

RIICSG401D

APPLY THE PRINCIPLES OF CIVIL CONCRETE STRUCTURES CONSTRUCTION

THEORY EXAM INSTRUCTIONS

- This exam will occur under standard assessment conditions.
 - An oral examination may be allowed under certain circumstances. Answers will be documented and FT003 (Oral examination declaration form) must be completed.
 - Participants must provide enough detail in their responses to demonstrate their knowledge and skills.
 - Please fill in the details below, providing your name, signature and date of assessment.
 - Your signature acknowledges that this is your own work.
- If a participant initially answers a question incorrectly but modifies their response, they must follow the instructions below:
- If a participant changes their response in writing, they must put their initials next to the written change.
 - If a participant changes their response verbally, this must be noted on the exam paper by the assessor.

Participant name _____

Participant signature _____

Assessor name _____

Assessor signature _____

Date _____

Number of questions	Number of questions answered correctly	Satisfactory?	
19		Yes	No

- Q1. List three (3) key aspects relevant to construction tasks involving concrete structures.**

(Page 14 Learner Guide)

1. Security of the footings
2. Load bearing capacity of equipment
3. The compaction rate of earthen foundations
4. The weight of the concrete
5. Concrete mix and type
6. Curing rate and engineering approval

- Q2. From the list below, select all areas of civil works that are related to the construction of concrete structures. Select all that apply.** (page 14 LG)

• Environmental conservation	• Road construction/maintenance
• Infrastructure development	• Pipeline construction
• Bridge construction	• Ship building
• Commercial development	• Constructing industrial buildings
• Light rail construction	• Systems development
• Tunnels	• Highway overpasses

- Q3. Where, in your workplace, would you locate procedures relevant to constructing concrete structures?** (Page 17 Learner Guide)

In the Technical or Engineering department you will find drawings and plans, and procedures may be stored on a central database or form part of a 'Job Pack' that may be sent to each Project.

- Q4. List two (2) sources where you would locate information relating to plant and equipment capabilities.**

(Page 18 Learner Guide)

1. The Project Plan should outline the purpose for various items of plant and equipment
2. The Original Equipment Manufacturer (OEM) guideline will provide details about the plant and equipment capabilities
3. Technical documents (OEM), training manuals and service manuals

Q5. In the table below, identify where, in your workplace, you locate information relating to:

(Page 18 Learner Guide)

- Organisational requirements
- Client requirements
- Site operational requirements
- Clarity for task specifications or work instructions

WORKPLACE INFORMATION	LOCATION
<i>Organisational requirements</i>	These are often located in internal documents such as Policies, performance targets and business profit projections. You own organisation will have requirements (and often linked to KPI's) regarding safety performance, reputation, costing, productivity and quality.
<i>Client requirements</i>	Located in the tender or client briefing document – outlining the specifications and quality requirements as expected by the client.
<i>Site operational requirements</i>	In the Project Plan – set of documents providing information regarding the organisation of the project and its components.
<i>Clarity for task specifications or work instructions</i>	Project manager can clarify plans, specifications, regulations, client requirements, etc. The Safety Officer can provide advice and information on all safety related matters and requirements. Management of the company in relation to procedures and policies etc.

Q6. Identify two (2) engineering survey principles that relate to the construction of concrete structures in the civil construction sector. (page 19 Learner guide)

1. Provision of the initial framework via a thorough survey of the job
2. Plan the job to ensure that all risks are identified and minimised and define the job
3. Ensure that sufficient independent checks are built into the project phases to eliminate or minimise errors
4. Safeguarding – the process of ensuring that the survey results can be replicated if accidental, or other, damage occurs to the survey markers or field observations

Q7. Describe how you determine the set-out requirements for a concrete structures construction task. (page 19 Learner guide)

