CONSTRUCTION
Training Group

LEARNER GUIDE

Excavator

National Guidelines for Occupational Health & Safety Competency Standards for the Operation of Loadshifting & Equipment & Other Types of Specified Equipment

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CONSTRUCTION
Training Group

Loadshifting Equipment

Excavator

ASSESSMENT

Part 1 Performance

Part 2 Oral/Written

AUGUST 2000

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Assessor Guidelines – General

1. Introduction

1.1 Scope

These general guidelines apply to all the assessment instruments for the certificates of competency prescribed by the *National Guidelines for Occupational Health and Safety Competency Standards for the Operation of Loadshifting Equipment and Other Types of Specific Equipment. (NOHSC: 7019)*
Assessors should also be familiar with the publication Assessment guidelines for *National Occupational Health and Safety Certification Standard for users and operators of industrial equipment.*

1.2 Additional Guidelines

Guidelines that provide additional specific information to certificate assessors are also included in each assessment instrument. Included, where appropriate, are specific instructions on the usefulness of training records (such as logbooks) and other certificates with overlapping competencies.

1.3 Evidence of Competence

Evidence of competence is established in a number of ways. The methods used in the following instruments involve:

- Assessment of practical performance
- Written and/or oral answers to questions on underpinning knowledge

2. Preparing for the Assessment

2.1 Study the instruments

You need to read the assessment instruments and specific instructions carefully before beginning an assessment

2.2 Confirm Appointments

Prior to the assessment, you need to confirm the date, time and location of the assessment with the applicants and any other relevant people.

2.3 Equipment Availability

The availability of equipment, materials and a suitable working area must be organised and confirmed, prior to the assessment

2.4 Workplace Factors

Because procedures and processes vary greatly between workplaces, it is important for assessors to plan their approaches to meet the requirements of the individual workplace.

Make sure you take the timeframe into account when planning the assessment and also make applicants aware of any time limits.

2.5 Selecting Questions

Questions for the written/oral assessment should be randomly selected, either by hand or using the computer system, if applicable.

3. Conducting the Assessment

3.1 Provide an Explanation

Begin by explaining clearly to the applicant what is required of them. Check that applicant has provided (or has been provided with) the necessary tools and equipment.

3.2 Practical Performance

Complete the practical performance checklist, as the applicant works through the required tasks. Wherever possible, this should be done in a normal working environment.

Do not ask the applicant questions while he/she is performing a task, as this can be distracting, and may affect the time taken to complete the assessment.

If, at any time, the applicant is endangering themself or others, stop the assessment immediately. This indicates that the applicant is not yet competent and may require further training, before been reassessed.

Assessments should also be stopped, if equipment or property is likely to be damaged.

3.3 Knowledge

The oral/written assessment determines the applicant's under pinning knowledge. The model answers provided with the oral/written assessment instruments are not necessarily exhaustive. Use your own judgement when scoring alternative answers.

3.4 Recording Responses

A box accompanies each item and question on the assessment forms you use. Assessors must complete every box as follows:

✓	CORRECT PERFORMANCE/ANSWER
X	NOT YET ACHIEVED
NA	NOT APPLICABLE

If a box is marked incorrectly, cross out the mistake, mark the correct response alongside, and initial the change.

4. Determining Competencies

4.1 Assessment Summary

A specific assessment summary is given for each certificate class. This is to be filled in and signed by the assessor and counter signed by the applicant.

Notice of Satisfactory Assessment the original and duplicate are given to the applicant. The applicant provides the original to the certifying authority. The assessor retains the triplicate.

4.2 Competency Requirements

In order for you to deem an applicant competent, he or she must have completed each section of the assessment to the standard required. You should note any time constraints when arriving at your decision.

The standard required for each instrument is specified in the specific guidelines and/or on the summary page at the end of each instrument.

In the case of a re-assessment, the assessor can decide to apple the whole or only that part of the assessment not yet achieved.

4.3 Additional Comments

Where an applicant fails to meet the standard of competence, you should add a written comment on the Assessment Summary, which briefly explains the problem.

Advice to the applicant, on the appropriate remedial action should also be included. This will also assist the certificate assessor, in an event that the applicant undergoes future reassessment.

4.4 Further Investigation

As a certified assessor, it is your role to determine whether or not an applicant has achieved the standard necessary for the certifying Authority to be able to grant a certificate of competency.

Whenever you are unsure of the applicant's performance or knowledge, ask additional questions, and obtain additional evidence, before making your final decisions.

National Guidelines for OHS Competency Standards

Loadshifting Equipment

Excavator

Part 1

Performance Assessment

AUGUST 2000

ASSESSOR GUIDELINES – SPECIFIC (Performance)

ASSESSMENT INSTRUMENT – SPECIFICATIONS

The following performance assessment covers the Loadshifting elements

1.1, 1.2, 1.3, 2.1, 3.1 & 3.2

1. The assessment requires the operator to check the equipment, plan the work and to safely and completely operate the excavator.

   The assessment if performed in six sections:

1.1 Conduct routine pre-operational check of excavator/equipment and the security of attachments.
1.2 Inspect the site, plan work and select and fit appropriate attachments.
1.3 Conduct pre-operational and post start up checks
1.4 Drive the excavator to the work area.
1.5 Operate Excavator
1.6 Shut down the equipment and secure the site.

