Wheel Loader Operator Assessment

Assessment	This document can be used: • For gathering evidence in a training environment, • As a competency check of knowledge on an existing worker; or • As part of a summative assessment.
Candidate Name	
Assessor Name	
Date of Assessment	
Summary of Assessment	☐ The candidate met all outcomes of the **worker assessment** ☐ The candidate has **NOT** met all outcomes of the **worker assessment** ☐ Gap training plan developed
Date of Reassessment	
Summary of Reassessment	☐ The candidate met all outcomes of the **worker assessment** ☐ The candidate has **NOT** met all outcomes of the **worker assessment**
Instructions	• Complete the assessment with the candidate, adding notes to justify your decisions. • Ensure the first page of this document is completed (all fields). • Develop a gap training plan for practical deficiencies if required. • Use the same form for reassessment (if applicable), only reassessing the areas where gaps exist. • Conduct the competency conversation before conducting the practical assessment.

Note: This worker assessment covers the technical components of a specific role. For general knowledge and a complete picture of a worker's competency, BC Forest Safety recommends the optional Basic Forest Worker competency profile and assessment tools that can be found at www.bcforestsafe.org.

Part 1 - Competency Conversation

General Instructions	
To conduct a competency conversation, ask the worker the questions in this first part of the assessment to determine if they understand the knowledge components of their role. It is acceptable to rephrase the question in a way that the worker understands, but the worker cannot be given hints to the correct answer. The assessment should not be used as a training opportunity; instead, any deficiencies identified in this assessment should be collected into a gap training plan and addressed with the worker later. **Important Note:** Do not conduct competency conversation while operating equipment.	
Assessment Instruction	**S** - This means that the candidate must supply all responses listed, as the knowledge is **safety** critical or important. **B** - This means the candidate must at a minimum verbalize the **bolded** responses, and additional responses are further proof of competence. **P** - The candidate must give a **percentage** of responses correctly to reasonably show competence in the area.

1081 – Describe Tools and Equipment for Heavy Machinery

Locator	Questions		
	Mechanized Harvesting/Road Building		
1.1	**What are nine common and specialty tools used on heavy equipment?** ☐ Multi-testers ☐ Inspection mirrors ☐ Pick up magnets ☐ Easy outs ☐ Wrenches ☐ Taps and dies ☐ Hammers ☐ Shovels ☐ Drift and pry bars ☐ Chisel ☐ Files ☐ Jack ☐ Air tools ☐ Impact wrenches ☐ Ratchets ☐ Die Grinder ☐ Greaser ☐ Hose press Assessment Instruction: P – 9 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

2.1	**Name eight pieces of welding equipment and supplies use on heavy equipment** ☐ Oxy acetylene cutting systems ☐ Air arc ☐ Chip hammers ☐ Propane gas torch ‘tiger torch’ ☐ Wire brush ☐ Chalk ☐ Tip cleaner ☐ Grinder ☐ Drill ☐ Cut off saw ☐ Air tools ☐ Flux chippers ☐ Grinders ☐ Vice ☐ Cutting table ☐ Plasma cutter Assessment Instruction: P – 8 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
2.2	**What are three types of welding commonly used on heavy equipment?** ☐ Stick ☐ Wire feed ☐ Brazing Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met

<table>
<tr><td>2.3</td><td colspan="3">What PPE is mandatory when using welding equipment?
☐ Gloves
☐ Welding helmet
☐ Cutting goggles
☐ Fire-proof clothing
☐ Safety glasses
Assessment Instruction: S</td></tr>
<tr><td></td><td>Assessment</td><td>☐ Outcome met</td><td>☐ Outcome not met</td></tr>
<tr><td>3.1</td><td colspan="3">What are common gas-powered tools used on heavy equipment?
☐ Cut off saw
☐ Pressure washers
☐ Gas or electric compressors
☐ Gas or diesel generators
☐ Pumps
☐ Plate compactor
Assessment Instruction: P – 4 from list</td></tr>
<tr><td></td><td>Assessment</td><td>☐ Outcome met</td><td>☐ Outcome not met</td></tr>
</table>

1082 – Describe General Heavy Equipment Inspection and Maintenance Procedures

Locator	Questions		
	Mechanized Harvesting/Road Building		
1.1	**What are the major mechanical components or systems that require maintenance and inspection?** ☐ Engine systems ☐ Hydraulic systems ☐ Electrical systems ☐ Attachments ☐ Undercarriage Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
1.2	**What are common symptoms or indicators of failure?** ☐ Noise ☐ Vibration ☐ Smells ☐ Leaks ☐ Cracks ☐ Lack of power ☐ Improper function ☐ Exhaust colour ☐ Gauges ☐ Warning lights Assessment Instruction: P – 7 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

