Unit	1022
Title	Move Grapple Yarder
Document type	Learning resource

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BC Forest Safety

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Feedback is welcome and may be sent to training@bcforestsafe.org.

Table of Contents

Unit Introduction

What you will learn in this unit

By the end of this unit, you will be able to demonstrate your knowledge and ability in:

- Route planning
- Risk assessment
- Taking grapple yarder on and off low bed
- Communication in the workplace
- Inspecting equipment

Why it's important for you to learn this unit

It is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulations related to the work being conducted. A full list of OHSR related to this unit can be found in the relevant package.

Are you ready to take this unit?

To take this unit, you need to have completed the following units:

- 1002 – Describe Forest Industry
- 1003 – Use Safe Work Practices
- 1004 – Communication in the Workplace
- 1005 – Recognize, Evaluate, and Control Hazards Related to General Forestry
- 1006 – Describe Workplace Documentation
- 1007 – Describe Emergency Preparedness
- 1008 – Describe and Apply Workplace Attributes
- 1009 – Recognize, Evaluate, and Control Hazards Related to Yarding
- 1010 – Describe Basic Regulations and Standards
- 1011 – Describe and Access Intermediate Regulations and Standards
- 1012 – Describe, Access, and Apply Advanced Regulations and Standards
- 1013 – Describe Rigging Components and Apply Basic Rigging Practices
- 1014 – Describe and Apply Advanced Rigging Practices
- 1021 – Apply Grapple Yarder Operator Skills.

Does this unit apply to you?

This unit applies to you if you are in the following occupation:

- Grapple yarder operator

Section 1022-01: Route Planning

What you need to know about this section

By the end of this section, you will be able to demonstrate your knowledge or ability in the following key points:

1.1 Plan route in accordance with route requirements

1.2 Knowing which equipment is best for the job in accordance with job requirements

Key Point 1.1: Plan a route

The plan for the move should be based on the best route. Keep the following points in mind when planning a route:

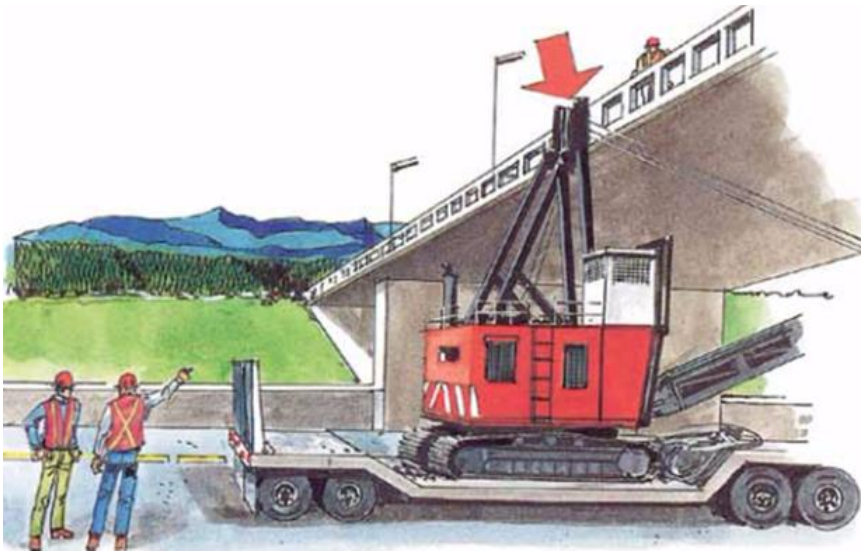
- Bridges and culverts should be able to withstand the load stresses
- The road should be wide and solid enough to handle the weight and length of the load
- The route should minimize the need to negotiate adverse and steep downhill grades
- Drive route and check for overhead or new hazards
- For longer sections of roadway over 10 percent grade, the move plan should include effective pulling, pushing, and snubbing equipment
- The unit will not be overloaded. For example, if its rated capacity is 91,000 kg (200,000 lb.), it will not be expected to transport 114,000 kg (250,000 lb.)
- The tractor pulling the unit is within its power/weight ratio and operated by a qualified operator
- The tractor and lowbed are properly maintained, with particular emphasis on tires and brakes and absence of cracks in the frame
- The centre of gravity of the load is lowered as much as possible to reduce racking (twisting) of the frame
- All equipment operators should be kept aware of the time frame of the move

Railway and road overpasses

The height of railway and road overpasses must be known. Accidents have happened where supervisors and operators have forgotten to add the height of the lowbed in the overall height of the load, resulting in the equipment hitting the overpass.

Overhead obstructions in the camp and log-dump areas that are unfamiliar to the crew are frequently contacted by the equipment. These include:

- Low-voltage power lines and phone lines in and around the camp
- Guylines for gin poles
- Guylines for log dumps
- Electric service lines for dry-land sort lighting
- Doors on service bays in shops



The gantry is too high and the move was inadequately planned and supervised

Preventing contact with overhead obstructions

Plan ahead to prevent contact with overhead obstructions:

- All overhead obstructions must have the height plainly signed on each side of the obstruction
- The height of each machine, with the boom in its lowest position, must be known
- New or altered equipment must be measured for total height
- Drivers hauling a lowbed should stop as they approach an overhead obstruction and proceed on signal from a safety watcher

Now try the quiz on the next page.

Plan Route—Self-Quiz (Part 1)

1. If the lowbed unit capacity is 91,000 kg (200,000 lb.), it will be able to transport up to 114,000 kg (250,000 lb.)

   ☐ True

   ☐ False

2. The centre of gravity of the load on lowbed units is lowered as much as possible to reduce racking (twisting) of the frame.

   ☐ True

   ☐ False

Now check your answers on the next page.

Plan Route—Quiz Answers (Part 1)

1. If the lowbed unit capacity is 91,000 kg (200,000 lb.), it will be able to transport up to 114,000 kg (250,000 lb.).

   Answer**: False**

2. The centre of gravity of the load on lowbed units is lowered as much as possible to reduce racking (twisting) of the frame.