2. **Prior learning and experience**

   An applicant who holds a front-end loader/backhoe, front-end loader of a skid-steer type, front-end loader, dragline, or dozer certificate does not require assessment in sections 2, 3 and 4.

3. **The performance assessment can be conducted at any location which has:**

- Sufficient clear space to operate the machine
- Ground suitable for excavating

4. **Equipment and Resources required:**

- An excavator and equipment
- Suitable site on which to use the excavator and equipment to excavate and backfill a trench.

5. Unless the assessor agrees to other arrangements, it will be the responsibility of the applicant, applicant's employer or trainer to provide the required equipment and resources.

6. **To be assessed an applicant must wear:**

- Safety helmet (where required)
- Appropriate footwear
- Other protective clothing and equipment as appropriate

7. The performance of each applicant is to be recorded on the assessor's checklist.

8. Safety of personnel: when an applicant is working dangerously, recklessly or without the necessary co-ordination, the assessor must direct the applicant to cease work and terminate those parts of the assessment immediately.

9. The applicant must undertake all performance criteria. An assessor must use his/her discretion in assessing competence under each criteria. The elements under each criteria must be marked with an appropriate tick, cross or n/a to indicate an applicant's competence level for that element.

Assessors Note: All performance criteria marked with a star ☆ are compulsory/critical. To determine a person's competence under each performance criteria, a prescribed number of elements are required to be demonstrated/answered under that criteria. The applicant must achieve the minimum specified number or more, of the performance elements to achieve competence for those criteria. To record the applicant's competence for the criteria a tick must be placed in the star.

10. Where an applicant is assessed as 'not yet competent' he/she must be informed of the reason(s) in order to gain further appropriate training.

11. The full performance assessment can take up to 1 hour.

12. The general assessment requirements are set out in Assessor guidelines – general.

13. Competence is achieved for a unit when the required number of elements for that unit have been correctly performed and ticked.

14. Overall competence is achieved when competence in all units has been achieved.

15. Where a performance element cannot be performed the assessor can stimulate or ask a question. The response must be recorded.

UNIT1: CONDUCTS ROUTINE CHECKS.

Performance Criteria 1.1.1 and 1.1.2

1. **Conduct routine checks on excavator (at least 13 elements checked)**
   - ☐ Complete walk around machine
   - ☐ Underneath machine for any water or oil leaks
   - ☐ Track condition and tension
   - ☐ Tyre condition and pressure
   - ☐ Fuel
   - ☐ Oil level in slew gear box
   - ☐ Hydraulic oil level
   - ☐ Vent hydraulic tan (release pressure)
   - ☐ Transmission oil
   - ☐ Engine oil
   - ☐ Brake fluid
   - ☐ Power steering
   - ☐ Battery security, water level and cleanliness
   - ☐ Coolant
   - ☐ Air tank drained
   - ☐ Air pre-cleaner
   - ☐ Air filter indicator

2. **Visual Check of structure/attachment for defects – (at least 9 elements checked)**
   - ☐ Attachments for condition and security
   - ☐ Damaged or broken parts
   - ☐ Quick hitch attachment/safety device lock
   - ☐ Falling objective protective structure (FOPS)
   - ☐ Roll-over protective structure (ROPS)
   - ☐ Loose nuts, bolts and couplings
   - ☐ Bucket for damage
     - ☐ Bucket for missing, worn or loose teeth
     - ☐ Worn skid plates/cutting edge
     - ☐ Hoses, fittings hydraulic rams for oil leaks
     - ☐ Connections for missing pins or keeper plates
     - ☐ Grease fittings and grease pins

3. **Checks other equipment for defects (at least 4 elements checked)**
   - ☐ Approved lifting lug
   - ☐ Wire slings
   - ☐ Chain Slings
   - ☐ Synthetic slings
   - ☐ Shackles
   - ☐ Other lifting gear

PLAN WORK AND CHECK EQUIPMENT

Performance Criteria 1.2.1, 1.2.3 and 1.2.5

4. **Inspects site and plans work: All hazards are identified where applicable (at least 8 hazards identified)**
   - ☐ Power lines
   - ☐ Trees
   - ☐ Overhead service lines
   - ☐ Bridges
   - ☐ Surrounding buildings
   - ☐ Obstructions
   - ☐ Other equipment in area
   - ☐ Personnel in area
   - ☐ Dangerous materials
   - ☐ Underground services
   - ☐ Recently filled trenches

5. **Appropriate safe access and path of Load movement is shown – (at least 2 indicated)**
   - ☐ To the work area
   - ☐ For the loads been moved
   - ☐ Traffic control considered

6. **Fits appropriate equipment for the task (at least 3 elements performed)**
   - ☐ Suitable tool used
   - ☐ Changes bucket
   - ☐ Secures catches
   - ☐ Correct procedure adopted
   - ☐ Works safely

Performance Criteria 1.3.1

7. **Conducts pre-operational start-up checks in accordance with manufacturer's specifications/operating manual – (at least 11 checks made)**
   - ☐ Window clean
   - ☐ Mounts correctly
   - ☐ Adjusts seat
   - ☐ Fastens seat belt
   - ☐ Transmission in neutral
   - ☐ Park brake on
   - ☐ Engine start
   - ☐ Warning device
   - ☐ Gauges
   - ☐ Warm up allowed
   - ☐ Rotating hazard light
   - ☐ Attachment movement
   - ☐ Clear for travel
   - ☐ Foot Brake moving forward and reverse
   - ☐ Parking brake moving forward and reverse
   - ☐ Steering

