roof truss
2. Purlins
3. Purlin cleat
4. Truss web
5. Rafter



Q59. Discuss uses and disadvantages of the following roof types.

Answer

Roof types	Uses and disadvantages
Box gable roof	If you reside in an area with high winds, a gable roof will most likely not be a suitable choice. Gable roofs are particularly prone to wind damage. This is because the design at the top of the roof can actually attract wind. Over time, if this happens it will actually start to peel the roof off.
Dual pitch roof	They require little maintenance which makes them a great choice for residential homes. Yet, these roofs do have their drawbacks as well. Dual pitched roofs are heavy. They almost always require heavy machinery to install.
Dutch gable and Dutch hip roof	The hip roof's structural stability comes from a complicated design which increases costs due to labor and material. Because of the complex structure of the roof, there is often no attic space
Hip and valley roof	In fact, hip roofs are more costly. Not only is a hip roof challenging to design, but it also requires more roofing materials than a gable roof. So, you can expect a slightly increased cost if you choose a hip roof.
Skillion roof	Since a skillion roof has no attic space and a lower ceiling height, it is not suitable for properties with a small amount of available space. It also cannot cover the entire house because of its limited span.



Q60. What parts of the building make up the gable end?

Answer

The term gable wall or gable end more commonly refers to the entire wall, including the gable and the wall below it. Some types of roof do not have a gable (for example hip roofs do not). One common type of roof with gables, the 'gable roof', is named after its prominent gables.



Q61. Discuss north light roofing.

Answer

North light trusses are traditionally used for short spans in industrial workshop-type buildings. They allow maximum benefit to be gained from natural lighting by the use of glazing on the steeper pitch which generally faces north or north-east to reduce solar gain.



Q62. Discuss the benefits and disadvantages of using concrete, clay or metal tiles for roof cladding.

Answer

Concrete tiles can withstand the toughest elements. Environmental conditions, however, affect metal roofing. For instance, metal roof tends to rust with exposure to salt and temperature changes, among others. Metal roofs are also more prone to dents and cracks if there is weight on them, as compared to concrete tiles.



Q63. Discuss the structural advantages associated with the following types of roof cladding.

Answer

Roof cladding	Structural advantages
Shakes	Wood shakes are cut to a depth and weight that makes them more wind-resistant than some other roofing materials, as long as the shakes are fastened properly during the installation process. Woods like cedar also deter many pests, and are naturally pest-resistant
Shingles	It can withstand up to 177 km/hr winds and also resist severe exposure to fire thus its class A Fire Rating. Because of the flexible material of asphalt roof shingles, it makes it easy to use for curved and organic roof planes. Unlike some roofing options, asphalt shingles provide a totally rust-free solution.
Short run sheeting	Metal roofing sheets offer exceptional durability, making them an excellent choice for long-lasting protection. With their ability to withstand extreme weather conditions such as heavy rain, strong winds, and hail, metal roofs provide reliable defence against the elements
Long run sheeting	The reduced weight of steel roofing means there is less of a burden on the structure of the home, making it ideal for earthquake prone areas. Low Maintenance. Long run metal roofs are easily cleaned and maintained, requiring very little maintenance over their lifetime.
Metal sheeting	Sheet metal structures are highly resistant to weather conditions, including heavy rains, snow, strong winds, and even extreme temperatures. With the proper maintenance and care, these structures can last for decades without showing signs of wear and tear.



CPCCBC4010

APPLY STRUCTURAL PRINCIPLES TO RESIDENTIAL AND COMMERCIAL CONSTRUCTIONS

WORKBOOK

Participant name	Rex Henderson
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FOR THE PARTICIPANT
Instructions
- You will complete written activities as outlined on the following pages. You must attempt all questions and provide enough detail in your responses to demonstrate your knowledge. - The timeframe for these tasks will be established by your Assessor or Training Plan, but additional time may be allowed upon negotiation with the Assessor. - You must complete all questions unassisted by the Assessor or other personnel but may refer to reference material as needed. All questions must be answered correctly for a 'Satisfactory' assessment outcome to be awarded. - An oral examination may be allowed under certain circumstances, whereby your answers will be documented by another party. - Any written questions that are incomplete, or not answered satisfactorily will need to be completed again after further training support. - If you answer a question incorrectly but modify your response, put your initials next to the written change (or the Assessor must initial a verbal change).
Resources required
Pen

FOR THE ASSESSOR
Instructions
- Where oral examination has occurred, ensure that this is acknowledged in writing (e.g. FT001 and Assessor Comments) - All questions must be satisfactorily demonstrated by the Participant for a Satisfactory determination (indicated by an Assessor tick to the right of the question). - Assessors are to complete marking in pen of a different colour to the Participant. - If the Participant verbally modifies their response, write in the modified response verbatim and put your initials next to the written change.