   Answer**: True**

Overhead obstructions

Every year, high-voltage overhead power lines are contacted by loader and yarder booms while the machines are being transported. Other power line contacts have occurred as the machine was being walked under a low overhead power line after being offloaded from the lowbed. The operators had forgotten to lower the boom or did not confirm the height of the line.

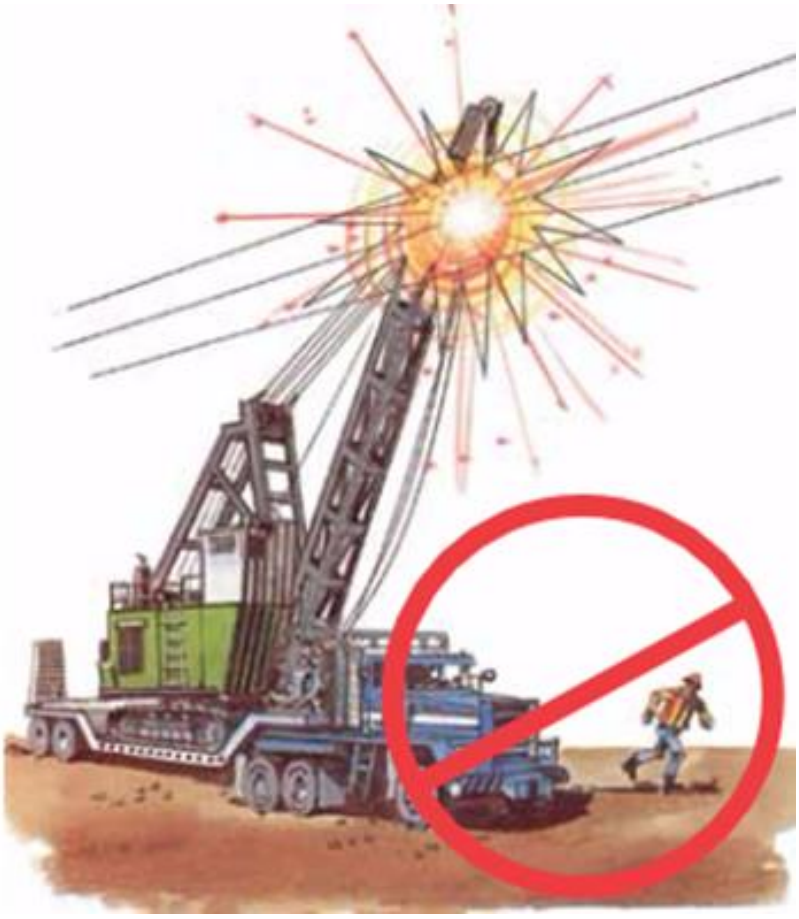
If any part of your machine touches a live power line, anything in contact with the machine will be energized for some distance. This includes the ground immediately below you. When the electrical flow reaches the ground, it spreads out like ripples in a pool of water. The voltage is highest at the point where the electricity flow reaches the ground. As it spreads out, the voltage drops off.

STOP!

If any part of your equipment makes contact with an overhead power line, you are safer inside the machine than on the ground. Do not touch or step onto anything that will provide a path for the current to flow to ground. It is the flow of current through you that kills or burns. Only in an emergency, such as a fire, should you abandon your machine if electrical contact has been made.

To safely escape from your machine, complete the following steps:

1. Remove any loose-fitting clothing like jackets or scarves.
2. Use the handle to open the door of your vehicle.
3. Stand at the opening of your door with your elbows tucked into your stomach and your hands held close to your chest.
4. Jump out and away from the vehicle. As you exit, don't touch the door and the ground at the same time. Land with your feet together – don't stumble.
5. Calmly shuffle with your feet together. Keep your feet touching as you shuffle. The heel of one foot should still be touching the toe of the other when you start moving the other leg.
6. Keep shuffling until you are at least 10 metres (33 feet) or a bus-length away from the vehicle.
7. Call 911 for help.



Grapple yarder contacting a power line because the boom was not lowered for travel

A worker contacting a power line with a lifting stick can be electrocuted. Do not try to clear the line

Recommended preventive actions

Remember the safe limits of approach. Electricity can arc or “jump” from the wire to a conducting object like a piece of equipment or a truck. When working around power lines, follow the Minimum Approach Distances from the Occupational Health and Safety Regulations.

Voltage	**Minimum approach distance for working close to exposed electrical equipment or conductors**	
Phase to phase	Meters	Feet
Over 750 V to 75 kV	3	10
Over 75 kV to 250 kV	4.5	15
Over 250 kV to 550 kV	6	20

Care must also be taken when moving equipment parallel to a power line. An arc can occur when equipment is moving parallel to the line and goes within the limits of approach. If your operations are only moving equipment underneath the power lines and not doing any work near the power lines, the following table can be used.

Voltage	**Minimum clearance distance for passing under exposed electrical equipment conductors**	
Phase to phase	Meters	Feet
Over 750 V to 75 kV	2	6.5
Over 75 kV to 250 kV	3	10
Over 250 kV to 550 kV	4	13

If a supervisor or operator is not sure of the line voltage, the utility company will advise by telephone or will send a line supervisor to the site to provide the necessary guidance.

STOP!

If contact with an electrical conductor is made, do not try to clear the fouled line by lifting it off or over the machine by hand or any other means, such as with a stick.

Never climb on or off the machine while the machine

is in contact with an electrical conductor.

A person who touches the lowbed or machine and the ground at the same time may be electrocuted.

Worker should never touch a truck in contact with a power line. The worker can get electrocuted

Now try the quiz on the next page.

Plan Route—Self-Quiz (Part 2)

1. If any part of the operator's machine makes contact with an overhead power line, where is the safest place to be?

   ☐ Inside the machine

   ☐ On the ground

2. While the machine is in contact with an electrical conductor—a person who touches the lowbed or machine and the ground at the same time may be electrocuted.