UNIT 2 – SHIFT LOAD

Performance Criteria 2.1.1 and 2.1.3

8. **Drives to the work area: (At least 4 elements performed)**
   - ☐ Selects correct controls
   - ☐ Raises attachments smoothly
   - ☐ Ensures travel direction clear of personnel and obstacles
   - ☐ Selects appropriate route
   - ☐ Travels at safe speed
   - ☐ Carries bucket at safe travelling height and crowed back

Performance Criteria 2.1.1, 2.1.3, 2.1.4, 2.1.5, 2.1.6

9. **Operates Excavator: Sets up excavator and excavates (at least 20 elements performed)**
   - ☐ Applies brake
   - ☐ Ensures turntable is reasonably level

- ☐ Checks control movements
- ☐ Personnel & plant clear of operating radius
- ☐ Smoothly operates controls
- ☐ Completes task in logical sequence
- ☐ Crowds bucket to fill
- ☐ Picks up materials
- ☐ Competently shifts material
- ☐ Equipment operated at a safe speed
- ☐ Ensures direction of slew is clear
- ☐ Cuts trench to specifications
- ☐ Demonstrates excavation around a pipe
- ☐ Deposits material the required distance from excavation
- ☐ Minimises spillage and ground damage
- ☐ Ensures direction of travel clear
- ☐ Uses appropriate path of travel
- ☐ Has the truck positioned for easy loading
- ☐ Approaches truck (or trench) correctly
- ☐ Smoothly raises and dumps load
- ☐ Repositions bucket ready for reload
- ☐ Maintains stockpile and working surface
- ☐ Moves load safely
- ☐ Lowers load to designated location
- ☐ Loads placed to ensure stability
- ☐ Loads placed to avoid causing hazard

10. **Identifies the following signals (responds correctly to all signals)** ☆
    - ☐ Stop – hand
    - ☐ Boom up – hand
    - ☐ Boom down – hand
    - ☐ Slew right – hand
    - ☐ Slew left – hand
    - ☐ Travel/traverse

11. **Consolidates and levels surface (demonstrates at least 3 elements)** ☆
    - ☐ Consolidates fill with excavator
    - ☐ Levels surface with bucket blade
    - ☐ Excess fill for natural compaction
    - ☐ Maintains level surface to work from

UNIT 3: SHUT OWN EQUIPMENT AND SECURE SITE

Performance Criteria 3.1.1, 3.1.2 and 3.2.1

12. **Shuts down equipment and secures site (demonstrated at least 7 elements)** ☆
    - ☐ Parks equipment in a suitable location away from dangerous areas
    - ☐ Attachments lowered to ground
    - ☐ Cutting edge of bucket on ground
    - ☐ Neutralises controls
    - ☐ Applies parking brake
    - ☐ Idles down, shuts down, locks ignition
    - ☐ Moves controls to release pressure
    - ☐ Applies safety lock
    - ☐ Dismounts correctly
    - ☐ Removes keys

Loadshifting Equipment

Excavator

Part 2

Oral/Written Assessment

AUGUST 2000

ASSESSOR GUIDELINES – SPECIFIC (Oral/Written)

ASSESSMENT INSTRUMENT – SPECIFICATIONS

The oral/written assessment covers the following Loadshifting elements

1.1, 1.2, 1.3, 2.1, 3.1 & 3.2

1. Oral/Written assessment for Excavator is divided into three units and eighteen sections (performance criteria 1.1.1, 1.1.2, etc).

2. To satisfy the requirements for competency the applicant must correctly answer (either in writing or orally) all critical questions as indicated by a star and a minimum of 75% of the non-critical questions from each unit.

   Assessor note: The assessment summary specifies the appropriate number of non-critical questions to be achieved.

Unit 1.0

1.1. Conduct routine checks
1.1.1. (select 12) including 4 stars
1.1.2. (select 2) including 1 star

1.2. Plan work
1.2.1. (select 9) including 4 star
1.2.2. (select 7) including 3 star
1.2.3. (select 2)
1.2.4. (select 1)
1.2.5. (select 3) including 1 star

1.3. Check controls and equipment
1.3.1. (select 9) including 2 stars
1.3.2. (select 1) which is a star

Unit 2.0

2.1. Shift load
2.2. (Select 2) which are both stars.
2.2.1. (Select 13) including 1 star
Note: 2.1.2 is divided into 6 headings. Each heading prescribes the number of questions to be selected.
2.2.2. (select 12) including 6 stars
2.1.5. (select 4)
2.1.6. (select 1)
2.1.7. (select 4) including 2 stars

Unit 3.0

3.1. Shut down equipment
3.1.1. (select 3)
3.1.3. (select 1)

3.2. Secure site
3.2.1. (select 2)

3. Prior learning and experience

An applicant, who holds a front-end loader/backhoe, front-end loader, front-end load of the skid-steer loader, dragline or dozer certificate and who answers questions for performance criteria 1.1.1. and 2.1.2 satisfactorily, are not required to complete the rest of the assessment.

4. The full oral / written assessment of **eighty-six questions** can take up to 2 hours to complete.

5. The items marked with a star are of critical importance. Failing to get any of these correct means that competency has not been achieved.

6. Competence is achieved for a unit when the required number of questions for that unit have been correctly answered and ticked.

   Overall competence is achieved when competence in all units has been achieved.

UNIT 1: CONDUCT ROUTINE CHECKS.

