Unit	1017
Title	Apply Tower Operator Skills
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BC **Forest Safety**

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

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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 of:

- Pre and post-operation inspection and maintenance of a tower
- The operation of a tower
- The tower operator's responsibility in regard to safety

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 – Describe 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

Does this unit apply to you?

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

- Tower operator

Section 1017-01: Apply Tower Operator Skills

What you will learn in this section

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

1.1 Conduct a pre-operational inspection of a tower in accordance with company policy and procedures

1.2 Conduct a post-operational inspection of a tower in accordance with company policy wand procedures

1.3. Lock out equipment in accordance with manufacturer's specifications and company procedures

1.4. Undertake basic maintenance of a tower in accordance with company policy and procedures

1.5. Signaling devices on tower are working properly in accordance with regulations

Key Point 1.1: Conduct a Pre-Operational Inspection of a Tower in Accordance with Company Policy and Procedures

Regular and documented inspections must be done on equipment used in yarding and loading. Inspections must be conducted by qualified workers and at appropriate intervals.

Inspections must be initiated:

- By the requirements of the manufacturer
- In accordance with recognized industry standards
- In accordance with the Occupational Health and Safety Regulation

Tools for inspection

Tools for inspecting equipment include the following:

- Coveralls
- Gloves
- Flashlight
- Wire brush

CAUTION!

Remember to use eye protection when using a wire brush.

- Cable and sheave gauge
- Pocket knife
- Tire pressure gauge
- Tape measure
- Inspection checklist

The inspection checklist found in the Resources section of this unit could be used for a site inspection.

Evaluation of machine setup

The first step is to verify that the configuration of the machine is in compliance with the manufacturer's specifications. The actual configuration affects the lifting capacity.

The following should be checked:

- Ground conditions
- Make sure you are operating on outriggers or a pad
- Leveling of yarder or tower
- Proximity of other equipment
- Workers in the active logging hazard area
- Swinging hazards of counterweights and logs
- Communications system (such as radio, hand signals)
- Lattice boom (check for damaged chords, lattice members, twisted boom)
- Hydraulic boom (check for bending, sway, and droop)
- All firefighting equipment in place and operational
- Grooving, gouging, or excessive shoulder wear of sheaves
- Bushings, bearings, and pins, for excessive wear
- All wire rope and connections, such as wedge sockets, for proper size and installation
- Rubber stoppers

Specific inspections

Inspections should be done on the following:

- Drums
- Counterweight
- A-frame and mast
- Wire rope
- Pendants
- Fairleads
- Grapple

Drums

- Check the general condition of the drums and the spooling of the lines.
- Check the dead end of the wire rope at the drum
- Check that drums are not rubbing on guards or house of machine

Counterweight

- Inspect all hardware, including brackets and pins used to attach the counterweight
- Check for cracks, breaks, and other signs of damage.
- Ensure that the loader or yarder is equipped with the original counterweights supplied by the manufacturer and that they contain the correct number of weights

A-frame and mast

- Inspect the frame and mast for bent or distorted members
- Check for cracks at or near welds

Wire rope

- Inspect wire rope and other forms of rigging in accordance with the Occupational Health and Safety Regulation

Note: Non-rotating wire rope must not be used for boom hoist reeving or for standing ropes.

- Check wire rope log

Pendants

Boom pendants must withstand large forces, not only from the weight of the boom and the load, but particularly from shock and vibration when the load is picked up.

- Inspect pendants for broken wires, as well as rust and corrosion, particularly at the fittings
- Ensure that pendants are matched pairs. Inspect sockets for signs of corrosion, rust, and broken wires

Fairleads

Inspect the fairlead structure, paying particular attention to welds.

Examine each sheave for the following:

- Groove smoothness
- Broken or chipped flanges
- Cracks in hubs
- Out-of-round conditions
- Groove depth, width, and contour
- Line guard's distance of shell from sheave

Use a gauge to make sure the contour of the groove is correct.

Check for damage if the fairlead has been spread open.

Machine deck

Inspection on the machined deck should include the following:

- Guards
- Cab guarding
- Clutches

Guards

All exposed gears, drive belts, pulleys, clutches, and brakes must be guarded.

Cab guarding

Cab guarding must conform to the Occupational Health and Safety Regulation.

Clutches

All bands and clutch plates must meet manufacturer's specifications. Check for dirt and grease accumulation and loose tools that could be caught in the clutches.

Operator's cab

The following must be checked:

- All controls must have their functions clearly identified

- Log books and maintenance manual must be available for inspection history
- Windshields must be clean, free of cracks, hazing, discoloration, and frosting
- Check for seat function and ability to adjust properly
- Check that there is no garbage on the floor that could impede the action of controls, as well as no loose objects in the cab

Carriers

Inspection on the carriers should include the following:

- Rubber-tired carrier
- Outrigger assemblies
- Crawler carrier

Rubber-tired carrier

Inspect tires for the following:

- Cuts
- Tears
- Breaks
- Proper inflation

Brake lines must be in good condition and brakes adjusted properly.

Also, inspect steering linkages.

Outrigger assemblies

- Check the outriggers to be sure that neither the beams nor the cylinders are distorted
- Ensure that welds are not cracked
- Beams and cylinder jacks must extend and retract smoothly
- Cylinders must hold
- Check outrigger floats for distortion and cracking

Crawler carrier

Check the following:

- Track and chain adjustment
- The condition of drive sprockets, idlers, support rollers, track pins, keepers, and all welds
- Track pads for cracks
- Cleanliness of tracks, which must be kept clean, especially in freezing weather

Note: All air and hydraulic lines must be in good condition and guarded at locations where they may be damaged.

Fluid and belts

Inspection of fluid levels and the condition of the belts on a yarder tower are conducted at the discretion of the supervisor at each work site. The manufacturer of the yarder tower may also have specific instructions as to the frequency and methods of inspection.

Examples of failures

Broken weld not found on inspection

Catastrophic yarder failure

Catastrophic yarder failure

Now try the quiz on the next page.

Pre-Operational Inspections—Self-Quiz

1. What must drums not rub against?

   - ☐ The frame
   - ☐ The mast
   - ☐ The guards
   - ☐ The A frame

2. Pendants must have a matched pair.

   - ☐ True
   - ☐ False

3. In what conditions must we pay particular attention to the condition of crawler carrier tracks?

   - ☐ Humid weather
   - ☐ Dry weather
   - ☐ Rainy weather
   - ☐ Freezing weather

Now check your answers on the next page.

Pre-Operational Inspections—Quiz Answers

1. What must drums not rub against?

   Answer: **The guards**

2. Pendants must have a matched pair.

   Answer: **True**

3. In what conditions must we pay particular attention to the condition of crawler carrier tracks?

   Answer: **Freezing weather**

Key Point 1.2: Conduct a Post-Operational Inspection of a Tower in Accordance with Company Policy and Procedures

Inspections of yarder towers at the end of a workday or shift are at the discretion of the site supervisor, and differ greatly from one worksite to another. Refer to your company policy or the yarder tower manufacturer's policy when conducting post-operational inspections.

Key Point 1.3: Lock Out Equipment in Accordance with Manufacturer's Specifications and Company Procedures.

WCB regulations require using lock or locks during repair and maintenance work to render machinery or equipment inoperable or to isolate an energy source.

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.

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. Flagging ribbon is also used to mark/indicate what is broken, needs welding or any other maintenance.

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

Why is it important to shut down the machine properly?

Hazards for machine operators are highest when entering or exiting the machine. Some machines may require the operator to start the machine from beside the motor.

CAUTION!

Operate only from a safe area recommended by the manufacturer.

If required, you may need to hold the low oil pressure over-ride switch on until the motor gets enough oil pressure to negate the use of the switch. Also, never exit the machine without shutting down and securing all hazardous energy completely.