ASSESSOR COMMENTS

As necessary, outline:

- Details on reattempts, alternative arrangements or reasonable adjustments made.
- Where a Participant is deemed 'Not Satisfactory', provide recommendations for future training.

NOTE

At times, you will be provided with a specific business context to which you must respond, otherwise it is anticipated that you will use a workplace of your choosing (your own, or hypothetical) to provide the context to the task.

At all times, the responses in your assessment must reference **Australian** (Queensland or Federal) documentation, including legislation, regulations, codes of practice, standards and guidance publications.

ACTIVITY 1

Access the NCC via the internet to locate the requirements applicable to the proposed building development plans at PALLARA, QUEENSLAND (*Handout 1 and Handout 2*) and complete the information below:

Building Description

Classification
1A
Climate zone and description
Zone 2, Warm humid summer, mild winter
Type of construction
class 1a—is a single dwelling being a detached house; or one of a group of attached dwellings being a town house, row house or the like
Wind Classification
Wind rating -N2
Site soil classification
Part 3.2.4 Site classification

Site Preparation

Termite management
NCC Volume 2 Part 3.1.4 Termite risk management
Site preparation
NCC Volume 2 Part 3.1 Site Preparation Part 3.1.1 Earth works Part 3.1.2 Earth retaining structures. Part 3.1.3 Drainage

Fire resistance and stability

Fire resistance information

NCC
Volume 1
Part C1 Fire resistance and stability

Fire hazard properties of materials, assemblies, fixtures and linings

NCC
Volume 1
Section C Fire resistance
Specification C1.10 Fire hazard properties

Material requirements

Reinforced concrete requirements relative to Australian Standards

NCC
Volume 2
Amendment 1
Part 3.2 Footings and slab
Part 3.2.3 Concrete and reinforcing

Structural timber and framing

NCC
Volume 2
Amendment 1
Part 3.4 Framing
Part 3.4.3 Timber framing State and Territory Variations

State and Territory Variations
In Queensland after 3.4.3.0(f) insert Qld 3.4.3.0(g) as follows:

Qld 3.4.3.0(g) Timber Species

(g)

Timber Species

In addition to sub-clauses (a) to (f) above, timber used for structural purposes must be a species scheduled for the appropriate use in Schedules A, B or C of Book 2 of the December 2017 version of the "Queensland Government, Department of Agriculture, Fisheries and Forestry - Construction timbers in Queensland, Book 1 and Book 2: Properties and specifications for satisfactory performance of construction timbers in Queensland - Class 1 and 10 buildings (Houses, carports, garages, greenhouses and sheds)".

Provision for services

NCC ABCB Housing provisions Part 13 Energy efficiency Part 13.7 services

Glazing requirements specifically for windows, sliding doors with frames
--

NCC Volume 2 Amendment 1 Part 3.6 Glazing
--

**Satisfactory
Outcome**



Identify Framing tie down schedule Bottom plate to slab

TYPICAL TIMBER BEAM/LINTEL TIE DOWN DETAIL
SCALE 1:20

TIMBER ROOF LINTEL TIE DOWN SCHEDULE (TILE ROOF)	
LINTEL SPAN	WIND CLASSIFICATION (NON-CYCLONIC AREAS)
	N1 & N2
0 - 1200	2/75x3.05φ NAILS
1201 - 1800	2/75x3.05φ NAILS
1801 - 2400	2/75x3.05φ NAILS
2401 - 3000	2/75x3.05φ NAILS
3001 - 3600	2/75x3.05φ NAILS

FRAMING TIE DOWN SCHEDULE (TILE ROOF)	
CONNECTION	WIND CLASSIFICATION (NON-CYCLONIC AREAS)
	N1 & N2
STUDS TO BOTTOM/TOP PLATES	2/75x3.05φ NAILS (UP TO 38 STUD) OR 2/90x3.05φ NAILS (38-50 STUD)
BOTTOM PLATES TO SLAB	75 MASONRY NAILS (HAND DRIVEN AT SLAB EDGE), SCREW OR BOLT AT 12m MAX. CRS.
BOTTOM PLATES TO FLOOR FRAME	2/75x3.05φ NAILS (UP TO 38 STUD) OR 2/90x3.05φ NAILS (38-50 STUD) 600 MAX. CRS.