Performance criteria 1.1.1 (select 12 including 4 with a star)

1. What precautions must be taken when inspecting under a raised attachment? ❑

Answer:
Chocks, Blocks or safety bars must be used to prevent the raised bucket from falling

2. Name three defects to look for when inspecting the hydraulic system. ❑

Answer:

- ❑ Oil leaks
- ❑ Loose connections
- ❑ Splits
- ❑ Fractures or bulges in hoses
- ❑ Bent piston rods

3. When should slings be inspected? ❑

Answer:
Prior to and after their use. (AS1666.1)

4. What % wear in a shackle would cause it to be discarded? ❑

Answer:
10% wear.

5. What action should you take with tracks that are loose? ❑

Answer:
Have the track tension adjusted.

6. How would you know when the machine that you are operating should be serviced? ❑

Answer:
By the hour meter, manufacturer's recommendation and log book.

7. Why are you not permitted to join a chain sling with a bolt? ☆

Answer:
Because the bolt is not an approved joining method and it does not have a load rating.

8. What percentage of broken wires within a rope lay or eight diameters of a wire rope sling would cause it to be discarded? ❑

Answer:
10%

9. List six defects that would condemn a flexible steel wire rope (FSWR) from safe use?

Answer:

- One broken wire immediately above or below a terminal or end fitting.
- Core collapse
- Corrosion
- Kinks
- Crushed
- Birdcaging
- Damaged splices
- 10% of broken wires in 8 diameter of rope
- Stretched
- Affected by heat
- Knotted

10. List six defects that would condemn a lifting chain and hook from safe use?

Answer:

- Cracks in links
- Over 10% wear
- Over 10% elongation
- Over 5% wear or stretch in throat of hook
- Over 10% wear in bite hook
- Twisted or damaged links
- No SWL tag
- Rusted
- Chain or hook affected by heat
- Spot welded links

11. What must you do if the SWL tag is missing from the chain sling?

Answer:
Stop use, tag out of use and send to manufacturer for SWL tagging.

12. How do you fill machine tyres with water ballast?

Answer:
Wheel jacked up with the valve at the top of the wheel, fill with water to manufacturer's specifications, add anti-freeze if required and then add air pressure.

13. What defects would you look for when carrying out the external check on the bucket of an excavator?

Answer:
Worn or missing teeth or a worn cutting edge and other damage to the actual bucket and bucket pivot pins.

14. What defects would you look for on the hydraulic rams and hydraulic pressure hoses?

Answer:
Leaks from seals, split or fractured hoses, and bent or damaged rams.

15. When would you check the transmission fluid?

Answer:
When the transmission is cold or after the transmission is hot and as per the manufacturer's specifications.

16. What checks would you conduct on the tracks of an excavator?

Answer:
Check for any visual damage to the track and track tension

17. How would you check the tension on the tracks of an excavator? ❑

Answer:
By placing a straight edge on the track from the roller to the driver wheel and measuring the distance from the straight edge to the track.

18. What is the minimum and the maximum track sag allowable? ❑

Answer:
As per manufacturers recommendations.

19. How would you find out the correct track sag or tension for a specific machine? ❑

Answer:
From the manufacturer's manual

20. What effect would a hydraulic leak in the quick hitch line have on the security of the bucket on an excavator? ❑

Answer:
The leak would cause a reduction in the pressure of the hydraulic line which could cause the quick hitch to release the bucket attachment, particularly when the engine was stopped

21. What would you look for on an attachment to ensure it will not fall off? ☆

Answer:
That the safety pins and keeper plates are in place.

22. What action would you take if during the routine check you found excessive wear in the power arms and connections that made the excavator dangerous to operate? ☆

Answer:
Inform supervisor/authorised person, tag equipment and refrain from operating the excavator until repairs have been carried out.

23. What would you do if a strand were broken in a flexible steel wire sling? ❑

Answer:
It must never be used and it should be discarded.

Performance criteria 1.1.2 (select 2 including 1 with a star)

24. What must be done to a lowered bucket before travelling? ❑

Answer:
Raise the bucket and secure it. Carry the bucket as per manufacturer's guide.

25. What must be provided on an excavator before it is used as a crane? ☆

Answer:
A manufacturer's approved lifting lug with SWL marked on the machine.

26. If a single wire in a sling was broken could you use the sling? Explain your answer. ❑

Answer:
Yes. You can use the wire rope sling provided that the one wire is not broken immediately below or above a terminal or end fitting – then it cannot be used

PLAN WORK

Performance criteria 1.2.1 (select 9 including 4 with a star)

27. What underground services would you check for before starting to excavate? ☆

Answer:
Check for power, telephone, gas, water, sewer, drainage, and fiber optic cable lines.

28. Who should be contacted in order to find out the location of underground services? ❑

Answer:
The site supervisor who will contact the supply authorities for council maps of the site.