Machine shutdown

Observe the following safety procedure:

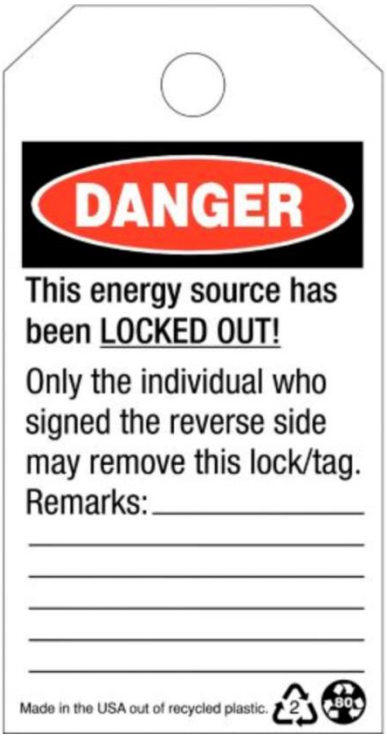
1. Lower blades, grapples, masts, or attachments to the ground or other stable surface. All moving parts must come to a complete stop.
2. Disengage winches or place transmission in neutral.
    - This helps to safely start the engine the next day. Sometimes the winches will engage when started by operator standing at the engine.
3. Shut down the engine.
4. Engage brakes to prevent movement.

Guidelines for what to do before maintenance is conducted

- Secure all parts and attachments against inadvertent movement
- Make sure the pressure or stored energy in pneumatic and hydraulic storage devices that move machine elements is discharged
- Remove ignition keys and place them in your pocket
- Put lockout tags over control devices, clearly saying “DO NOT OPERATE” or “DO NOT START” or another appropriate warning

CAUTION!

Check the work area before lockout tags are removed to be sure all tools have been removed; guards are in place, and workers in the clear.



Now try the quiz on the next page.

Lock Out Equipment—Self-Quiz

1. Lockout tags are always used on yarder towers.

   ☐ True

   ☐ False

2. We need to check the work area after the lockout tags are removed.

   ☐ True

   ☐ False

3. When are hazards highest for machine operators (as mentioned above)?

   ☐ When starting the machine

   ☐ When entering or exiting the machine

   ☐ When shutting the machine down

   ☐ When removing lockout tags

4. It is permitted at any time to remove locks for other operators should they not be available to do so.

   ☐ True

   ☐ False

Now check your answers on the next page.

Lock Out Equipment—Quiz Answers

1. Lockout tags are always used on yarder towers.

   Answer: **False**

2. We need to check the work area after the lockout tags are removed.

   Answer: **False**

3. When are hazards highest for machine operators (as mentioned above)?

   Answer: **When entering or exiting the machine**

4. It is permitted at any time to remove locks for other operators should they not be available to do so.

   Answer: **False**

Key Point 1.4: Undertake Basic Maintenance of a Tower in Accordance with Company Policy and Procedures

Undertake Basic Maintenance applies here in 1017 (Apply Tower Operator Skills).

It also applies and is repeated in 1018 (Set up Tower) and 1019 (Take Down Tower).

What do we need to know before we set it up or take it down?

Before setting up the yarder at the landing site, a competent person must inspect the following and make repairs or replace defective equipment before to use:

- Machinery
- Tools
- Lines
- Blocks
- Shackles
- Other rigging

Check the fairleads at the top of the pipe to make sure there is no debris stuck in them from the move that could fall on workers.

Grease the fairleads. Once the pipe is stood up, workers won't be able to get to it until the setting is finished and it towers down.

Machine operators must know the manufacturer's recommendations for safe machine operation, maintenance, and safe work practices.

Operators must inspect their machines each day before starting work, and make all necessary repairs and adjustments for safe operation before any strain or load is placed upon the machine.

Notes for inspections

Before performing any inspection or repairs, make sure the engine is off, except when running the engine is necessary for adjustment or checking fluids.

Use only approved and provided access points when applying open gear lube to rotating gears. The rotating gears on the yarders need to be lubricated when they are in motion. Operators need to use extreme caution and only use the small access doors specifically designed for the safe application of the open gear lube.

Before operating the machine, make sure:

- Guards are reinstalled
- Safety devices reactivated
- Tools removed

Regular maintenance guidelines—general

Check machinery on a regular basis for cracks appearing in welds or in the steel plating. Repair defects before operation. A daily inspection to ensure safe operation must include the following items:

- Steering and brakes must operate properly. Test all drum brakes before taking a load
- Multiple throttle controls operate properly
- Hydraulics operates properly, motors rotate both ways, and all hydraulic lines are clear
- Check hydraulic hoses for signs of chafing, damage, or leaking. Defective hoses, lines, or fittings must be replaced immediately
- All fuel and oil levels must be adequate
- Check for any obvious fluid leaks
- Power take-off equipment to the hydraulic system, and the leveling and raising jacks must operate properly. Boom-type machines must have a boom stop

Now try the quiz on the next page.

Undertake Basic Maintenance of a Tower in Accordance with Company Policy and Procedures—Self-Quiz

1. How often should operators inspect their machines before starting work?

   - ☐ Hourly
   - ☐ Weekly
   - ☐ Monthly
   - ☐ Daily

2. What two things do we need to inspect for cracks regularly?

   - ☐ Hydraulic hoses and welds
   - ☐ Welds and steel plating
   - ☐ Drum brakes and hydraulic hoses
   - ☐ Steering columns and drum brakes

3. Which of the following should be inspected **before** the yarder is set up?

   - ☐ Machinery
   - ☐ Other rigging
   - ☐ Blocks
   - ☐ Lines
   - ☐ Shackles
   - ☐ Tools
   - ☐ All of the above

Now check your answers on the next page.

Undertake Basic Maintenance of a Tower in Accordance with Company Policy and Procedures—Quiz Answers

1. How often should operators inspect their machines before starting work?

   Answer: **Daily**

2. What two things do we need to inspect for cracks regularly?

   Answer: **Welds and steel plating**

3. Which of the following should be inspected **before** the yarder is set up?

   Answer: **All of the above**

Regular maintenance guidelines—yarder

Metal towers must be inspected by a competent person each time the tower is lowered, and at any time it's safe condition is in doubt.

Use the following list to check specific components on the yarder.

Visually check the entire tower or gantry frame, the transport frame, and raising frame for the following:

- Cracks
- Bends
- Dents
- Wear
- Loose or worn bearings
- Missing or loose retainer clips, bolts, and washers

Check the tower raising system:

- For leaks on telescoping hydraulic raising arm
- Condition of rolled up hydraulic hose, and make sure it spools freely
- Condition of top of ram is in the "pocket" on the back of the pipe
- For pin and molly at bottom of raising ram

Check the following for cracks, wear, and damage:

- Drive chains
- Locking dogs
- Dog actuator
- Ratchet wheel on the guyline drums

Ensure guyline drums and drives are properly secured.

Ensure all lever mechanisms are in good condition.

Guyline drum controls and outrigger controls must be separated and clearly identified to prevent engaging the wrong control.

CAUTION!

Yarder guyline control handles are commonly color-coded to match the color of the lead blocks and guyline drums they control to avoid confusion during use.

Check air pressure on the skyline brake and all components on the yarder drum brakes.

Note: Making adjustments on bolts and anchor pins will cause wear over time and require replacement.

Ensure the ram has a safety valve to stop the tower from coming down if a hydraulic hose blows.

Check the raising lines for damage and signs of aging.

Check the age of the guylines and guyline extensions. Consider age, use, care, and visual inspection when deciding to replace the guylines. Age of lines can be checked in line log book.

Check condition and presence of all nuts and bolts that hold the two sections of the yarder pipe together

Regular maintenance guidelines—spar

- Check the spar closely for dents or deformation whenever it is raised or lowered, or if it has been struck
- Check bolts and nuts are present between two sections of steel spar pipes
- Check that telescoping raising ram is in the pocket and didn't bounce out on last move
- Lighter vertical tube spars are made from spiral rolled material and the slightest deformation will greatly reduce the strength
- Newer towers with lattice boom construction are also greatly weakened by deformations or dents

If there is any doubt concerning damage to the spar, consult the manufacturer or a professional engineer before using the equipment.

IMPORTANT!

Yarder spars are subjected to extreme forces, and over time, the metal will develop stress-related fatigue. Even if dents or deformations are not observed in the spar, it is extremely important to have it thoroughly inspected on an annual basis by the manufacturer or a professional engineer to prevent catastrophic failure.

Check the following components on the spar:

- On telescoping towers, check the locking dogs (or locking pawl) for damage, excessive wear, or cracks.
- Check all attachment points for excessive wear or cracking.
- Check the guy ring and guy lugs where they attach to the tower
- Check the safety strap at the top of the tower to ensure that it is properly connected and is in serviceable condition. The strap must be equal in strength to the individual guyline in use
- Check sheaves for cracks, deformations, evidence of line wear, and loose or worn bearings

Regular maintenance guidelines—carriages and rigging

Make sure to regularly inspect carriages. Carriages typically see the highest amount of wear and tear. Ensure all hooks and shackles are the correct size for the lines.