   ☐ True

   ☐ False

3. What is the most important thing to do before we dig into the ground where there could be hidden underground cables?

   ☐ Put on your boots

   ☐ Put on your hard hat

   ☐ Call the local power company

   ☐ Check site plans

4. Where is the voltage the highest in a situation where your machine touches a live power line?

   ☐ At the point it touches the machine

   ☐ At the point where the electrical current reaches the ground

   ☐ At the highest point in the electrical line

   ☐ At the centre point of the machine

5. In a situation where your machine is touching a live line, keeping your feet together when jumping off is a very smart idea to prevent getting shocked.

   ☐ True

   ☐ False

6. What should a worker not do when trying to escape a machine that is touching a live power line?

- ☐ Stand still when your body is clear of the machine
- ☐ Touch the equipment and the ground at the same time….
- ☐ Stay in your machine and wait for help
- ☐ Keep your feet together when jumping off the machine

Now check your answers on the next page.

Plan Route—Quiz Answers (Part 2)

1. If any part of operator's machine makes contact with an overhead power line, where is the safest place to be?

   Answer: **Inside the machine**

2. While the machine is in contact with an electrical conductor—a person who touches the lowbed or machine and the ground at the same time may be electrocuted

   Answer**: True**

3. What is the most important thing to do before we dig into the ground where there could be hidden underground cables?

   Answer**: Call the local power company**

4. Where is the voltage the highest in a situation where your machine touches a live power line?

   Answer**: At the point where the electrical current reaches the ground**

5. In a situation where your machine is touching a live line, keeping your feet together when jumping off is a very smart idea to prevent getting shocked.

   Answer**: True**

6. What should a worker not do when trying to escape a machine that is touching a live power line?

   Answer**: Touch the equipment and the ground at the same time**

Key Point 1.2: Which Equipment is Best for the Job

When selecting the best equipment based on the job requirements, take into account the following:

- The most important thing to consider when choosing equipment is that the machine (Cat or Dozer) doing the pulling needs to have a higher friction coefficient for weight than the one it is pulling
- Sometimes two to three machines will be required in combination to have the friction coefficient necessary to pull a low bed with a tower on it
- Straps are used between lowbed and pushing or snubbing machines, or between tower and pushing and snubbing machines
- The straps used to secure the tower to the lowbed must be large enough, and should be checked beforehand
- Attachment points for straps need to be strong enough for expected load on straps between machines

Section 1022-02: Risk Assessment

What you need to know about this section

By the end of this section, you will be able to demonstrate your knowledge and ability in the following key point:

2.1 Risk assessment of your planned route

Key Point 1.1: Conduct a Risk Assessment of your Planned Route

Accidents occur when the employer does not have a well-planned procedure for assisting a lowbed or a machine up or down a grade.

Push and pull trucks assisting lowbed on steeper grade

Snubbing, pulling, or pushing a lowbed or machine

The decision to pull, push, or snub is normally left to the supervisor of the move. The supervisor depends on previous experience and advice from the grapple or loader operator, or lowbed tractor operator. Problems arise when:

- The supervisor's experience is limited
- Shortcuts are taken to save time
- The operators do not know the limitations of the lowbed or equipment
- There are poor operating or maintenance procedures, resulting in deteriorated drive or brake components of the lowbed or tractor

Pressures placed on persons involved with the equipment move may result in poor judgment being used, especially if there are no standard moving procedures. Information needed to make the best decisions should be discussed with the operation's master mechanic /or the equipment manufacturer's representative.

For lowbeds and tractors, the supervisor and equipment operators must have the following information:

- Load capacity
- Condition of the tires
- Braking capacity at normal speeds
- Braking capacity on downhill grades
- Power and traction capability of tractor unit on uphill grades
- Mechanical condition of tractor unit
- Effect of any modifications to the lowbed or tractor unit

For wheeled and tracked machines, the supervisor and equipment operators must have the following information:

- The ability of the machine to travel a road grade
- Condition of the equipment, such as tracks, tires, drive chains, and brakes

What should the supervisor, operators and hook tender have a clear understanding of?

Supervisors, operators, and hook tender must have a clear understanding of the following when making decisions on assisting a lowbed or a machine up or down a grade:

- The push or pull of a crawler tractor on a firmly packed gravel road
- The holding power of an off-highway truck when it is half-loaded and used to snub a machine down a hill
- The effect of tire wear on holding power
- Whether tire inflation affects the assisting equipment
- The pull capacity of a log truck with trailer
- The push capacity of a log truck with trailer
- The maximum percent grade for snubbing, pushing, or pulling, for crawler tractors or trucks, if the road is frozen or there is ice or snow
- The steep grade assessment. Make sure it has been completed if needed

This information should be provided in written form to the supervisors, operators, and hook tenders.

The driver of the lowbed or a machine is fully responsible for the safe operation of the equipment. The driver must be trained and certified for the equipment used. This may include air brake certification. The driver mush also be experienced with the specific work practice (snubbing, pushing, or pulling) and aware of the hazards involved.

Other potential hazards

Other potential hazard s includes the following:

- Walking the grapple yarder
- Culverts and bridges
- Roads covered with debris or snow
- Rock protrusions

Walking the grapple yarder

On established roads there are fewer hazards, provided the road is of sufficient width. Hazards do develop on newly constructed haul roads. Often roads or spur roads are constructed barely wide enough for the tracks. The operator is then forced to walk off centre of the road to the uphill side, with the tracks or tires close to or in the ditch. In that position, the machine can tip sideways. Roads not adequately benched or built with loose side-cast material could give way under the weight and vibration of the grapple yarder.

When the road is too narrow the grapple yarder can be off centre resulting in sideways tipping

Culverts and bridges

Metal, plastic, and log culverts, if not adequately bedded, can shift and collapse. The yarder must not be turned when it is over a culvert. Plugged culverts can wash out under the road surface and collapse. Bridges must be inspected periodically to ensure that the structure is capable of withstanding the load.

