

CONSTRUCTION
Training Group

LEARNER GUIDE

Front-End Loader/Backhoe

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

Assessor Guidelines – Specific (Performance Assessment)

ASSESSMENT INSTRUMENT – SPECIATIONS

The performance assessment covers the following Loadshift elements:

1.1, 1.2, 1.3, 2.1, 3.1 & 3.2

1. This assessment requires the operator to check the equipment, plan the work and to safely and competently operate the front-end loader/backhoe.

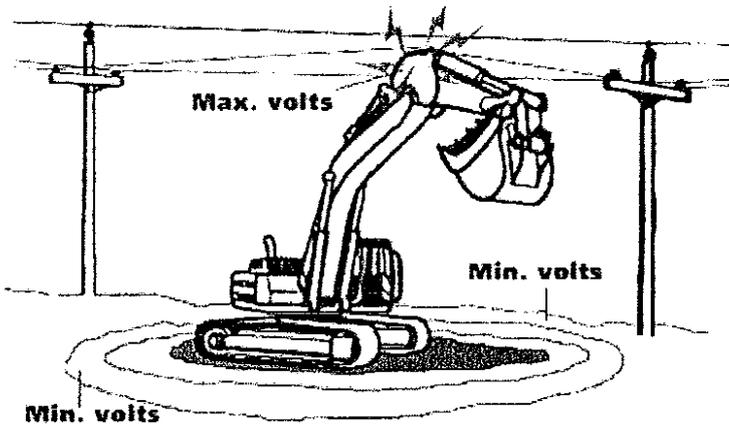
The Assessment is performed in ten sections:

- 1.1 Conduct routine pre-operational check front-end loader/backhoe, 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 to the work area.
- 1.5 Set up machine and excavate a trench.
- 1.6 Use the front-end loader/backhoe as a crane
- 1.7 Backfill the trench and load or simulate lading a truck.
- 1.8 Consolidate and level a surface.
- 1.9 Pick up and shift material in the bucket.
- 1.10 Shut down equipment and secure site.