29. Name six hazards that must be checked on the work site before operating the excavator? ❑

Answer:
- ❑ Power lines
- ❑ Trees
- ❑ Overhead service lines
- ❑ Bridges
- ❑ Surrounding buildings and structures
- ❑ Obstructions
- ❑ Other equipment
- ❑ Dangerous materials \
- ❑ Underground services (gas, electricity, sewerage, water, communication lines)
- ❑ Personnel
- ❑ Ground conditions / recently filled trenches

30. What is the minimum distance any part of the excavator is allowed to operate from: ☆

Answer:

a. At least 6.4m from domestic powerlines

b. At least 10m from high voltage transmission lines

NOTE: *Assessors must ensure that the applicant is aware of State Authority regulations.*

31. What precautions should you take when cutting a trench across a footpath? ❑

Answer:
- ❑ Obtain information from relevant authorities who may run services under the footpath
- ❑ Excavate towards any underground services, slowly
- ❑ Provide appropriate barricades and signs

32. If using an excavator to lay pipes in a trench, what precautions should be taken? ❑

Answer:
An approved lifting lug must be used and the SWL must be marked on the machine. Persons are to be cleared from the trench where the pipe is to be layed.

33. What precautions would you take if a person were in a trench while you are lowering pipes into the trench? ☆

Answer:
Ensure the person is not under the load been lowered and is standing well clear of either end of the pipe, make sure you are lowering the pipes in a location where the trench will not cave in.

34. Name five (5) site hazard checks that you would make of the work area?

Answer:

- ❑ Hidden holes
- ❑ Drop offs
- ❑ Embankment
- ❑ Over head obstructions
- ❑ Underground services
- ❑ Overhead power lines
- ❑ Telephone lines
- ❑ Other obstructions that could be dangerous
- ❑ Personnel
- ❑ Plant & Equipment

35. What is the danger of starting and running an internal combustion engine in an enclosed space?

Answer: Exhaust fumes from the internal combustion engine in an enclosed space can kill.

36. What action must be taken before starting up and whilst operating an internal combustion engine in an enclosed space?

Answer:
The 'enclosed space' must be adequately ventilated.

37. What must be provided and maintained on the exhaust of an internal combustion engine when operated in a confined space?

Answer:
An approved exhaust control unit, catalytic converter (scrubber).

38. Why is it important to keep the floor plates free from oil, grease and tools?

Answer:

- ❑ To prevent the foot plates from becoming slippery and causing operator to slip when mounting or dismounting
- ❑ To prevent the tools from fouling controls

Performance criteria 1.2.2 (select 7 including 3 with a star)

39. What must be provided to prevent a person falling into a trench?

Answer: Barricades, guardrails or fencing.

40. When should hearing protection (ear muffs) be worn?

Answer: When the noise level could contribute to the loss of hearing. (eg; above 85 dba)

41. When a danger exists on a site what should be posted or erected to warn people of the danger?

Answer: Warning signs barricades, guardrails or fencing.

42. When should an operator wear a safety helmet?

Answer: Where there is a possibility that the operator could be struck on the head.

43. When would you be required to shore an excavation?

Answer: When the excavation is greater than 1.5 metres in depth.

44. What is the minimum type of footwear that an operator should wear to operate loadshifting equipment?

Answer: Footwear that encloses the foot and has a non-slip sole.

45. Under what conditions can a passenger ride on a machine with the operator?

Answer: Only if a special seat and seatbelt has been provided within the confines of the machine for a passenger.

46. How do you calculate the cubic capacity of the bucket of an excavator?

32. Answer: $\frac{LxWxHt}{2}$

47. What are two conditions that would result in a trench shield or shoring been used?

Answer: A trench into which a person is to enter which is1.5 metres or more in depth & where the soil is unstable or backfilled.

48. You have to cut an excavation deeper than 1.5m. The workers have to enter this excavation and there is a likelihood that the walls may collapse. Using the excavator what could you do to make the excavation safe to enter?

Answer: Bench, batter sides, drop in trench shields

49. You have to load a truck with large boulders using your excavator. You are on the same level as the truck. What are the dangers?

Answer: As you raise the bucket the boulders could tip out of the bucket onto the truck

Performance criteria 1.2.3 (select 2)

50. When travelling on a sloping surface which is the safest route of travel?

Answer: Directly up or down a sloping surface.

51. What gear should be selected to travel down a steep sloping surface?

Answer: The lowest possible gear

52. What hazards would you check for on a travel route before moving the excavator to perform work?

Answer:

- Hidden holes
- Drop offs
- Embankments
- Overhead obstructions
- Underground services
- Overhead power lines
- Telephone lines
- Other obstructions that could be dangerous
- Personnel
- Plant & Equipment

Performance criteria 1.2.4 (select 1)

53. To travel down or up a steep incline would you change gears on the incline or select the appropriate gear before travelling on the incline?

Answer: Select the appropriate gear before travelling on the incline

54. What documentation would you be required to obtain from an authorised person to operate an excavator in a hazardous working area?

Answer: The required hazardous work permits.

55. What must you obtain before digging up a footpath with an excavator?

Answer: A permit from the relevant local government authority.

Performance criteria 1.2.5 (select 3 including 1 with a star)

56. What attachment would you fit to an excavator to break up reinforced concrete? ❑

Answer: Hydraulic hammer attachment.

57. When an excavator is used in a demolition process what must be provided on the machine to protect the operator? ☆

Answer: A falling object protective structure. (FOPS)

58. Name four types of attachments that may be used on an excavator? ❑

Answer:

- ❑ Excavating bucket
- ❑ Rock bucket
- ❑ Hydraulic hammer
- ❑ Magnet attachment
- ❑ Trench bucket
- ❑ Mower attachment
- ❑ Approved lifting lug for slinging loads
- ❑ Log grapple
- ❑ Blade grader

59. On a construction site who would you contact to confirm the job requirements for the work to be performed with the excavator? ❑

Answer: The person in charge on the site or other person authorised to confirm job requirements

60. How do you select the appropriate bucket to perform the work? ❑

Answer:

- ❑ Type of material to be excavated
- ❑ Size of the excavation or trench to be considered

CHECK CONTROLS AND EQUIPMENT:

Performance criteria 1.3.1 (select 9 including 2 with a star)

61. What action would you take if you noticed a bulge form in a hydraulic hose? ❑

Answer: Stop operating, tag the machine and make sure the hose is replaced before the machine is used.