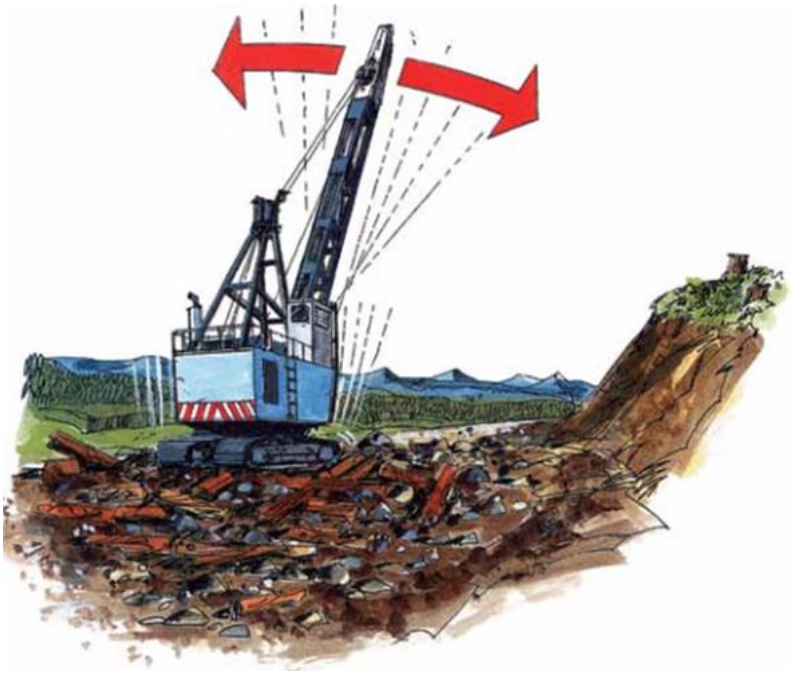
Bridges must be inspected to ensure they can support the loads imposed upon them

Roads covered with debris or snow

When travelling on debris-covered roads, jill-pokes are common, resulting in air lines being broken and tracks derailed. When roads are covered with ice or snow, it is difficult to determine the stability of the road. The road edge may not be visible, or there can be poor traction. Keep the road clear, and be aware of loss of traction from ice buildup between the grousers.

Rock protrusions

Rock protrusions are common on poorly built and poorly maintained roads. These protrusions can cause severe vibration, bounce, and jarring. Such severe movements cause equipment damage and loss of control by the operator.



Walking over road protrusions causes severe shake and can adversely affect the operator

Now try the quiz on the next page.

Conduct a Risk Assessment of your Planned Route—Self-Quiz

1. What is the most common reason why incidents occur when moving a lowbed or other machine?

   - ☐ A route that has grades that are too steep is chosen
   - ☐ Not enough workers available to assist
   - ☐ Workers are not trained on how to operate machines safely
   - ☐ A proper policy and plan are not in place for how to transport the machine safely

2. What can directly help to reduce the speed of a tractor on a steep downhill section?

   - ☐ Condition of the tires
   - ☐ Condition of exhaust brakes
   - ☐ Load capacity of the lowbed or tractor
   - ☐ Rocks or stumps in the road

3. Established roads frequently have more hazards when moving the yarder than newly constructed spur roads.

   - ☐ True
   - ☐ False

4. How should details that supervisors, operators, and hook tenders need be shared?

   - ☐ Verbally at a meeting
   - ☐ Verbally on the way to the job
   - ☐ In written form well ahead of time
   - ☐ In written form on the day the move starts

Now check your answers on the next page.

Conduct a Risk Assessment of your Planned Route—Quiz Answers

1. What is the most common reason why incidents occur when moving a lowbed or other machine?

   Answer: **A proper policy and plan are not in place for how to transport the machine safely**

2. What can directly help to reduce the speed of a tractor on a steep downhill section?

   Answer**: Condition of exhaust brakes**

3. Established roads frequently have more hazards when moving the yarder than newly constructed spur roads.

   Answer**: False**

4. How should details that supervisors, operators, and hook tenders need be shared?

   Answer**: In written form well ahead of time**

Section 1022-03: On/Off Lowbed

What you need to know about this section

By the end of this section, you will be able to demonstrate your knowledge and ability in the following key point:

3.1 Load and unload a machine off a lowbed, including signals

Key Point 3.1: Load and Unload a Machine off a Lowbed

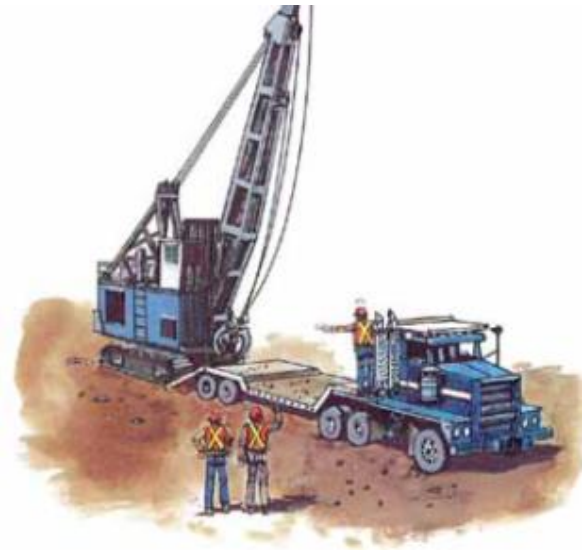
Once the plan to move the equipment has been communicated to the crew, the machine can be loaded onto the lowbed. The ground where the machine is loaded should be as flat and level as possible. That means no uphill slope and definitely no side slope to the grade. A slight downhill slope is desirable for ease of loading.

Once the loading ramps have been lowered and cushioned with proper blocking, the machine can be walked onto the lowbed. This must be done under the direction of a qualified supervisor. A designated signaler must direct the machine operator. This signaler must be in clear view of the operator at all times.