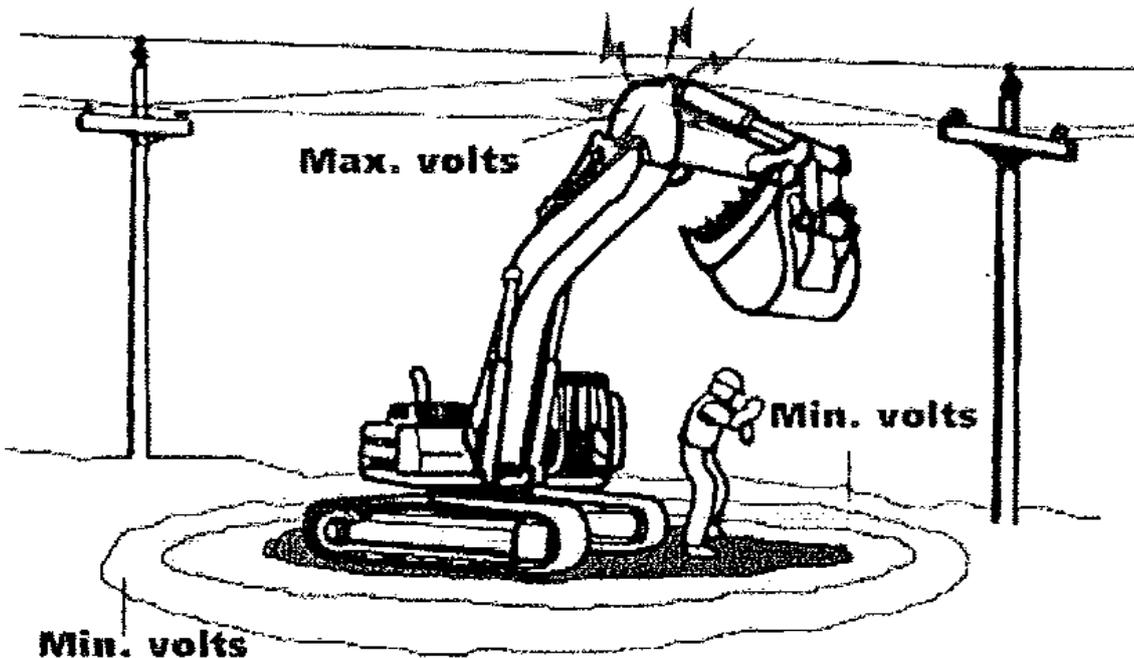
2. Prior learning & experience
 - 2.1 An applicant who holds a front-end loader, excavator, dragline or dozer certificate do not require assessment in sections 2, 3, 4, 7, 8 and 9.
 - 2.2 Applicant who produces satisfactory documentary evidence (such as a log book) which establishes 50 days experience in front-end loader/backhoe operations specifically covering competencies tested in sections 2, 3, 4, 7, 8 and 9 does not require assessment in these sections.
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:
 - Front-End loader/backhoe and equipment.
 - A write rope sling, chain sling, shackle and a fibre rope tag line.
 - Suitable loads to sling (such as a bundle of timber and a concrete pipe).
 - Suitable site on which to use the front-end loader/backhoe and equipment to excavate and backfill a trench, use the front-end loader/backhoe in the crane mode and to load or simulate loading of a truck.
 5. Unless other arrangements are agreed to by the assessor, it will be responsibility of the applicant, applicants 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 to the assessors 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 items in the shaded boxes are critical importance. Failing to get any of these correct means that the competency has not been achieved.
 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 and 30 minutes.
 12. The general assessment requirements are set out in the Assessor's guidelines – general.
 13. The applicant's competence in each unit is to be summarised for both performance and knowledge on the summary sheet. Competence is achieved for a unit when the required number of boxes for that unit have been ticked or marked as 'NA'.
- Overall competence is achieved when competence in all units has been assessed.

Diagram 1:



If anything touches a high-voltage power line or if a power line falls to the ground, electricity will flow to the ground energising the tree or equipment and anything in contact with it. The surrounding ground may be extremely hazardous. The voltage gradually decreases from the point of contact until it reaches zero. The safe distance shown here—10 metres — is for line voltages up to and including 66 kV (66,000 V).