1. EQUIVALENT FIXING IS PERMISSIBLE TO BE ADOPTED IN LIEU OF ABOVE SPECIFICATION AND IT MUST BE IN ACCORDANCE WITH AS1684.2-2010
2. REFER TO TRUSS MANUFACTURER FOR TIE-DOWN FIXING ON ROOF BATTENS AND RAFTERS/TRUSSES
3. TIMBER MEMBERS ASSUMED TO BE JOL GROUP OR STRONGER
4. HOUSE ASSUMED TO HAVE A MAXIMUM WIDTH OF 12m
5. STUDS ASSUMED TO BE AT 450 MAX CRS
6. THE TOP PLATE SHALL BE FIXED OR TIED TO THE LINTEL WITHIN 100mm OF EACH RAFTER/TRUSS, OR THE RAFTER/TRUSS FIXED DIRECTLY TO THE LINTEL WITH A FIXING OF EQUIVALENT TIE-DOWN STRENGTH TO THAT REQUIRED FOR THE RAFTER/TRUSS
6. G.I.S. MEANS 30 x 0.8 GALVANISED IRON STRAP

Rev.	Remark/Comment	Date	Appr.
01	CONSTRUCTION ISSUE	24.03.19	

Project: [REDACTED]

Drawing No. [REDACTED]

FRAMING DETAILS - SHEET 1

CONSTRUCTION ISSUE			
Date	Engineer	Drawn	
JAN 2019	D.H.	D.H.	
Scale @ A3: AS SHOWN	Checked: M.F.	No. of Sheets: 13	
Job No. [REDACTED]	Drawing No. [REDACTED]	Rev. [REDACTED]	
		S07	01

Specify framing tie down bottom plates to floor frame

TYPICAL TIMBER BEAM/LINTEL TIE DOWN DETAIL
SCALE 1:20

TIMBER ROOF LINTEL TIE DOWN SCHEDULE (TILE ROOF)	
LINTEL SPAN	WIND CLASSIFICATION (NON-CYCLONIC AREAS)
	N1 & N2
0 - 1200	2/75x3.05φ NAILS
1201 - 1800	2/75x3.05φ NAILS
1801 - 2400	2/75x3.05φ NAILS
2401 - 3000	2/75x3.05φ NAILS
3001 - 3600	2/75x3.05φ NAILS

FRAMING TIE DOWN SCHEDULE (TILE ROOF)	
CONNECTION	WIND CLASSIFICATION (NON-CYCLONIC AREAS)
	N1 & N2
STUDS TO BOTTOM/TOP PLATES	2/75x3.05φ NAILS (UP TO 38 STUD) OR 2/90x3.05φ NAILS (38-50 STUD)
BOTTOM PLATES TO SLAB	75 MASONRY NAILS (HAND DRIVEN AT SLAB EDGE), SCREW OR BOLT AT 12m MAX. CRS.
BOTTOM PLATES TO FLOOR FRAME	2/75x3.05φ NAILS (UP TO 38 STUD) OR 2/90x3.05φ NAILS (38-50 STUD) 600 MAX. CRS.

1. EQUIVALENT FIXING IS PERMISSIBLE TO BE ADOPTED IN LIEU OF ABOVE SPECIFICATION AND IT MUST BE IN ACCORDANCE WITH AS1684.2-2010
2. REFER TO TRUSS MANUFACTURER FOR TIE-DOWN FIXING ON ROOF BATTENS AND RAFTERS/TRUSSES
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6. THE TOP PLATE SHALL BE FIXED OR TIED TO THE LINTEL WITHIN 100mm OF EACH RAFTER/TRUSS, OR THE RAFTER/TRUSS FIXED DIRECTLY TO THE LINTEL WITH A FIXING OF EQUIVALENT TIE-DOWN STRENGTH TO THAT REQUIRED FOR THE RAFTER/TRUSS
6. G.I.S. MEANS 30 x 0.8 GALVANISED IRON STRAP

Rev.	Remark/Comment	Date	Appr.
01	CONSTRUCTION ISSUE	24.03.19	

Project: [REDACTED]