2.1	**What are the three main pre-start procedures?** ☐ External visual equipment checks ☐ Fluid checks ☐ Operational (in cab) checks Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
2.2	**What are the main considerations for shut down procedures?** ☐ Parking position ☐ Attachments grounded ☐ Cool down time ☐ Maintenance log Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met

2.3	**What are common maintenance procedures on heavy equipment?** ☐ Lock out or zero energy state ☐ Greasing ☐ Adding fluids and fuel ☐ Draining fuel sumps and water separators ☐ Tightening loose hardware ☐ Repair leaks ☐ Replacing O-rings ☐ Replacing hoses ☐ Replacing filters ☐ Bleeding air from fuel systems ☐ Adjust track tension ☐ Adjust belt tension ☐ Maintain tire pressure ☐ Clean and maintain batteries Assessment Instruction: P – 10 from list

Assessment	☐ Outcome met	☐ Outcome not met

1083 – Describe Heavy Equipment Mechanical Systems

Locator	Questions		
	Mechanized Harvesting/Road Building		
1.1	**What are two basic components of an engine and their function?** ☐ Turbo charger – increases power on an engine ☐ Air compressor – builds up air supply ☐ Cylinder head – Allows air / fuel into / out of combustion chamber ☐ Piston – creates compression Assessment Instruction: P – 2 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
1.2	**Name two things a driver should check in an engine lubrication system** ☐ Oil level ☐ Oil pressure ☐ Grade of oil required Assessment Instruction: P – 2 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
1.3	**What are two components of a cooling system and their function?** ☐ Radiator – allows air and water flow to cool engine ☐ Hoses – water to circulate ☐ Fan – draw air into radiator ☐ Fan belts – drive the fan Assessment Instruction: P – 2 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

1.4	**What are three components of a fuel system and their function?** ☐ Tanks – holds fuel ☐ Lines – deliver fuel from tank to engine ☐ Filters – removes foreign debris from fuel ☐ Pump – Deliver fuel to engine Assessment Instruction: P – 3 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
1.5	**What are three component of air induction and exhaust systems and their function?** ☐ Pre-cleaner – Takes course particulates from air supply ☐ Air filter – Removes fine particulates from air supply ☐ Air to air – Delivery system of air to the turbo charged engine ☐ After treatment (DEF) – System that minimizes air pollution in exhaust Assessment Instruction: P – 3 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
2.1	**What are three component of hydraulic systems including function?** ☐ Pumps – pump fluid ☐ Motor – propulsion on components ☐ Cylinders – move attachments or implements ☐ Hoses – delivers fluid or motors or cylinders ☐ Valves – Controls flows ☐ Tank and fluid level indicator – identify levels of fluids Assessment Instruction: P – 3 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

3.1	**What are three component of a powertrain system including function?** ☐ Travel motor – allows machine/component to move ☐ Transmissions – transfer power form engine to drive systems ☐ Differentials – transfers power from transmission to axles ☐ Swing gear – allows machine to rotate ☐ Final drives – drives tracks ☐ Engine – primary source of power ☐ Pumps – secondary source of power Assessment Instruction: P – 3 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
4.1	**What are three components of track systems including function?** ☐ Tracks – enables machine to move ☐ Idler – allows track to rotate around ☐ Sprocket – drives track to rotate around ☐ Bottom and top (carrier) rollers – reduce friction within the undercarriage system ☐ Track adjuster – keeps track tight Assessment Instruction: P – 3 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
5.1	**What are four types of braking systems?** ☐ Air system ☐ Hydraulic system ☐ Air / hydraulic system ☐ Engine braking system (compression, exhaust) ☐ Hydrostatic system Assessment Instruction: P – 4 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

6.1	**Name three common parts of electrical systems and their function** ☐ Alternators – creates electrical current ☐ Starters – starts the engine ☐ Batteries – powers the starter ☐ Fuses – fail safe for system ☐ Solenoids – an electromagnetic switch ☐ Switches - turns power on and off Assessment Instruction: P – 3 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
6.1	**What are the two common types of electrical systems?** ☐ 12 V and 24 V Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
7.1	**Name three types of ground engaging systems and their function** ☐ Blades – pushes material ☐ Buckets – carries material ☐ Scarifiers – digs up ground ☐ Grapples – grabs logs ☐ Rock hammer – breaks rocks ☐ Compactors – compresses material ☐ Drill hammer – drills holes in rocks Assessment Instruction: P – 3 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