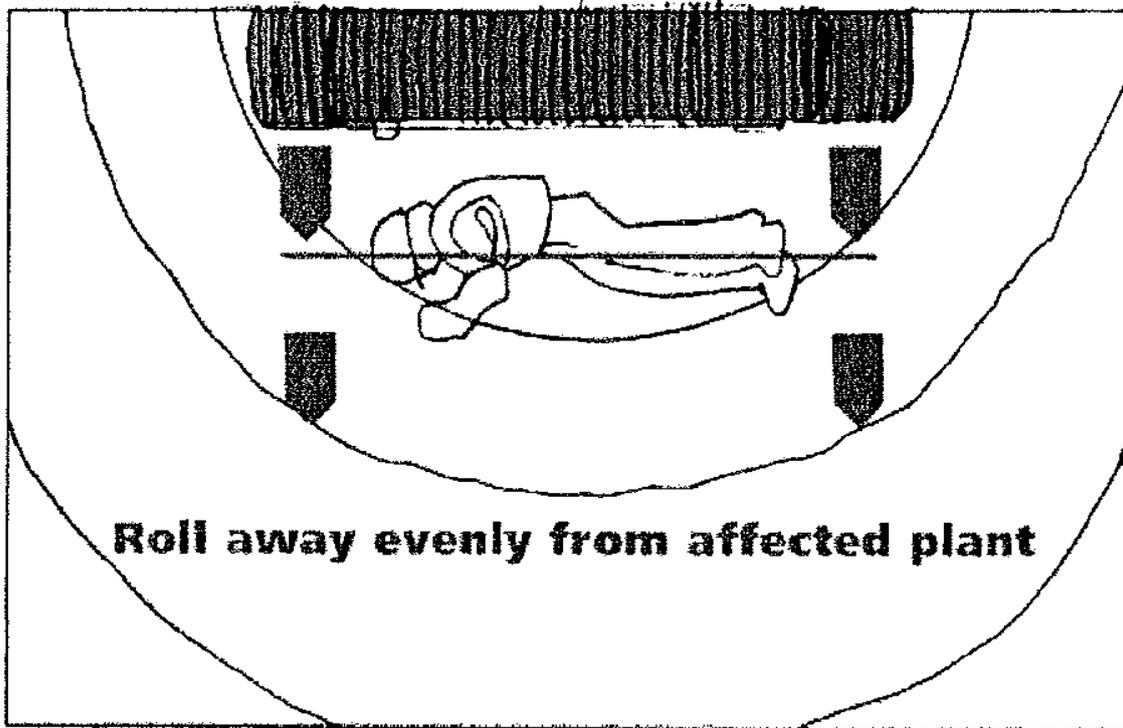
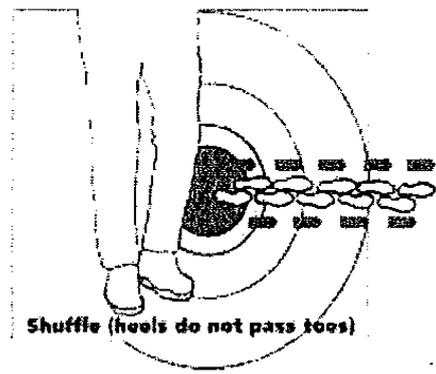
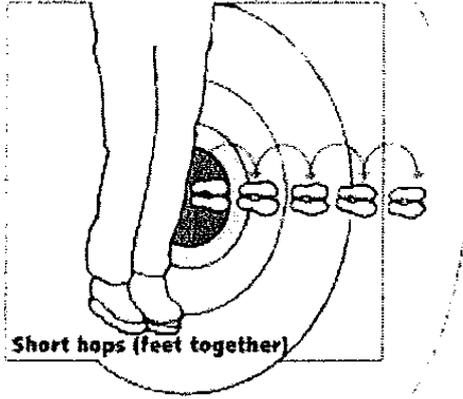