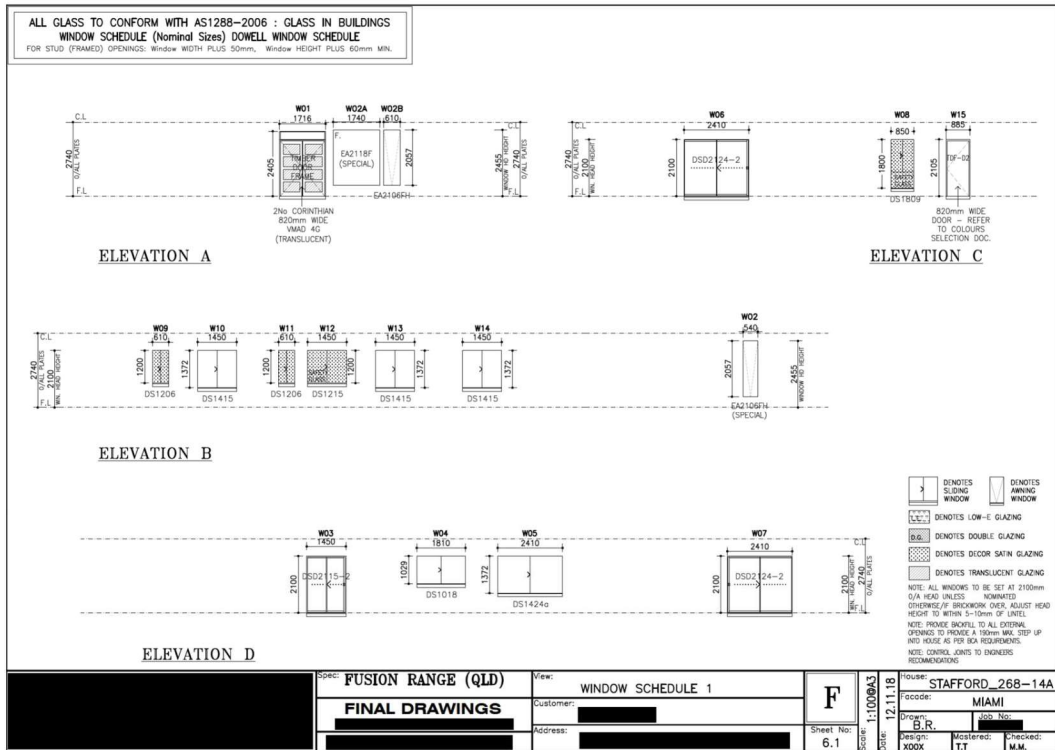
Drawing No. [REDACTED]

FRAMING DETAILS - SHEET 1

CONSTRUCTION ISSUE			
Date	Engineer	Drawn	
JAN 2019	D.H.	D.H.	
Scale @ A3: AS SHOWN	Checked: M.F.	No. of Sheets: 13	
Job No. [REDACTED]	Drawing No. [REDACTED]	Rev. [REDACTED]	
		S07	01

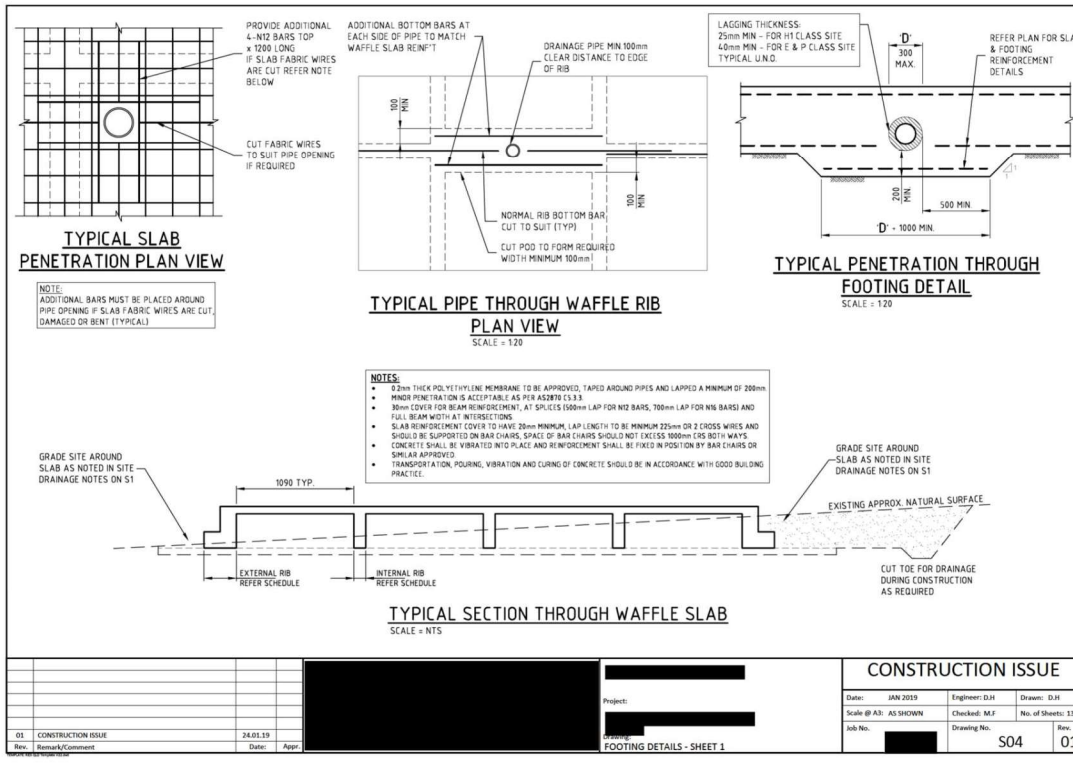
Specify wall frame bracing material
NCC ABCB Housing provisions 7 Roof and wall cladding Part 7.5 Timber and composite wall cladding 6.0kN/m capacity Plywood Bracing 3.0kN/m capacity Bracing -
Identify compression strength of a brick unit
NCC Volume 2 Amendment 1 Part 3.3 masonry Part 3.3.5 Masonry veneer Brick work B1 the unconfined compressive strength of a brick unit to be min of 15MPa and compressive strength of masonry to be a min of 5.4 MPa
Identify structure of roof system
NCC ABCB Housing provisions 7 Roof and wall cladding Part 7.2 sheet roofing Live load Roof 0.25 kPa OR $(1.8/A + 0.12)$ which ever is greater.
Identify roof cladding
NCC volume 2 Amendment 1 Part 3.5 Roof and Cladding Part 3.5 Roof cladding, gutters and downpipes and wall cladding Concrete roof tiles @ 22.5° Pitch
Identify wall cladding and sarking
NCC ABCB Housing Provisions 7 Roofing and wall cladding Part 7.5 Timber and composite wall cladding NCC NCC volume 2 amendment 1 Part 3.12 Energy Efficiency Part 3.12.1 Building fabric