62. When should the operator carry out tests, checks and inspections on the excavator that is to be operated? ☆

Answer: Daily before use.

63. Describe how you would safely mount/dismount an excavator. ☆

Answer: Facing the machine use the grab-rail or handrail and steps to mount /dismount the machine (Three points of contact).

64. Where can the start up procedures and shut down procedures for each excavator be found? ❑

Answer: In the manufacturer's manual.

65. Before performing the work with an excavator, what should you do if you have not used the machine before? ❑

Answer: Read the operators manual to familiarise yourself with the machine (e.g. controls and decal information).

66. On mounting the excavator what should you do before attempting to start the engine? ❑

Answer: Make sure controls are in neutral or park and park brake is on.

67. Once sitting in the operator's seat and before driving off, what should you do for safety and comfort? ❑

Answer: Adjust seat until comfortable, adjust mirror (if applicable) and secure safety belt.

68. What should be referred to for the correct start up and shut down procedure for the equipment? ❑

Answer: Always refer to the manufacturer's operation manual for the correct procedure.

69. Before moving off what should be done with grounded attachments? ❑

Answer: Attachments should be raised to the correct travelling height or stowed.

70. Before reversing an excavator, what action should you take? ❑

Answer: Look back over both shoulders to ensure the path of travel is clear and sound horn twice before moving unless there is a reversing/motion alarm fitted.

71. Your excavator has run out of diesel, you refill the tank but the motor will not start. What could be the possible cause? ❑

Answer: Air in the fuel system and the fuel system needs bleeding.

Performance criteria 1.3.2 (select 1) with a star.

72. What action would you take with damage and defects found on the machine? ☆

Answer: Tag the machine, put it out of service and report the damage and defects to the authorised person.

UNIT 2 - SHIFT LOAD:

Performance criteria 2.1.1 (select 2) with a star.

73. Why are you not allowed to hoist persons with the bucket of an excavator? ☆

Answer: The manufacturer did not design the machine to hoist persons and it is against all safe operating procedures.

74. Why are you not allowed to attach slings to the teeth of the bucket? ☆

Answer: You may break off the teeth and/or the sling could slip off the teeth and cause the load to fall, which may injure or kill someone or damage the load. It is against regulations to sling loads using an excavator without the appropriately approved lifting connection fitted.

Performance criteria 2.1.2 (select 2 including 1 with a star)

75. You are required to operate an excavator on soft and uneven ground. What effect would this have on the load you could raise and carry with the excavator? ☆

Answer: It would reduce the weight of the load that could be safely carried.

76. How would you establish the load that can be safely lifted by an excavator? ❑

Answer: By the load chart on the excavator.

77. What must be provided on an excavator to attach slings so that the excavator may be used as a crane? ❑

Answer: A specially designed and approved lifting lug.

Load Charts (Select 1)

78. From excavator load chart "Appendix A" what is the SWL to be hoisted over the side at a radius of 3.0 metre and at a hook height of 3.0 metres? ❑

Answer: 10750 kg

79. From excavator load chart "Appendix A" what is the SWL to be hoisted over the side at a radius of 6.1 metre and at a hook height of (minus) – 3.0 metres? ❑

Answer: 3900 kg

Weight of materials (select 2)

80. List two ways that you would assess the weight of a load to be hoisted? ❑

Answer:

- ❑ By calculating the weight
- ❑ Delivery dockets
- ❑ Weighbridge certificate
- ❑ Weight marked on the item

81. What is the approximate weight of cubic metre of concrete? ❑

Answer: 2.4 Tonnes

82. Of topsoil or clay which is harder to excavate, push and spread? ❑

Answer: clay

Load factors (select 2)

83. What effect does a choker hitch around a square load have on the WLL for the sling? ❑

Answer: Reduces the SWL/WLL by 50%

84. A four legged bridle sling arrangement is attached to a rigid load. How many and which sling legs would be assumed to support the load? ❑

Answer: Two opposite diagonal slings must be capable of supporting the load.

85. What effect does a choker hitch around a round load have on the WLL for a wire rope sling? ❑

Answer: Reduces the SWL/WLL by 25% or to 75% of SWL/WLL

Rule of thumb formula (select 2)

86. State the rule of thumb formula to calculate the WLL of wire rope. ❑

Answer: Diameter in mm squared x 8 = WLL in kg.

87. State the rule of thumb formula to calculate the diameter of the wire rope sling required to lift a specified load? ❑

Answer: Square root of load in kg/8 = Diameter in mm

88. State the rule of thumb formula to calculate the WLL of a grade 80 lifting chain? ❑

Answer: Diameter in mm squared x 32 = WLL in kg or Diameter in mm squared x 0.4 x grade = WLL in kg

89. State the formula for calculating the WLL of grade 30 to grade 75 lifting chain? ❑

Answer: Diameter in mm squared x 0.3 x grade of chain = WLL in kg

SWL of slings (select 4)

90. What is the WLL of a 12mm diameter wire rope sling? ❑

Answer: 12 x 12 x 8 = 1152kg.