1077 – Describe Job Control and Engineering Basics

Locator	Questions		
	Road Building		
2.1	**What are common instruments used in road building?** ☐ Levels ☐ Rotary laser ☐ Pipe laser ☐ Electronic measurement systems ☐ Chain (tight chain, string box) ☐ Clinometers ☐ Compass ☐ GPS Assessment Instruction: P – 6 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
3.1	**What can an operator do to confirm that identified slope is correct?** ☐ Station mark on map matches the field ☐ Read the cross section and profiles Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
3.2	**How is slope expressed?** ☐ Percentage / degrees Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met

3.3	**How is slope stability maintained during road construction?** ☐ A ratio that is dependent on the type of material excavated Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
3.4	**What are the main causes of road constructed initiated slides?** ☐ Over steepened fill slopes ☐ Not maintaining water control Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
3.4	**How is this risk mitigated?** ☐ End haul ☐ Maintain original water courses ☐ Maintain ditches and culverts concurrent with construction Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
4.1	**Where are instructions on working in proximity to utilities found?** ☐ Operational map Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
4.2	**What are techniques used to expose existing utilities?** ☐ Take small amounts of material away at a time ☐ Vacuum trucks ☐ Clean up bucket (no teeth) ☐ Expose by hand Assessment Instruction: P-3 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

1078 – Describe Soils and Aggregates

Locator	Questions		
	Road Building		
1.1	**What are common types of soil?** ☐ Cohesive (hard panned clay) ☐ Granular (sand or gravel types) ☐ Organic (topsoil or layers) Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
1.2	**What determines suitability of soil types for road construction?** ☐ Drainage characteristics ☐ Compactibility Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
1.3	**Name four characteristics of soil** ☐ Load bearing ☐ Density ☐ Adhesion ☐ Shearing resistance ☐ Permeability ☐ Plasticity (water retention) ☐ Elasticity ☐ Gradation Assessment Instruction: P – 4 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

1.4	**How are soils classified?** ☐ Texture ☐ Structure ☐ Consistency ☐ Colour Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
1.6	**What are common sediment control techniques?** ☐ Silt fences / geotextile ☐ Hay bales ☐ Water management ☐ Sumps ☐ Hydro seeding ☐ French drains ☐ Culvert placement ☐ Water bar Assessment Instruction: P – 6 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
2.1	**What are types of rippable rocks?** ☐ Shale ☐ Rotten ☐ Conglomerate Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
2.1	**What are types of non-rippable rocks?** ☐ Granite ☐ Limestone ☐ Basalt Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met

2.2	**What are the characteristics of aggregates?** ☐ Permeability ☐ Load bearing ☐ Resistance to shearing ☐ Gradation ☐ Plastic limit ☐ Liquid limit Assessment Instruction: P – 4 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
2.3	**What are the three steps in aggregate processing?** ☐ Screening ☐ Crushing ☐ Processing Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met
2.4	**What are common products or uses for aggregates?** ☐ Pit runs ☐ Screened road base 3” minus ☐ Bedding sand ☐ Crushed road mulch ☐ Asphalt aggregates ☐ Drain rock ☐ Chips, driveway chips ☐ Recycled asphalt ☐ Concrete sand, C 33 ☐ Stucco sand Assessment Instruction: P - 6 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

3.1	**What are principles of compaction in relation to effects of moisture?** ☐ Dry soils resistant to compaction ☐ Water acts as lubricant to help overcome the cohesive nature of soil particles ☐ Moisture increases density Assessment Instruction: P – 1 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
3.2	**What types of equipment are used for compaction?** ☐ Water trucks ☐ Plates ☐ Rollers ☐ Hoe packs ☐ Rammers ☐ Tamping bars ☐ Dynamic compaction Assessment Instruction: P – 4 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
3.3	**What are methods to test compaction?** ☐ Nuclear density testing ☐ Sand cone test ☐ Probing ☐ Cone penetrometer ☐ Deflectometer ☐ Clegg impact soil tester ☐ Load testing / roll test Assessment Instruction: P – 4 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