Identify installation requirements of windows and doors



Identify membrane to be used around pipes traveling through slab.

0.2mm thick polyethylene membrane to be approved, taped around pipes and lapped a minimum of 200mm



**Satisfactory
Outcome**



ACTIVITY 3

A man living in a bungalow in southern New South Wales notices that small splits and cracks are forming in his house's timber roof trusses. He remembers that his area recently experienced heavy snowfall and calls a contractor for help in fixing the cracks.

During their conversation, the contractor tells him that the trusses were not built to withstand heavy snow loads and that a team will come and fix the trusses.

Given the information above, write a report in the space below, to the man, as the contractor, responding to the following points:

- a) The structural defects of the roof trusses.
- b) What contributed to the structural defects of the trusses identified.
- c) The implications of the structural defect identified.
- d) Structural principles that were not applied.
- e) How the structural defects you identified were caused by failure to apply the relevant structural principle you identified.
- f) The extent of work that needs to be done to rectify the structural defects you identified.

Dear Homeowner,

Following our recent conversation regarding the condition of your timber roof trusses, I have compiled a detailed report addressing the issues identified, the contributing factors, the implications, and the necessary steps for rectification.

A) Structural Defects of the Roof Trusses:

Upon inspection, the primary structural defects identified in your roof trusses include:

1. Small spits (splits) in the timber.
2. Cracks forming along the length of the trusses.

B) Contributing Factors to the Structural Defects:

The primary factor contributing to these structural defects is the recent heavy snowfall in your area. The roof trusses were not designed or built to withstand the additional load imposed by the accumulated snow. The excessive weight has caused stress and strain on the timber, leading to splits and cracks.

C) Implications of the Structural Defects:

The structural defects identified have several significant implications:

1. **Reduced Structural Integrity:** The splits and cracks weaken the overall strength of the trusses, compromising the stability of your roof.
2. **Safety Hazard:** Continued stress on the weakened trusses could lead to further damage or even collapse, posing a serious safety risk to the occupants of the house.
3. **Potential for Further Damage:** If not addressed promptly, the cracks could propagate, causing more extensive damage to the roof structure and potentially affecting other parts of the house.

D) Structural Principles Not Applied:

The primary structural principle that was not applied is the consideration of live loads, specifically snow loads, in the design and construction of the roof trusses. Building codes and standards often require that structures in regions prone to snowfall be designed to handle such loads.

E) How the Structural Defects Were Caused by Failure to Apply the Relevant Structural Principle:

The failure to account for snow loads during the design and construction phase meant that the roof trusses were not adequately reinforced or designed to bear the additional weight of snow. This oversight has directly led to the formation of splits and cracks in the timber, as the material was subjected to stresses beyond its designed capacity.

F) Extent of Work Needed to Rectify the Structural Defects:

To rectify the identified structural defects, the following steps are recommended:

1. **Assessment and Reinforcement:** A thorough assessment of all the roof trusses to determine the full extent of the damage. Trusses showing minor splits may be reinforced with additional timber or metal plates to restore their integrity.
2. **Replacement:** Severely damaged trusses should be replaced entirely to ensure the safety and stability of the roof structure.
3. **Design Modifications:** Implement design modifications to account for potential snow loads in the future. This may involve adding additional supports or upgrading the material used for the trusses.
4. **Preventative Measures:** Install snow guards or roof heating systems to prevent excessive snow accumulation in the future.

We will assemble a qualified team to carry out these repairs and reinforcements. Our goal is to restore the structural integrity of your roof and ensure it is capable of withstanding any future weather conditions.

Please let us know your availability so we can schedule a time for our team to begin the necessary work. If you have any questions or require further information, feel free to **contact us**.