Also, check components according to the type of carriage and replace worn parts, as follows:

Buttrigging and drift carriages

- Sheaves, bearings, and barrels
- Attachment points
- Shackles used to attach lines to carriage
- Butt hooks

Mechanical slack pullers and grapples

All of the above, plus:

- Dropline wear
- Skyline clamps
- Grease sheaves, chains
- “Bullet” on the end of the tong line and the bitch hook

Motorized carriage

All of the above, plus:

- Radios and horns
- Clear of oil and debris
- Fire extinguisher
- Spark arrester (if not turbo charged)
- Hydraulic hoses and fittings
- Fluid level

CAUTION!

Stabilize heavy carriages when inspecting or working on them to prevent the carriage from falling on workers.

Now try the quiz on the next page.

Maintenance of Yarder, Spar and Carriages and Rigging—Self-Quiz

1. What does the ram need to have to prevent the tower from coming down?

   - ☐ Bolts and anchor pins
   - ☐ Safety valve
   - ☐ Hydraulic hose
   - ☐ Outrigger controls

2. Why is it useful for the yarder guyline control handles to be color-coded?

   - ☐ To make it easier to communicate problems to others
   - ☐ So we know when they are secured
   - ☐ To help identify when they need to be repaired
   - ☐ To make it easier to pair up with the proper lead blocks and guyline drums

3. How often should a spar be thoroughly inspected, even if it doesn't show evidence of dents or deformations?

   - ☐ Monthly
   - ☐ Yearly
   - ☐ Every two years
   - ☐ Weekly

4. What must we make sure fit correctly to the carriage lines?

   - ☐ Skyline clamps
   - ☐ Sheaves, bearings, and barrels
   - ☐ Shackles and hooks
   - ☐ Hydraulic hoses

Now check your answers on the next page.

Maintenance of Yarder, Spar and Carriages and Rigging—Quiz Answers

1. What does the ram need to have in order to prevent the tower from coming down?

   Answer: **Safety valve**

2. Why is it useful for the yarder control handles to be color-coded?

   Answer**: To make it easier to pair up with the proper lead blocks and guyline drums**

3. How often should a spar be thoroughly inspected, even if it doesn't show evidence of dents or deformations?

   Answer: **Yearly**

4. What must we make sure fit correctly to the carriage lines?

   Answer: **Shackles and hooks**

Key Point 1.5: Signaling Devices on Tower are Working Properly in Accordance with Regulations

Signaling device include radios and whistles.

Radios

It is standard procedure to use radios to do a verbal check that all crew members are connected, and all radios are working. The operator will check in first, and then all others, one at a time.

Communication is key between the operator, rigger or slinger, and hooktender. Chasers may also have radios.

Make sure everyone is on the same channel.

Whistles

If this system is used, do a system check at the start of a shift to check for bugs in the signal device.

Tap it a couple of times, which signals a system check. Wait for others to confirm.

The checks that are done to make sure the communication systems are working as well as the signals that are used on any given day or site are usually established during your daily meeting. This meeting may occur on site, or in the truck on the way to the site.

Audible high-lead signals – Operational signals

Operational Signals		
Start work	1 long	–
Stop any movement	1 short	•
Ahead* on mainline	3 short	• • •
Slack the mainline	5 short (minimum)	• • • • •
Ahead* on the haulback	2 short, 2 short	• • • •
Slack the haulback	2 short, several short	• • • • • •
Tightline	3 short, 2 short	• • • • •
Tightline on inhaul	3 short, 2 short	• • • • •
Cancel tightline on inhaul	3 short	• • •
Ahead* on strawline	3 short, 1 short	• • • •
Slack the strawline	3 short, 1 short, several short	• • • • • • • •
Pick up the guyline	2 short, 2 short, 2 short, 1 short	• • • • • • • •
Slack the guyline	2 short, 2 short, 2 short	• • • • • •
Extreme hazard present (runaway log, etc.)	1 long, sustained until hazard has stopped or hazard cleared	———
Accident	7 long	———————
Fire	1 long, several short, repeated	– • • • •

Note: "Ahead" mean haulage line moves toward machine.

Audible high-lead signals – when buttrigging is at the landing

When Butt Rigging Is at the Landing		
Check the rigging	5 short (minimum)	• • • • •
Send out strawline extension	3 short, 1 short, and 1 short for each extension	• • • • • •
Send out strawline in the haulback eye	3 short, 1 long	• • • –
Chokers required	2 short and 1 short or long for each choker required	• • • • • •
Put on/take off scab block	1 long	–
Calling foreman	4 long	– – – –
Calling hooktender	3 long	– – –
Calling hooktender and crew	3 long, several short	– – – • • • •
Calling for water bag	1 short, 1 long	• –
Calling for block and strap	1 long, 1 short	– •
• Any regular signal preceded by a long signal is a "slow" signal. • Any signal that the engineer is not sure of is a "stop" signal.		

Now try the quiz on the next page.

Checking Signaling Devices—Self-Quiz

1. Who checks in first on the radio?

   - ☐ Hooktender
   - ☐ Operator
   - ☐ Rigger or slinger
   - ☐ Chaser

2. A systems check is done by doing what?

   - ☐ Tapping the whistle once
   - ☐ Tapping the whistle 5 times
   - ☐ Tapping the whistle and holding it
   - ☐ Tapping the whistle a couple of times

3. Audible high-lead signals – operational signal. Match what it means to what you do.

Stop any movement	7 long
Slack the guyline	1 short
Accident	1 long, several short, repeated
Fire	2 short, 2 short, 2 short,1 short

4. Audible high-lead signals – when buttrigging is at the landing. Match what it means to what you do.

Call for block and strap	4 long
Chokers required	5 short (minimum)
Call hooktender	3 long
Check rigging	1 long, 1 short

Now check your answers on the next page.

Checking Signaling Devices—Quiz Answers

1. Who checks in first on the radio?

   Answer: **Operator**

2. A systems check is done by doing what?

   Answer**: Tapping the whistle a couple of times**

3. Audible high-lead signals – operational signal question. Match what it means to what you do.

Stop any movement	1 short
Slack the guyline	2 short, 2 short, 2 short
Accident	7 long
Fire	1 long, several short, repeated

4. Audible high-lead signals – when buttrigging is at the landing. Match what it means to what you do.

Call for block and strap	1 long, 1 short
Chokers required	2 short and 1 short, and 1 short for each extension
Call hooktender	3 long
Check rigging	5 short (minimum)

Section 1017-02: Operate Tower

What you will learn in this section

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

2.1 Yard logs and pile or deck logs in accordance with block requirements and manufacturer's specifications

2.2. Change roads in accordance with block requirements and manufacturer's specifications

2.3 Operate tower smoothly in accordance with block requirements and manufacturer's specifications

2.4 Spool lines

2.5 Run guylines

Key Point 2.1: Yard Logs and Pile or Deck Logs in Accordance with Block Requirements and Manufacturer's Specifications

Planning and preparing the log landing

Clear hazardous terrain and conditions

Yarding usually begins on the upper side of the block closest to the yarder, so the crew remains above any hazardous logs, rocks, and other debris on sloping ground. Reassess the terrain for hazards as the crew moves downhill.

Stay aware of danger trees

Arrange work to minimize danger to workers. Snags and other danger trees within reach of the landing must be removed if they could endanger the landing crew.

Stable piling when landing the turn

To ensure stable piling when landing the turn, observe the following:

- Provide adequate slack to unhook the chokers
- Chaser should determine that the logs are stable and properly landed before unhooking the turn

- Any equipment movement that could affect the safety of the chaser must cease while the turn is being unhooked
- Logs must be landed straight and stable
- When cold decking is required, build a stable pile. This is achieved by keeping all logs in lay and not allowing crossed logs in the pile

Spotting rigging

Observe the following when spotting rigging:

- The rigging slinger will spot the rigging where the chokers are being set
- Once the rigging has been spotted, the crew must remain in the clear until the rigging stops swinging

---

IMPORTANT!