91. What is the diameter of a single leg wire rope sling that is required to hoist a 2048 kg load? ❑

Answer: Square root of (2048/8) = 16mm

92. What is the WLL of a flexible steel wire rope (FSWR) 16mm in diameter? ❑

Answer: 16 x 16 x 8 =2048 kg.

93. When a sling is reeved around a square load how is the WLL altered? ❑

Answer: Reduces SWL/WLL by 50%

94. What is the WLL of an 8mm diameter flexible steel wire rope (FSWR)? ❑

For variation of question 94 use:
- 5.5mm
- 10mm
- 18mm

Answer: 8 x 8 x 8 = 512 kg. Options: 242kg, 800kg, 2592kg

95. What is the WLL of a 12mm mild steel chain? ❑

Answer: 12 x 12 x 30 x 0.3 = 1296kg.

96. What is the WLL of a 7.1mm diameter 80-grade chain? ❑

For variation of question 96 use:
- 8mm grade 80
- 10mm grade 30
- 13mm grade 80

Answer: 7.1 x 7.1 x 32 = 1613.12 kg.
Options: 2048kg, 900kg,5408kg

Performance criteria 2.1.3 (select 12 including 6 with a star)

97. What is the danger of slewing with a load when the turntable is not level? ☆

Answer: The machine could overturn

98. Is it permissible for loads to be slewed over the cabin of the truck been loaded? Explain your answer. ❑

Answer: No. The driver of the truck may be in the cabin and in the event of an accident the bucket could strike the cabin, or load could be dropped on the cabin.

99. List three precautions that must be taken when dumping material into a truck using an excavator? ❑

Answer:

- ❑ The truck must be correctly positioned.
- ❑ No load must pass over the cabin of the truck
- ❑ A layer of soil must be laid first to take the impact if large rocks are to be loaded
- ❑ The loaded bucket must be within the SWL of the machine.

100. What action should be taken if you discover a large rock in the side of a trench that you are digging? ❑

Answer: The rock should be removed

101. How far must people be kept away from the excavator when it is digging? ☆

Answer: The operating radius of the machine

102. Name two methods that should be used to prevent a cave in of a trench or excavation? ☆

Answer: Shoring, battering, benching or trench shields.

103. What would be the indications that you are excavating quiet close to an underground service? ❑

Answer: Observe the spoil, the appearance of the following foreign materials is an indication that the area has been previously excavated:

- ❑ Crushed blue metal
- ❑ Plastic tape
- ❑ Clean sand
- ❑ Sand bags
- ❑ Broken tiles
- ❑ Moisture

Any other unusual material

104. While excavating you suspect there could be an underground service in the area of the excavation, what action would you take? ❑

Answer: Stop operating immediately and hand dig to investigate further and check relevant statutory authority maps and plans.

105. How high must the bucket be kept above the ground when driving forward? ❑

Answer: Only high enough to provide ground clearance at all times.

106. The load you are going to lift is likely to swing, how would you prevent this from happening? ❑

Answer: Attach tag lines to the load.

107. Before reversing a machine what precaution should be taken? ☆

Answer: Sound the horn look in the mirrors and over both shoulders and ensure the direction of travel is clear

108. When loading trucks using an excavator, where should the truck driver and other observers be? ❑

Answer: All persons must be in view of the operator and at a safe distance from the loading operation.

109. What is the minimum diameter size tag line that can be used to control loads? ❑

Answer: Not less than 16mm diameter

110. How are vehicles/machines stopped from coming too close to an excavation? ☆

Answer: By using barricades and warning signs.

111. What are the dangers of driving your excavator close to the edge of an excavation? ☆

Answer: The excavation could collapse causing the excavator to overturn or to fall into the excavation.

Performance criteria 2.1.5 (select 4)

112. Interpret the following Signal ❑

Answer: Stop

---

113. Interpret the following Signal ❑

Answer: Boom Down

---

114. Interpret the following Signal ❑

Answer: Boom Up

---

115. Interpret the following Signal ❑

Answer: Slew Right

---

116. Interpret the following Signal ❑

Answer: Slew Left

---

117. Interpret the following Signal ❑

Answer: Retract Boom

---

118. Interpret the following Signal ❑

Answer: Extend Boom

---

119. Interpret the following Signal ❑

Answer: Travel and Traverse

Performance criteria 2.1.6 (Select 1) with a star.

120. How far away from an excavation must material be dumped? ☆

Answer: Not closer than 1 metre with material coming to rest no closer than 0.5 metres from the excavation.

Performance criteria 2.1.7 (select 4 including 2 with a star)

121. How would you dismount a machine that contacted live power lines, which could not be released, or the power turned off? ☆

Answer: Jump well clear of machine ensuring contact with the ground and machine is not at the same time.

122. If the slings shifted on a load been hoisted, what action would you take? ❑

Answer: Carefully lower the load to the ground and have the slings re-positioned and secured.

123. If you accidentally damaged an underground electrical cable, whom would you immediately contact to render the power supply safe? ❑

Answer: Supervisor who would contact the electrical supply authority.

124. The excavator you are operating overheats and needs to be checked for coolant level. What precautions would you take prior to removing the radiator cap and topping up the coolant? ❑

Answer: Allow the machine to cool down, use a cloth to protect from hot water burns and remove the radiator cap slowly.