Best regards,

[Contractor's Name] [Contractor's Company] [Contact Information]

☐

CPCCBC4010

APPLY STRUCTURAL PRINCIPLES TO RESIDENTIAL AND COMMERCIAL CONSTRUCTIONS

PRACTICAL ASSESSMENT

Participant name	Rex Henderson
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FOR THE PARTICIPANT

Instructions

- The tasks outlined on the following pages will require performance of normal workplace activities, as a result of a structured activity set by an Observer in the workplace or a simulated activity set by your Assessor/Observer.
- The timeframe for these tasks will be established by your Assessor/Observer, in consideration of location conditions and industry requirements.
- You must complete all tasks unassisted by the Assessor or other personnel, unless the steps note this assistance.
- You must attempt all tasks (and itemised steps) for a 'Satisfactory' assessment outcome to be awarded.
 - For any observation conducted that is incomplete, or without satisfactory performance, the observation will need to be completed again after further training support.

FOR THE ASSESSOR/OBSERVER

Instructions

- The following observation record should be used to judge and record your observations of the Participant as they complete the task(s) set. You must record your observations of the Participant's performance.
 - For each occasion, indicate the task performed and whether it was a simulation or workplace-based task.
 - Any simulated assessment must ensure the Participant still performs under workplace conditions which reflect industry standards.
 - In the comments, provide clear detail regarding the task that the Participant was required to do (e.g. PPE used, materials handled, attachments connected, plant types).
- All steps must be satisfactorily demonstrated by the Participant for a 'Satisfactory' determination (indicated by an Assessor tick to the right of each itemised step, or an Observer tick to the right of each itemised step, and confirmation by an Assessor in the Assessor Comments).
 - Where you have determined that one or more task steps have not been satisfactorily demonstrated, provide the Participant with additional support and outline details of such assistance in the Assessor/Observer Comments. Allow the Participant two (2) further opportunities to demonstrate the task again to allow an opportunity for a 'Satisfactory' assessment outcome to be achieved.
 - If after three (3) attempts the Assessor determines that the Participant cannot demonstrate the required steps, a 'Not Satisfactory' outcome is to be determined.

TASK OUTCOME					
Task	Date	Task Type (Tick)	Location	Task outcome (Tick)	
				Satisfactory	Not Satisfactory
Task 1	22/04/25	☒ Workplace ☐ Simulation	Maroochydore Private hospital job site.	☒	☐

ASSESSOR COMMENTS: GENERAL

As necessary, outline:

- Details on reattempts, alternative arrangements or reasonable adjustments made.
- Where a Participant is deemed 'Not Satisfactory', provide recommendations for future training.

Great work with the Practical side of this module Rex. A very good understanding.

ASSESSOR COMMENTS: PRACTICAL TASK 1

- ☒ Individual student (as named on cover page)
☐ Multiple students ☐ All from Attendance Report, ☐ Specific students involved – identify students]

Task	Provide detail
1.1A. 1.1B. 1.1C. 1.1C. 1.1D. 1.1E. 1.2C. 1.2D. 1.3C. 1.3D. 1.5A. 1.5B. 1.5C. 1.6A. 1.6B.	Specify (✓) where building classifications, criteria requirements and performance solutions were documented: ☒ Workplace Quality document ☐ Quality Assurance Template ☐ Other (please specify): ☒ Document attached as evidence
1.1F.	Specify (✓) who was consulted regarding structural integrity: ☒ Project management ☒ Relevant tradesperson ☒ Builder ☐ Supplier ☐ Other (please specify):
1.1H.	Specify new and emerging building technologies assessed for compliance. A lot of the compliance and documentation is now done via apps and web browsers. storing all documentation online.
1.2B.	Specify how cut and fill, excavation and compaction were confirmed as compliant with geotechnical report: We use level 1 supervision when undertaking civil fill works. we also undertake DCP testing to certify layers and compaction achieved onsite.
1.3B.	Specify where footing type and tie-down details located. located within the structural documents, generally on the notes section or on footing details plan.
1.3E.	Specify team supervised and floor system installed. We resource our project well at McNab and have supervision for all trades. We would look to utilise foreman (Trades supervisor) from each of our subcontractors also.

ASSESSOR COMMENTS: PRACTICAL TASK 1

1.4C.	Specify structural and non-structural wall systems installation supervised to ensure compliance. These will be identified on the structural plans. They are also picked up when our structural engineers comes and reviews/ inspections are undertaken.
1.5D.	Specify how quality finishes were assured for roof systems. Started at the tendering stage, ensuring the contractor has allowed for the specified products, then using ITP's for installation inspections along the way.
1.6C.	Specify supervision and checks made: Site diary, ITP,s, inspections, defects, subcontractor meetings ect.