Never stand directly under elevated rigging. Equipment could fail or a hung line could break free unexpectedly.

Get in and get out.

- The rigging is usually kept elevated until the chokers are untangled
- The rigging slinger will signal to slack the lines slowly to enable the chokersetter to pull the chokers to the turn

Note: The only time a yarder operator will have to confirm the location of the rigging is when the yarder operator's view is blocked by the pipe. The yarder operator will need to confirm the location of the rigging through communication with the rigging slinger. In a safe situation where the yarder is not facing straight uphill, this should not happen often.

Not in front of yourself

When using a yarder without a grapple, distances to the turn can be further, making it easier to keep it above and behind.

No logs sideways

Sometimes logs may be laid across the pile to level and support it. Unless this is the case, logs should not cross with each other.

This is the correct way to pile logs

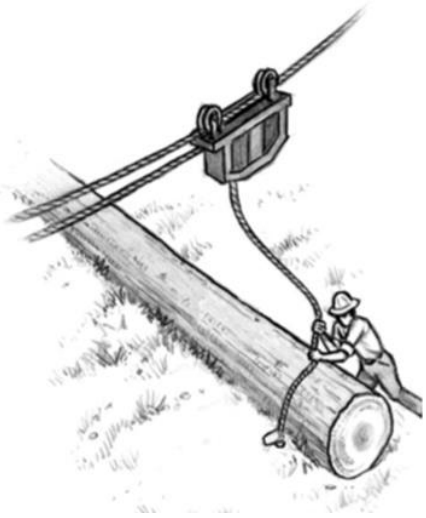
Safety: rolling logs, rocks and other objects

Gravity is the primary source of hazardous energy when working on a slope. Logs, rocks, or other objects can be disturbed by rigging activities and roll or slide downhill toward the crew. The risk is greater working around newly felled timber where logs can shift and dislodge other logs or material that appeared stable.

Precautions

- Yard a slope from the highest point down
- Never work below unstable logs, rocks, or other material. If it is unclear what is holding a log, then assume it can move at any time
- When getting in the clear above and behind the turn before the go-ahead signal, identify the logs that will move and make sure that no unbucked logs or tree lengths could intrude on the safe area chosen
- When there is no logged-off area available, retreat farther and use extra caution. Never remain below anything that could be dislodged when the turn is yarded free

- In an area with bucked timber, never stand on the second cut of a tree that is hooked up
- If there is any doubt about the action of logs in a turn, give the “go ahead slow” signal
- Stay alert to the moving turn and be ready to signal stop if a hazard develops. Chokers can break on the way to the landing or logs break in two, sending material back down on the rigging crew



Stay above the log on sloped ground

A short landing is sometimes inevitable and it may be necessary for the loader or processor to grab and hold the turn while the chaser unbells the logs. Make sure the rigging crew below is in the clear in case a log slips out of the grapples

Working below a landing on steep ground

The landing must be planned to minimize the risk of logs or other debris kicked loose at the landing from running downhill toward the rigging crew. On a small landing, the cramped operating area for the loader becomes hazardous. A log in the grapple can strike the mainline and cause the rigging to jump as the rigging crew sets a turn below, or logs may be decked too close to an edge and get disrupted as logs are added.

Precautions

- Discuss the organization of the landing and work zones with the entire crew beforehand. Communication and planning with multiple perspectives improves effectiveness and attention to safety
- The landing must be adequate for the turn to be landed and unchoked without using the loader to prevent the turn from running back down the hill
- Plan the areas of operation of the yarder, processor, and loader, and maintain safe distances. Identify areas where equipment operations overlap
- Make sure logs or the loader boom does not strike the mainline, skyline, running lines, or guylines when the rigging crew is setting chokers. Avoid throwing debris over the bank
- Set up an emergency whistle at the landing with a signal worked out in advance to warn the rigging crew if materials slide off the landing or other hazards appear they may be unable to see

Crew in clear

Once the chokers are set, the rigging crew must get in the clear before the go-ahead whistle is blown by the rigging slinger. Always get in clear before lines begin to move. Never touch a moving line.

Precautions

- Move away from the turn, above and behind, and clear of the bight of the line
- Ensure the area where the crew stands is free from any log movement or potential for debris to enter from above
- Remain standing and face the turn (be above and behind it if possible)

Here's an example of how communication may occur when something isn't in the clear.

A rigging slinger blows the whistle three times to state he is in the clear. The operator may see something dangerous that the rigging slinger didn't notice. The yarder operator alerts the rigging slinger of this by waiting and not moving at all. The lack of movement will signal to the rigging slinger that they need to recheck the situation.

Watch the In the Clear video to get a better understanding of how to get in the clear.

On The Hillside - In The Clear - SAFER.ca

Working draws and ridges

When operating a yarder, start high and work low on the ridge. Make sure to maintain an angle to the hillside, so that if timber or other falling objects come down the hillside, the yarder and other workers are in the clear on the high side.

Precautions

- Make sure the logs go one way, are along the ridgeline, and are not in the chute
- The more deflection you have, the better. If issues arise, move logs to a place where you can logically get them later, without having to go back

Yard Logs and Pile or Deck Logs in Accordance with Block Requirements and Manufacturer's Specifications—Self-Quiz

1. Whose job is it to decide if the logs have been landed in the correct way and won't displace when detaching the turn?

   - ☐ Rigging slinger
   - ☐ Hook tender
   - ☐ Operator
   - ☐ Chaser

2. It is important for all crew members to never stand under elevated rigging.

   - ☐ True
   - ☐ False

3. Where should the crew stand to be in the clear before the signal to go ahead is g?

   - ☐ Above and behind the turn
   - ☐ In front of and to the side of the turn
   - ☐ Above and to the side of the turn
   - ☐ Above and as close to the turn as is safe

4. If an operator sees something dangerous in the landing, but the rigging slinger doesn't see it and indicates they are in the clear, what does the operator do to signal that there is danger?

   - ☐ Blow the whistle three times
   - ☐ Blow the whistle and hold it
   - ☐ Step out of the cab and yell to them
   - ☐ Nothing

Now check your answers on the next page.

Yard Logs and Pile or Deck Logs in Accordance with Block Requirements and Manufacturer's Specifications—Quiz Answers

1. Whose job is it to decide if the logs have been landed in the correct way and won't displace when detaching the turn?

   Answer: **Chaser**

2. It is important for all crew members to never stand under elevated rigging.

   Answer: **True**

3. Where should the crew stand in order to be in the clear before the signal to go ahead is given?

   Answer: **Above and behind the turn**

4. If an operator sees something dangerous in the landing, but the rigging slinger doesn't see it and indicates they are in the clear, what does the operator do to signal that there is danger?

   Answer: **Nothing**

Key Point 2.2: Change Roads in Accordance with Block Requirements and Manufacturer's Specifications

Note: Aspects of this section may be repeated in 1026-04 – for hook tenders.

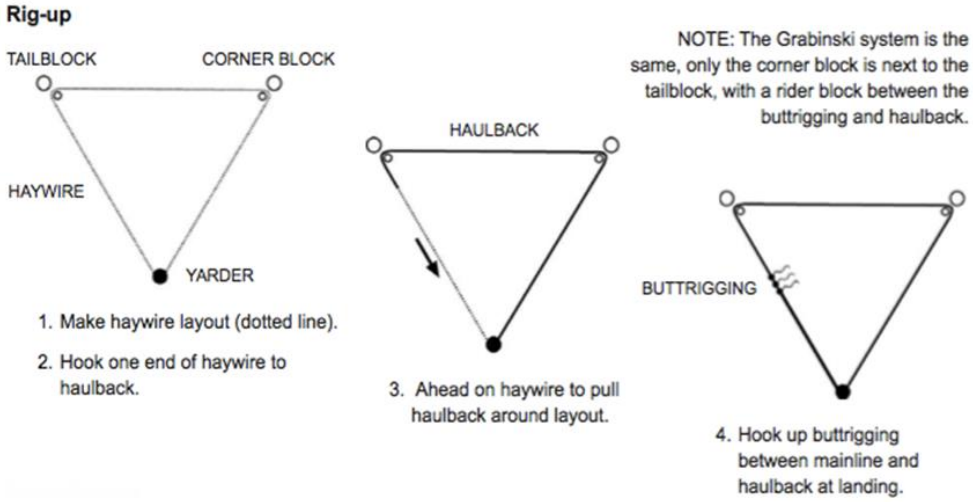
There are several procedures for road changes that involve stringing strawline through blocks at the new road line, then tightlining the yarding lines to the new location. Sometimes this is a quicker choice, but these kinds of "jumps" in the line can be hazardous due to potential hang-ups and side binds. Even moving lines no farther than toward the corner block in the existing layout produces a very large bight area. Workers must stay well clear during line shifts that jump lines directly to the new location.