Each movement of the machine is done on a signal from the designated signaler. The machine must be properly centered on the lowbed.

Once the yarder or loader is properly centered on the lowbed, the boom must be lowered in order to lower the center of gravity. This reduces the sway when turning around corners, especially on roads with improperly graded crowns. The machine must be secured to the lowbed with adequate turnbuckles, cinches, or other suitable rigging, and its parking brakes must be set.

The grapple and boom of the machine are secured to the lowbed with the mainline or straps. If the machine has a pin mechanism to secure the upper works of the grapple yarder, the pin must be put in the locked position.



Moving equipment to the unloading site

Before the loaded lowbed is moved, the operator of the lowbed and the driver of the pilot vehicle must make a final check of the planned move, using these questions as a checklist:

- Are the radios working properly?
- Have all the overhead obstructions been located?
- Is the road of the intended route capable of supporting the load?
- Has the snubbing equipment been provided at the appropriate locations?
- Is the unloading site suitable?
- Is there a possibility of adverse weather conditions such as snow, rain, or ice?
- Have bridge capabilities been assessed?

Once under way, the pilot vehicle must drive at a speed that respects the road conditions and the safe operating speed of the lowbed tractor.

Unauthorized vehicles encountered en route must be notified of the lowbed's approach and told to clear the roadway. If the unauthorized vehicle does not stop, the move must be halted until the vehicle is cleared.

CAUTION!

Simply pulling off to the side of the road is not acceptable unless it is certain that there is enough room for the wheels of the lowbed and tractor to remain on the solid roadway and the lowbed driver is notified of the location of the vehicle.

The pilot vehicle operator must never assume that, because of road width or familiarity with the area, an oncoming vehicle can pass without incident.

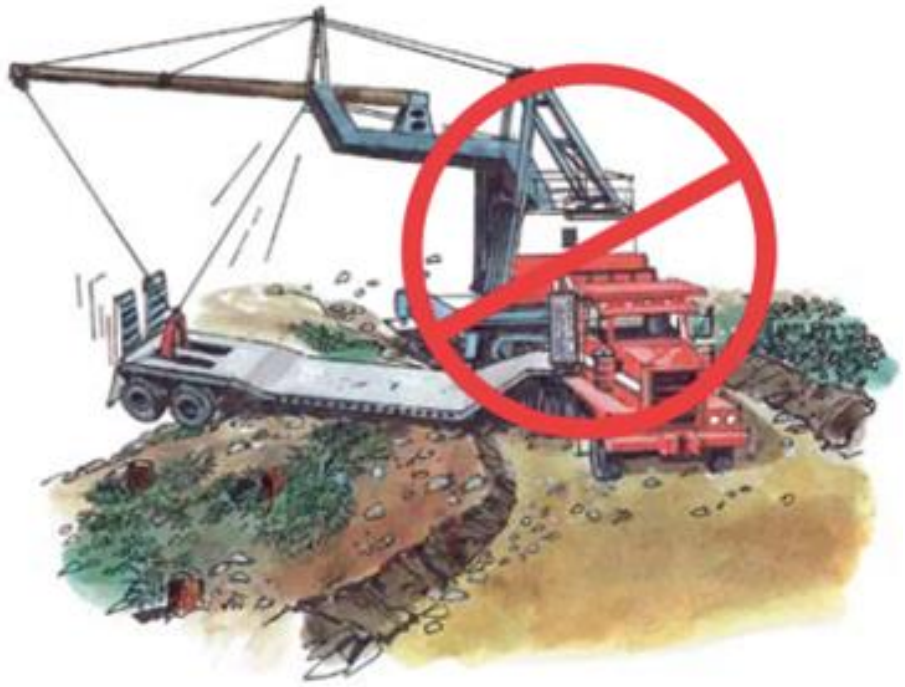
Unloading the equipment

Unloading the equipment is the reverse procedure of loading and must be done under the direction of a qualified supervisor. The following conditions for unloading the equipment must be observed:

- Choose a suitable site with little or no side slope. There must be no uphill grade
- Set the parking and maxi brakes on the lowbed and tractor unit
- Remove the tie-down rigging and place it where it will not be run over or forgotten
- Designate a qualified person to supervise the unloading of the equipment. This person will signal directions to the operator. The operator, in turn, must follow those directions precisely. The signaler must be in clear view of the operator at all times
- Keep all unnecessary crew transportation vehicles and workers clear of the unloading area so that the signaler and operator are not distracted

CAUTION!

The unloading area must provide sufficient room to turn the lowbed around without having to back it into or over a bank, through slash, or over saplings.



Lowbed trailers are frequently damaged by using this method to turn

Signals when loading and unloading

Two-way radios are essential in these situations. Those in different vehicles and in different roles need to be in constant communication.

Often communication needs to be coordinated between someone pulling, pushing, or someone ahead relaying information on terrain and corners coming up.

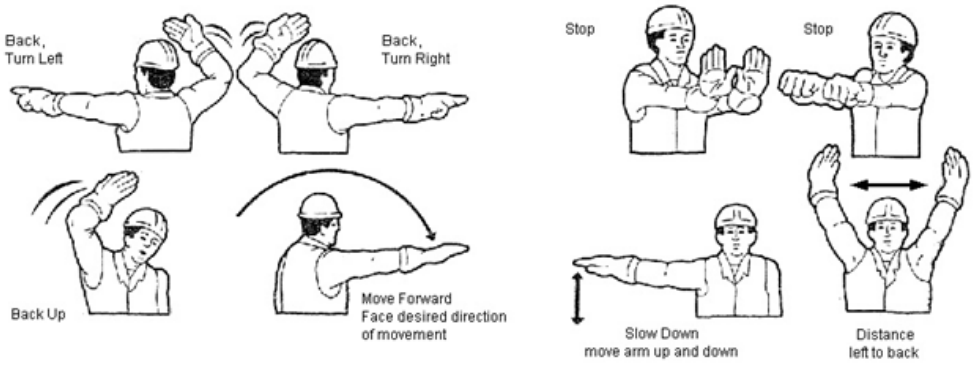
Communication differs in different types of towers

- In a 71-72 foot mini tower, the operator sits in the same cab when it is being unloaded as when operating it. There should be a radio in it for communication
- In a 90-foot tower, there is a separate driver cab (without a radio in it). In this situation, a portable radio is necessary

Using a spotter or guide

If a spotter is required to load or unload the equipment, remember that it is critical that all signals be made by hand and not by shouting instructions. The signaler must have a clear view of the machine and the operator but must stand offside and not directly behind the machine.