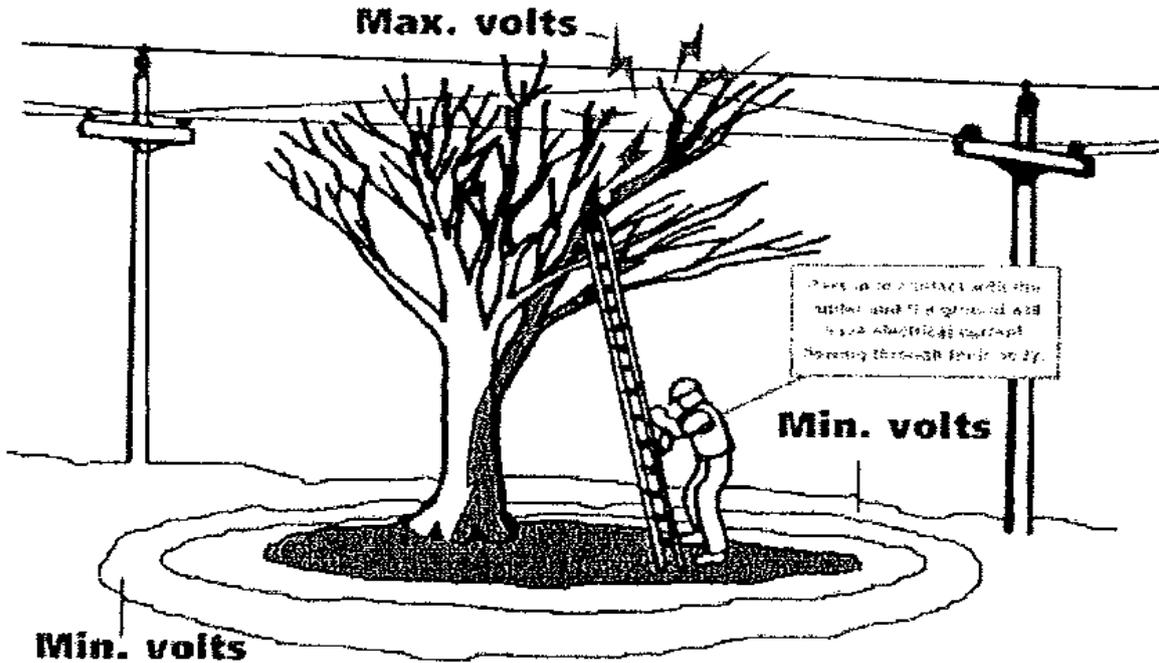
Step potential

Step potential is the voltage difference between two places that are a step apart on energised ground. For example, if you are standing on energised ground, there could be a significant difference in voltage between where one foot and the other are placed, and an electric current could flow up one leg and down the other.

Step potential. If your feet are spread apart on energised ground, electricity can flow through your body from the area of higher voltage to the area of lower voltage

If your feet are close together and touching, you are fairly safe. Since there is almost no voltage difference between the places your feet stand, there is little reason for electricity to seek a path through your body.





Touch potential

Touch potential is another danger that comes from the difference in voltage. It occurs when you touch something that is energised while standing on the lower voltage ground. For example, if some equipment is in contact with a power line, it will be energised to the same voltage as the power line; the surrounding ground will be energised to a lower voltage. If you touch the energised equipment or tree at the same time as you touch the ground with your feet, electricity will flow through your body from the higher voltage equipment to the lower voltage ground.

Touch potential: Trees and equipment become energised when they contact a power line. Electricity can flow through a worker who touches the energised tree or equipment, often causing serious injury or death.

Currents greater than 75 mA can cause ventricular fibrillation (rapid, ineffective heartbeat) and will cause death in a few minutes.

Conduct Routine Checks:

Performance Criteria 1.1.1 and 1.1.2

1. Conducts routine checks on vehicle equipment:

- Tyre condition & inflation

Checks liquid levels:

- Fuel
- Hydraulic Oil
- Engine Oil
- Battery
- Coolant

Checks structure for defects:

- Damaged or broken parts
- Loose nuts, bolts and couplings

Checks attachment for defects:

- Damage
- Bucket for missing, work or loose teeth
- Hoses, fittings, hydraulic rams for oil leaks
- Connections for missing pins or keepers
- Grease holes and grease pins

Checks other equipment for defects:

- Wire slings
- Chain slings
- Shackles
- Other Gear
- Checks attachments for security

Performance Criteria 1.2.1, 1.2.3 and 1.2.5

2. Inspects site and plans work:

Identifies Hazards:

- Power lines
- Phone Lines
- Service drains
- Obstructions

Access and path of movement is indicated:

- To work area
- For loads

Fits appropriate equipment:

- Suitable tools used
- Secures catches
- Correct procedure adopted
- Works safely

Performance Criteria 1.3.1

3. Conducts pre-operations and post start-up checks in accordance with manufacturers specifications/operating manual

- Mounts correctly
- Adjusts seat
- In neutral
- Warning device
- Engine start
- Gauges
- Warm-up allowed
- Attachment movement
- Clear for travel
- Foot brake
- Holding brake
- Steering

SHIFT LOAD:

Performance Criteria 2.1.1 & 2.1.3

4. Drives to the work area:

- Raises attachments smoothly
- Secures backhoe bucket
- Ensures travel direction clear
- Selects appropriate route
- Travels at safe speed