When jumping heavy lines on slopes or uneven ground, use a chain to keep the line from running away when the strawline is released. Attach the chain to the line and to a sapling or secure object.

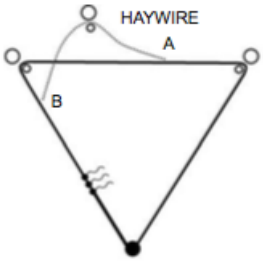
Illustrations on ways to rig-up and change roads in different setups include the following examples:

- Highlead: rig-up, road change, corner block change
- Skyline, shotgun or gravity: rig-up, road change
- Skyline, slackline: rig-up, road change

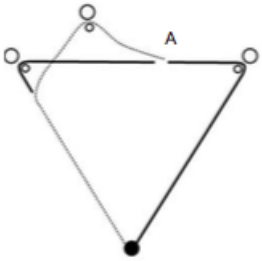
High-lead system



Road Change

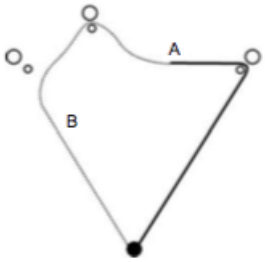


1. String haywire section(s) between points A and B.
2. Disconnect haulback from buttrigging on landing.
3. Hook haulback to haywire on landing.

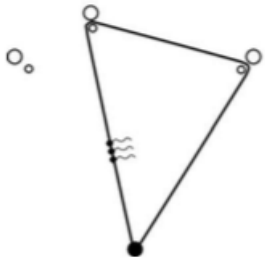


4. Ahead on haulback to pull haywire to point A.
5. Disconnect haywire from haulback.
6. Hook short section(s) of haywire to haulback at point A.

haulback at landing.

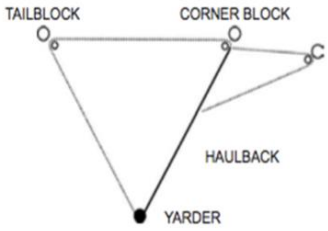


7. Ahead on haywire to pull back to point B.
8. Hook haywire to short section(s) of haywire at point B.
9. Ahead on haywire to pull haulback to landing.

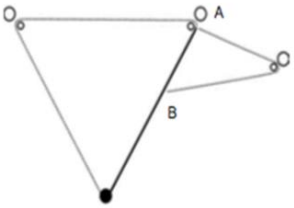


10. Hook up buttrigging at landing.

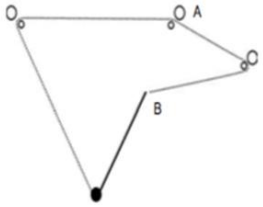
Corner block change



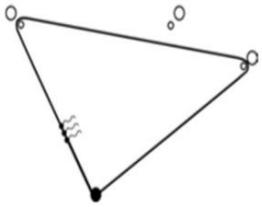
1. Layout haywire section(s) (dotted line).
2. Hook haulback to haywire on landing.



3. Ahead on haulback to Pull haywire to point A.
4. Disconnect haywire from haulback.
5. Hook short section of haywire to haywire at point A.



6. Ahead on haulback to pull back to point B.
7. Hook haulback to short section of haywire at point B.



8. Pull haywire to pull haulback to landing.
9. Hook up buttrigging at landing.

Skyline, shotgun or gravity system

Rig-up

1. Run haywire (dotted line).
2. Hook one end of haywire to skyline.

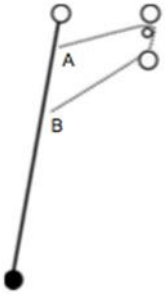
3. Ahead on haywire to pull skyline past tailhold.

NOTE: It may be necessary to tie off lines with a strap and rigging chain so the skyline does not run back downhill. Leave the haywire out to assist in pulling on the rigged line to loosen rigging chain and strap.

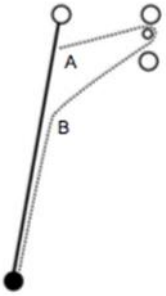
4. Disconnect haywire and hook skyline to tailhold.
5. Tighten skyline.
6. Pull haywire to landing.

Road Change

1. Layout section(s) of haywire as shown.
2. Hook haywire to carriage on landing.



3. Use carriage to pull haywire from landing to point B.
4. Hook haywire to short section(s) of haywire at point B.
5. Take carriage back to landing.
6. Drop skyline.
7. Kick skyline loose of stump and pull skyline to point A.

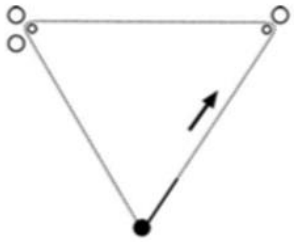


8. Hook haywire section(s) to skyline at point A.
9. Go ahead on haywire to pull skyline past new tailhold.
10. Disconnect haywire and hook skyline to tailhold.

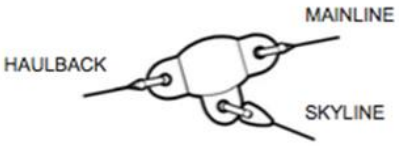
11. Tighten skyline.
12. Pull haywire to landing.

Skyline, slackline system

Rig-up



1. Make haywire layout (dotted line).
2. Hook one end of haywire to haulback at landing.
3. Ahead on haywire to pull haulback around layout back to landing.

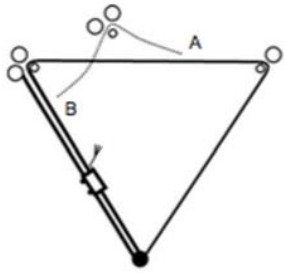


4. Hook a highlead barrel or swivel between haulback and mainline.
5. Hook skyline to middle of buttrigging barrel as shown.

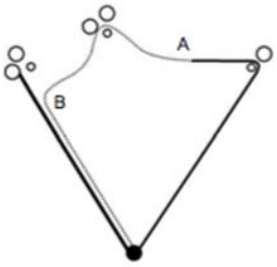
6. Pull on haulback to pull mainline and skyline back behind the tail stump.
7. Disconnect skyline and hook to tail stump.
8. Pull on mainline and pull haulback to landing.
9. Put on carriage.

Road Change

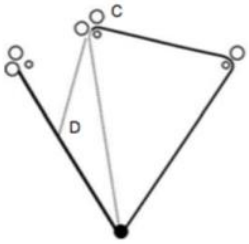
Split into two road changes. Move haulback to new tail block before moving skyline.



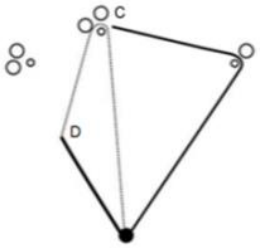
1. Layout section(s) of haywire between points A and B.
2. Hook haulback and haywire together at landing.



3. Ahead on haulback to pull haywire to point B.
4. Disconnect landing haywire from haulback at point B.
5. Hook haywire into haywire section(s) at point B.
6. Ahead on haulback to point A.
7. Hook haulback into haywire section(s) at point A.



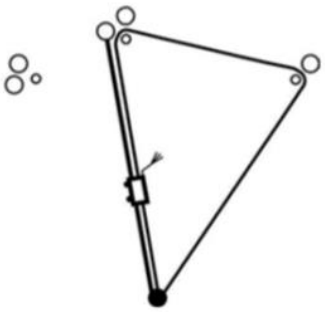
8. Ahead on haywire to pull landing haywire to bring haulback to point C.
9. String section(s) of haywire from point C to point D.
10. Disconnect haywire from haulback at point C.



11. Hook haywire into haywire section(s) at point C.
12. Slack skyline and unhook skyline from tailhold.
13. Pull skyline until end is at point D.
14. Hook haywire section(s) to skyline at point D.
15. Ahead on haywire to pull skyline to new tailhold.