CPCBC4010

APPLY STRUCTURAL PRINCIPLES TO RESIDENTIAL AND COMMERCIAL CONSTRUCTIONS

Practical Task 1

Description of task:

The participant must demonstrate the skill and ability to apply structural principles to the construction of one building project including the following points. Documented evidence of all criteria must be presented (*template (HO3) available for use if required*)

- Analyse the structural integrity of building project
 - Read the plans to determine and document the intended use of the building, class and climate zone from the NCC. (*template available- HO3*)
 - Analyse the project documents for compliance with NCC bushfire, high wind, earthquake and alpine environment requirements. (*template available- HO3*)
 - Analyse and document building design and structural integrity from project plans and specifications, building standards and codes. (*template available- HO3*)
 - Determine and document the effect of section properties on various materials. (*template available- HO3*)
 - Determine and document if structural performance meets the General Requirements and Performance Requirements of NCC. (*template available- HO3*)
 - Confirm analysis of structural integrity with relevant industry professionals.
 - Conduct pre-commencement site inspection to confirm analysis.
- Plan, coordinate and manage the laying of footings.
 - Identify earthworks and footing or slab configuration from project plans and specifications.
 - Establish cut and fill, excavation and compaction compliance with geotechnical report.
 - Assess performance of reinforcement, concrete and other elements which contribute to structural integrity of specified footings.
 - Determine compliance with building and construction regulations, standards and codes.
 - Set out footings in accordance with project plans and specifications.
- Plan, coordinate and manage laying of flooring systems
 - Identify flooring systems materials, components and configuration from project plans and specifications.
 - Determine footing type and tie-down details.
 - Assess suspended flooring system component sections' compliance with standards and codes' span requirements. (*template available- HO3*)
 - Determine if floor framing and flooring is compliant with NCC Performance Requirements for climate zone, fire resistance and rising damp requirements. (*template available- HO3*)
 - Supervise and confirm laying of specified floor system complies with project documentation.
- Plan, coordinate and manage the building of wall systems.
 - Determine and analyse structural and non-structural wall systems used in the planning of the building and construction project. (*template available- HO3*)
 - Determine materials used for timber and steel framing and structural steel members meet the Performance Requirements of the NCC and timber framing complies with AS 1684 Residential timber-framed construction.
 - Adhere to and check processes for erecting structural and non-structural wall systems to ensure these comply with manufacturer's specifications and building and construction standards and codes.
 - Apply bracing, tie-downs, tolerances, allowances, and fixing and installation of wall frame components for compliance with relevant Australian Standards, codes and manufacturer specifications.
 - Manage processes to ensure quality of the frame, whether factory pre-cut and pre-nailed, factory pre-cut and assembled on site, or cut and assembled on site.
 - Determine and apply allowances for services to be installed.
 - Ensure the installation of windows and doors is compliant with building and construction standards and code and manufacturer's specifications.
- Plan, coordinate and manage the building of structural roof systems.
 - Identify type of structural roof system and components and determine compliance with Performance Requirements of NCC.
 - Plan, implement and check erection of structural roof, roof trusses or hand cut roof members comply with building and construction standards and codes and accepted industry construction practices.

Practical Task 1

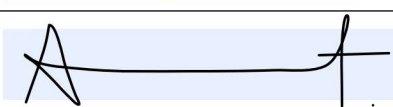
- Plan, implement and check installation of roof sarking and cladding, skylights, roof ventilators and service penetrations comply with building standards, codes and manufacturer specifications.
- Manage processes to ensure roof systems' quality finish.
- Plan, coordinate and manage wall cladding.
 - Assess structural performance of cladding to be used for bracing in the frame construction for compliance with building and construction standards, codes and manufacturer specifications.
 - Determine cladding, vapour permeable sarking or waterproof membrane and components meet the Performance Requirements of NCC.
 - Supervise and check installation of specified cladding complies with building and construction standards, codes and industry-accepted industry practices.

These tasks may be simulated or real. The Participant is to gather evidence of how they have completed each component of the Practical Task, which is to be submitted with this Practical Assessment sheet. The Observer is to provide detailed comments on the tasks completed by the Participant (on the Observer Comments, overleaf). The Assessor is to verify the Observer's comments, noting their findings in the Assessor Comments (on the back of the Practical Assessment cover page) and provide the assessment outcome.

Resources required:

Construction site and plans, specifications and drawings for one residential or commercial construction; workplace quality policies and procedures; technology to access building and related industry codes, standards and manufacturer product information and materials specifications; Technology to access the NCC and current relevant Acts and Regulations. PPE as required. Materials and tools Documentation of design and construction (suitability or evidence of suitability) (*template available- (HO3)*).