Standing off to the side toward the rear, to be seen either directly by the operator or the spotter gives positive and strong hand signals for steering, slowing and stopping.



Responsibilities of the spotter

The spotter must:

- Be constantly aware of the surroundings while performing this function
- Be constantly looking and listening for other vehicles and people entering the path of the backing vehicle
- Either stop the oncoming hazard or stop the machine being backed up
- Be aware of objects and direct the operator safely around them
- Not only look at the ground level for obstructions, but also look up for overhead hazards such as wires, etc.

- Use hand signals to direct the driver. These hand signals should be somewhat exaggerated so that the driver can be clear as to what the spotter is signalling
- Be alert for his or her own safety

Now try the quiz on the next page.

Load and Unload a Machine off a Lowbed—Self-Quiz

1. What kind of slope needs to be absolutely avoided when preparing the lowbed for loading?

   - ☐ A side slope
   - ☐ An uphill slope
   - ☐ A downhill slope
   - ☐ A muddy slope

2. What is the biggest reason to lower the boom or any part of the yarder or loader that can reduce the overall height?

   - ☐ It is easier to secure
   - ☐ It reduces the sway when going around corners
   - ☐ It makes it easier to see what is behind
   - ☐ You can fit more on the lowbed

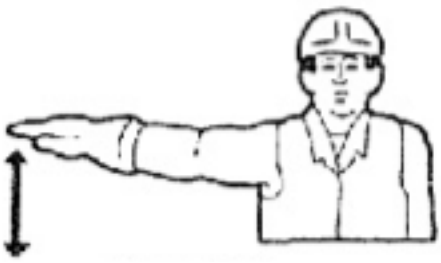
3. Pulling off the side of the road is permitted only if you can keep the wheels on a solid roadway.

   - ☐ True
   - ☐ False

4. Where should a spotter be located when assisting to load or unload equipment?

   - ☐ In front and to the side
   - ☐ In front and straight ahead
   - ☐ Directly behind the machine
   - ☐ To the side and behind

5. What does the following signal mean?



- ☐ Slow down
- ☐ Back up
- ☐ Move forward
- ☐ Stop

Now check your answers on the next page.

Load and Unload a Machine off a Lowbed—Quiz Answers

1. What kind of slope needs to be absolutely avoided when preparing the lowbed for unloading?

   Answer: **A side slope**

2. What is the biggest reason to lower the boom or any part of the yarder or loader that can reduce the overall height?

   Answer**: It reduces the sway when going around corners**

3. Pulling off the side of the road is permitted only if you can keep the wheels on a solid roadway.

   Answer**: True**

4. Where should a spotter be located when assisting to load or unload equipment?

   Answer**: To the side and behind**

5. What does the following signal mean?

   Answer**: Slow down**

Section 1022-04: Inspect Equipment

What you need to know about this section

By the end of this section, you will be able to demonstrate your ability in the following key points:

4.1 Inspect equipment to ensure machine is secure on low bed for trip

4.2 Check function of brakes and demonstrate knowledge of capabilities of brakes on equipment in accordance with manufacturer’s specifications

4.3 Lock out equipment in accordance with manufacturer’s specifications

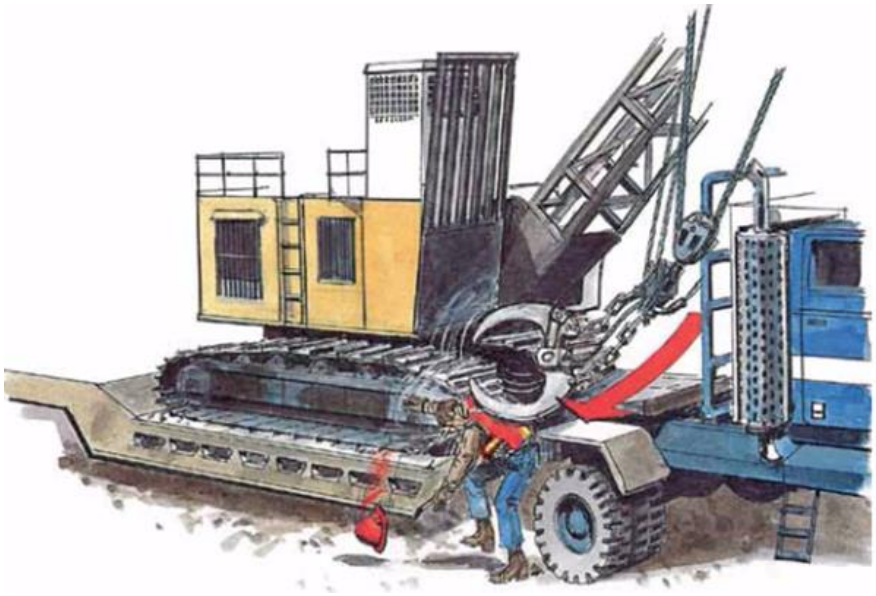
Key Point 4.1: Inspect Equipment to Ensure Machine is Secure on Lowbed for Trip

The grapple yarder should be facing the lowbed when walking onto it. All movements must be under direction of a signaler, usually the lowbed tractor operator or supervisor.

Many of the new grapple yarders are hydraulically driven. The power required to drive the hydraulic system may cause the engine to stall at peak hydraulic demand. An engine stall may occur if the engine RPM is reduced to control travel speed as the grapple yarder is about to “break over” walking up the lowbed ramp.