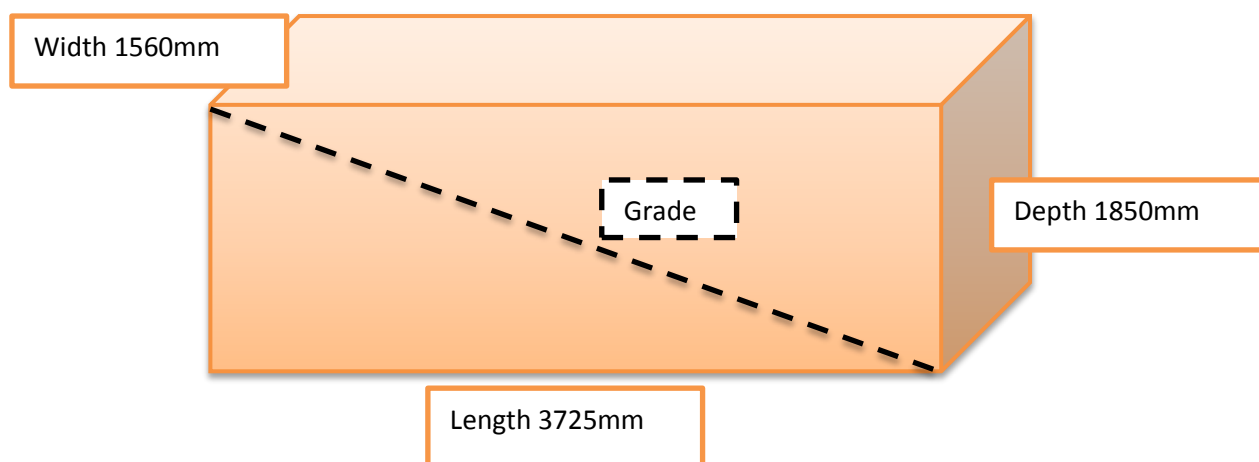
Information provided by Engineers, competent tradespersons, architects and the like allow the job to be planned in a structured manner based on science, tested processes and experience. A building is 'Set out' in order to clearly define the outline of the excavation and the centre line of the walls, so that construction can be carried out exactly according to the plan. The centre line method of setting out is generally preferred and adopted.

Q8. Calculate the following: (page 20 Learner guide)

- What is the total volume of the shape below? 10,750,350,000 cubic mm ($V = L \times W \times D$)
- What is the surface area of the shape below? 5,811,000 square mm ($A = L \times W$)
- In the shape below, calculate the grade of the dotted line.

$$\text{Ramp (slope)} = \frac{\text{Rise } 1850 \text{ (10)} \text{ } 185\text{mm}}{\text{Run } 3725 \text{ (10)} \text{ } 372.5\text{mm}}$$

For every 372.5mm the grade drops by 185mm (37.25:18.50)



- You need an excavator for 3 days and have been asked to make sure there is enough diesel to last the whole 3 days. The excavator uses 15 litres per hour and will be operating for approximately 6 hours per day. The company buys its diesel at cost (\$1.10 p/l) and it has a policy that requires all orders include a contingency of 10%.
 - What is the total consumption of diesel for the 3 days? 270 Litres
 - How much diesel will you need to order? 297 Litres
 - What is the total cost of your order? \$326.70
- Q9. In your workplace, what are two (2) key things you must consider when scheduling the delivery of materials to site? (page 21 Learner guide)
- The ability to receive the materials using plant & equipment and/or personnel
 - The storage location – so as to not require relocating due to works
 - The duration that the goods will be stored – so as to not hold up other works
 - Weather conditions
 - Skills of personnel to utilise the materials in a 'just in time' principle
 - Quality check of the materials received

Q10. Describe three (3) components that are involved in developing a 'work plan'.
(page 26 Learner guide)