Observer details

Name of observer:	Adrian Wyatt
Role of observer (Confirm suitability to sign)	Site Manager
Email address of observer	Adrian.wyatt@mcnab.net.au
Signature of observer:	
Date:	8/08/2023

When completing the task, did the Participant:	Tick if satisfactorily completed. Provide comments if left unticked.
1 Analyse the structural integrity of building project.	
1.1A. Read the plans to determine and document the intended use of the building, class and climate zone from the NCC. (<i>template available- HO3</i>)	☒
1.1B. Analyse the project documents for compliance with NCC bushfire, high wind, earthquake and alpine environment requirements.	☒
1.1C. Analyse and document building design and structural integrity from project plans and specifications, building standards and codes. (<i>template available- HO3</i>)	☒
1.1D. Determine and document the effect of section properties on various materials. (<i>template available- HO3</i>)	☒
1.1E. Determine and document if structural performance meets the General Requirements and Performance Requirements of NCC. (<i>template available- HO3</i>)	☒
1.1F. Confirm analysis of structural integrity with relevant industry professionals.	☒
1.1G. Conduct pre-commencement site inspection to confirm analysis.	☒

When completing the task, did the Participant:	Tick if satisfactorily completed. Provide comments if left unticked.
1.1H. Assess new and emerging building technologies for application to the construction process and their compliance with NCC requirements and relevant Australian Standards.	☒
2 Plan, coordinate and manage the laying of footings.	
1.2A. Identify earthworks and footing or slab configuration from project plans and specifications.	☒
1.2B. Establish cut and fill, excavation and compaction compliance with geotechnical report.	☒
1.2C. Assess performance of reinforcement, concrete and other elements which contribute to structural integrity of specified footings. <i>(template available- HO3)</i>	☒
1.2D. Determine compliance with building and construction regulations, standards and codes. <i>(template available- HO3)</i>	☒
1.2E. Set out footings in accordance with project plans and specifications.	☒
3 Plan, coordinate and manage laying of flooring systems.	
1.3A. Identify flooring systems materials, components and configuration from project plans and specifications.	☒
1.3B. Determine footing type and tie-down details.	☒
1.3C. Assess suspended flooring system component sections' compliance with standards and codes' span requirements. <i>(template available- HO3)</i>	☒
1.3D. Determine if floor framing and flooring is compliant with NCC Performance Requirements for climate zone, fire resistance and rising damp requirements. <i>(template available- HO3)</i>	☒
1.3E. Supervise and confirm laying of specified floor system complies with project documentation	☒
4 Plan, coordinate and manage the building of wall systems.	
1.4A. Determine and analyse structural and non-structural wall systems used in the planning of the building and construction project. <i>(template available- HO3)</i>	☒
1.4B. Determine materials used for timber and steel framing and structural steel members meet the Performance Requirements of the NCC and timber framing complies with AS 1684 Residential timber-framed construction. <i>(template available- HO3)</i>	☒
1.4C. Adhere to and check processes for erecting structural and non-structural wall systems to ensure these comply with manufacturer's specifications and building and construction standards and codes.	☒
1.4D. Apply bracing, tie-downs, tolerances, allowances, and fixing and installation of wall frame components for compliance with relevant Australian Standards, codes and manufacturer specifications.	☒
1.4E. Manage processes to ensure quality of the frame, whether factory pre-cut and pre-nailed, factory pre-cut and assembled on site, or cut and assembled on site.	☒
1.4F. Determine and apply allowances for services to be installed.	☒
1.4G. Ensure the installation of windows and doors is compliant with building and construction standards and code and manufacturer's specifications.	☒
5. Plan, coordinate and manage the building of structural roof systems.	
1.5A. Identify type of structural roof system and components and determine compliance with Performance Requirements of NCC. <i>(template available- HO3)</i>	☒
1.5B. Plan, implement and check erection of structural roof, roof trusses or hand cut roof members comply with building and construction standards and codes and accepted industry construction practices. <i>(template available- HO3)</i>	☒
1.5C. Plan, implement and check installation of roof sarking and cladding, skylights, roof ventilators and service penetrations comply with building standards, codes and manufacturer specifications. <i>(template available- HO3)</i>	☒
1.5D. Manage processes to ensure roof systems' quality finish.	☒

When completing the task, did the Participant:	Tick if satisfactorily completed. Provide comments if left unticked.
6. Plan, coordinate and manage wall cladding.	
1.6A. Assess structural performance of cladding to be used for bracing in the frame construction for compliance with building and construction standards, codes and manufacturer specifications. <i>(template available- HO3)</i>	☒
1.6B. Determine cladding, vapour permeable sarking or waterproof membrane and components meet the Performance Requirements of NCC. <i>(template available- HO3)</i>	☒
1.6C. Supervise and check installation of specified cladding complies with building and construction standards, codes and industry-accepted industry practices.	☒