NOTE: If extra strength is needed, hook the haulback to a short haywire section, which hooks to the skyline, then pull on the haulback to move the skyline.

16. Disconnect haywire from skyline.
17. Hook skyline to new tailhold stump.
18. Tighten skyline.
19. Hook haulback to haywire at point C.
20. Ahead on haywire to pull haulback to landing.



Now try the quiz on the next page.

Change Roads in Accordance with Block Requirements and Manufacturer's Specifications—Self-Quiz

1. What is a potential hazard of stringing strawline through blocks when establishing a new road line?

   - ☐ It is hard to tightline the yarding lines and dangerous
   - ☐ It is hard to get in the clear
   - ☐ It is impossible to attach a chain for safety
   - ☐ Hang-ups and side binds can occur, which are dangerous

2. Moving lines no farther than toward the corner block in an existing layout produces a small bight area.

   - ☐ True
   - ☐ False

3. Which of the following set-ups do you need to do a corner block change?

   - ☐ Highlead System
   - ☐ Skyline, Shotgun or Gravity System
   - ☐ Skyline, Slackline System
   - ☐ Highland and Skyline, Slackline systems

4. Which system do you need to hook a highlead barrel or swivel between haulback and mainline, and also hook skyline to middle of buttrigging barrel?

   - ☐ Highlead System
   - ☐ Skyline, Shotgun or Gravity System
   - ☐ Skyline, Slackline System
   - ☐ Highland and Skyline, Shotgun or Gravity System

Now check your answers on the next page.

Change Roads in Accordance with Block Requirements and Manufacturer's Specifications—Quiz Answers

1. What is a potential hazard of stringing strawline through blocks when establishing a new road line?

   Answer: **Hang-ups and side binds can occur, which are dangerous**

2. Moving lines no farther than toward the corner block in an existing layout produces a small bight area.

   Answer: **False**

3. Which of the following set-ups do you need to do a corner block change?

   Answer: **Highlead system**

4. Which system(s) do you need to hook a highlead barrel or swivel between haulback and mainline, and also hook skyline to middle of buttrigging barrel?

   Answer: **Skyline, Slackline System**

Key Point 2.3: Operate Tower Smoothly in Accordance with Block Requirements and Manufacturer's Specifications

The following steps and instructions for how to operate a yarder smoothly have been outlined from an experienced yarder. Be aware that all yarder towers are different and these steps may not all apply to all towers. The purpose of this is to give a general overview on yarder tower operations.

Make sure to consult your supervisor or the operator's manual of the yarder you are operating before getting in it and starting it up.

1. Starting off with the buttrigging in the landing, chaser has undone chokers.
2. Chaser signals he is in the clear and for the operator to send the rigging back to the bush. Waves arm and points to the bush.
3. Operator ensures all other workers are in the clear.

Note: The operator is sitting with both frictions on and hand brakes on.

4. Operator releases both hand brakes and applies foot brakes at the same time.
5. Operator engages mainline friction and slowly applies throttle as he lets go easily on foot brakes to raise chokers out of pile.
6. Operator lifts lines and chokers clear of log pile.
7. Operator steps on mainline foot brake to stop main and releases mainline friction.
8. Operator engages haulback friction and raises buttrigging to desired height and while continuing to slowly add throttle he releases mainline brake foot pedal pressure to hold buttrigging at desired height above ground.

Note: More pressure on brake gauge keeps the buttrigging and chokers higher off the ground.

9. Operator smoothly runs the buttrigging back to rigging crew, keeping choker bells just above the ground.
10. Operator watches drums to check on and make sure lines are spooling correctly.
11. Operator anticipates where the crew is working and slows down as he gets the buttrigging close.
12. Rigging crew blows stop whistle and operator releases throttle and applies both foot pedals to smoothly stop lines from moving.

STOP!

Don’t stab brake pedals as it tangles chokers.

13. Operator applies both frictions and hand brakes, slowly releases foot pedals to make sure everything stays still.
14. If crew signals for slack on the mainline, operator steps on mainline brake pedal, releases mainline hand brake, leaves mainline friction on and slowly releases foot pedal pressure watching mainline drum for movement to keep drum moving slowly and smoothly as it pays out slack.
15. When rigging crew signals stop, operator again steps on both brake pedals and applies both hand brakes and both frictions, slowly releases both foot brakes to make sure nothing moves.

Note: Use the same procedure for slacking haulback, just insert haulback where mainline appears.

16. When rigging crew signals to go ahead on turn operator steps on both main and haulback foot brake pedals, disengages haulback friction, releases both hand brakes, applies throttle as he releases mainline foot pedal brake.
17. Yarder operator releases haulback brake pressure to keep buttrigging at correct height in the air as he slowly increases throttle.
18. Operator watches turn as he comes ahead easy at first, slowly increasing throttle as turn moves forward.

Note: This step separates great operators from all the other yarder operators. By starting slowly and consistently doing the same thing as they start the turn moving it creates a safer workplace for everyone. Most hazards are eliminated right here. Less debris getting flung around less chance of up-ending logs hitting crew, less chance of breaking chokers or mainlines.

19. Yarder operator watches drums to make sure lines are spooling correctly, as well as watching turn and being aware of potential hang-ups, increasing tension on haulback brake to lift turn over the hang-up or releasing tension to allow turn to slide around hang-up.
20. Operator ensures all workers and machines are clear of log landing site before bringing turn into landing.
21. Operator releases some throttle pressure and slows turn down by applying slightly more haulback pressure.
22. Operator slowly brings log onto the pile watching for other logs being pushed or thrown out of lead in the pile.
23. Operator calls in loader operator to assist in landing logs if necessary.

Note: If operator’s view is hampered by the pipe, operator relies on chaser’s hand signals to land logs in correct position.

24. Operator then lands log in correct position and in lay with other logs.

25. Operator steps on both foot pedal brakes, disengages mainline friction, slacks the mainline by releasing pressure on the mainline brake foot pedal.
26. Operator slacks mainline enough for chaser to easily undo chokers without having to fight too much extra slack.
27. Both frictions are engaged and both hand brakes are on.
28. Operator watches out for chaser to make sure that no hazards develop as the chaser has his head down undoing chokers.
29. Operator blows whistle to warn chaser of hazard if necessary.

Note: If chokers are fouled and chaser signals him to do so, the operator lifts buttrigging with mainline and adjusts log, slacking it down when finished.

30. Operator applies both foot pedal brakes, applies both frictions, applies both hand brakes and slowly releases foot pedal brakes to make sure nothing moves.
31. Operator waits for chasers signal to repeat.

Watch the Madill071 Controls video that shows the operations of a yarder.

Madill 071 controls explained

Watch the Pull in the turn video which shows the rigging as logs are brought into the landing.

Dennis Hayes Logging - Madill 172 Yarder - Pulling in First Drag/Turn.MPG

Now try the quiz on the next page.

Operate Tower Smoothly in Accordance with Block Requirements and Manufacturer's Specifications—Self-Quiz

1. According to the yarder operator procedures, how can the chaser indicate to the operator that he is in the clear?

   - ☐ Radio in to tell him
   - ☐ Blow the whistle three times
   - ☐ Wave arms and point to the bush
   - ☐ Wave arms

2. Why is it important to keep as much pressure on the brake gauge as possible when raising the chokers and buttrigging?

   - ☐ It keeps them from falling
   - ☐ It keeps the movement smooth
   - ☐ It keeps them closer to the ground
   - ☐ It keeps them higher off the ground

3. What does the operator need to do in order to be smooth when stopping the lines from moving?

   - ☐ Apply both mainline and haulback foot pedals
   - ☐ Release both hand brakes
   - ☐ Push the mainline and haulback foot pedals very quickly
   - ☐ Release mainline friction

4. When bringing the turn into the landing, what must the operator do in order to slow the turn down?

   - ☐ Apply less pressure to the haulback
   - ☐ Apply more pressure to the haulback
   - ☐ Disengage mainline friction

- ☐ Release pressure on the mainline brake

5. What does the operator need to do if the chaser cannot undo the chokers due to fouling?

   - ☐ Blow a whistle to tell the crew
   - ☐ Apply both frictions and hand brakes
   - ☐ Use the mainline to lift the buttrigging and move the log
   - ☐ Slowly release foot pedal brakes

Now check your answers on the next page.