PLANNING COMPONENT	DESCRIPTION
Step 1: Explain the project plan to key stakeholders and discuss its key components.	The project plan is a set of living documents that can be expected to change over the life of the project. Like a road map, it provides the direction for the project. And like the traveller, the project manager needs to set the course for the project, which in project management terms means creating the project plan. Just as a driver may encounter road construction or new routes to the final destination, the project manager may need to correct the project course as well. A common misconception is that the plan equates to the project time line, which is only one of the components of the plan. The project plan is the major work product from the entire planning process, so it contains all the planning documents.
Step 2: Define roles and responsibilities	Identifying stakeholders - those who have a vested interest in either the project or the project outcome - is challenging and especially difficult on large, risky, high-impact projects. There are likely to be conflicting agendas and requirements among stakeholders, as well as different slants on who needs to be included. It is important for the project manager to get clarity and agreement on what work needs to be done by whom, as well as which decisions each stakeholder will make
Step 3: Develop a scope statement	The scope statement should include: Business need and business problem Project objectives, stating what will occur within the project to solve the business problem Benefits of completing the project, as well as the project justification Project scope, stated as which deliverables will be included and excluded from the project Key milestones, the approach and other components as dictated by the size and nature of the project.

- Q11. Identify three (3) principles of leadership and how they apply to you in your role as a Supervisor in the construction of concrete structures.
(page 29 Learner guide) Any three of the following are applicable

LEADERSHIP PRINCIPLE	APPLICATION IN THE WORKPLACE
Demonstrate Safety Leadership	Safety leadership involves communicating the importance of safety in all interactions with subordinates, subcontractors, suppliers and other project stakeholders throughout all processes within the life of the construction project.
Promote Design for Safety	Effective safety management at the design stage can minimise risks to the health and safety of people who subsequently construct, occupy and maintain a facility/ structure.
Communicate safety and project related information	Communication and consultation are essential to the management of safety and the overall project. Within construction projects, safety and project information should be exchanged between the different stakeholders. Open and honest dialogue regarding issues between the client, the designer and the constructor (including subcontractors) should be maintained throughout the life of the project. This may be verbal or non-verbal, formal or informal.
Manage risk	The systematic management of safety risks through the elimination or reduction of risks is a requisite for improved safety performance within the construction industry. At all stages in the project process decisions should be made on the basis of careful consideration of the safety implications of available options. Decisions made about project options, design of the permanent facility/ structure, design of the construction process, choice of plant, equipment, materials and construction methods, and project organisational arrangements should be made following an assessment of safety risks, using an appropriate and recognised risk assessment method
Continuously improve performance	Safety management should strive for continuous improvement by regularly reviewing safety performance, seeking feedback from project stakeholders, and using the lessons learned to improve performance and to share and promote best practices in the construction industry
Entrench safety practices	Expect safety to be the core of the culture in the workplace – safe working behaviours should be promoted and recognised as part of the operation.

- Q12. In the list below, number each task in order of sequence for the construction of concrete structures. Number each task from 1 to 10.
(page 29 Learner guide)

1	Plan the work	3	Ground Surface treatment
6	Testing of concrete	9	Update service plans and drawings
4	Prepare foundation	8	Erection and stabilisation of concrete structure
2	Prepare the work environment	7	Laying concrete
5	Installation of formwork	10	Clean up work area

Q13. List five (5) daily tasks you conduct, when undertaking the supervision of civil concrete structures construction tasks.

(page 32 Learner guide) Any five of the following are applicable

- a) Site inspection for hazards, damage or other issues of concern
- b) Inventory control to ensure no unexpected overuse of materials
- c) Authorising overtime
- d) Providing required explanations for the builders and other professionals associated with the project.
- e) Coordinating and collaborating with the architects, engineers, client and specialists.
- f) Pre-start meeting attendance
- g) Review of previous days reports, progress and incidents
- h) Maintain open communication with authorities and the client

Q14. Explain one (1) method of records maintenance that you are required to undertake, as a supervisor.