To prevent such a stall, full engine RPM must be maintained and travel speed controlled with the hydraulic valve. When loaded for transport, the grapple must be grounded on the deck or grappled onto a hold-down strap and the boom lowered. While travelling, the grapple yarder must be tied down onto the lowbed.

The increased height while on the lowbed calls for extra caution when passing under power lines. Unloading procedures must be under the direction of a qualified signaler or supervisor.



The grapple must be grounded (tied) to the lowbed to prevent it from sliding

The machine car body should be secured to the lowbed with adequate turnbuckles, cinches, or other suitable rigging, and the brakes should be set.

Note: All yarders are unique, and inspections differ depending on the size of yarder, as well as what lowbed and truck it is on. Refer to the manufacturer's instructions when inspecting and securing the tower to the lowbed.

Now try the quiz on the next page.

Inspect Equipment to Ensure Machine is Secure on Lowbed for Trip —Self-Quiz

1. Who decides if the machine is too heavy to transport on the paved highways?

   ☐ Foreman

   ☐ Low-bed Driver

   ☐ Machine Operator

   ☐ MOT at weigh station

2. Who decides on the position of the machine on the lowbed?

   ☐ Foreman

   ☐ Low-bed Driver

   ☐ Machine Operator

   ☐ MOT at weigh station

3. Who decides how to chain the machine down to the lowbed?

   ☐ Foreman

   ☐ Low-bed Driver

   ☐ Machine Operator

   ☐ MOT at weigh station

Now check your answers on the next page.

Inspect Equipment to Ensure Machine is Secure on Lowbed for Trip—Quiz Answers

1. Who decides if the machine is too heavy to transport on the paved highways?

   Answer: **MOT at weigh station**

2. Who decides on the position of the machine on the lowbed?

   Answer: **Low-bed Driver**

3. Who decides how to chain the machine down to the lowbed?

   Answer: **Low-bed Driver**

Key Point 4.2: Check Function of Brakes and Demonstrate Knowledge of Capabilities of Brakes on Equipment

All yarder towers have different braking systems, and it is essential to follow manufacturer’s instructions when checking their function and capabilities.

Key Point 4.3: Lock Out Equipment

Guidelines on locking equipment

- When using a start/stop switch for checking that the equipment has all power sources disconnected, ensure that the switch is left in the stop or off position
- Personal padlocks and one key will be supplied to all workers required to lock out. Only padlocks supplied by the company can be used. Each personal lock will be identified to the person to whom it is issued
- Each worker is responsible for attaching his lock and for removing his lock
- When a job continues over a shift change, workers coming on shift must place their personal locks on all control devices before the workers going off shift remove their locks
- All locks placed on control devices may only be removed by the person who applied the lock
- In the event a personal lock is left on after a job is completed, or the worker has left the site, it may be removed in an emergency

A thorough investigation is required by the foreman and safety representative to ensure that no workers will be endangered by the removal of the personal lock. Any breaking of the lockout procedures must be recorded and the worker whose lock was removed notified.

Sample lockout procedures

Yarders and loaders

- Night switch turned off and locked out.

Lock trucks

- Night switch will be turned off, ignition key removed and locked to the steering wheel.

Transportation vehicles

- Key will be removed from ignition switch and locked to steering wheel.

Other equipment

If starting system keyed, switch to off position. Remove key and lock to steering wheel or bush guard.

- If not keyed, turn night switch off and lock out

- If not keyed or night switched, remove negative battery cable and install lock to terminal end

Step-by-step lockout procedure

- Identify machinery or equipment that needs to be locked out
- Shut off machinery. All moving parts must come to a complete stop
- Identify and deactivate the main energy-isolating device for each energy source.

Note: For plugged-in equipment, unplug the device.

- Apply personal lock to the energy-isolating device of each energy source and secure all parts and attachments against inadvertent movement
- Test that the lockout is effective.

Note: When testing, ensure that all workers are in the clear in case the lockout is not effective.

- Use personal padlocks, with one spare key only to be kept by shift supervisor. To lock out plugged-in electrical equipment and machinery, follow the same procedure.

A personal lock is not required if the worker can keep the plug in plain view and within reach while performing repair/maintenance work.

Many yarders do not have lock-out tags. When there is a shift change or when maintenance is required, they MAY be used, but not in all situations.

Yarders frequently have a sheet on the dash where messages can be left when there is a need for maintenance. Verbal communication over the radio or otherwise are also common when maintenance is required.

Now try the quiz on the next page.

Lock Out Equipment—Self-Quiz

1. “Night switch turned off and locked out” is the lock-out procedure for:

   - ☐ Yarders and loaders
   - ☐ Log trucks
   - ☐ Transportation vehicles
   - ☐ Other equipment

2. “Night switch will be turned off, ignition key removed and locked to the steering wheel” is the lock-out procedure for:

   - ☐ Yarders and loaders
   - ☐ Log trucks
   - ☐ Transportation vehicles
   - ☐ Other equipment

3. “Key will be removed from ignition switch and locked to steering wheel” is the lock-out procedure for:

   - ☐ Yarders and loaders
   - ☐ Log trucks
   - ☐ Transportation vehicles
   - ☐ Other equipment

Now check your answers on the next page.

Lock Out Equipment—Quiz Answers

1. **“**Night switch turned off and locked out” is the lock-out procedure for:

   Answer: **Yarders and loaders**

2. “Night switch will be turned off, ignition key removed and locked to the steering wheel” is the lock-out procedure for:

   Answer**: Log trucks**

3. **“**Key will be removed from ignition switch and locked to steering wheel” is the lock-out procedure for:

   Answer**: Transportation vehicles**

Section 1022-05: Communication with Crew

What you need to know about this section

By the end of this section, you will be able to demonstrate your ability in the following key point:

5.1 Communicate with crew to facilitate the safe movement of grapple yarder including signals

Key Point 5.1: Communicate with Crew to Facilitate the Safe Movement of Grapple Yarder including Signals

Note: Signal systems are different from site to site. The signal systems you use on any given day will be discussed at your safety meetings. This key point provides an overview of the signal systems.