Operate Tower Smoothly in Accordance with Block Requirements and Manufacturer's Specifications—Quiz Answers

1. According to the yarder operator procedures, how can the chaser indicate to the operator that he is in the clear?

   Answer: **Wave arms and point to the bush**

2. Why is it important to keep as much pressure on the brake gauge as possible when raising the chokers and buttrigging?

   Answer: **It keeps them higher off the ground**

3. What does the operator need to do in order to be smooth when stopping the lines from moving?

   Answer: **Apply both mainline and haulback foot pedals**

4. When bringing the turn into the landing, what must the operator do in order to slow the turn down?

   Answer: **Apply more pressure to the haulback**

5. What does the operator need to do if the chaser cannot undo the chokers due to fouling?

   Answer: **Use the mainline to lift the buttrigging and move the log**

Key Point 2.4: Spool Lines

To spool lines properly, observe the following:

- Lines should be spooled and tightened properly onto the drums when they are first installed and be kept properly spooled for line life
- The only time the line should lay flat is on the first tier. After that, they should stack round on round (with high tension)
- Make sure line comes in tightly. If lines loosen, they may fall “out of lag,” which can damage the line over time. This can increase the chance of a break, and cause uneven slack during heavy loading
- All lines should be run in at a very slow speed when workers spool the lines
- Workers wearing caulked boots are not allowed to stand on metal covers or hoods while they spool lines, unless the metal is covered with a nonslip material
- Upend the lines regularly to reduce excessive wear and increase the life of the line

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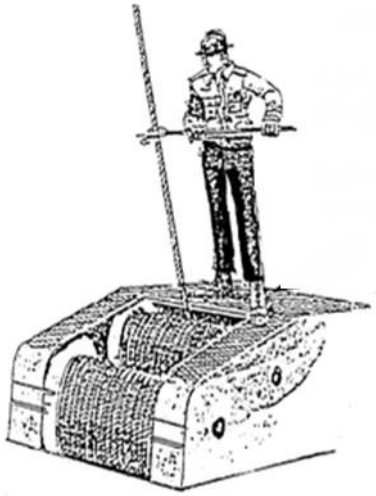
CAUTION!

Workers should use proper spooling irons or tools when spooling the haulback and mainline so they are not caught by any jaggers on the lines.

If workers have to handle lines with their hands as they are spooling, they should use the hand over hand method to keep the chance of getting caught by a jagger to a minimum.

The following pictures show correct and incorrect spooling practice and hazards of spooling lines.

Incorrect spooling practice: worker not using proper spooling tool and standing on mainline drum



Correct spooling practice: worker using spooling tool and standing on slip-proof platform on hood

Now try the quiz on the next page.

Spool Lines—Self-Quiz

1. When is the only time that a line should not stack round on round?

   - ☐ When you are tightening the first loop
   - ☐ The first tier
   - ☐ When you have a jagger on the line
   - ☐ When you use hand over hand method

2. Which of the following is not a safe spooling practices?

   - ☐ Resting only one foot on the drum
   - ☐ Running in lines at a slow speed
   - ☐ Using a spooling tool or iron
   - ☐ Tightening the lines really tightly

3. Workers wearing boots that are caulked are not allowed to be on metal hoods at any time.

   - ☐ True
   - ☐ False

Now check your answers on the next page.

Spool Lines—Quiz Answers

1. When is the only time that a line should not stack round on round?

   Answer: **The first tier**

2. Which of the following are not safe spooling practices?

   Answer: **Resting one foot on the drum**

3. Workers who are wearing boots that are caulked are not allowed to be on metal hoods at any time.

   Answer: **False**

Key Point 2.5: Run Guylines

Note: Content here in 1017-02 for running guylines has similarities to information included in 1018-03 and 1019-02 (Set up guylines).

Every model of yarder is different. Refer to the specific plate on the yarder for colour-coding and other guyline instructions and procedures.

Pulling guylines out to the anchors with the strawline

Once guyline stumps are selected and notched, guylines are then pulled out to the anchors. On large yarders, this is done with the aid of the yarder strawline. On small yarders, the guylines are normally pulled out by hand.

Remember the following points when pulling out guylines with the strawline:

- Hang a light strap and Tommy Moore block on the guyline stump or just behind it and string the strawline
- Connect the strawline to the guyline end with a pass chain far enough up the guyline to provide enough slack for the guyline end to go around the stump
- When wrapping the guyline with the chain, ensure the chain is wrapped opposite the direction of pull
- Place the guyline around the stump with the lead to the spar on the high side. This will make disconnecting the guyline easier
- Use a proper guyline shackle to connect guylines to the anchors
- Insert the guyline shackle pin from the bottom for easier removal
- Place the pin in the eye of the guyline and secure it

CAUTION!

Work safely with strawline.

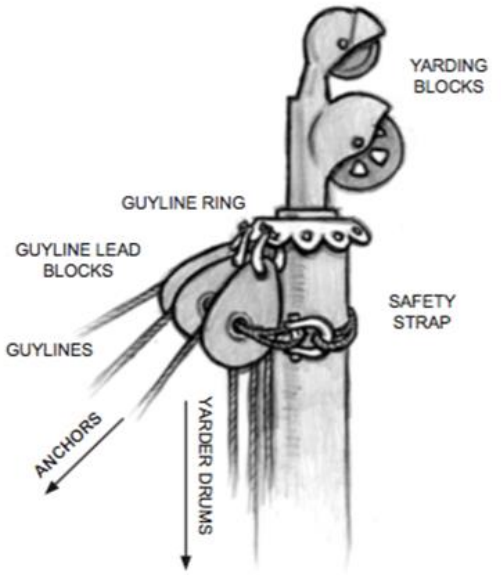
The strawline is typically attached to the eye of a line or hooked several feet up the guyline with a rigging chain to make it easier to connect the guyline to the stump. Once movement begins, stay in the clear as the chain may slip.

Stringing a guyline with strawline

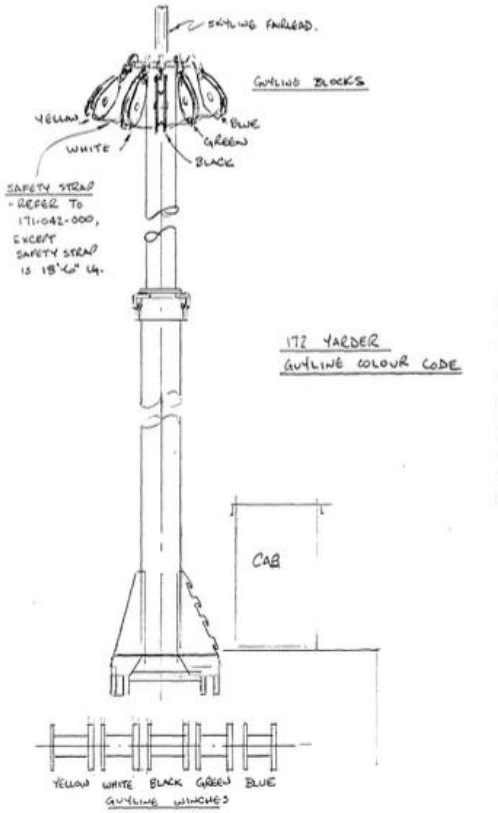
Pass chain wrapped against the pull

CAUTION!

Never touch a moving line. Strawline can get loops or tangles in the line when pulled from a coil. Never put your hand in the middle of a loop to attempt to straighten it out when it is under tension or being moved. Stringing strawline is the source of many lost fingers.



Proper set up of guylines and guyline lead blocks



172 GUYLINE WINCH COLOUR CODING

Using a pickup truck to pull strawline

CAUTION!

Exercise care when attaching guylines to a vehicle to pull them off the yarder. Pulling too fast or too hard can upset the tower. The yarder engineer needs to be in control at all times. Use a spotter to communicate between the yarder engineer and the vehicle operator.

Radio communication is preferable between operator and person driving vehicle to pull lines off.

If the same vehicle is used to supply tension to tighten line as it is spooled back on the machine, it needs to be big and heavy enough to not be out powered by force of line being pulled in. This mistake has resulted in many pick-up trucks being pulled off the road on a corner.

Other important considerations when stringing guylines

Beware of tension in the line when unhooking the strawline

Pulling out a line can produce a twist that will unleash violently when the strawline is released.