125. If you are operating an excavator and it makes contact with power lines what should you do? ☆

Answer:

- Stay calm, remain in seat, warn others to keep away, try to break contact by lowering bucket (if possible), try and get someone to switch off the power
- If it is unsafe to remain on the machine – jump well clear of the machine, don't make contact with the ground and the machine at the same time. If you have made contact with underground power cables, be aware the area around the machine could be electrified.
- Remain a safe distance from the machine and warn others to keep clear. Have someone notify the site manager/supervisor who should report immediately to the appropriate authority.

UNIT 3 - SHUT DOWN EQUIPMENT

Performance criteria 3.1.1 (select 3)

126. Name three areas where you would not park the excavator. ❑

Answer: Access ways, near overhangs, refueling sites, tidal or flood areas, adjacent to an excavation.

127. When leaving the excavator what should be done with all hydraulically raised attachments?
Answer: Attachments should be lowered with the cutting edge flat on ground and pressure removed from hydraulic lines.

128. What type of surface is the ideal type to park an excavator on?

Answer: A firm level surface.

129. What is the danger of parking near an excavation?

Answer: The weight of the excavator could cause the excavation to cave in, particularly if the ground is affected by rain.

130. Describe the correct way to park an excavator.

Answer: Park on level ground, apply park brake or place in park, lower bucket to ground with cutting blade resting on the ground, turn off machine.

Performance criteria 3.1.3 (select 1)

131. What post-operational checks of an excavator should the operator carry out?

Answer: Check the machine and equipment for defects and wear. Check the oil, fuel and water levels.

SECURE SITE:

Performance criteria 3.2.1 (select 2)

132. What shall be provided when an excavator has to be parked on or protrudes on to an access way?

Answer: Barricades, lights and signs.

133. For what reason should the key be removed from ignition of the machine?

Answer: To prevent unauthorised movement

134. Before leaving the site what must be provided to restrict access to the site? ❑

Answer:
Barricades or fences.

135. List eight things that must be done when parking the machine? ❑

Answer:
- ❑ Parked away from access ways
- ❑ overhangs
- ❑ fuelling site
- ❑ Parked away from excavations and trenches
- ❑ Parked clear of fire hazard
- ❑ Parked clear of entrances, exits
- ❑ Parked away from firefighting and electrical equipment
- ❑ Parked on firm level ground or if on an incline facing up the slope
- ❑ Lower bucket with cutting edge on ground
- ❑ Engine stopped in accordance with manufacturer's operation manual (idle engine before turning off)
- ❑ Secure parking brake or leave in park position
- ❑ Remove keys

APPENDIX A

Load Chart for Excavator – Stationary on firm level ground

EXCAVATOR LOAD CHART										
22 Tonne Excavator fitted with a 3.05m long arm, 1m³ bucket and 600mm slides										
Radius	Max reach		7.6m		6.1m		4.6m		3.0m	
Hook height	Front	Side	Front	Side	Front	Side	Front	Side	Front	Side
6.1m	***3100**	***3100**	***3450**	***3250**						
4.6m	***3150**	**2650**	***3950**	**3250**	***4100**	***4100**				
3.0m	***3300**	**2400**	***4450**	**3050**	***5050**	**4500**	***6450**	***6450**	***10750**	***10750**
1.5m	**3550**	**2300**	**4550**	**2950**	***6050**	**4200**	***8300**	***6450**	**85450**	***5450**
0m	**3600**	**2300**	**4450**	**2850**	**6200**	**400**	***9650**	**6050**	***6900**	***6900**
-1.5m	**3900**	**2500**	**4350**	**2750**	**6100**	**3850**	***9650**	**5900**	***10200**	***10200**
-3.0m	**4654**	**2950**			**6100**	**3900**	**9650**	**6000**	***14900**	**12300**
-4.6m	**6650**	**4250**					**9200**	**6100**	***13800**	**12700**

The ratings are based on 75% of tipping load, stationary on firm level ground as per AS 1418.5

* **The ratings do not exceed 87% of hydraulic lifting capacity or 75% of tipping load.**

For "pick and carry loads" on firm level ground the load shall not be greater than 66.7% of tipping load as per AS 1418.5 or 88.9% of the SWL.

Where ground is sloping, rough or not firm, the load must be dramatically reduced.

EXCAVATOR ASSESSMENT SUMMARY

ORAL/WRITTEN ASSESSMENT

Operational Area UNIT	Number of critical criteria required	Number of critical criteria achieved	Number of non-critical criteria required	Number of non-critical criteria achieved	Competent? (tick) ***YES***	***NO***
1	16		21			
2	11		19			
3	0		5			
Assessment start time:		**: am/pm**	**Finish time:**	**: am/pm**		
Oral/Written Assessment completed within time allowed – approx 2						

PERFORMANCE ASSESSMENT

Operational Area UNIT	Number of criteria required	Number of criteria achieved	Competent? (tick) ***YES***	***NO***
1	7			
2	4			
3	1			
Assessment start time:		**: am/pm**		
Assessment finish time:		**: am/pm**		
Performance Assessment completed within time allowed –				

Applicant is: ☐ COMPETENT

(tick or circle the result obtained) ☐ NOT YET COMPETENT

Name of Assessor:..... Name of Applicant:.....

Signature:..... Signature.....

Date.../..../....

Comments/Feedback **(Assessor to make additional comments which clarify the assessment results)**

_____

_____

_____

EXCAVATOR ASSESSMENT SUMMARY