1079 – Describe Environmental Awareness, Protection and Enhancement

Locator	Questions		
	Road Building		
1.1	**Why is public perception of forestry activities important?** ☐ Can result in protests ☐ Public pressure ☐ Public perception drives politics Assessment Instruction: P – 1 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
1.2	**What impact on fish can road building have?** ☐ Effect of silt ☐ Effect of water temperature ☐ Drainage effect ☐ Effect of increased flows Assessment Instruction: P – 2 from list		
	Assessment	☐ Outcome met	☐ Outcome not met
2.2	**What are potential sources of spills related to constructing resource roads?** ☐ Broken lines / mechanical failure ☐ Refuelling ☐ Fuel storage ☐ Storage of other products ☐ Sewage Assessment Instruction: P – 4 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

2.3	**What can be used to reduce risk of petroleum spills?** ☐ Security ☐ Safe storage facilities ☐ Spill kits ☐ Training Assessment Instruction: P – 2 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

1088 – Describe and Operate Wheel Loader

Locator	Questions		
	Road Building		
1.1	**Name two places that an operator can look to find information on operation capabilities, limitations and restrictions of road building equipment** ☐ Operator manuals ☐ Standard operating procedures Assessment Instruction: S		
	Assessment	☐ Outcome met	☐ Outcome not met

1.2	**What are common hazards related to operating road building equipment?** ☐ Slips and falls ☐ Pinch points ☐ Roll over ☐ Crush injuries ☐ Other worker in work area ☐ Energized machines ☐ Communication failure ☐ Unstable soil ☐ Slippery machine surfaces ☐ Equipment fire ☐ Debris entering operator's area ☐ Logs entering cab ☐ Jill pokes ☐ Other road users Assessment Instruction: P - 10 from list		
	Assessment	☐ Outcome met	☐ Outcome not met

Part 2 – Practical Assessment

General Instructions
To conduct the practical assessment, monitor the worker in a variety of situations to determine if they can consistently perform the skill components of their role in a safe and effective manner. Once confident that the worker can conduct the skills consistently, mark the outcome met. If the worker cannot consistently perform the skills required, add this component to the gap training plan. Remember not to distract the operator when conducting the practical assessment.

Training and Assessment Rubric	
Outcome Not Met (ONM)	**Skills:** Can complete the task but only with direct instruction and supervision, may lack consistency in application. **Knowledge:** Does not understand what they are doing, or are not aware of a knowledge deficiency, or need guidance and support. **Attributes:** Displays limited or no professional attributes including being fit for work, prepared for the day, working in an organized manner, achieving work outcomes, or lacks in consistency.
Outcome Met (OM)	**Skills:** Consistently completes the task using safe work practices multiple times in a variety of contexts. **Knowledge:** Has a solid grasp of underpinning knowledge, consistently applies it, and can explain it. **Attributes:** Consistently displays professional attributes including being fit for work, prepared for the day, working in and organized manner and achieving work outcomes.

A) PREPARE FOR THE DAY	OM	ONM	N/A
Arrived on time	☐	☐	☐
Clothing for conditions • Layered clothing appropriate to the elements for working and transport conditions	☐	☐	☐
Nutrition and water • Adequate food for the day • Sufficient hydration for work and weather conditions	☐	☐	☐
Fit for work • Candidate is physically able to do the task • 3-point contact on and off machine • Able to get up and down machine • Able to perform simple maintenance • Able to change attachments • Can fit through escape hatch	☐	☐	☐
Not noticeably impaired • Candidate is not obviously physically or mentally impaired (by drugs, alcohol, personal situations, fatigue)	☐	☐	☐
• Knows where ERP is located	☐	☐	☐

B) PERSONAL PROTECTIVE EQUIPMENT (where applicable)	OM	ONM	N/A
Hard hat • CSA – less than 3 years old / ANSI – less than 5 years old • No dents / cracks, modifications • Suspension maintained (4-point min)	☐	☐	☐
Hi-Vis • Minimum 120 square inches front and back • Not faded, discoloured, torn or permanently dirty • Contrasts with the work environment	☐	☐	☐
Leg protection • Minimum 3600/4100 FPM rating • Kevlar not compromised or exposed • Pants maintained and repaired (no loose tears to outer layer)	☐	☐	☐

Face/Eye protection • Face screen free of holes • Moves freely between down and raised position • Safety glasses used when appropriate	☐	☐	☐
Hand protection • Not damaged and free of holes • Appropriate to weather conditions • Sized correctly for hands	☐	☐	☐
Hearing protection • Minimum 24 NRR • Maintained and in working condition	☐	☐	☐
Footwear • Good condition including sole tread pattern • Must be laced	☐	☐	☐
Has fire extinguisher in cab	☐	☐	☐
Dust mask • NIOSH N95 compliant	☐	☐	☐
PPE inspected and maintained	☐	☐	☐
PPE used consistently as required	☐	☐	☐