CAUTION!

Before work can commence, all frequencies being used must be approved. See WorkSafeBC regulation 26.34 (12).

Signal systems when moving

The whistle can be used to convey information to the operator when moving or loading the machine on a low-bed, such as:

- 1 whistle means **stop**
- 1 and 1 pause 1 and 1 means **back-up**
- 1 and 1 and 1 means **go ahead**

Any right or left turns would be signaled by the spotter pointing which way the yarder should go.

Converting the whistle signals to hand signals is the same as high lead hand signals such as go ahead, skinner back, stop, and dog brakes.

A voice type radio is the best for giving instructions for moving yarders.

VHF/UHF signals

The two acceptable means of controlling the movement of lines on cable yarding systems, other than hand signals are very high frequency (VHF) radio whistle signaling devices and ultra-high frequency (UHF) voice radios.

Very high frequency (VHF) radio whistle signaling devices

These are radio transmitters, usually worn around the waist, that activate a whistle on the yarder when a button is pushed. Each

required movement of the line has a specific audible whistle signal, which is the same on every yarding site in the province. The unique combinations of short and long whistles ensure controlled movement of yarding lines at all times.

Ultra high frequency (UHF) voice radios

A worker tells the operator what line movement is required. The worker directing line movement must use WorkSafeBC-approved verbal commands, which describe the VHF radio whistle signals.

When a voice radio is used, any worker who may be affected by the line movement must be able to hear the verbal command. If a worker cannot hear, radio whistles must be used.

To meet this requirement, there are three alternatives:

- All workers are equipped with radios
- An amplifying speaker is mounted on the outside of the yarder; the speaker clearly broadcasts each verbal command
- The operator repeats each verbal command with a radio whistle signal

Radio signaling devices, either hand-held transmitters or equipment-mounted radios used in logging operations, must be clearly marked with the name of the manufacturer, serial number, assigned operating frequency, and specified tone frequency.

Radio signaling devices must have the following:

- Power limits of ¼ watt for grapple yarder radios
- Power limits of ½ watt for high-lead radio whistles
- A permanently enabled tone-encoded squelch

There should be only one frequency per radio. Where multi-channel radios are used, the selection switch must be disabled so that only an authorized person can change the operating frequency.

CAUTION!

Radio signals replace audible signals for the movement of equipment in logging. Interference by other radios on the same frequency can seriously endanger workers.

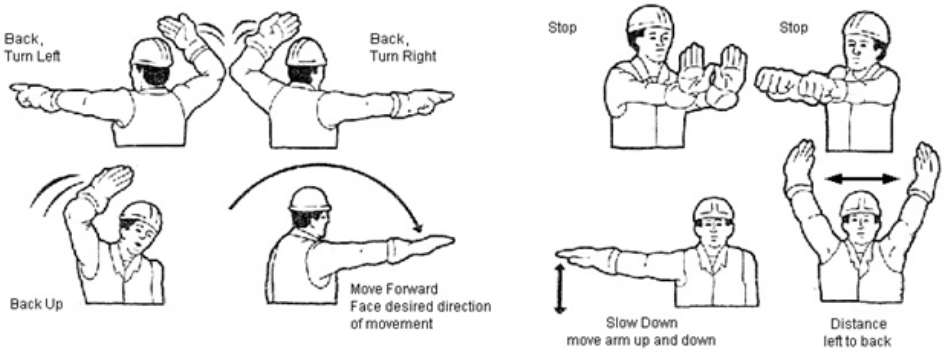
Additionally, minerals in the ground can impede the operation of VHF radio whistle systems, causing missed or incorrect whistles to come out. UHF is considered “line of sight,” so being behind obstacles or in a vehicle can impede the signal as well.

Using a spotter or guide

If a spotter is required to load or unload the equipment, remember that it is critical that all signals be made by hand and not by shouting instructions. The signaler must have a clear view of the machine and

the operator but must stand offside and not directly behind the machine.

Standing off to the side toward the rear, to be seen either directly by the operator or the spotter gives positive and strong hand signals for steering, slowing and stopping.



Responsibilities of the spotter

The spotter must:

- Be constantly aware of the surroundings while performing this function
- Be constantly looking and listening for other vehicles and people entering the path of the backing vehicle
- Either stop the oncoming hazard or stop the machine being backed up
- Be aware of objects and direct the operator safely around them
- Not only look at the ground level for obstructions, but also look up for overhead hazards such as wires, etc.
- Use hand signals to direct the driver. These hand signals should be somewhat exaggerated so that the driver can be clear as to what the spotter is signalling
- Be alert for his or her own safety

Now try the quiz on the next page.

Communication—Self-Quiz

1. Match the following signals with what they mean

1 whistle	Back up
1 and 1 and 1	Stop
1 and 1 pause 1 and 1	Go ahead

2. A voice type of radio is the best for giving instructions when moving yarders.

   ☐ True

   ☐ False

3. Where are VHF type radios usually worn?

   ☐ On the wrist

   ☐ Attached to the helmet

   ☐ Clipped to your vest

   ☐ Around the waist

4. What must not be enabled when radios are using many different channels at a worksite?

   ☐ The whistle function

   ☐ The selection switch

   ☐ The voice function

   ☐ A tone-encoded squelch

Now check your answers on the next page.

Communication—Quiz Answers

1. Match the following signals with what they mean

   Answer:

1 whistle	Stop
1 and 1 and 1	Go Ahead
1 and 1 pause 1 and 1	Back up

2. A voice type of radio is the best for giving instructions when moving yarders.

   Answer: **True**

3. Where are VHF type radios usually worn?

   Answer: **Around the waist**

4. What must not be enabled when radios are using many different channels at a worksite?

   Answer: **The selection switch**