5. Sets up backhoe and excavates:

- Position backhoe competently
- Applies brake
- Lowers bucket

- Secures and mounts backhoe seat
- Check controls
- Lowers stabilisers (lowest side first)
- Back wheels of ground
- Smoothly operates controls
- Tackles task in logical sequence
- Uses sufficient revs for work
- Uses correct bucket angle
- Crowds sufficiently to fill bucket
- Deposits full buckets of soil
- Deposits soil away from trench
- Keeps persons out of operating radius
- Cuts trench to specifications
- Demonstrates digging around a pipe

Performance Criteria 2.1.2

6. Operates front-end loader/backhoe as a crane:

- Checks sling attachment point
- Establishes weight of load
- Load not more than SWL for the operation
- Selects appropriate slings and gear
- Raises bucket to connect load

- Supervises correct slinging of the load
- Ensures tag line connected (if required)
- Trial lifts load
- Moves load to hand signals
- Moves load safely
- Lowers load to designated location

7. Backfills trench and loads truck:

- Bucket at correct level and angle
- Uses sufficient revs and speed
- Avoids excessive wheel spin
- Crowds bucket to fill
- Ensures direction of travel clear
- Travels with bucket low
- Acceptable and safe speed
- Minimises spillage and ground damage
- Uses appropriate path of travel
- Approaches trench or truck correctly
- Smoothly raises and dumps load
- Repositions bucket ready for reload
- Maintains stockpile and working surface

8. Consolidates and levels surface:

- Consolidates fill with loader
- Levels surface with bucket blade
- Leaves excess fill for natural compaction
- Maintains level surface to work from

9. Picks up and shifts material in the bucket:

- Picks up material
- Shifts material in bucket

Performance criteria 2.1.1, 2.1.4, 2.1.5 and 2.1.6

General performance sections of 4, 5, 6, 7, 8 and 9

10. Operates front-end loader/backhoe as a crane:

- Equipment suitable for the work
- Machine suitable for ground conditions
- Competently shifts material
- Equipment operated at a safe speed
- Signals are interpreted and observed
- Loads placed to ensure stability
- Loads placed to avoid causing hazard

**SHUT DOWN EQUIPMENT AND
SECURE SITE**

**Performance Criteria 3.1.1, 3.1.2
and 3.2.1**

**11. Shuts down equipment and
secures site:**

Parks equipment:

- Machine parked in suitable area
- Attachments lowered to ground
- Cutting edge of bucket on ground

Shuts down equipment:

- Neutralises controls
- Applies holding break
- Idles to stop, locks ignition
- Moves controls to release pressure
- Applies safety lock (where applicable)

Avoid hazards:

- Parks away from danger areas
- Removes keys
- Locks cabin (if applicable)

Assessor Guidelines – Specific (Knowledge Assessment)

ASSESSMENT INSTRUMENT – SPECIATIONS

The performance assessment covers the following Load shift elements:

1.1, 1.2, 1.3, 2.1, 3.1 & 3.2

1. Knowledge assessment for Front-end Loader/Backhoe is divided into three units and seventeen 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) the specified number of questions in each of the following sections:

Unit 1.0

- 1.1 Conduct routine checks
 - 1.1.1 (select 4)
 - 1.1.2 (select 1)
- 1.2 Plan work
 - 1.2.1 (select 2)
 - 1.2.2 (select 3)
 - 1.2.3 (select 1)
 - 1.2.4 (select 1)
 - 1.2.5 (select 1)
- 1.3 Check controls and equipment
 - 1.3.1 (select 1)
 - 1.3.2 (select 1)

Unit 2.0

- 2.1 Shift load
 - 2.1.1 (select 1)
 - 2.1.2 (select 3)
 - 2.1.3 (select 1)
 - 2.1.5 (select 1)
 - 2.1.7 (select 2)

Unit 3.0

- 3.1 Shut down equipment
 - 3.1.1 (select 1)
 - 3.1.3 (select 1)
- 3.2 Secure site
 - 3.2.1 (select 1)

3. Prior learning and experience:

An applicant who holds a front-end loader, excavator, dragline or dozer certificate who answers questions for performance criteria 1.1.1, 2.1.2 and 2.1.5 satisfactorily is not required to complete the rest of the assessment.