C) PRE-WORK ACTIVITIES	OM	ONM	N/A
Equipment manuals available	☐	☐	☐
Pre-start equipment checks • Walk around and check for leaks • Check for loose components • Check for cracks, loose, missing bolts • Check for damage to machine • Obstructions • Fluid levels • Water / Coolant • Hydraulic • Engine • Night switch • Check track pads (where applicable) • Tire pressure (where applicable) • Check for tire damage (where applicable) • Wheels and wheel nuts (where applicable) • Close air reservoir (where applicable) • Safety equipment check	☐	☐	☐
Start-up procedures • Maintain 3-point contact on and off machine • Find key • Check gauges • Warning systems • Start and warm up hydraulics • Check transmission • Warning lights • Wipers • Seatbelt • Lock out • Parking brake • All controls and major systems • Escape hatch • Housekeeping • Radio operational	☐	☐	☐

D) COMMUNICATION	OM	ONM	N/A
Attends pre-work meetings	☐	☐	☐
Ensures hazards are understood	☐	☐	☐
Communicates hazards throughout workday	☐	☐	☐
Uses signals as required	☐	☐	☐
Consistently communicates work plans	☐	☐	☐
Professional communication throughout workday	☐	☐	☐

E) ERGONOMICS	OM	ONM	N/A
Lifts correctly (where applicable)	☐	☐	☐
Best practice for body position while operating	☐	☐	☐
Walks safely in the bush (where applicable)	☐	☐	☐

F) COMPLETE TASKS	OM	ONM	N/A
Shut down procedures • Safe parking location • Brake on (where applicable) • Lower boom / blade / attachments • Position for ease of access and egress • Level position for fluid checks • Cool down before shut-down • Walk around and general check • Secure / lock machine • 3-point contact on and off • Turn off night switch • Close air reservoir access (where applicable)	☐	☐	☐

Daily maintenance tasks • Lubrication systems • Air intake systems • Air system reservoir • Fuel tank sump • Drain air system / water separator • Drain fuel filters / water separator • Inspect and clean components • Housekeeping • Track tension (where applicable) • Tire pressure (where applicable) • Greasing • Fueling • Check for leaks	☐	☐	☐
Basic repairs • Hydraulic hoses / fittings / O-rings • Fuel / air filter • Engine oil change • Belt tension • Battery terminals • Change lights • Repair wiring	☐	☐	☐

G) OPERATE WHEEL LOADER	OM	ONM	N/A
Maintains 3-point contact on and off machine	☐	☐	☐
Ability to use multiple functions while operating equipment	☐	☐	☐
Monitors equipment performance while operating	☐	☐	☐
Backfill trenches and excavations	☐	☐	☐
Determine pit face stability	☐	☐	☐
Maintain attachments	☐	☐	☐

Operator functions on wheel loader • Raise and lower bucket • Curl and dump • Move forward • Stop • Back up • Apply brake • Lockout transmission • Drive on even ground • Doesn't spin wheels • Smooth operation • Safe coordination with other equipment • Situational awareness at all times	☐	☐	☐
Use Attachments – wheel loader • Use safely and with operational control to manufacturer specifications • Perform inspections • Take on and off safely to specifications • Log grapple • Forks • Digging and clean up buckets	☐	☐	☐
Load trucks • Organize loading site • Maintain level pit floor • Load smoothly not dropping load from height that damages truck • Communication with truck when loading (audible/verbal) • Borrow pit below road grade (borrow pit has not compromised road integrity) • Guarded when not active	☐	☐	☐
Dig, carry, stockpile materials • Fill and maintain grade • Carry a stable load at safe speeds, • Stockpile surface materials with control • Create ramp • Remove material to approved location	☐	☐	☐
Place the spread / grade material in lifts • Carry a stable load at safe speeds, • Place surface materials with control • Place where accessible to spreaders or other equipment	☐	☐	☐

This is the last page of the assessment.

In consultation with industry subject matter experts, the BC Forest Safety Council (BCFSC) facilitated the production of this material. Funding was provided by the Government of Canada, the Province of British Columbia, and industry in-kind contributions.

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BRITISH COLUMBIA

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BC **Forest Safety**