Pay careful attention to the stability of the spar

During this stringing process, the spar is only held up by the raising system on the yarder. Stay aware of the forces exerted on the spar and avoid unnecessary loads on it. Stabilizer hydraulic jacks need to be used. Use a bubble level to monitor tower movement. Stay out of the bight of the spar in case it should suddenly drop. Refer to the manufacturer's instructions if there is any question about how high the spar can be raised without the support of guylines. Some telescoping spars have auxiliary safety guylines to anchor before the main guylines are strung and the top section raised.

Note: Only raise hydraulic ram to 2nd stage when running out guy-lines for safety and stability, as seen below.

The guylines must be strung out in an order that ensures the stability of the spar

With vertical towers, ensure guylines are strung with opposing lines in succession to prevent all of the weight pulling one side of the tower. With a leaning-type tower, pull out the side guylines first, work to the center, and do the back guys last. Work so that tightening any one guyline will not tip the tower.

When yarding downhill from a backspar, the two front guylines must be tightened first

When yarding uphill, the two back guylines must be tightened first. Guylines should be tensioned to support the backspar adequately, and positioned so that the inside angle is less than 45 degrees to the horizontal. When this cannot be done, additional guyline support is required.

Avoid side binds

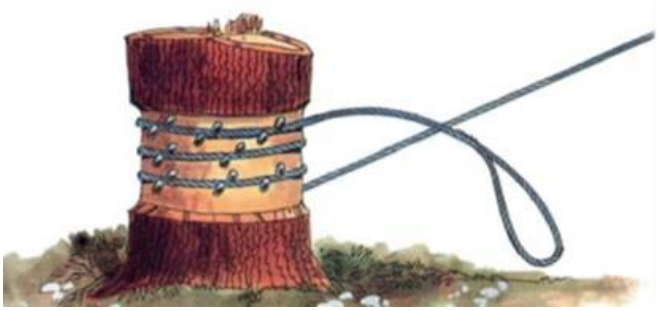
A side bind is a bend in the line under tension, commonly caused by obstructions from saplings, stumps, or roots. A side bind in any line is extremely dangerous. When stringing the lines, make as straight a line as possible from the yarder to the stump, and go over the top of all debris. When tensioning the lines, be alert for hang-ups and correct immediately. Never assume a strawline is free of side binds. The bight of the line in a side bind is a direct hazard, but a side bind can also throw material considerable distances. When the line gets passed underneath a log as the line is strung out, it can throw the whole log when the line is tightened.

Backspar guylines

When a backspar is required, guylines must be used. Proper rigging practices for guylines also apply to backspars. A come-along may be used to tighten a backspar guyline; use a minimum of three spikes to secure the last wrap.

A guyline secured to a stump must be wrapped at least 2½ times. The top wrap must be secured with three spikes. The number and position of spikes should be adequate to ensure that the guyline will handle the imposed stresses.

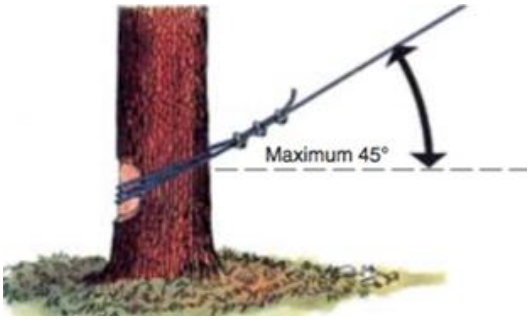
Railway spikes should only be used with large lines and large stumps.



Home spar spiked guyline

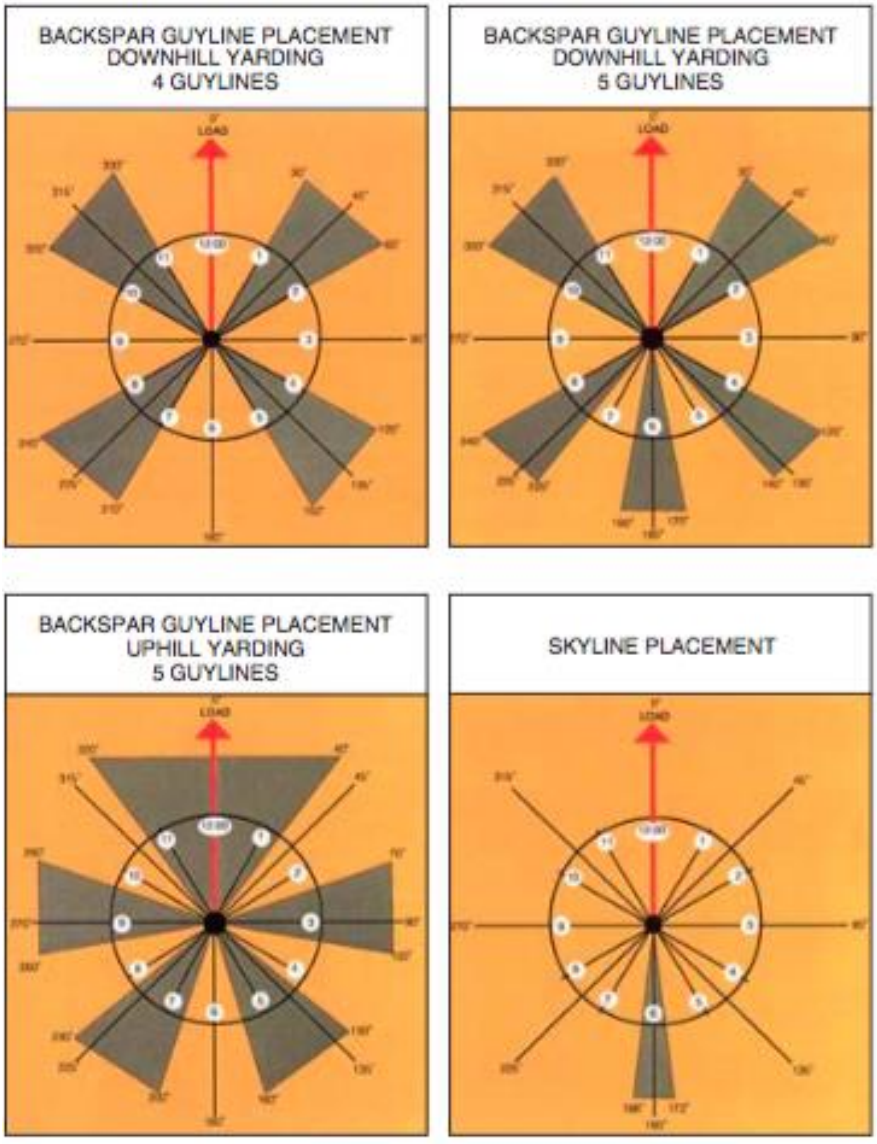
Remember this rule of thumb: 2.5 cm (1 in.) of slack in the guyline on the stump gives 30 cm (1 ft.) of slack in the belly of the guyline.

Cable clips are acceptable for securing lines. The line must have at least one full wrap on the stump. Ensure that the required number of clips are properly installed and torqued.



Backspar with cable clips

Acceptable guyline and skyline placement patterns



Now try the quiz on the next page.

Run Guylines—Self-Quiz

1. When attaching guyline and chain together, the chain must be wrapped in the same direction as the pull.

   ☐ True

   ☐ False

2. What should be used to attach the guylines to the anchors?

   ☐ A light strap

   ☐ A chain

   ☐ A shackle

   ☐ A pin

3. What should we never do with our hand when stringing strawline?

   ☐ Put it in the middle of a loop

   ☐ Put it directly on the strawline

   ☐ Put it on strawline while under tension

   ☐ Lift it up

4. What is the minimum number of spikes that must be used to attach the last wrap of a backspar guyline?

   ☐ Two

   ☐ Three

   ☐ Five

   ☐ Seven

Now check your answers on the next page.

Run Guylines—Quiz Answers

1. When you attach guy line and chain together, the chain must be wrapped in the same direction as the pull.

   Answer: **False**

2. What should be used to attach the guylines to the anchors?

   Answer: **A shackle**

3. What should we never do with our hand when stringing strawline?

   Answer: **Put it in the middle of a loop**

4. What is the minimum number of spikes that must be used to attach the last wrap of a backspar guyline?

   Answer: **Three**