4. The full knowledge assessment of twenty six questions can take up to thirty minutes.
5. The items in the shaded boxes are of critical importance. Failing to get any

of these correct means that competency has not been achieved.

6. The applicant's competence in each unit is to be summarised for both performance and knowledge on the summary sheet. Competence is achieved for a unit when the required number of boxes for that unit have been ticked or marked 'N/A'.

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

**CONDUCT ROUTINE CHECKS:
Performance criteria 1.1.1 (select 4 including 1 with a shaded box)**

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

Provision provided to prevent attachment descending.

2. Name three defects to look for in the hydraulic system.

Oil leaks, loose connections, splits, fractures or bulges in hoses.

3. When should slings be inspected?

Prior to their use. (AS1666)

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

10% wear.

5. Briefly describe how you would check the air pressure of water filled tyres.

Check with the valve at the top of the wheel.

6. What safety precautions should be taken to inflate split rim wheels?

Do not stand in front of the wheel and inflate tyre in a cage if available.

7. Is it permissible to join a chain sling with a bolt?

No.

8. What % of broken wires within a lay or in eight diameters of a wire rope sing would cause it to be discarded?

10% of the wires.

Performance criteria 1.1.2 (select 1)

9. What must be done to a lowered backhoe bucket before travelling?

Raise the bucket and secure it.

10. What shall be provided on a front-end loader/backhoe before it is used as a crane?

Special provision to attach the slings to and the SWL marked on the equipment.

PLAN WORK:

Performance criteria 1.2.1 (select 2)

11. In built-up areas what checks should be made before excavating?

Check for power, telephone, gas or drainage lines.

12. What would you refer to in order to establish the location of underground services?

Supply authority or council maps.

13. Name two methods that you would use to prevent a cave in of a trench or excavation?

Shoring, battering or benching.

14. If you accidentally damaged an underground electrical cable who would you immediately contact to render the power supply safe?

The electrical supply authority.

Performance criteria 1.2.2 (select 3 including 1 with a shaded box)

15. What shall be provided to prevent a person falling into a trench?

Barricades or guardrails or fencing.

16. When should ear protection be worn?

Where the noise could contribute to the loss of hearing.

17. What is the danger of loading a truck across a sloping surface?

The loader could overturn.

18. When should an operator wear a safety helmet?

Where the person could be struck on the head.

19. In doubtful soil, what depth trench is required to be shored before it is entered?

Trenches over 1.5m deep.

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

Non-slip footwear that encloses the foot.

Performance criteria 1.2.3 (select 1)

21. Which is the preferred route of travel, diagonally across or directly down sloping surface?

Directly down the sloping surface.

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

A low gear. The gear required to climb the sloping surface.

Performance criteria 1.2.4 (select 1)

23. What would you be required to obtain from the Relevant Authority to operate a machine in a hazardous working area?

The required permits.

24. What Government licence do you require to drive a front-end loader/backhoe over 4.5 tonnes on a public road?

The appropriate heavy vehicle licences.

Performance criteria 1.2.5 (select 1)

25. What attachment would you use to break up reinforced concrete?

Hydraulic hammer attachment.

26. When a front-end loader/backhoe is used in a demolition process what shall be provided to the machine to protect the operator?

An overhead protective structure. (AS 2601)

**CHECK CONTROLS AND EQUIPMENT:
Performance Criteria 1.3.1 (select 1)**

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

Replace the hose before the machine is used.

28. When should tests, checks and inspections be made by the operator on the front-end loader/backhoe that is to be operated?

Daily before use.

Performance criteria 1.3.2 (select 1)

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

Report the damage and defects to authorised person and ensure safety is not jeopardised.