Save in the company's records management system; e.g. SAP, or other knowledge management system used company-wide
 Saved in the company's 'general' drive, which is accessed by all managers and project related personnel
 Updates are version controlled
 Posted on the main notice board for site
 Kept in filing cabinets in the site office
 Sent via email to all stakeholder groups
 Send all changes/updates to the Project Manager

Q15. Identify two (2) construction monitoring methods you use when supervising the construction of concrete structures. (page 33 Learner guide)

1. On the job supervision
2. Formal quality assurance
3. Formal general inspections
4. Informal inspections

Q16. In the table below, briefly describe the following ground surface treatment requirements and procedures. (page 35 Learner guide)

Ground Surface Treatment	Requirements	Procedure
Proof rolling	Proof rolling is the process of identifying any unsuitable material by moving a heavy vehicle over the subgrade or existing surface and observing the resultant deformation.	Proof rolling shall be carried out: - Over all areas where fill is to be placed - Over all of the formation in cut - Within 2 days of stripping in areas of fill or completion of a cut - Prior to any hauling over the prepared area.
Compacting material below the prepared ground surface	It is done to: - Provide shape to the ground to assist drainage - Remove materials which will inhibit or prevent satisfactory placement of fill layers, loose material, debris and organic matter - Compact the ground exposed after stripping to achieve the required density of overlying fill in order to support structural build.	This process involves the preparation of the ground surface before placing fill (including topsoil fill), ground slabs or load bearing elements.
Acid Sulphate testing	Soils or sediments that when exposed to air can rapidly form sulphuric acid. This acid can leach into surrounding environments, possibly causing damage to concrete and steel structures such as foundations	Tests are performed by Soil Testing Laboratories

Q17. Pavement drainage requirements include: (select all that apply) (page 35 Learner guide)

- | | |
|---|---|
| a) Subgrade requirements to be known | d) Pattern to be as per Australian Standard |
| b) Edging requirement | e) Grading for fall |
| c) Linkage to water control & flow features | f) Metal edging |

Q18. Briefly explain the purpose of the following tests. (page 36 Learner guide)

Terminology	Definition
Concrete Slump test	- Indicates the workability of concrete. - Workability shows how easy the concrete is to place, handle and compact. - The measured slump must be within a set range (tolerance) from the specified slump.
Concrete Cylinder test	- Shows the best possible strength that the concrete can reach under ideal conditions. - This test measures concrete strength in a hardened state.

Q19. Explain three (3) terms in your words that are commonly used in the construction of concrete structures. There is a glossary at the end of your Learner Guide

[Learner Guide Glossary] Any three of the following are applicable - (the candidate will be able to explain approximately – their interpretation which is deemed reasonable by the assessor)

TERMINOLOGY	DEFINITION
BACKFILL	To fill the earth, any remaining space after placing concrete, brickwork, timber, pipes etc in an excavation.
BATTER	The slope of a wall of buttress built at an inclination to the vertical plane.
BENCHMARK (BM)	A fixed point of reference, the elevation of which is known and referred to during levelling operations.
BRACE	A member, usually a diagonal, which resists lateral loads and/or movements of a structure
CAST IN-SITU	Concrete cast or poured in its permanent position in prepared forms (eg concrete steps, hearth slabs, floors, beams, lintels)
COMPRESSIVE STRENGTH	Resistance of a material to a crushing force.
CONCRETE	Artificial rock of cement, sand and aggregate
CONTOUR LINE	A line drawn on a site plan joining points of the same elevation
CROSS BRACE	Any crosspiece which diverts, transmits, or resists the pressure of a load
CURING	Treatment of concrete or cement rendering to facilitate hardening
DATUM	A predetermined level on a site from which all other levels are established.
EXCAVATION	A hole made by removing earth
FOOTING	The construction whereby the weight of the structure is transferred from the base structure to the foundation
FORMS	Prepared forms of timber or other material for the casting of concrete
FOUNDATION	The ground upon which the footings of a building are constructed.
GROUND LINE	The ground level or natural grade line
GROUND PLAN (FLOOR)	Plan view of a horizontal section of a building showing the layout of rooms on the ground floor
HOIST	Any device or machine used in building for lifting materials.