

RIIMPO402D APPLY THE PRINCIPLES OF EARTHWORKS 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?	
		Yes	No
45			

1. Compliance documentation and reporting:

a) Answers may include:

- Legislation:
 - OHS/WHS.
 - Equal employment opportunity.
 - Disability discrimination.
- Organisational requirements:
 - Workplace relations.
 - Sick leave requirements.
- Client requirements:
 - Client standards and expectations.
 - Planned outcomes of the earthworks construction project.
- Site operational requirements:
 - Operational procedures, e.g. work instructions, SOPs and other site and equipment safety requirements.
 - Emergency response and evacuation procedures.

b) Answer may include:

- WorkCover.
- EPA.
- RTA.

2. Administrative documentation and project quality management:

a) Answers may include:

Paperwork relating to:

- Daily activities.
- Ordering and reordering.
- Workplace incident and accident management.
- Pay and other employee/worker entitlements.
- General administrative tasks.

b) Answer may include:

- Dimensions and tolerances of tasks.
- Material standards.
- Work standards.
- Documentation requirements.
- Project specifications and drawings.
- Client standards and expectations.

3. What is the aim of OHS/WHS legislation?

To ensure the safety of everyone working on or visiting the site.

4. List three (3) requirements that may be covered by the environmental management plan for your worksite?

Answer may include:

- Special protection areas.
- Levels of acceptable noise, vibration amounts and dust control measures.
- Work footprint.
- Boundaries of work activities.
- Waste/clean-up management requirements.
- Negating soil runoff through the use of appropriate sediment control techniques.
- Minimising chemical use near waterways.
- Maintaining safe working distances from waterways.

5. What are the three (3) plans that outline the requirements and procedures for controlling traffic and people around and through the work zone?

- The Traffic Management Plan.
- The Vehicle Management.
- The Site Isolation Plan.

6. Why is it important to consult and communicate with others during the risk management process?

It will help ensure that risks and hazards are not only effectively identified but that those involved with controlling and treating them are clear of their role and responsibilities in the risk management process. It also allows different skills, expertise and views to be brought together to enhance and support the risk management process.

7. What should you do if you don't understand the meaning of a particular term, phrase or word used on your worksite?

Seek further clarification at team meetings or speak directly with your manager.

8. Geotechnical, geological, survey and engineering data:

a) Geotechnical data is used to:

- Identify soil and rock types and characteristics.
- Check conditions and materials on and under the ground surface.
- Determine their physical/mechanical and chemical properties.
- Evaluate the stability of natural slopes and man-made soil deposits.

b) Soil or geological data is used for:

- Defining material types.
- Identifying wet and dry areas.
- Identifying broken ground, faults and joints.
- Locating water tables.
- Showing compaction levels.

c) Survey and engineering information is used to define work areas and zones, e.g.:

- Floor heights.
- Bench heights and widths.
- Floor and bench grades.
- Voids and underground situations.

- Road profile requirements.

9. Hydrological and meteorological data:

- a) Answer Hydrological data helps to determine the properties, distribution and effects of water, moisture content and exposures on the project/site soil, rocks and atmosphere. These must be known to ensure all tasks are completed using the correct materials and processes.
- b) Meteorological data may include:
 - Rainfall.
 - Humidity.
 - Temperature.
 - Wind direction and speed.

10. Project plans and specifications:

- a) Answers may include:
 - Plans and drawings provide an overview of the site, e.g.
 - Location of the site and earthworks in relation to the surrounding area.
 - The position of structures, roads, access areas.
 - Layout of drainage lines.
 - Foundation details and landscaping features.
- b) Project and task specifications list the types and characteristics of particular earthworks tasks to be carried out. They also detail how activities will be completed.

11. Drainage and dewatering:

- a) Drainage and dewatering requirements may include:
 - Any form of erosion or sediment controls.
 - Pumping out of sumps or pits.
 - Shifting water from one location to another using the site controls or water transfer devices such as pumps.
- b) So that no dirty or contaminated water or pollution leaves the site otherwise severe penalties can be imposed.

12. Why is it important that earthworks construction activities are scheduled within a job plan?

Scheduling will ensure that processes are conducted in the correct order or sequence and that the appropriate resources are available when they are needed.

13. Soil density and testing:

- a) It is necessary to have the density and moisture in balance in order to gain adequate compaction. High moisture can make the material difficult to work or turn it to mud. Low moisture content can mean the material will not bind and therefore will not compact properly.
- b) The plasticity index or PI determines how the materials can be shaped and will relate to the clay content within the material.
- c) It is important to have the right balance of particle sizes to ensure the correct construction of layers.

14. Earthwork calculations:

a) Answer:

- Grade = rise divided by run.
- Volume = length x width x depth.
- Area = width x length.

b) Percentage or cross fall is generally the slope placed on earthworks to ensure water can drain off the work area.

c) Daily production figures will often be used as a guideline to work out consumption rates.

15. Sequencing of civil works task:

a) You may be involved in planning which civil construction work activities will be completed and in what order. You need to ensure that all base activities or sub-tasks are completed before the next task starts.

b) Drainage includes the steps for earthworks:

1. Mark out the work area.
2. Clear and grub (remove vegetation)
3. Remove the topsoil.
4. Create contours or drains, or carry out the next step in the construction process.

And may then involve:

5. Forming drain lines.
6. Forming out the work area, that is building the frame to hold the drain system.
7. Laying pipes, box drains or culverts.
8. Backfilling.
9. Landscaping as appropriate.

16. Job planning and administration:

Answers may include:

a) The job plan should include sub-plans that address requirements for:

- Human resources.
- Plant and machinery.
- Construction materials, including quality and delivery.
- Sub-contractor support.
- Communication and coordination.
- Activity scheduling.
- Material delivery.
- Risk management.
- OHS/WHS.
- Quality management, including testing schedules.
- Traffic management.
- Environmental management, including waste disposal.
- Task and performance monitoring.
- Reporting.

b) Administration procedures and requirements may cover:

- Procurement.
- Supply agreements.
- Sub-contractor engagements.
- Reporting achieved targets or productivity.
- Staff requirements such as leave timesheets, wages or other documentation.
- Accounts procedures.
- Other requirements specific to the project and/or site.

17. Interpret requirements and provide estimates:

- a) The contract will determine the success or failure of the job and is crucial to the financing of all activities. Each section of the contract will outline who is responsible for what and at what cost. You need to ensure that all earthworks plans, client requirements and quality standards are known, understood and achieved.
- b) You may have to estimate the costs and/or time factors for a job. To estimate the total cost you add the cost of production to the cost of materials. To estimate completion time, you work out how long each individual activity should take from start to finish. You then determine how many activities need to be completed, and add the 2 figures together.

18. List four (4) types of resources that will need to be available and ready for earthworks construction tasks.

Necessary resources will include:

- Labour.
- Plant, equipment and tools.
- Material supply vehicles.
- Construction materials.
- Sub-contractor services.

19. How can you be sure that you have followed the relevant resource requirements and procedures?

Check the resource requirements outlined in the project and task documentation. Confirm that the relevant organisational procedures for procuring the equipment have been followed. Make sure that personnel/workers know how to use each item in line with site and equipment safety requirements and that the appropriate pre-operational checks have been carried out. Also check and confirm the resources with the relevant personnel/workers, e.g. supervisor/managers, engineers or project management staff.

20. How do you confirm that plant and equipment is suitable for the task?

Check that the intended application or use of each item is in line with its capabilities and limitations. You may need to refer to the machine specifications and other details listed in the individual operator's manuals or your site documentation.

21. Provide instructions and supervise team members:

Answers may include:

- a) Instructions and other information may be communicated through:

- Briefings.
- Handovers.
- Work orders.
- Toolbox meetings.
- Site meetings.

- b) Team members may include:

- Personnel/workers directly involved in the task.
- Other members of the organisation's management team.

- Supplier's representatives.
- Sub-contractors representatives.
- Supervisors or managers of other organisations who are involved in related tasks.
- Engineering staff.
- Administrative staff.
- Other people necessary to the operations.
- Subject matter expert.

22. List two (2) factors that may be detailed in your worksite communication requirements and procedures?

Answer may include:

- Communications equipment and methods to be used on site
- Protocols for using communications equipment.
- Documentation requirements, e.g. verbal or written reports.

23. Prepare messages and instructions:

- a) They are vital in aiding communications on the site. They ensure that appropriate and relevant information is conveyed to the team so everyone is kept informed of issues relating to safety, quality, environment, traffic management, or general work activities.
- b) Keep them clear, concise, and easy to understand. Make sure they are appropriate and not confusing for the receiver. It helps to remember the target audience you're aiming your message at.

24. Why is it important for a leader/supervisor to develop and maintain workplace relationships?

It promotes a good work environment and encourages effective interactions between team members, supervisors, management, and any additional people who may be involved with the work activities.

25. What factors will determine the leadership style and techniques you adopt?

Your team members, organisational requirements, work procedures, and the type of earthworks construction being undertaken. Also the nature and dynamics of the group and the experience level of the people concerned.

26. Supervisor techniques:

- a) A supervisor needs to be able to:
 - Communicate.
 - Organise.
 - Plan.
 - Manage people and resources.
 - Liaise with both management and your work team.
 - Deal with issues that may relate to work tasks, personnel/workers, subcontractors, suppliers, or other aspects of earthworks operations.
 - Trust in your team.
 - Lead by example.
- b) Mentoring involves:
 - Accompanying.
 - Sowing.
 - Catalysing.
 - Showing.
 - Harvesting.

27. What do set out requirements and procedures include?

- Establishing control lines.
- Establishing cleared width.
- Determining batters.
- Establishing construction offsets.

28. What are construction offsets and how are they established?

Offsets refer to how far from a control line an activity is to take place or an area is to be cleared. In establishing construction offsets, quite often survey markers and level pegs are used to define the work area. In many cases these pegs or markers are placed at an offset value to where the works are being conducted to prevent them from being hit or damaged during the work processes.

29. List three (3) factors of road geometry.

Answer may include:

- Grade or slope.
- Curves and curve radius.
- Crests.
- Drainage types and requirements.
- Structures.
- Cuttings or embankments.
- Other relevant factors to the road construction.

30. What are levelling devices used for in the setting out process?

- Determining gradients, batters and benches.
- Measuring offsets.
- Determining drainage grades.
- Helping with road geometry.

31. What are the four (4) aspects of project and task monitoring that you must carry out?

- Ongoing risk assessment and management.
- Engineering survey.
- Sampling and testing.
- General supervision, observation and recording.

32. Engineering principles and interpret test results:

- a) To ensure earthworks construction is being done correctly, with correct layer formation and within the specified tolerances.
- b) You need to monitor the material variances throughout the works. Test results are also used to ensure levels of compaction are achieved based on specifications.

33. Monitor earthworks tasks:

- a) Monitoring the performance of tasks will relate to certain criteria, such as:
- Layer thickness.
 - Compaction.
 - Particle size.
 - Clay content.
 - Homogenous lot area (completed using the same production technique and using similar materials).
 - Other site-specific requirements.
- b) Some methods for monitoring may include:
- Inspection and test plans.
 - Field checklists.
 - Site inspections that may be daily, weekly, or based on a particular work area.
 - Survey and level checks.
 - Geotechnical testing.
 - Material analysis.
 - Other methods suitable to the site or work activities.

34. Why should routine inspections of earthworks operations be carried out?

To ensure compliance with OHS/WHS legislation, contractual obligations and requirements specific to the project and the worksite. It may also be necessary to refer to relevant national and industry standards to ensure compliance.

35. List four (4) methods and operational techniques involved in earthworks construction practice.

Answer may include:

- Site preparation.
- Extraction.
- Load and haulage.
- Placement.
- Distribution.
- Surface finishing.
- Line, grade and level control.
- Compaction.
- Water application.
- Sedimentation control.
- Other methods or techniques appropriate to the work activity or site location.

36. How will you find out the operational techniques for the earthworks job you are working on?

They will be outlined in the relevant procedures for the work activity. The project and task specifications should also indicate what operational techniques apply to the various types of tools, plant and equipment to be used.

37. In ground surface treatment, what is proof rolling?

Proof rolling is when a plant item, e.g. roller, loaded truck, or other nominated item, is used to see if there is any movement in the ground underneath. This could indicate unsuitable or insufficiently compacted material in lower layers.

38. Give two (2) examples of how you should inform operators and other personnel/workers in writing and verbally that changes to the job plan or relevant earthworks construction practice have been initiated?

Answer may include:

- Written communication, e.g. plans, sketches and drawings, work instructions or other documentation.
- Oral communication, e.g. briefings, toolbox meetings, verbal instructions, discussions with operators, team meetings, or relevant conversations based on the activity.

39. What are four (4) maintenance activities that may be carried out by earthworks construction operators?

Answer may include:

- Cleaning and checking for damage before and after use.
- Servicing and monitoring, e.g. changing filters, topping up oils and hydraulic fluids.
- Minor repairs, e.g. replacing ripping teeth or boots.
- Fitting and removing attachments.
- Helping the mechanics with maintenance and repairs.
- Recording and reporting of damage, defects or faults.

40. How can you ensure that your team carries out maintenance activities in line with site procedures and the manufacturer's specifications?

Create a maintenance schedule to ensure that regular times are allocated to your team for cleaning, checking, repairing and carrying out other maintenance activities.

41. List four (4) reasons why you should follow organisational and/or site requirements and procedures for preparing and presenting reports.

Answer may include:

Organisational and/or site reporting requirements and procedures will outline:

- How and when reports are to be completed.
- Who completes the reports.
- What supporting documentation is required for each report.
- How the report is presented and submitted.

By following these requirements you will also ensure that the correct report is submitted to the right person within the designated timeframes.

42. What are three (3) guidelines you should keep in mind when preparing reports?

Answer may include:

- Keep it clear and concise – use a style of language that is simple enough to be read quickly but technical enough to meet the needs of the audience.
- Pay attention to your grammar and make sure the information is clear.
- Proofread it. Check for errors, e.g. spelling, typing, information inconsistencies, formatting or simply illogical placement of graphic or other information.
- Include any significant risks and explain how you are dealing with them.
- Present the most important information first.
- Present the least important information at the end of the report.
- Use basic report formats.

43. What are logbooks and diaries used for?

They are used to track daily and weekly activities. Logbooks are often used to verify the number of hours an operator has worked on a machine, training that has been completed or other task-related information.

44. List four (4) things that you need to do when recommending changes or improvements to the safety, effectiveness or efficiency of tasks.

Answer may include:

- Summarise the situation.
- Clarify why you are providing advice.
- Outline all the considerations.
- Explain the risks or hazards.
- Provide details as to how the risks or hazards could be controlled.
- If possible, provide options.
- Give a final preferred option.
- Check with someone that the recommended change complies with legal and quality requirements.

45. How do you develop individual workers or the team as a whole?

Discuss with the team any recommendations for changes in and improvements to the way tasks are conducted. Listen and consider their ideas. Be approachable and open to suggestions to enhance team function and morale.