SHIFT LOAD:

Performance criteria 2.1.1 (select 1)

30. Is it permissible to hoist persons with the bucket of a front-end loader/backhoe?

No.

31. Is it permissible to attach slings to the teeth of the bucket?

No.

Performance criteria 2.1.2 (select 3)

32. What effect would sloping ground have on the load that you would hoist and carry with the front-end loader/backhoe?

It would reduce the load that could be safely carried.

33. What is the approximate weight of cubic metre of concrete?

2.4 tonnes.

34. What is the approximate SWL of a 12mm diameter wire rope?

12 x 12 x 8 = 1152kg.

35. Of topsoil or clay which is more cohesive and harder to excavate, push and spread?

Clay.

36. What effect does a choker hitch around a square load have on the SWL for the sling?

Reduces the SWL by 50%.

37. State the rule of thumb formula to calculate the SWL of wire rope.

Diameter in mm squared x 8 = SWL in kgs.

Performance criteria 2.1.3 (select 1)

38. Before reversing the machine what precaution should be taken?

Ensure the direction of travel is clear.

39. What is the added danger when a trench is under cut?

The trench is more likely to cave in.

Performance criteria 2.1.5 (select 1)

40. Applicant to state the meaning of the hand signal for "hoisting lower" demonstrated by the assessor.

Hoisting lower.

41. Applicant to state the meaning of the hand signal for "hoisting raise" demonstrated by the assessor.

Hoisting raise.

42. Applicant to state the meaning of the hand signal of "stop" demonstrated by the assessor.

Stop.

Performance criteria 2.1.7 (select 2)

43. What action would you take if a hydraulic hose sprung a leak while the bucket was raised?

Lower bucket and have repairs carried out.

44. If the machine contacted a live power line which could not be released or the power turned off, how would you dismount the machine?

Jump clear ensuring contact with the ground and machine is not at the same time.

45. If the slings shifted on a load being hoisted, what action would you take?

Stop the crane, warn people in the area, then carefully lower the load and have the slings re-positioned and secured.

**SHUT DOWN EQUIPMENT:
Performance criteria 3.1.1 (select 1)**

46. Name three areas where you would not park the front-end loader/backhoe.

Access ways, near overhangs, refuelling sites, tidal or flood areas, adjacent to an excavation.

47. When leaving the loadshifting equipment what should be done with all hydraulically raised attachments?

Attachments lowered and pressure removed from hydraulic lines.

Performance criteria 3.1.3 (select 1)

48. What post-operational checks should be carried out by the operator on the front-end loader/backhoe to prepare it ready to be reoperated?

Check the structure and equipment for defects and wear and the oil, fuel and water levels.

SECURE SITE:

Performance criteria 3.2.1 (select 1)

49. What shall be provided when a front-end loader/backhoe has to be parked on or protrudes onto an access way?

Barricades, lights and signs.

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

To prevent unauthorised movement.

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

Barricades or fences.

Unit	Form of assessment	Total number of boxes in the assessment	Number of boxes given or NA	Number of boxes required to meet standard	Were all critical boxes given or NA?		Assessment standard requirements achieved *		
					Yes	No	Yes	No	
1	Performance	40		36	Yes	No	Yes	No	
	Knowledge	15		10	Yes	No	Yes	No	
	Assessment completed within time allowed							Yes	No
2	Performance	59		54	Yes	No	Yes	No	
	Knowledge	8		5	Yes	No	Yes	No	
	Assessment completed within time allowed							Yes	No
3	Performance	11		9	Yes	No	Yes	No	
	Knowledge	3		2	Yes	No	Yes	No	
	Assessment completed within time allowed							Yes	No

*Performance standard = Number of items required to meet standard (including all critical boxes)

Knowledge standard = Number of questions required to meet standard (including all critical boxes)

Summary

Candidate is:

COMPETENT

NOT YET COMPETENT

Date: _____

Name of Assessor: _____ Signature: _____

Name of Candidate _____ Signature: _____

Comments/feedback:
