Unit	1025
Title	Apply Landing/Utility Person Skills
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 of:

- How to prepare for work
- Communication in the workplace
- Safety responsibilities of a landing or utility person
- Job responsibilities of a landing or utility person

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
- 1013 – Describe Rigging Components and Apply Basic Rigging Practices

Does this unit apply to you?

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

- Landing or utility person

Section 1025-01: Prepare for Work

What you need to know about this section

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

1.1 Arrive at work prepared, on time, with all personal protective equipment (PPE) required and in working order

1.2 Pre-work meetings

1.3 Safe zone and hazard zones relevant to the block

1.4 Hazards and safe methods of walking in the bush

Key Point 1.1: Arrive at Work Prepared, on Time, with All PPE Required and in Working Order

An important part of being prepared for work is arriving well rested and not impaired by fatigue, illness, drugs, or alcohol or by stress or emotional upset. Logging often requires waking up early to travel to the worksite and long days with physically demanding work. Being physically and mentally fit is necessary to be productive and safe on the job.

Before commencing work in proximity to other departments, a pre-work plan must be conducted by the hook tender or his supervisor with all crews to identify the potential hazards and discuss the work plan.

Personal protective equipment

Workers must wear the following personal protective equipment and clothing:

- Suitable clothing for protection against the natural elements and the hazards of the work
- Clothing that fits fairly close to the body and allows the worker to move freely
- High-visibility ANSI/CSA approved hardhat in red or orange for all yarding and loading crews
- High-visibility apparel for all workers
- Caulk-soled boots for all workers required to walk logs
- Hand protection
- Leg protective devices of a standard acceptable to WorkSafeBC for workers operating a power chain saw
- Eye protection, when there is a hazard of eye injury for workers cutting cable, operating a chain saw, or moving through heavy brush
- Hearing protection for workers exposed to noise levels in excess of permissible limits

High visibility clothing

The Occupational Health & Safety Regulation (OHSR) contains the following specific requirements for high visibility clothing for loggers that are applicable to a chokerperson:

1. Highly visible outer clothing that meets the requirements of Part 8 must be worn by a worker in a forestry operation if:

- The worker may be endangered by any moving equipment or line
- The worker's location must be routinely checked, or
- The worker is involved in harvesting trees at night

2. Safety headgear worn by a worker in a forestry operation must be a high visibility colour that contrasts with the background against which the worker is working.

Now try the self-quiz on the next page.

Arrive at Work Prepared, On Time, with All PPE Required and in Working Order—Self-Quiz

3. What colors are acceptable for high-visibility headgear?

   - ☐ Yellow or orange
   - ☐ Orange or red
   - ☐ Red or yellow

4. PPE includes which of these additional items:

   - ☐ High-visibility apparel
   - ☐ Hand protection
   - ☐ Caulk-soled boots
   - ☐ All of these choices

5. If you are operating a chainsaw, what else do you need?

   - ☐ Leg protection
   - ☐ Eye protection
   - ☐ Ear protection
   - ☐ All of these choices

Now check your answers on the next page.

Arrive at Work Prepared, On Time, with All PPE Required and in Working Order—Quiz Answers

1. What colors are acceptable for high-visibility headgear?
   Answer: **Orange** or **red**
2. PPE includes which of these additional items:
   Answer: **All of these choices**
3. If you are operating a chainsaw, what else do you need?
   Answer: **All of these choices**

Key Point 1.2: Pre-work Meetings

The Occupational Health and Safety Regulations (OHSR) contain requirements for pre-work meetings.

It defines “new work location” as a work location or block in a forestry operation where the crew of workers has not previously worked.

Before a crew of workers starts work in a new work location, a crew safety meeting must be held by the hook tender or his supervisor to inform the workers of any known or reasonably foreseeable risks in that location and the actions to be taken to eliminate or minimize those risks.

If a worker did not attend the crew safety meeting under subsection (2) of the regulation for a new work location, before starting work in that location, the worker must receive a safety orientation that covers any known or reasonably foreseeable risks in that location and the actions taken to eliminate or minimize those risks.

Records must be kept of the crew safety meetings and safety orientations provided under subsections (2) and (3).

The pre-work meeting can be part of a Workplace Safety Plan. A sample of this document appears on the following pages. Read through each of the forms included in the the plan so that you are familiar with the content.

The supervisor files the Workplace Safety Plan with the company doing the work, and keeps a copy on site.

It is paramount that everyone attending the meeting sign the document, so that a record of the meeting is kept on file with those signatures.

See the Work Safety Plan template in the resources section of this unit.

1025 - Apply Landing/Utilityperson Skills

What you will learn in this unit

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

- How to prepare for work
- Communication in the workplace
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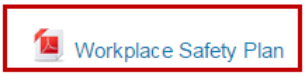
This unit applies to you if you are in the following occupation:

- Landing or utility person



Now complete the self-quiz on the next page.

Pre-work Meetings—Self-Quiz

1. For a new work location, crews must attend a pre-work crew safety meeting before any work begins.

   ☐ True

   ☐ False

2. The purpose of the meeting is to inform the crew of:

   ☐ Known risks

   ☐ Foreseeable risks

   ☐ Action to be taken to minimize or eliminate those risks

   ☐ All of these choices

3. If a worker was absent for that meeting, does he need a safety orientation before he starts work at that new work location?

   ☐ No

   ☐ Yes

4. Do we need to keep records of crew safety meetings and safety orientations?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Pre-work Meetings—Quiz Answers

1. For a new work location, crews must attend a pre-work crew safety meeting before any work begins.

   Answer: **True**

2. The purpose of the meeting is to inform the crew of:

   Answer: **All of these choices**

3. If a worker was absent for that meeting, does he need a safety orientation before he starts work at that new work location?

   Answer: **Yes**

4. Do we need to keep records of crew safety meetings and safety orientations?

   Answer: **Yes**

Key Point 1.3: Safe Zone and Hazard Zones Relevant to the Block

Hazard area of logging equipment

A hazard area created by the operation of logging equipment must be identified.

Every hazard area identified under Part 8, subsection (1) of the OHSR must be communicated to all workers in close proximity to the operating logging equipment and to the hazard area.

A worker must not enter into or proceed on foot through a hazard area referred to in subsection (1) unless the equipment operator first gives permission to the worker in a clear and unmistakable manner.

Designated safe work area

A safe work area must be designated for workers on foot in close proximity to any operating logging equipment.

The boundaries of a safe work area designated under subsection (1) must be communicated to all workers within and in close proximity to the safe work area.

No equipment may enter into or proceed through a safe work area unless:

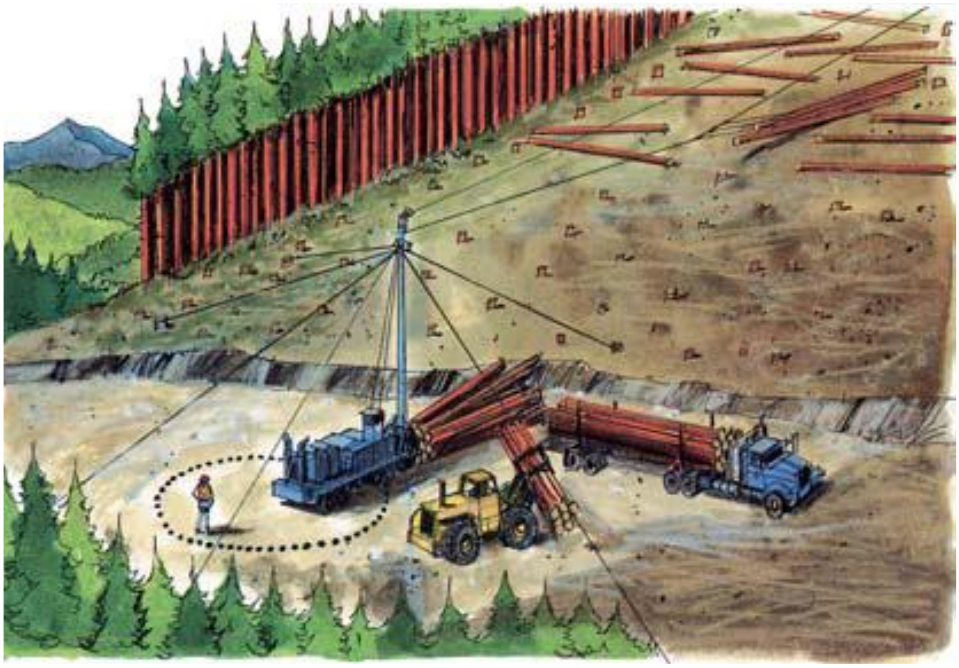
- The equipment operator first obtains permission in a clear and unmistakable manner from all of the workers in that safe work area or from the supervisor of those workers
- Those workers take a safe position

At the same time, permission is also required for workers leaving their designated safe zones. Get permission from the operators and maintain eye contact.

Landing safe area (In the clear)

Remember these points when working in a landing:

- Do not stand underneath or close by the mainline during yarding
- Stand clear of the incoming turn. Remember, logs could jill-poke, upend, or strike logs already in the landing
- Do not stand beneath the guylines opposing the pull of the turn. The guyline could break or the stump may slab or pull
- Do not stand in the bight formed by the running yarding lines
- All landing workers must use designated safe positions, outside the work circle and visible to the machine operators



In the clear

Now try the quiz on the next page.

Safe Zone and Hazard Zones Relevant to the Block—Self-Quiz

1. Every hazard area identified must be communicated to all workers:

   ☐ In close range of logging equipment

   ☐ In close range of hazard area

   ☐ All of the above

2. To enter a hazard area, a worker must have permission from the equipment operator.

   ☐ True

   ☐ False

3. Boundaries of a safe work area must be communicated to workers:

   ☐ Within the safe work area

   ☐ In close proximity to safe work area

   ☐ All of the above

4. When working in a landing, can you stand underneath or close by the mainline during yarding?

   ☐ Yes

   ☐ No

5. Can you stand beneath the guylines opposing the pull of the turn?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Safe Zone and Hazard Zones Relevant to the Block—Quiz Answers

1. Every hazard area identified must be communicated to all workers:

   Answer: **All of the above**

2. To enter a hazard area, a worker must have permission from the equipment operator.

   Answer: **True**

3. Boundaries of a safe work area must be communicated to workers:

   Answer: **All of the above**

4. When working in a landing, can you stand underneath or close by the mainline during yarding?

   Answer: **No**

5. Can you stand beneath the guylines opposing the pull of the turn?

   Answer: **No**

Key Point 1.4: Hazards and Safe Methods of Walking in the Bush

Slips, trips & falls injury prevention

Ultimately, your company should strive to reduce all injury types. But when it comes to creating sustainable change and reducing injuries across the operations, it can help to start small and specific with the change and expand the effort as you see progress.

You may find the first aid records for your crew show multiple sprains happening from jumping off a slash pile, a few bruises and cuts from falling down and a tweaked knee from tripping over gear left on the landing. It is up to management to decide where to start in tackling slips, trips, and fall injuries. It may be decided that reducing or eliminating the multiple lost time incidents around the sprains represent the best value for your effort or it might make the most sense to focus on reducing or eliminating the more “expensive” (in terms of claims costs, downtime and worker injury) incident of tripping.

Starting small and demonstrating improvements to yourself and your team helps to build momentum in making further changes.

Additional resources

Below are links to additional resources:

- Injury Prevention Resource Order Form
- Slips, Trips & Falls Injury Prevention Resource Package
- Slips, Trips & Falls Injury Prevention Webinar - Recording

Before going to the field:

- Strive to keep active and stay healthy when away from work
- Stretch and loosen up when you arrive at work before you start the day
- Ensure you have adequate clothing, footwear, and appropriate PPE for the tasks you will be performing and the weather outside
- Ensure you have an adequate food and water supply for the day
- Always make sure that you follow the applicable check-in procedures

When you get to the worksite:

- Ensure you know the designated muster point in the area where you are working

- Be aware of potential eye hazards at all times when walking through the timber
- When walking with co-workers maintain approximately three meters distance between each other
- Avoid jumping off of obstacles
- Be careful around blowdown trees. They may be under tension and unstable in their current position
- When walking on logs watch your footing as logs may roll, be rotten or have loose bark
- Be cautious with your footing when walking or climbing on bare rock
- Always be aware of your surroundings and the potential for wild animal encounters
- Do not sit or walk below fresh cut slopes as banks or rocks may come loose
- On rainy or snowy days, be aware of slippery ground
- In icy conditions, avoid walking on felled logs and in windfall areas
- Be aware that caulk boots are very slippery on smooth, hard surfaces such as rock and steel
- Be aware of loose bark which can stick on your caulks and be slippery. It's worse in the spring when the sap is running and particularly bad on logs that have been run through a processor head

Working in areas with unstable slopes:

- Look for hazards prior to walking in an area with potentially unstable slopes
- Be on the alert for unstable debris, rocks, and logs that may become dislodged
- Be on the alert for unstable ground that may have been impacted by equipment
- Be aware of where you step; if you are unsure find an alternate route
- Be aware of fellow co-workers working downhill from you
- Avoid working in areas at risk of a large landslide (such as steep slopes with
- large, fresh earth cracks or recent landslides/slumps) and report the area to your supervisor

Working on steep slopes:

- Try to maintain three points of contact with the ground when moving across steep slopes
- Where possible keep 1 hand free to grab onto secure objects
- Do not work above or below another worker
- Avoid going below slash accumulations and boulders that may become dislodged
- Move slowly across the hillside if possible. Never jump off of obstacles
- If traction is poor (such as wet, frosty etc.) work on an alternative site if possible
- Avoid walking on slash, boulders, and talus

Walking on down trees at height:

- Employees are to avoid this practice
- Use an alternate route that allows you to stay on the ground

Walking along rock bluffs or excavations:

- Stay back at least 2 meters from the edge or drop-off
- Never take steps or walk backwards towards the edge
- Avoid slippery or unstable surfaces adjacent to the edge

Walking across streams:

- Assess the stream for hazards before crossing. Do not cross if you are unsure or you feel the crossing is unsafe
- Be aware of changing weather conditions as the water may rise during the day. Make sure you are going to be able to return at the end of the day

Now try the self-quiz on the next page.

Hazards and Safe Methods of Walking in the Bush—Self-Quiz

1. When walking with co-workers, how far should you maintain between each other?

   ☐ 2 meters

   ☐ 3 meters

   ☐ 4 meters

2. Can you sit or walk below fresh cut slopes?

   ☐ Yes

   ☐ No

3. When working on steep slopes, try to maintain 3 points of contact with the ground.

   ☐ True

   ☐ False

4. Employees should avoid the practice of walking on down trees at height.

   ☐ True

   ☐ False

5. When walking along rock bluffs or excavations, how many meters at least should you stay back from the edge or drop-off?

   ☐ 1 meter

   ☐ 2 meters

   ☐ 3 meters

6. When crossing streams, do you need to consider water rise over the course of your absence before your return trip?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Hazards and Safe Methods of Walking in the Bush—Quiz Answers

1. When walking with co-workers, how far should you maintain between each other?

   Answer: **3 meters**

2. Can you sit or walk below fresh cut slopes?

   Answer: **No**

3. When working on steep slopes, try to maintain 3 points of contact with the ground.

   Answer: **True**

4. Employees should avoid the practice of walking on down trees at height.

   Answer: **True**

5. When walking along rock bluffs or excavations, how many meters at least should you stay back from the edge or drop-off?

   Answer: **2 meters**

6. When crossing streams, do you need to consider water rise over the course of your absence before your return trip?

   Answer: **Yes**

Section 1025-02: Communication

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:

2.1 Use signals required for the job

2.2 Communicate hazards back to hook tender or other crew member

Key Point 2.1: Use Signals Required for the Job

You need to be able to demonstrate ability to use signals required for the job.

Logging signals

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

Very high frequency (VHF)

Very high frequency (VHF) radio whistle signaling devices 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)

Ultra-high frequency (UHF) voice radio is another means of communicating line movement. 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 the worker cannot hear the command, 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

VHF radio whistles and UHF skyline yarder radio equipment

To ensure that radio equipment used to replace hand signals provides reliable, non-ambiguous, uninterrupted signals, the radio equipment must meet the current WorkSafeBC requirements.

Each radio frequency used by yarding operations must be registered with and coordinated by WorkSafeBC's Radio Frequency Coordinator. This is to ensure that the overlapping of radio frequencies doesn't occur with yarding operations. Overlapping of signals can lead to miscommunication and crews receiving signals from the nearby operation.

WorkSafeBC officers inspecting workplaces where cable yarders are used will ensure the following:

1. All necessary documentation is available at the workplace, either in an office located on the workplace or in the cable yarder, including:

    - Industry Canada radio license for the current year. Licenses expire on April 1 of each year.

    If this documentation is not available or is out of date, the officer will issue an order requiring the frequency to be licensed and coordinated. Transmitters must be removed from service until they are licensed and coordinated.

2. Radio signaling devices, either hand-held transmitters or equipment-mounted radios used in logging operations, must be clearly marked with the following:

    - Name of the manufacturer
    - Serial number
    - Assigned operating frequency
    - Specified tone frequency

3. 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
    - Permanently enabled tone-encoded squelch

Note: There must only be 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.

Interference on radio frequencies

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

Standard audible signals

The audible whistle signals listed below are currently in use in B.C. In addition, carriage operators often use verbal signals with large machines.

Verbal signals are derived from the following whistle signals:

Audible high-lead 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	— • • • •

*“Ahead” means haulage line moves toward machine

Audible high-lead signals

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.

Audible slackline signals

Refer to the standard high-lead whistle signals for most line control signals. The following are additional whistle signals to be used for slackline operations.

Operational signals		
Stop outhaul and slack skyline	1 short	•
Pick up the skyline	1 short, 2 short	• • •
Slack the skyline	5 short	• • • • •
Pick up skyline on inhaul to clear obstruction	2 short	• •
Pick up skidding line after obstruction is cleared	3 short	• • •
Slack the skidding line	3 short, several short	• • • • • • • •
Carriage on outhaul		
“Slack skidding line” signal given as “skyline is slacked” means “slack both lines at the same time.”		
Hold skidding line tight, keep coming back until stop signal is given	3 short	• • •
Hold skidding line tight, slack skyline, keep coming	2 short	• •
Slack skyline faster	2 short	• •

When carriage is at head tower		
Send strawline out in choker bell for a dead line	3 short, 1 short, 2 short, 2 short	• • • • • • • • •
Send out that many coils	3 short, 1 short, 1 short for each coil needed	• • • • • • • •
Calling second rigger	2 long, 1 short	— — •

Skyline carriage signals

All standard high-lead and slackline whistle signals apply to carriages.

Gravity/shotgun carriage		
Standard slackline whistle signals will apply.		
Dropline/accumulator carriage		
Ahead* on carriage skidding line	3 short	• • •
Slack the carriage skidding line	3 short, several short	• • • • • • • • •
Mechanical slack-puller		
Ahead* on slack puller	1 long, 1 short	— •
Ahead* on dropline	2 short	• •
When the haulback is used as a running skyline, standard high-lead signals apply.		
Radio-controlled motorized self-contained yarding carriage		
• This system is similar to the “radio-controlled motor-driven slack-puller, skyline lock” carriage, but does not have a skyline lock. • Any signal preceded by a long signal is a “slow” signal.		
Slack the dropline	3 short, several short	• • • • • • • •
Stop the dropline	1 short	•
Ahead* on dropline	3 short	• • •
If fitted with engine controls:		
Stop engine	1 short, 1 long	• —
Start engine	2 short	• •

*“Ahead” means haulage line moves toward machine

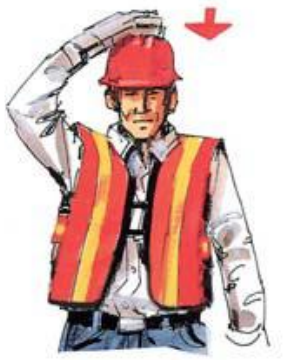
Radio-controlled motor-driven slack-puller, skyline lock		
• These carriages are fitted with and controlled by an on-board computerized radio control system • This radio system is operated independently through a transmitter separate from that of the yarder • The yarding and carriage frequencies must be separate, registered, and coordinated through the WorkSafeBC coordination system to ensure that one does not interfere with the other or with another operation. Contact the WorkSafeBC Engineering Department for more information • An audible signal must be sounded at the carriage and not at the yarder. This signal must have a tone different from that of the yarder signal • Carriages with variable dropline speeds must have a special signal for the speed changes. These signals must be different from standard yarding signals		
Lock/unlock skyline clamp	2 short	• •
Slack the dropline	5 short	• • • • •
Stop dropline	1 short	•
Ahead* on the carriage skidding line	3 short	• • •
If fitted with engine controls:		
Stop engine	1 short, 1 long	• —
Start engine	1 long, 1 short	— •
Loading the skyline yarder signal		
This signal is to be used for alerting the landing workers that the skyline is about to be loaded.		
Skyline being loaded	2 short	• •

*“Ahead” means haulage line moves toward machine

Hand Signals

Cable down

Touch the top of head



Cable up

Raise hand up and down

Ahead on the dropline

Cross arms in front

Mainline ahead slow

Raise both arms

Slack the haulback

Hands in front of body using chopping motion

Slack strawline

Pat back of hand with other hand

Hold dog drum or brake lever

Clasp one hand with the other

Tightline

Place hands over head with fingertips touching

Mainline ahead normal

Raise one arm

Mainline ahead

Raise one arm with hand fluttering

Slack mainline all off

Extend arm at side with wrist flipping

Slack the mainline easy

Extend both hands with hands fluttering

Ahead on strawline

Touch hand to bent elbow

Now try the self-quiz on the next page.

Use Signals Required for the Job—Self-Quiz

1. Match the command to the correct operational signal.

☐ Stop any movement	☐ 3 short, 1 short, • • • •
☐ Slack the haulback	☐ 2 short, 2 short, 2 short, 1 short, • • • • • • • •
☐ Ahead* on Strawline	☐ 1 short, •
☐ Pick up the guyline	☐ 1 long, several short, repeated, — • • • •
☐ Fire	☐ 2 short, several short, • • • • • •

2. Match the command when butt rigging is at the landing with the correct signal.

☐ Chokers required	☐ 3 long, several short, — — — • • • •
☐ Calling foreman	☐ 1 long, 1 short, — •
☐ Calling hooktender and crew	☐ 2 short and 1 short or long for each choker required, • • • • •
☐ Calling for block and strap	☐ 4 long, — — — —

3. For slackline signals, to pick up the skyline, choose the correct signal:

   ☐ 1 short, 1 long

   ☐ 1 short, 2 short

   ☐ 1 long, 1 short

4. For skyline carriage signals, slack the carriage skidding line is represented by:

   ☐ 3 short, several short

   ☐ 2 short, several short

   ☐ 1 short, several short

5. Which hand signal does the diagram below represent?

- ☐ Cable down
- ☐ Cable up
- ☐ Mainline ahead slow

6. Which hand signal does the diagram below represent?

- ☐ Ahead on the dropline
- ☐ Slack the haulback
- ☐ Slack strawline

7. Which hand signal does the diagram below represent?

- ☐ Tightline
- ☐ Slack mainline easy
- ☐ Ahead on strawline

Now check your answers on the next page.

Use Signals Required for the Job—Quiz Answers

1. Match the command on the left to the correct operational signal on the right.

Stop any movement	1 short, •
Slack the haulback	2 short, several short, •• ••••
Ahead* on Strawline	3 short, 1 short, ••• •
Pick up the guyline	2 short, 2 short, 2 short, 1 short, •• •• •• •
Fire	1 long, several short, repeated, — ••••

2. Match the commands when butt rigging is at the landing with the correct signal on the right.

Chokers required	2 short and 1 short or long for each choker required, •• •••
Calling foreman	4 long, — — — —
Calling hooktender and crew	3 long, several short, — — — ••••
Calling for block and strap	1 long, 1 short, — •

3. For slackline signals, to pick up the skyline, choose the correct signal:

   Answer: **1 short, 2 short**

4. For skyline carriage signals, slack the carriage skidding line is represented by:

   Answer: **3 short, several short**

5. Which hand signal does the diagram below represent?

Answer: **Cable up**

6. Which hand signal does the diagram below represent?

Answer: **Slack strawline**

7. Which hand signal does the diagram below represent?

Answer: **Slack mainline easy**

Key Point 2.2: Communicate Hazards Back to Hook Tender or Other Crew Member

Communication

Communication between the rigging crew and the machine operator is essential to ensure the operating plan is known and agreed upon. Communication of potential hazards at the worksite is the responsibility of all workers.

Remember the following important points:

- When spotting or setting chokers in blind locations which are out of the operator's vision, the operator must confirm the rigging crew is in a safe location and "In the Clear" before moving anything
- Rigging crew members must make sure they are "In the Clear" and notify the operator to immediately stop if there is any doubt of their safe location
- The machine operator must never assume the rigging crew is in a safe location. The machine operator must have radio or visual confirmation, or both

Methods of communicating

The chaser or landing or utility person has to understand as well as be able to give signals to the crew. They can communicate hazards back to the hook tender and yarder operator, or other crew member in one of the following ways:

- In person – if available
- During pre-work meetings – to inform crew members of known hazards or new ones that have occurred since the last meeting
- During breaks – either coffee or lunch breaks, or during the drive to the block
- Radio communication – probably the most accessible and convenient
- Whistle signals – to communicate hazards right away

Now complete the quiz on the next page.

Communicate Hazards Back to Hook Tender or Other Crew Member—Self-Quiz

1. If rigging crew members are in any doubt of their safe location, what must they notify the operator?

   ☐ Go slow

   ☐ Stop

2. What are some of the ways the landing/ utility person can communicate back to the hook tender?

   ☐ Radio communication

   ☐ During breaks

   ☐ Whistle signals

   ☐ All of the above

Now check your answers on the next page.

Communicate Hazards Back to Hook Tender or Other Crew Member—Quiz Answers

1. If rigging crew members are in any doubt of their safe location, what must they notify the operator?

   Answer: **Stop**

2. What are some of the ways the landing/ utility person can communicate back to the hook tender?

   Answer: **All of the above**

Key Point 2.3: Communicate with Hook Tender and Yarder Operator in Accordance with Job Requirements

Working around the landing

When working around the landing, watch for these points specific to your job requirements in case you need to communicate with the hood tender or yarder operator:

- Be prepared to assist the yarder operator in landing turns if his vision is obstructed by the pipe
- Watch guyline stumps during heavy pulls
- Have engineers knock piles down if possible
- Notify operator of out-of-the-ordinary moves
- Know call signals, general signals, and hand signals
- Watch turns coming in, stand clear and wait until turn is landed and rigging slacked; watch for flying chokers
- Face work area or action area at all times; never turn your back
- Be sure logs are stable before going in to unhook them
- Unhook turn from uphill side and bottom logs first, as applicable
- Trim all limbs and broken ends. Watch for splinters
- Never assume loader operator can see you or knows where you are
- Replace or upend badly kinked and jagged chokers
- Use all required PPE when using power saw
- Use soft hammer on wire axe
- Use spooling tool to spool lines
- Watch for equipment moving, especially logging trucks backing into landing or front-end log loaders. Always be in the clear
- Keep clear when the trailer is being unloaded
- Keep legs and feet from beneath trailer reach. Use handles on reach
- Keep hands clear of trailer hookup to avoid injury to hands
- Ensure bunks are straight before loading starts
- Use care when standing on metal decks. Never ride on a moving machine, including fenders or running boards of log trucks
- Watch for loads built too high. Signal driver when load is finished
- Direct all traffic through the landing

- Make eye contact with loader operator and receive permission before you go around or onto the loader
- Notify loading operator when counterweight clearance is less than 2 feet
- Be aware of the blind spot behind front-end loader
- Do not use gas to light fires
- Practice good housekeeping and stow all tools correctly

Now complete the quiz on the next page.

Communicate with Hook Tender and Operator(S) in Accordance with Job Requirements—Self-Quiz

1. Can you assume that the loader operator can see you or knows where you are?

   ☐ Yes

   ☐ No

2. How should you communicate with the loader operator to receive permission before you go around or onto the loader?

   ☐ Hand signal

   ☐ Eye contact

3. Notify loading operator when counterweight clearance is how much?

   ☐ Less than 3 feet

   ☐ Less than 2 feet

4. Who is responsible for directing traffic through the landing?

   ☐ Rigging slinger

   ☐ Landing/ Utility person

   ☐ Hook tender

5. Who should you notify to knock piles down?

   ☐ Chokerperson

   ☐ Hook tender

   ☐ Engineer

Now check your answers on the next page.

Communicate with Hook Tender and Operator(S) in Accordance with Job Requirements—Quiz Answers

1. Can you assume that the loader operator can see you or knows where you are?

   Answer: **No**

2. How should you communicate with the loader operator to receive permission before you go around or onto the loader?

   Answer: **Eye contact**

3. Notify loading operator when counterweight clearance is how much?

   Answer: **Less than 2 feet**

4. Who is responsible for directing traffic through the landing?

   Answer: **Landing/ Utility person**

5. Who should you notify to knock piles down?

   Answer: **Engineer**

Section 1025-03: Safety Responsibilities of a Landing or Utility Person

What you will learn in this section

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

3.1 Constantly look for hazards within work area

3.2 Controls within the work zone

3.3 Use proper ergonomics required to do the job safely

3.4 Reporting procedures for all accidents or serious near misses

Key Point 3.1: Constantly Look for Hazards within Work Area

The following are some of the hazards within the work area that you need to be constantly on the lookout for:

- Danger trees
- Downhill yarding
- Raising, lowering, moving the tower
- Breaking lines
- Missing guards
- Spooling lines
- Working with strawline
- Carriage movement
- Hand signals
- Unhooking the turn
- Bucking logs
- Run over by vehicle or machine
- Trips and falls
- Lifting heavy objects
- Cutting line
- Gasoline near fire

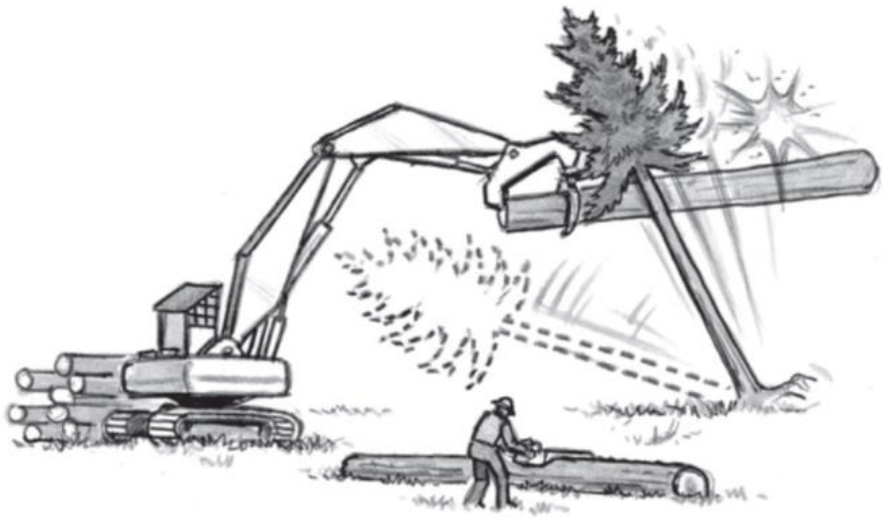
Hazard 1: Danger trees

Danger trees within reach of the landing must be felled before yarding begins if they pose a hazard. Stay alert during operations to be sure no other trees or saplings have become a danger.

The chaser is in the most danger of being struck by saplings pulled over into the landing by the moving turn or swinging logs in the grapple of the log loader. The tops of trees can break off and fly in any direction.

Precautions

- Report potential hazards to a qualified person who can evaluate danger trees and snags
- The chaser and hooktender must stay alert for danger trees and have them removed before work continues, or work must be arranged to minimize danger



Remove danger trees near the landing before work begins

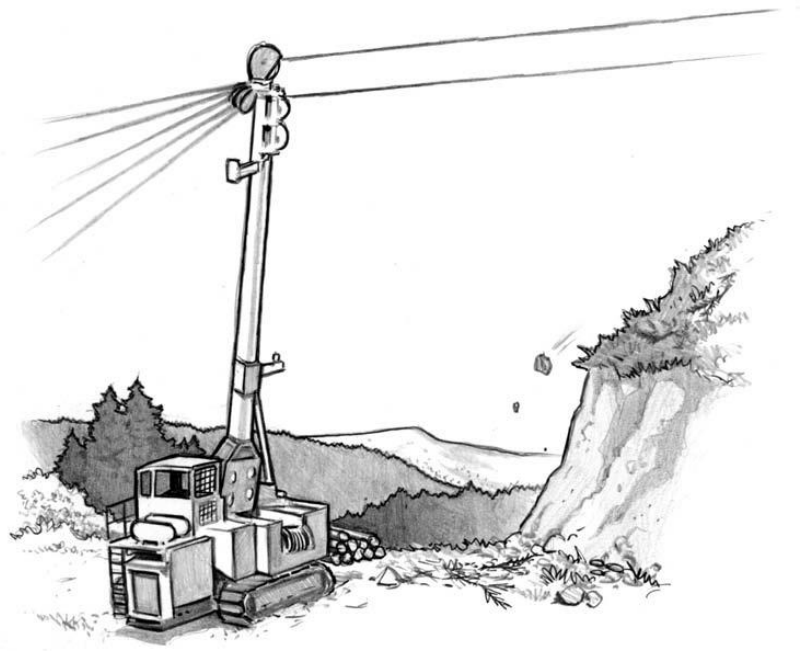
Hazard 2: Downhill yarding

In downhill yarding setups, yarding is not allowed if the yarder engineer is endangered by sliding objects. Straight downhill yarding on steep slopes is particularly dangerous. Typically, a larger landing area is needed to increase the amount of space in the clear. Logs can come to the landing out of control at times.

Plan in advance how to work on steep slopes and take measures to minimize the risk of logs or other debris rolling into machinery or ground personnel. The machine operator and a competent person must agree how to safely operate, considering experience of the operator, machine limits, soil conditions, corridor directions, hazards of moving machinery, weather, load size, and any other adverse conditions.

Precautions

- Keep the chaser, loader, and processor clear when rigging is moving
- Take care that logs or other materials are not pushed or thrown down the slope when the landing crew is below
- In downhill yarding, beware of roots or chunks caught on the yarding lines, which can be thrown toward the landing when the turn is tightlined. Immediately signal to slack the yarding lines and remove the hazard before landing the turn
- Slow the turn before it approaches the landing and be sure the haulback is adequately snubbed to control it



In downhill yarding setups, minimize the risk of logs or other debris from rolling into machinery or landing personnel

Hazard 3: Raising, lowering, moving the tower

When the yarder needs to be moved to a new position on the landing, the tower must generally be lowered first. The tower may be raised for mobility if adequately supported and the stability of the machine is not impaired. Be careful on rough ground to avoid damage to the tower from flexing in the carrier saddle.

Moving the tower and raising it again on new guylines can be a hazardous moment. Ensure workers are aware of the danger and alert to potential failure.

Precautions

- Only a qualified person may undertake moving the yarder, and only an authorized yarder engineer may operate the controls
- Stay clear of side binds and bights. Pay close attention to strawline to avoid side binds or bights
- Tow or snub yarders on adverse grades to control movement. Many older yarders may not have adequate brakes. Stay clear of lines and machinery in towing or snubbing operations
- Do not walk directly behind the yarder when it is being moved up a grade
- Always use a spotter during yarder movement
- When raising or lowering the tower, stay clear where blocks or jacks could move. Use caution when working with strawline under tension

- Follow manufacturer's instructions when raising the tower in the new position. Follow safe practices when spooling the lines
- Know your escape route when working with machinery
- Use caution when spooling lines, especially when spooling the raising guys

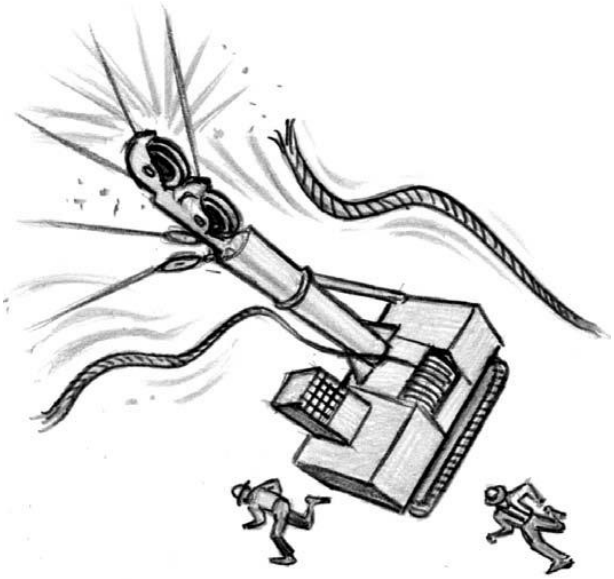
Hazard 4: Breaking lines

Wire rope most often fails because it is worn out or overloaded. Planning, equipment inspection, and safe operating procedures are the best way to prevent line failure.

Lines generally break in the leads where they twist through sheaves. Whenever a line breaks, movement is likely to occur around the landing.

Chasers must remain far enough in the clear to avoid being struck if lines do break and fall. Beware of thrown objects that may come with a broken line, such as parts of blocks or shackles and beware of the possibility the tower could collapse.

Chasers and ground personnel need to plan escape routes in advance to know immediately where to go if lines fail and come crashing down. Broken mainlines or skylines can recoil back over the top of the yarder into "safe zones" behind the yarder. When this happens, the only safe place is under the yarder.



CAUTION!

Be prepared!

Always know your escape route!

Hazard 5: Missing guards

The cab of the yarder must protect the operator from broken lines, chunks, and logs. Shear or deflector guarding must be installed in front and the sides of each cab to deflect whipping saplings and branches without compromising visibility. Every fully enclosed cab must have a second, alternate means of escape without tools.

Most cabs must provide structural protection and restraint for the operator, including ROPS, FOPS, reinforced cabs, or overhead guards. Operators of stationary yarders are not required to use the operator restraint system or wear a hardhat while working in the cab.

Guarding is particularly important during and following maintenance. Do not run the machine during maintenance with guards removed, unless necessary for a particular procedure. Completely shut down and lock out energy during maintenance.

Unless otherwise stated by the manufacturer, never start a machine from outside the operator's cab – something commonly but wrongly done during maintenance, which puts the operator at risk outside the guarded space of the cab. Sudden movement of a parked machine or vehicle can be fatal. Start and operate machines only from the operator's seat.

Machines must not be operated until all guards are reinstalled, safety devices reactivated, and maintenance equipment removed after adjustments or repairs are made. Without guards in place, the operator or others may be caught in gears, or belt and chain drives. These are almost always severe or fatal injuries.

Precautions

- Make sure all guards are adequate and meet manufacturer's specifications
- Report guard defects for repair
- Make sure the alternate escape route from the cab is functional

Hazard 6: Spooling lines

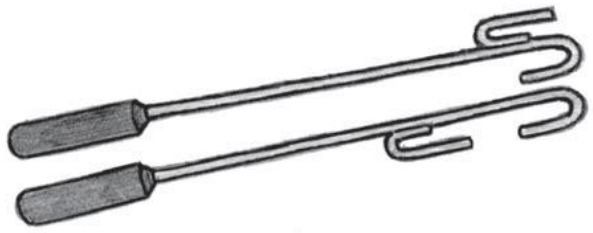
All lines need to be spooled at one time or another. Guylines and the skyline are the most common lines to need attention.

Use caution walking and working on metal yarder surfaces. Caulk boots are not safe, unless a nonslip material covers the walking surface. Stand securely with both feet on the platform, and do not rest a foot on or near the drum or any moving parts.

When a worker is spooling a line, there must be an operator at the controls ready to stop the drum immediately. Never put a drum in gear and spool it without someone else at the controls.

Assure all guards are in place to avoid contact with hazardous pinch or shear points. If it is necessary for a worker to stand near the drum to spool a line or perform machine maintenance, make sure hazardous energy is shut down and locked out to prevent unintentional activation of the drum.

Always use an appropriate tool. It is OK to touch a moving line provided it is moving slowly. Use a handover-hand motion. Do not allow a line to slide through gloved hands – a jagger can catch on the glove or hand.



Two examples of spooling tools

Hazard 7: Working with strawline

Strawline is most commonly used when stringing guylines and changing roads. Side binds are not as common or severe on the landing as in the brush, but the landing crew is also at risk. Pay close attention to line movement to indicate obstructions. Notify the hooktender immediately if a hazard emerges, and clear any hang-ups before continuing. The chaser needs to notify the hooktender or operator if any strawline needs to be replaced.

Precautions

- Use caution when unhooking a strawline from a larger line pulled back up to the landing. A twist can be pulled into the line and it may spin back violently when unhooked
- Keep fingers clear of the strawline eyes when releasing sections of wire
- Never grab the wire close to the sheaves. Remember that fingers can get pulled into the sheaves
- Always wear gloves, and watch out for jaggers
- Watch for loose strawline eyes when changing roads and fixing them

Hazard 8: Carriage movement

When working the landing, the yarder engineer must ensure the chaser is out of the bight of the line before any line is moved. A particular hazard exists when sending signals to a radio-controlled carriage. It is possible for the carriage to get the wrong signal or the operator to hit the wrong switch, and have the carriage react unexpectedly.

The chaser needs to stay alert to whistle signals that indicate a line is about to move. When removing or placing the carriage on the skyline, be sure the carriage is properly supported so it does not fall on workers.

Now try the quiz on the next page.

Constantly Look for Hazards within Work Area—Self-Quiz Part 1

1. Do you need to remove danger trees near the landing before work begins?

   ☐ Yes

   ☐ No

2. In downhill logging, ensure that logs or other materials are not pushed or thrown down the slope when the landing crew is below.

   ☐ True

   ☐ False

3. Workers need to plan escape routes in advance to know immediately where to go if the line breaks and things come crashing down.

   ☐ True

   ☐ False

4. Do you need shear or deflector guarding installed in front and the sides of each yarder's cab?

   ☐ Yes

   ☐ No

5. Is it OK to touch a moving line if it is moving slowly?

   ☐ Yes

   ☐ No

6. When working with strawline, is it OK to grab the wire close to the sheaves?

   ☐ Yes

   ☐ No

7. When removing or placing the carriage on the skyline, do you need to ensure that the carriage is properly supported?

- ☐ Yes
- ☐ No

Now check your answers on the next page.

Constantly Look for Hazards within Work Area—Quiz Answers Part 1

1. Do you need to remove danger trees near the landing before work begins?

   Answer: **Yes**

2. In downhill logging, ensure that logs or other materials are not pushed or thrown down the slope when the landing crew is below.

   Answer: **True**

3. Workers need to plan escape routes in advance to know immediately where to go if the line breaks and things come crashing down.

   Answer: **True**

4. Do you need shear or deflector guarding installed in front and the sides of each yarder's cab?

   Answer: **Yes**

5. Is it OK to touch a moving line if it is moving slowly?

   Answer: **Yes**

6. When working with strawline, is it OK to grab the wire close to the sheaves?

   Answer: **No**

7. When removing or placing the carriage on the skyline, do you need to ensure that the carriage is properly supported?

   Answer: **Yes**

Hazard 9: Hand signals

Chasers must understand and correctly use standard hand signals to avoid injury from unexpected machine movement. The chaser and machine operators must understand when and where hand signals will be used, with a set of mutually understood signals.

Ground personnel and machine operators must coordinate their activities to avoid dangerous situations. The chaser or other person on the ground must stay visible while machinery operates. Make distinct hand signals within a visible distance, but beyond reach of the machine. Be certain the operator understands the signal before moving.

Precautions

- Make sure the landing crew is adequately trained in hand signals before working together as a team
- Do not use signal methods that involve throwing sticks or other objects, unless no other way exists to get the operator's attention

Hazard 10: Unhooking the turn

Unhooking the turn requires good physical condition, quick reflexes, and rapid judgment of hazards in the situation. Chasers need to be fit and sharp.

Follow safe practices described earlier in this chapter. Stay alert for the kinds of hazards experienced by the rigging crew: avoid working from the lower side, avoid unstable logs, watch for counterbalance swing, avoid working directly under the rigging, and stay alert for unexpected hazards.

If any logs in the turn arrive on tagged chokers or a long dropline, stay clear of logs already on the landing that could be disrupted.

CAUTION!

Watch for long ends of logs, mis-choked logs, and logs or trees coming into the landing at odd angles.

The chaser needs to communicate to the machine operators any intentions to move out of the normal, clearly visible safe position on the landing. Always notify operators when approaching the turn, moving to buck logs, or any other activity.

Hazard 11: Bucking logs

At some operations, chasers must use a chainsaw continuously. Chasers must be trained in safe handling and use of a chainsaw and wear proper personal protective equipment, including leg, eye, and ear protection.

A particular area should be reserved on the landing where bucking can be performed safely. Stay in view of the machine operators on the landing and make sure they are aware of the work being performed.

Only buck logs that are stable and on the road.

Do not brand, buck, or trim logs in a location exposed to contact with moving lines, logs, rigging, machines, equipment, or vehicles.

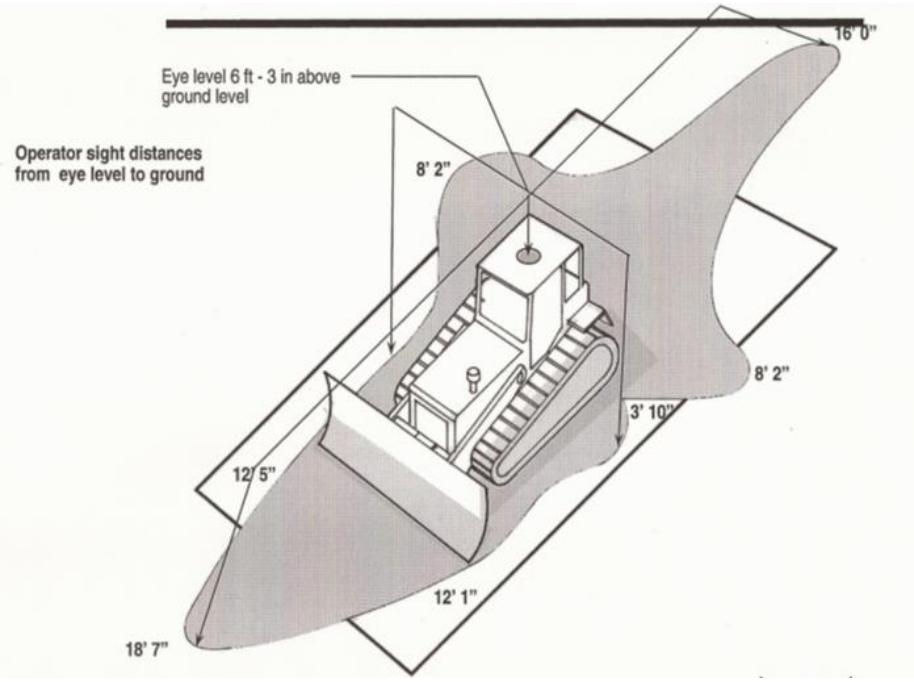
Bucking a log

Hazard 12: Run over by vehicle or machine

Many workers are seriously or fatally injured in work areas that combine vehicle and machine traffic and ground personnel. Instances include riding on a machine outside the cab, approaching or trying to mount a moving machine, and getting caught by a vehicle or machine backing up.

Parked vehicles can be a hazard as well. Many workers are injured while working around or under a stationary vehicle that suddenly moves.

Working machines can suddenly and unexpectedly move. Always consider the path of travel, swing radius, or blind spots of all machinery, even when stationary.



A bulldozer's blind spots

Precautions

- Avoid standing directly behind a machine or vehicle, or in any blind spot of particular machines. Never stand at the ends of tracks
- Avoid getting cornered against an object by a machine or vehicle. Keep an escape route
- Never ride a machine or vehicle outside the cab
- Never try to mount or dismount a moving machine
- Block wheels and make sure supports are secure before working underneath a machine or vehicle
- Never start a machine from outside the cab

Hazard 13: Trips and falls

Trips and falls are common, but often preventable. Wear caulked boots if work involves walking on logs. Note that caulked boots easily slip on metal surfaces. Step carefully mounting or dismounting machinery, especially in wet weather. Always pay attention to footing while walking or working. Avoid awkward positions in case quick movement is necessary.

The chaser and machine operators should coordinate to keep debris and waste materials clear of work areas. Store all equipment and tools not in use out of the way. Keep frequently used tools, such as power saws, in a specific place away from work paths.

Hazard 14: Lifting heavy objects

Train all workers how to safely lift heavy objects to avoid back injury. The chaser is most exposed to risk on the landing. Rely on machinery as much as possible to pick up heavy objects.

Correct posture for lifting a heavy load

Hazard 15: Cutting line

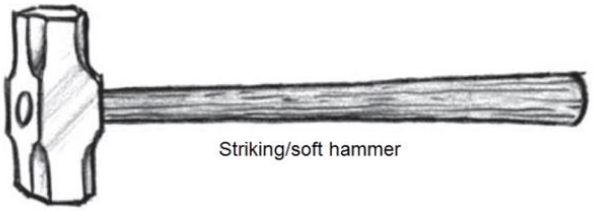
Use caution when cutting lines. Metal chips can be ejected from the line cutter. Make sure guards are in place on the line cutter. Everyone working around a line cutter must wear eye protection. Thrown chips are generally hot, which makes eye injuries more severe.

Precautions

- Always wear eye protection, and preferably with full face protection
- If using a cut-off saw, be aware of the sparks on dry ground or on nylon buckers pants
- When holding a line for another worker to cut, keep head down during the cut, with safety glasses and hardhat for protection
- Make sure all tools are in good condition and the hammer head is secure on the handle
- Use only a soft-headed hammer when cutting line
- Ensure a firm grip
- Use only acceptable wire cutters
- When starting a cut, place the cutting blade over the same point on the wire for every hammer blow to prevent flying chips

- Avoid placing the cutter on a hard surface, like a rock, which makes it bounce around. Use a stump when possible
- Stand on the closed side of a piston or guillotine-type cutter. Use caution for all cutters. Even a hydraulic cutter can throw chips

Always wear eye protection when cutting line



Striking/soft hammer

Eye protection goggles

Guillotine line cutter

Hazard 16: Gasoline near fire

Warming fires are common in logging operations, especially during winter months. In wet conditions, loggers have been tempted to use saw gas to get a fire to burn, with disastrous results.

CAUTION!
Never use gasoline or saw gas near any open flame!

Gasoline quickly vaporizes and becomes explosive. Diesel fuel can be safely used to start a warming fire, but diesel fuel may burn off and fail to ignite wet wood.

Loggers may not have access to diesel fuel and may be tempted to use saw gas alone to start a fire. Don't do it. Instead, alternative noncombustible products are available to start fires, such as fire starters comprised of sawdust and wax. These products are small and lightweight. Or use pitchy wood from old-growth stumps. Using a mixture of diesel fuel and gasoline in a ratio of 3:1 or 4:1 diesel to gasoline to start a fire is safer than using straight gasoline.

Prepare for a warming fire in advance by obtaining a safe fire starter.

Employers must train employees on safe procedures for starting and stoking fires, and emphasize the extreme hazard of using gasoline on a fire.

Precautions

- Check the fire hazard before starting a warming fire. Open fires are not allowed during periods of high fire hazard
- Clear an adequate firebreak around warming fires or contain in a burn barrel
- Never use gasoline or any liquid fuel to stoke an existing fire
- Keep fires small
- Keep a fire extinguisher and fire-suppression tools readily accessible at any warming fire
- Keep chainsaws and saw fuel at least 10 feet from any open flame or other source of ignition
- Do not engage in horseplay around a fire
- If your clothing catches on fire, remember to "stop, drop, and roll." Do not run. Cover your face with your hands and roll on the ground until all flames are extinguished

Now try the quiz on the next page.

Constantly Look for Hazards within Work Area—Self-Quiz Part 2

1. Can you use signal methods that involve throwing sticks or other objects?

   ☐ Yes

   ☐ No

2. Do you need a designated area on the landing where bucking can be performed safely?

   ☐ Yes

   ☐ No

3. Should you ride a machine or vehicle outside the cab?

   ☐ Yes

   ☐ No

4. Do caulked boots easily slip on metal surfaces?

   ☐ Yes

   ☐ No

5. Should you rely on machinery as much as possible to pick up heavy objects?

   ☐ Yes

   ☐ No

6. Does everyone working around a line cutter need to wear eye protection?

   ☐ Yes

   ☐ No

7. Can you use gasoline or saw gas near a fire?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Constantly Look for Hazards within Work Area—Quiz Answers Part 2

1. Can you use signal methods that involve throwing sticks or other objects?

   Answer: **No**

2. Do you need a designated area on the landing where bucking can be performed safely?

   Answer: **Yes**

3. Should you ride a machine or vehicle outside the cab?

   Answer: **No**

4. Do caulked boots easily slip on metal surfaces?

   Answer: **Yes**

5. Should you rely on machinery as much as possible to pick up heavy objects?

   Answer: **Yes**

6. Does everyone working around a line cutter need to wear eye protection?

   Answer: **Yes**

7. Can you use gasoline or saw gas near a fire?

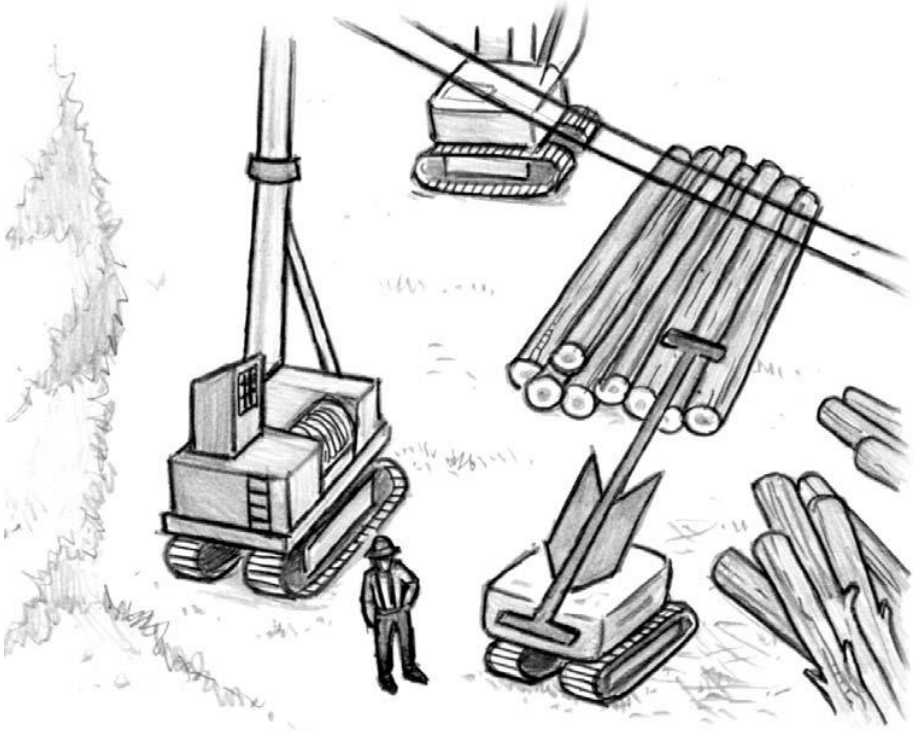
   Answer: **No**

Key Point 3.2: Controls within the Work Zone

The chaser unhooks turns coming to the landing, keeps the landing area clear of accumulated debris, uses a chainsaw to limb and buck logs, and monitors the safe operating zones of machinery to ensure a 2-foot clearance. Due to the hazardous working environment, the chaser must wear all required PPE and must stay constantly vigilant and careful of the position and movement of machines.

When the chaser leaves the landing for any reason, operators should be told when he goes and when he arrives back. Operators must not move or handle logs without seeing or knowing the chaser and other ground personnel are safe. The loader operator must ensure that log truck drivers and others who may enter the landing are aware of hazard areas and safe procedures.

The chaser must find a place on the landing clear of machine operating zones, careful of the extended rear counterweight on rotating machines, and clear from overhead lines, guylines, and the incoming turn, and in view of machine operators.



Recheck line spooling

Regularly check how lines are spooling onto the yarder drums. New lines in particular tend to unwind in use and can cause spooling

problems. Incorrect spooling can crush the bottom layers of line as more line is added. If spooling is a problem, first check the level of the yarder base and tower. Adjusting to plumb can solve the problem. In some cases, it may be necessary to completely respool a line. Snub the line and use a soft hammer to tighten each wrap as the line spools.

Unsafe locations on the landing

The following are unsafe location on the landing:

- Underneath or near the mainline during the yarding
- Underneath the guylines opposing the pull of the turn
- Within reach of the turn being landed
- Blind spot of machinery operators
- Within the swing of the loader, processor, or swing yarder

Underneath or near the mainline during the yarding

The mainline and haulback could break and drop, or the mainline could be slackened accidentally without warning.

Underneath the guylines opposing the pull of the turn

Avoid working under the active guylines in case of anchor or line failure. Stay aware of the yarding process while moving about the landing as a turn in a new position can shift the load to different anchors. Be aware of any known weak anchors and tie them back if possible.

Within reach of the turn being landed

The area within reach of the incoming turn is directly hazardous, and a farther area is indirectly hazardous. Beware of other logs already on the landing within reach of the turn. Logs entering the landing can jillpoke other logs and upend, swing, or push them. Choked logs with a long end increase the hazard.

Blind spot of machinery operators

The chaser needs to ensure that the machinery operators know when he needs to enter a blind spot to perform any task.

Within the swing of the loader, processor, or swing yarder

Never approach the loader or a swing yarder without the operator’s acknowledgement. To approach within 2 feet, the machine must stop. These machines are particularly hazardous because of the swinging counterweight on the rear that often takes workers by surprise, and also, the broad sweep required to swing logs onto decks and trucks. A rotating machine must maintain a minimum clearance of 2 feet for the counterweight in all directions.

Now try the quiz on the next page.

Controls within the Work Zone—Self-Quiz Part 1

1. How much clearance must be there for the counter weight on a swing machine?

   ☐ 2-foot clearance

   ☐ 3-foot clearance

2. If the landing man leaves the landing for any reason, do operators need to be notified when he goes and when he arrives back?

   ☐ Yes

   ☐ No

3. Is the area within reach of the incoming turn directly hazardous?

   ☐ Yes

   ☐ No

4. To approach the loader or a swing yarder within 3 feet, the machine must stop.

   ☐ True

   ☐ False

5. If spooling is a problem, you start by completely re-spooling the line.

   ☐ True

   ☐ False

6. Is working underneath the guylines opposing the pull of the turn a safe position?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Controls within the Work Zone—Quiz Answers Part 1

1. How much clearance must be there for the counter weight on a swing machine?

   Answer: **2-foot clearance**

2. If the landing man leaves the landing for any reason, do operators need to be notified when he goes and when he arrives back?

   Answer: **Yes**

3. Is the area within reach of the incoming turn directly hazardous?

   Answer: **Yes**

4. To approach the loader or a swing yarder within 3 feet, the machine must stop.

   Answer: **True**

5. If spooling is a problem, you start by completely re-spooling the line.

   Answer: **False**

6. Is working underneath the guylines opposing the pull of the turn a safe position?

   Answer: **No**

Rigging up and towering down

- Watch all lines, and specifically for fouled ram hose
- Ensure proper length on guyline ends when sending out to the rigging crew with the strawline
- Ensure that the pass chain is wrapped at least three turns in the correct direction when sending out guyline ends
- Watch for any side-bound guylines
- Be aware of pinch points to the hands and feet when spooling guylines onto the drums
- Do not pinch the ram hose or any other line in the saddle while lowering the tower into the saddle
- Stay visible to yarding engineer whenever possible

Chasing and bucking responsibilites

- You must be trained in proper power saw use and bucking procedures
- Do not climb on load for any reason
- Limb all logs on the ground before loading
- Ensure proper positioning when trimming logs behind water tank
- Do not allow anyone within 3m (10ft) while operating a power saw
- Stand well out in front of logging truck (not at the truck fender and not downhill) during the loading process
- Beware that logs may drop or roll out of the grapple
- Before bucking alongside a log truck, wait for the signal from its driver that it is safe to proceed
- Enter the loading area only after receiving the permission from the loader operator that it is safe to enter
- Be visible to the truck driver as he backs up to hook up a trailer. Keep all parts of your body away from under the reach while hooking up the trailer. Report any damaged steps or reach handles to the truck driver for repair
- No worker is allowed on the catwalk of the logging truck while it is being loaded
- Control the loading area. Do not let any other worker enter while the loader is working

Placing binders and cinches

- Assist driver to place binders over load
- Stand in the clear when cinches are thrown or pulled over load
- Watch that loose logs, chunks or branches are not pulled off load by the movement of the binders
- Watch that the heel boom does not hit logs on the top of the load as the cinches are pulled over the load
- If the truck is to be moved before the load is stamped, move the truck well into the clear. If the cinches have not been installed on the load, the truck cannot be moved unless there

are no workers below the area that the truck will travel to. The second loader walks in front of the loaded truck to the area where the load will be stamped, and where binders and cinches will be tightened

- Watch for whiskers, mud or grit on log ends when stamping load

Controls within the Work Zone—Self-Quiz Part 2

1. When sending out guyline ends, how many turns must the pass chain wrap in the correct direction?

   ☐ At least once

   ☐ At least twice

   ☐ At least three times

2. What do you need to be aware of when spooling guylines onto the drums?

   ☐ Pinch points to the hands only

   ☐ Pinch points to the hands and feet

3. When lowering the tower into the saddle, is it a good idea to pinch the ram hose or any other line in the saddle?

   ☐ Yes

   ☐ No

4. Do you need permission from the loader operator that it is safe to enter before you enter the loading area?

   ☐ Yes

   ☐ No

5. Is anyone allowed on the catwalk of the logging truck while it is being loaded?

   ☐ Yes

   ☐ No

6. If the cinches have not been installed on the load, can you move the truck if there are workers below the area that the truck will travel to?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Controls within the Work Zone—Quiz Answers Part 2

1. When sending out guyline ends, how many turns must the pass chain wrap in the correct direction?

   Answer: **At least three times**

2. What do you need to be aware of when spooling guylines onto the drums?

   Answer: **Pinch points to the hands and feet**

3. When lowering the tower into the saddle, is it a good idea to pinch the ram hose or any other line in the saddle?

   Answer: **No**

4. Do you need permission from the loader operator that it is safe to enter before you enter the loading area?

   Answer: **Yes**

5. Is anyone allowed on the catwalk of the logging truck while it is being loaded?

   Answer: **No**

6. If the cinches have not been installed on the load, can you move the truck if there are workers below the area that the truck will travel to?

   Answer: **No**

Key Point 3.3: Use Proper Ergonomics Required to Do the Job Safely

Ergonomics matches workplace conditions and job demands to a person's capabilities, to improve worker safety and productivity. Applying the science of ergonomics can be especially helpful in reducing the risk of musculoskeletal injury (MSI), which is the most common work-related injury in B.C.

What is a musculoskeletal injury?

Musculoskeletal injury (MSI) is an injury or disorder of the muscles, tendons, ligaments, joints, nerves, blood vessels or related soft tissue including a sprain, strain and inflammation, that may be caused or aggravated by work.

MSIs can affect the body's soft tissues: the muscles, tendons, ligaments, nerves, blood vessels, and joints of the neck, shoulders, arms, wrists, legs, and back.

The risks

The main physical risk factors for MSIs associated with the demands of a job include:

- Force – exerting force on an object as part of a task
- Repetition – doing a task that uses the same muscles over and over with little chance for rest or recovery
- Work posture – the position of different parts of the body when taken outside of the comfortable range of motion (awkward posture), usually combined with static posture (such as holding a posture for a long time)
- Local contact stress – a hard or sharp object coming in contact with the skin

For each of these risk factors, it is important to consider magnitude, frequency, and duration of exposure.

Assessing the risks

Employers must conduct risk assessments for MSIs in their workplace, and eliminate or minimize the risks. Employers must also educate and train workers about MSI risks in the workplace.

How to reduce the risks

Once you have completed a risk assessment. You then need to eliminate the risk factors, where practicable, using risk controls.

There are so many variables involved in MSI and it's not always possible to eliminate the risk factors. If it is not possible to eliminate the risk, then the risk must be minimized.

To help identify potential risk controls, consider the following questions:

Engineering controls

Physical modifications to facilities, equipment, and processes can reduce risk factor for MSIs. Some question to consider:

- Can mechanical lifting aids be used instead of manual material handling?
- Can the load be lifted within the range of knee to waist height?
- Can the vertical distance the load has to be lifted or lowered be shortened?
- Can stooped or twisted positions be avoided by providing unrestricted work space, or arranging the workspace differently?
- Can the size of the load be made smaller? Options include ordering smaller containers, or having workers make two trips with smaller loads rather than one trip with a heavy load.
- Can carrying distance be shortened by changing the workflow?
- Can equipment be modified to eliminate or reduce awkward postures for workers?
- Can the workplace be modified to eliminate or reduce the need for lifting of heavy objects?

Administrative controls

Changing work practices and work policies, awareness tools, and training can limit the risk of sprains and strains. Some questions to consider:

- Can workers rotate between tasks involving different muscles?
- Can workers use safe work procedures to minimize risk factors, for example, using neutral wrist posture?
- Can workers be trained to perform the tasks using neutral postures?
- Can storage space be organized so that heavy items are located between knee and waist height and light items above shoulder height?
- Can the task design be changed? Examples include changing a lifting task into a lowering task, or changing a carrying task to a pushing or pulling task.
- Can workers be given time to rest or recover when lifting or handling loads?
- Can work demands and work pace be balanced more effectively?

Personal protective equipment

Personal protective equipment (PPE) can only be used when engineering or administrative controls can't be applied. Some questions to consider:

- Do workers have suitable gloves that fit properly? For example, they may need padded, friction-enhanced or vibration-limiting gloves.
- If workers are required to kneel, do they have knee pads or a kneeling pad?
- Do workers have warm clothing if they have to work in cold conditions?

Additional resources

Visit WorkSafeBC's website to download their guide book called Understanding the Risks of Musculoskeletal Injury (MSI): An Educational Guide for Workers on Sprains, Strains, and Other MSIs.

The book is an educational guide to help workers and employers recognize the signs and symptoms of MSI and understand the potential health effects of these injuries. It also helps employers and workers to identify the factors that place workers at risk for MSI, such as force, repetition, work posture, and local contact stress.

Sprains and strains (MSIs)

Sprains and strains are among the most common injuries for B.C. workers. They can arise from a number of incident types, such as overexertion, repetitive motion, motor vehicle incident, and slips, trips, and falls. Sprains and strains that arise from overexertion and repetitive motion incident types are referred to as musculoskeletal injuries (MSIs) at WorkSafeBC.

How to reduce the risks

To help identify potential risk controls, consider the following questions:

Engineering controls

Physical modifications to facilities, equipment, and processes can reduce risk factor for MSIs.

- Can equipment be added or modified to eliminate or reduce awkward postures for workers?
- Can the workplace be modified to eliminate or reduce the need for lifting of heavy objects?

Administrative controls

Changing work practices and work policies, awareness tools, and training can limit the risk of MSIs.

- Can tasks requiring highly repetitive motions be automated?
- Can tasks requiring heavy lifting be done by mechanized equipment, or by teams of workers rather than one person?

Back Injuries

The following poster gives instructions for proper back support as well as pictures for illustration.

BACK UP YOUR BACK

FIT TO LOG

A neutral posture and activated core will reduce pain and increase strength. Take a moment to restore your posture once per hour every day.

STEP 1: FIND A NEUTRAL SPINE

1. **Stand tall as though a string is pulling out the top of your head.**
2. **Look straight ahead - don't drop or raise your chin.**
3. **Keep your shoulders and chest relaxed, just lengthen through your spine.**
4. **Put one hand on the back of your neck to check that your neck is lined up with your spine (if your head is forward, the knobby 7th vertebra will stick out. Correct this by pushing your chin straight back with the other hand until the vertebrae all line up).**

STEP 2: PUT YOUR PELVIS UNDERNEATH YOU

1. **Put one hand on your hip bone and the other on your pubis as shown in the photo.**
2. **They should be in one plane, the pubis should not be behind or in front of the hip bone.**

STEP 3: ACTIVATE YOUR CORE

1. **Tighten your belly by drawing your lower abdomen in and up very slightly.**
2. **Make sure your upper body is still relaxed, only your lower belly is tight.**
3. **Tighten the pelvic floor (lift your testicles slightly to activate this core muscle) and hold for a count of 10, then do 10 contractions in a row.**

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Now try the quiz on the next page.

Use Proper Ergonomics Required to Do the Job Safely—Self-Quiz

1. What are the main physical risk factors for MSIs associated with the demands of a job?

   ☐ Force

   ☐ Repetition

   ☐ Local contact stress

   ☐ Posture

   ☐ All of these choices

2. What type of controls pertains to physical modifications to reduce risk factors for MSIs?

   ☐ Administrative controls

   ☐ Engineering controls

3. What type of controls pertains to work policies and practices, and awareness tools to mitigate sprains and injuries?

   ☐ Engineering controls

   ☐ Administrative controls

4. A forward posture and activated core will reduce pain and increase strength.

   ☐ True

   ☐ False

Now check your answers on the next page.

Use Proper Ergonomics Required to Do the Job Safely—Quiz Answers

1. What are the main physical risk factors for MSIs associated with the demands of a job?

   Answer: **All of these choices**

2. What type of controls pertains to physical modifications to reduce risk factors for MSIs?

   Answer: **Engineering controls**

3. What type of controls pertains to work policies and practices, and awareness tools to mitigate sprains and injuries?

   Answer: **Administrative controls**

4. A forward posture and activated core will reduce pain and increase strength.

   Answer: **False**

Key Point 3.4: Reporting Procedures for All Accidents or Serious Near Misses

General protocol

In general, all incidents should be reported to the worker's supervisor. However, each company may have specific procedures.

The landing or utility person should report all hazards, close call, injuries, property damage, and environmental incidents to their supervisors.

Now try the quiz on the next page.

Reporting Procedures for All Accidents or Serious Near Misses—Self-Quiz

1. Only serious incidents need to be reported to the worker's supervisor.

   ☐ True

   ☐ False

2. Which of the following does the landing or utility person need to report to their supervisors?

   ☐ Hazards

   ☐ Close call

   ☐ Injuries

   ☐ Property damage

   ☐ Environmental incidents

   ☐ All of these choices

Now check your answers on the next page.

Reporting Procedures for All Accidents or Serious Near Misses—Quiz Answers

1. Only serious incidents need to be reported to the worker's supervisor.

   Answer: **False**

2. Which of the following does the landing or utility person need to report to their supervisors?

   Answer: **All of these choices**

Section 1025-04: Choking and Rigging

What you need to know about this section

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

4.1 Good housekeeping in accordance with job requirements

4.2 Inspect rigging and tools before use

4.3 Undo chokers in a safe manner

4.4 Proper position of the guylines on stumps (utility person only)

4.5 Select, notch, and prep guyline stumps

4.6 Spot the rigging (utility person only)

4.7 Check guylines often when yarding operations are in progress

4.8 Do basic splices

Key Point 4.1: Good Housekeeping in Accordance with Job Requirements

Housekeeping

Observe the following housekeeping guidelines:

- Maintain good housekeeping in the landing
- Keep the landing area free of limbs, chunks, and other debris
- Keep the end of the strawline secured to the base of the spar when not in use
- Store all equipment, rigging, and tools not in use in a designated safe area, away from mobile equipment
- Keeping tools in serviceable condition

Maintain good housekeeping

Remove hazards

Basic housekeeping on the landing is a primary safety feature. Keep the landing free of loose materials or debris. Other typical hazards, above and below the landing, include snags that can reach the landing, loose or overhanging logs, and loose rocks or boulders that could roll onto the landing or onto the rigging crew below. Guylines must not side bind any standing timber, because guyline pressure could cause a tree to fall over and strike a machine or worker on the landing.

Now try the quiz on the next page.

Good Housekeeping in Accordance with Job Requirements—Self-Quiz

1. Is it necessary to keep the landing area free of limbs, chunks, and other debris?

   ☐ Yes

   ☐ No

2. Where do you keep the end of the strawline when not in use?

   ☐ Secured to any part of the spar

   ☐ Secured to the base of the spar

3. Where should you store all equipment, rigging, and tools that are not in use?

   ☐ In a safe area near mobile equipment

   ☐ In a designated safe area, away from mobile equipment

4. Can guylines side bind any standing timber?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Good Housekeeping in Accordance with Job Requirements—Quiz Answers

1. Is it necessary to keep the landing area free of limbs, chunks, and other debris?

   Answer: **Yes**

2. Where do you keep the end of the strawline when not in use?

   Answer: **Secured to the base of the spar**

3. Where should you store all equipment, rigging, and tools that are not in use?

   Answer: **In a designated safe area, away from mobile equipment**

4. Can guylines side bind any standing timber?

   Answer: **No**

Key Point 4.2: Inspect Rigging and Tools Before Use

The landing or utility person is responsible for storing and retrieving tools. His responsibilities are, but not limited to, the following:

- Starts up the bus so it's warm for the crew when they are finishing their shift
- Retrieves the gas and oil for the power saw
- Ensures the saw is gassed up and sharp
- Splices the strawline
- Makes Molly Hogans and small straps
- Retrieves and, if required, makes chokers
- Helps the operator with spooling and any other mechanical help
- Notches guyline stumps

Be sure to inspect the rigging and tools before use:

- Inspect butt rigging daily
- Check and tighten butt-rigging shackles
- Report badly-worn parts to yarding engineer and hook tender
- Inspect mainline and haulback eyes on a daily basis
- Check fire truck regularly, and daily in hazardous conditions

Try the quiz on the next page.

Inspect Rigging and Tools Before Use—Self-Quiz

1. Is the utility person responsible for gassing up the power saw?
   - ☐ Yes
   - ☐ No
2. Are making or retrieving chokers his responsibility?
   - ☐ Yes
   - ☐ No
3. Does the utility person help the operator with spooling?
   - ☐ Yes
   - ☐ No
4. Who should you report badly-worn parts to?
   - ☐ Yarding engineer
   - ☐ Hook tender
   - ☐ Both
5. How often should you inspect mainline and haulback eyes?
   - ☐ Daily
   - ☐ Weekly
6. In hazardous conditions, how often should you check the fire truck?
   - ☐ Daily
   - ☐ Weekly

Now check your answers on the next page.

Inspect Rigging and Tools Before Use—Quiz Answers

7. Is the utility person responsible for gassing up the power saw?
   Answer: **Yes**
8. Are making or retrieving chokers his responsibility?
   Answer: **Yes**
9. Does the utility person help the operator with spooling?
   Answer: **Yes**
10. Who should you report badly-worn parts to?
    Answer: **Both**
11. How often should you inspect mainline and haulback eyes?
    Answer: **Daily**
12. In hazardous conditions, how often should you check the fire truck?
    Answer: **Daily**

Key Point 4.3: Undo Chokers in a Safe Manner

Unhooking lines off anchors

Releasing a line off a stump anchor is very hazardous, due to pressure in the line. Use caution and always stand on the inside of the point of attachment during release, particularly when there is pressure in the line.

Stumps are either wrapped once and attached with a shackle through an eye, or they are wrapped three times and cable clipped or spiked. With single-wrapped stumps, it may be safe enough to unhook the end of the line and let it run. If the line needs to be held on the hillside, use a rigging chain and a short strap, or use a catch shackle and strap.

With multi-wrapped stumps, it may be necessary to use a rigging chain and use the strawline or come-a-long to pull the pressure out of the line to release the stump. If the pressure is great, use a back wrap to ensure the line is all out in the direction of pull, and use the strawline or come-a-long to lower the line.

Always stand on the inside of the point of attachment when releasing a line from an anchor

It may be necessary to pound a guy-line shackle pin out with a hammer when there is tension on the line, such as when stumps are above the yarder. This is why shackles are done up with the pin coming up from the bottom.

Landing the turn

Turns are generally landed in the area immediately in front of the yarder (the chute). A swing yarder is an exception, swinging the turn to the side. In all cases, the yarder engineer must stay alert that ground personnel remain in the clear and regard the safety of any workers positioned downhill from the landing area. Some operators allow the chaser to operate the carriage bug, working closely with the yarder engineer to land the turns. Loaders and skidders used to clear the chute must remain in the clear while a turn is landed.

The slope of the landing chute must be less than 20 percent if a chaser is required to unhook the rigging from the logs or when a rigging crew is working immediately below the landing. A chute slope more than 20 percent may require a grapple to assist in securing the turn. Additional control measures are also possible. Strawline can be used to control logs from rolling off the landing.

Machine operators must always use extreme caution when the rigging crew is working below the landing and avoid knocking material over the edge. Stack log decks carefully to ensure stability. Rolling logs or sliding poles can travel a considerable distance downhill.

The yarder engineer must be careful to control the turn being landed and use the assistance of other machinery on difficult turns. The yarder engineer must also ensure the chaser is not in the landing chute or in front of the yarder when landing turns. Use the following procedures to make unhooking the turn easy and safe.

Slow the turn before it approaches the landing

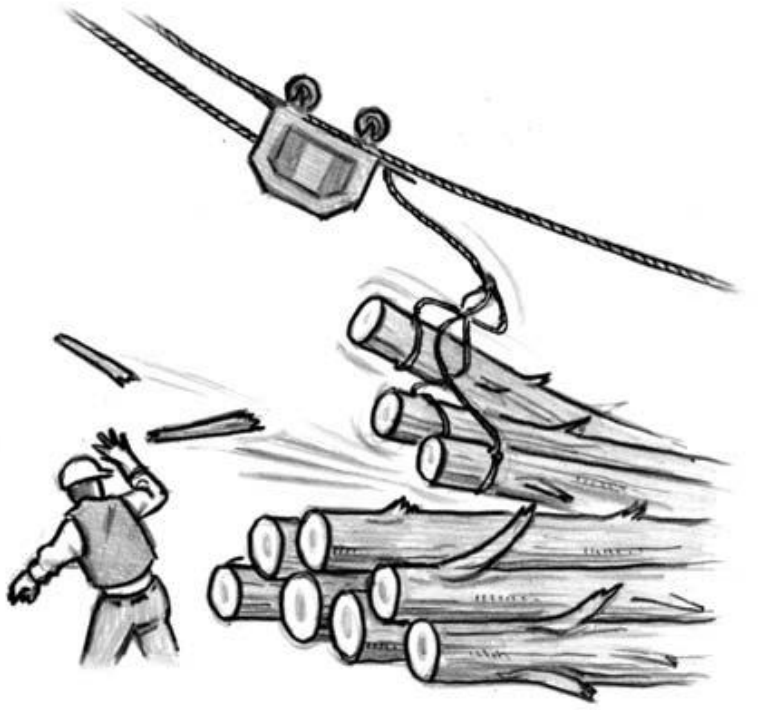
Tightline or slack the lines as required to safely land the turn. Avoid striking the ends of decked logs.

When available, use the haulback to help control turns

If the haulback is not sufficiently snubbed when landing the turn, the turn could be yarded into the tower or could kick other logs ahead into the yarder. On steep approaches, it may be necessary to slack the haulback when near the landing and let the logs slide a short distance into the landing. If the haulback is braked too much, the turn could tightline or “balloon,” causing the ends of the logs to swing in all directions, creating a serious hazard.

Lower the logs

Chunks of debris can be thrown great distances when a load is dropped. If it is necessary to purposely drop a turn to stabilize a pile, make sure ground personnel are well in the clear.



Logs should be lowered, not dropped, to prevent flying debris

Do not land or deck logs in a crisscross manner or in unstable piles

Unstable piles are hazardous to the chaser and workers below the landing.

Use extra caution on guthooked logs

Guthooked logs are more difficult to land safely. Lift as high as possible on approach to clear the ground and any previously landed logs.

Use caution with heavy turn.

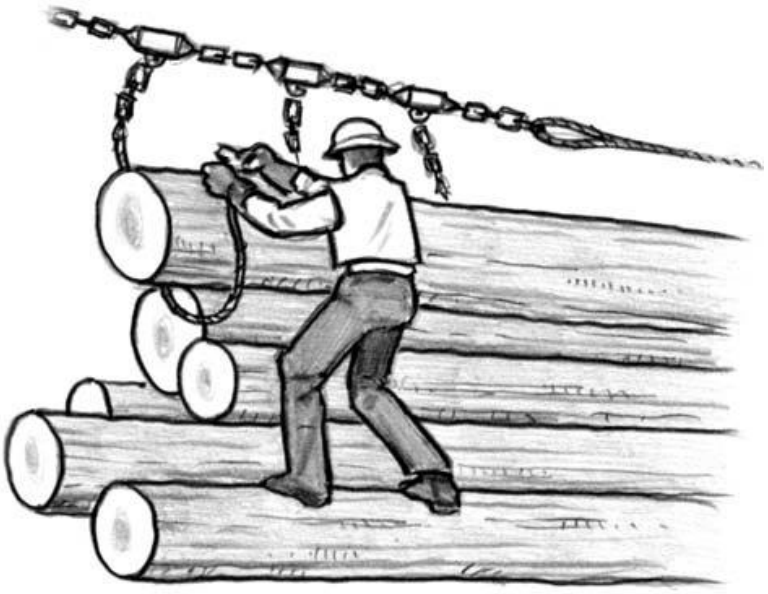
On some older yarders, it may be necessary to stop heavy turns just before reaching the landing. Release friction and apply again after sufficient pressure has been reached to land the turn.

Unhooking the turn

Once a turn is landed in the chute, slack the rigging only enough to unhook the chokers. The rigging must be completely stopped and the logs stable before the chaser approaches. Both the operator and chaser should re-evaluate the stability of the turn as the chaser approaches. If any logs appear insecure, the chaser must retreat to a safe spot, then signal for the turn to be picked up and repositioned by the machine operator. The operator must receive a signal from the chaser before any lines are moved.

The chaser must follow safe procedures:

- Approach the turn from the upper side
- Do not climb on elevated logs
- It is generally safest to unhook the bottom log first. In some cases, you'll need to unhook one or two chokers and then get in the clear and let the operator reposition the rest of the turn before you unhook it
- Be careful of unstable logs when unhooking the turn
- Never work beneath or reach between unstable logs
- If the yarder engineer needs to raise and drop a turn to clear a choker, beware of swinging chokers
- On tagged logs, shorten the choker before pulling it free to prevent the tagged choker from swinging dangerously



Correct approach to unhook a turn

Fouled chokers

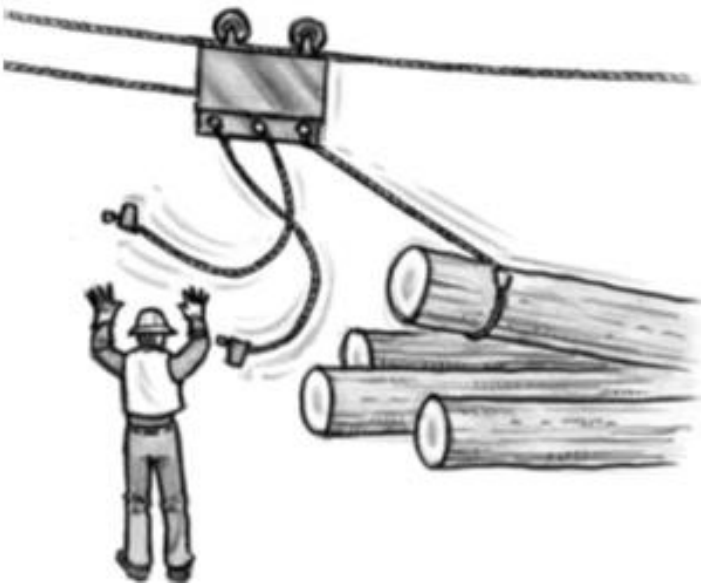
At times the loader or processor operator may be signaled to lift a log to free a fouled choker or to reposition an unstable log. Always use machinery to clear a fouled choker. Many workers have been injured when logs rolled on them as they tried to free a fouled choker. Machine operators must coordinate with the chaser before swinging the boom or grapple into the area. The chaser should signal to the yarder and other operators how many logs are left to be unhooked.

Be aware of rolling logs while unhooking the turn

Clear the chute

Logs must not be permitted to accumulate in the landing chute to the point where they become a hazard. The landing chute should be cleared of logs before the next turn of logs is landed, unless the logs are fully contained in the chute or there is no possibility that workers below the landing are endangered. The chaser coordinates with the loader operator to clear the chute of accumulated slash and debris before the next turn.

The loader and processor operators also keep the landing area clear of accumulated debris. A safe debris pile should be established where workers below the landing will not be endangered.



Beware of swinging chokers when they are being pulled clear of the pile

Now try the quiz on the next page.

Undo Chokers in a Safe Manner—Self-Quiz

1. The slope of the landing chute must be less than what percent if a chaser is required to unhook the rigging from the logs or when a rigging crew is working immediately below the landing?

   - ☐ Less than 15 percent
   - ☐ Less than 20 percent
   - ☐ Less than 25 percent

2. Can the landing man be in the landing chute or in front of the yarder when landing turns?

   - ☐ Yes
   - ☐ No

3. Should you deck the logs in a crisscross manner?

   - ☐ Yes
   - ☐ No

4. Guthooked logs are easier to land safely.

   - ☐ True
   - ☐ False

5. When unhooking the turn, you should approach the turn from the upper side.

   - ☐ True
   - ☐ False

6. Generally, it is safest to unhook the bottom log first.

   - ☐ True
   - ☐ False

Now check your answers on the next page.

Undo Chokers in a Safe Manner—Quiz Answers

1. The slope of the landing chute must be less than what percent if a chaser is required to unhook the rigging from the logs or when a rigging crew is working immediately below the landing?

   Answer: **Less than 20 percent**

2. Can the landing man be in the landing chute or in front of the yarder when landing turns?

   Answer: **No**

3. Should you deck the logs in a crisscross manner?

   Answer: **No**

4. Guthooked logs are easier to land safely.

   Answer: **False**

5. When unhooking the turn, you should approach the turn from the upper side.

   Answer: **True**

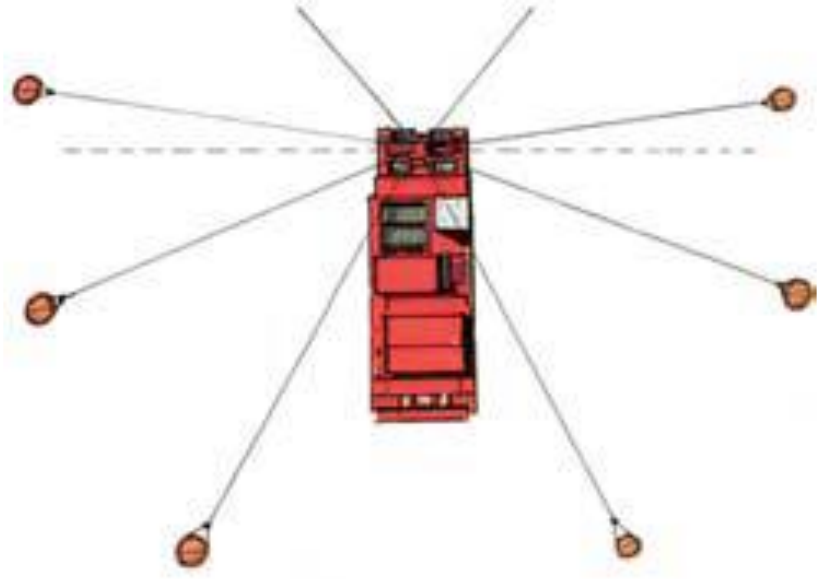
6. Generally, it is safest to unhook the bottom log first.

   Answer: **True**

Key Point 4.4: Proper Position of the Guylines on Stumps (Utility Person Only)

Yarder guylines

Older steel spar yarders are usually fitted with six guylines. Grapple yarders, which are much more commonly used now, generally have two to three guylines.

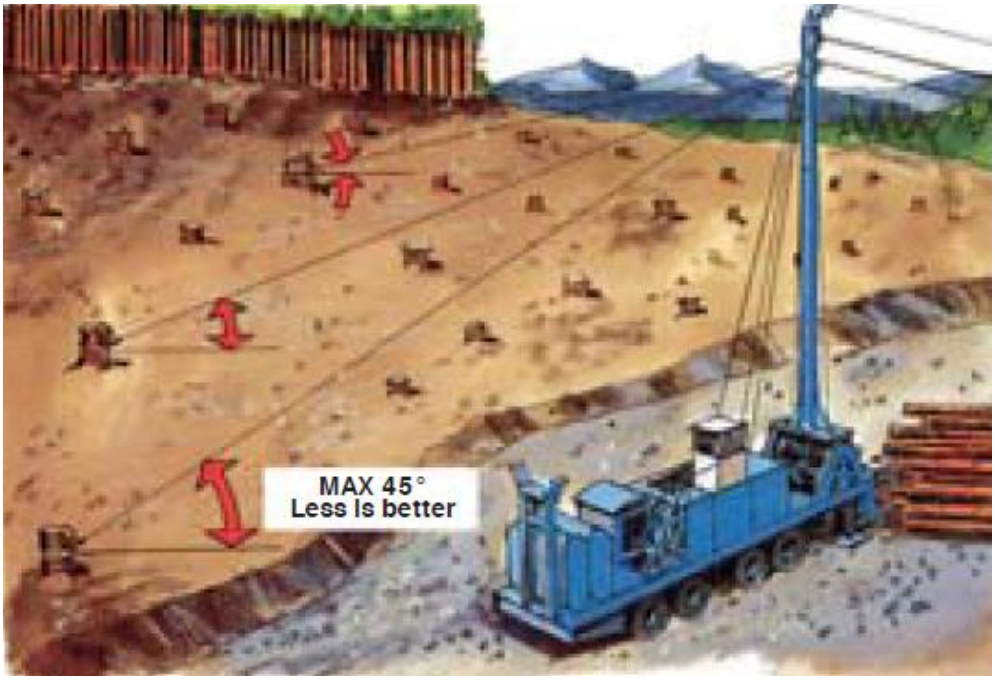


Correct guyline placement — eight guylines

Guylines and guyline stubs are critical components for yarder stability. Guylines are commonly used until external wear or corrosion indicates they should be replaced. When damage to a line occurs, such as severe abrasion, corrosion, or kinking, the line must be removed from service.

Guylines must be periodically inspected. One method is to open the line to the core. If the core is dry or lacking lubrication, the worker inspecting the line should check for other deficiencies, such as broken wires, excessive wear, or line deformation. If any of these are found, the line must be removed from service. See Occupational Health and Safety Regulation, Section 15.25.

Small wood yarder—three guylines



Maximum guyline angles

The following practices will damage wire rope and should be avoided:

- Pulling guyline stubs behind a vehicle from one setting to another severely abrades the exterior of the line, creates heat, and forces dirt into the line, which then acts as an abrasive in the core and between strands
- Running over guylines with tracked and rubber-tired mobile equipment, (loaders, crawler tractors, and log trucks) during a rig-up or move may cut or severely kink the line

If the line is coated with dirt or mud, damage is not always apparent. Damage can be eliminated by spooling guylines and stubs properly onto a “line horse,” or placing them in storage where they cannot be damaged by mobile equipment.

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:

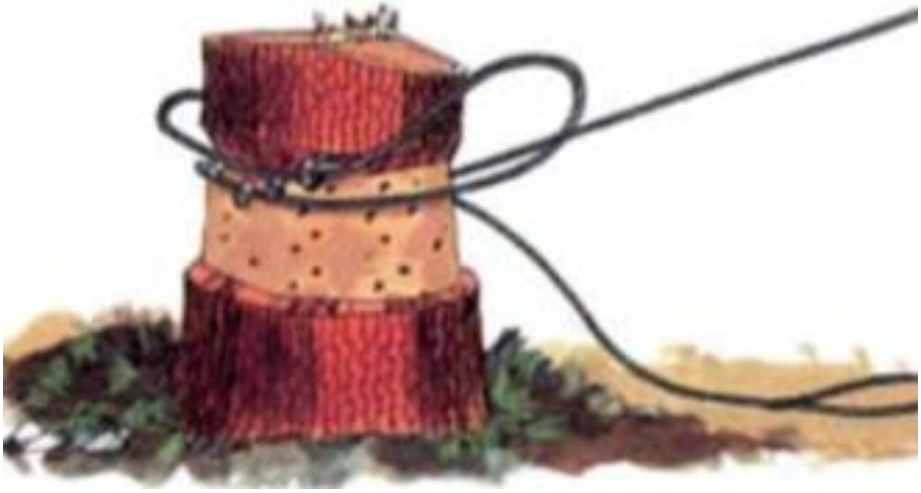
- Hang a light strap and Tommy Moore block on the guyline stump or just behind it and string the strawline
- Connect the strawline to the guyline end with a pass chain far enough up the guyline to provide enough slack for the guyline end to go around the stump
- When wrapping the guyline with the chain, 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
- String the line straight with no side binds

Stringing a guyline with strawline

Pass chain wrapped against the pull

Safety wrap for additional spiked guylines

When additional yarder guyline support is required, guylines may be spiked to the anchor with railway spikes. The release of a guyline spiked to a guyline anchor stump will create a hazard if a safety wrap is not used.



Safety wrap

The following safe work procedure can reduce this hazard.

Note: Additional, site-specific work procedures may be required

1. Check the spikes in the guyline wraps to ensure they are solidly in the stump. There must be three wraps on the stump.

   If the guyline is tightly tensioned, it may be necessary to drive additional spikes in the last wrap to stop it from slipping when the first and second wraps are released.

2. Make sure the guyline slack and loose guyline end are out in front of the guyline anchor stump.
3. Use a spike bar and hammer to pull the track spikes from the first wrap.
4. Remove the wrap from around the stump.
5. Pull the spikes from the second wrap.
6. Take the second wrap around the back of the stump and form a loop.
7. Hold the loop in place by hooking the bight under a spike positioned just above the last wrap. This will hold the line down and stop it from flipping over the stump when the last wrap is released.
8. Pull the guyline slack and loose guyline end out in front of the guyline stump on the lead side.
9. With the bight of the guyline held down by the single spike, remove the spikes carefully from the top side of the last wrap inside the looped bight.
10. Remove these spikes one at a time.

The worker using the spike bar must stand on the loop side of the guyline, away from the hazardous area, which will be swept by the released guyline.

The worker using the sledgehammer to drive the spike bar must also stand on the loop side of the guyline.

Now try the quiz on the next page.

Proper Position of the Guylines on Stumps (Utility Person Only)—Self-Quiz

1. What is the maximum number of guylines?

   ☐ Six

   ☐ Eight

2. If there is damage to a line, such as severe abrasion, corrosion, or kinking, can you still use the line?

   ☐ Yes

   ☐ No

3. What is the maximum guyline angle?

   ☐ 35°

   ☐ 40°

   ☐ 45°

4. Is pulling guyline stubs behind a vehicle from one setting to another good for the wire rope?

   ☐ Yes

   ☐ No

5. When wrapping the guyline with the chain, ensure the chain is wrapped in what direction of the pull?

   ☐ Same direction of pull

   ☐ Opposite the direction of pull

6. What do you use to connect guylines to the anchors?

   ☐ Guyline shackle or knob and bell

   ☐ Chain

Now check your answers on the next page.

Proper Position of the Guylines on Stumps (Utility Person Only)—Quiz Answers

1. What is the maximum number of guylines?

   Answer: **Eight**

2. If there is damage to a line, such as severe abrasion, corrosion, or kinking, can you still use the line?

   Answer: **No**

3. What is the maximum guyline angle?

   Answer: **45°**

4. Is pulling guyline stubs behind a vehicle from one setting to another good for the wire rope?

   Answer: **No**

5. When wrapping the guyline with the chain, ensure the chain is wrapped in what direction of the pull?

   Answer: **Opposite the direction of pull**

6. What do you use to connect guylines to the anchors?

   Answer: **Guyline shackle or knob and bell**

Key Point 4.5: Select, Notch, and Prep Guyline Stumps

Anchor safety

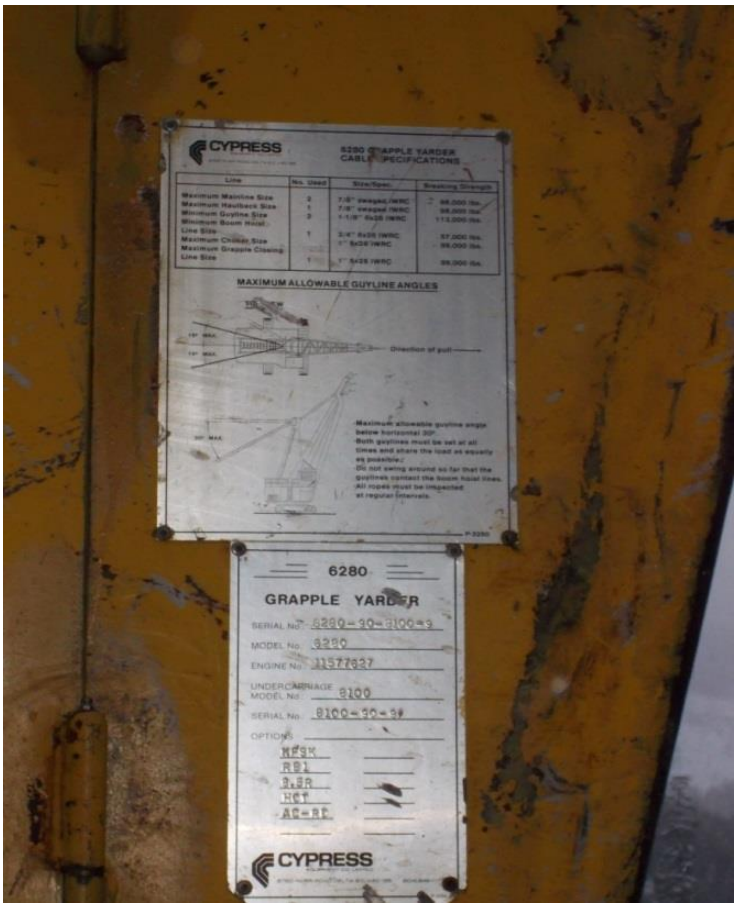
Anchors need to withstand significant forces to assure tower and rigging system stability. In general, remember the following critical points in anchor safety:

- Guyline stumps or anchors are within the guy zones
- Relative stump strength
- Angle of the guyline measured horizontally
- Anchor distances
- Anchor inspection
- Load balance
- Adequate deflection

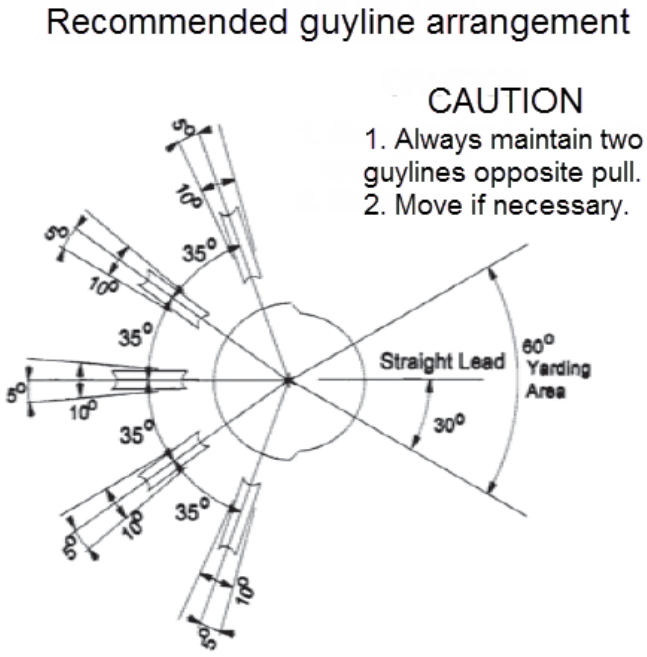
Guyline stumps or anchors are within the guy zones

Ensure that guyline stumps or anchors are within the guy zones.

Guy zones established by the yarder manufacturer, or established for lift tree stability, are designed to avoid catastrophic failure during the yarding process. Guy zones are set so the guylines share the load on the yarding lines. If anchors are not available in a guy zone, or at the extreme edge of a guy zone, reduce the payload or adopt other measures to ensure stability. It may be possible or necessary to rig an additional guyline.

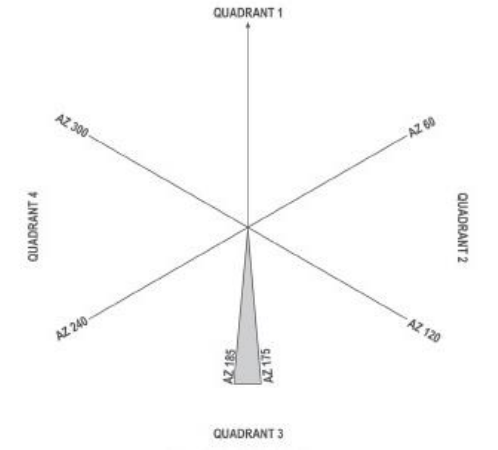


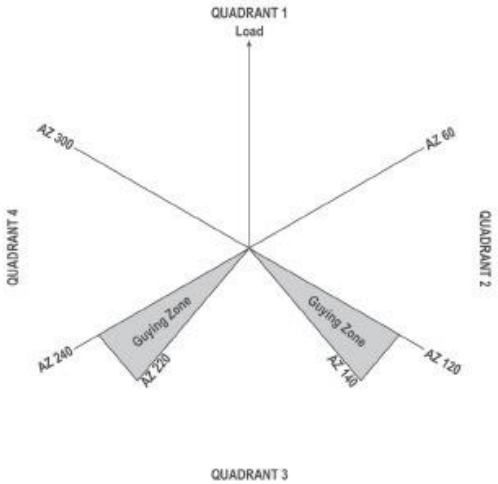
The spec plate and cab decal show the correct manufacturer's recommended guyline placement

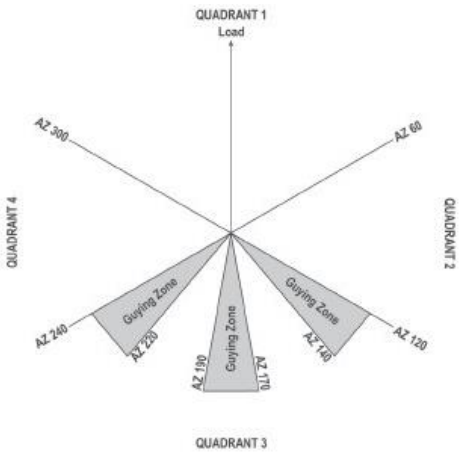


Manufacturer's cab decal

A manufacturer’s cab decal (above) shows a yarder setup with five guylines, which allows at least three guylines to oppose the load in a broader 60-degree yarding window. Always follow manufacturer’s models or available technical manuals for anchor placement within appropriate guy zones. The following examples show required guy zones for different numbers of anchors, one through eight, with variations suitable for tailholds and lift trees, as well as yarders.







Relative stump strength

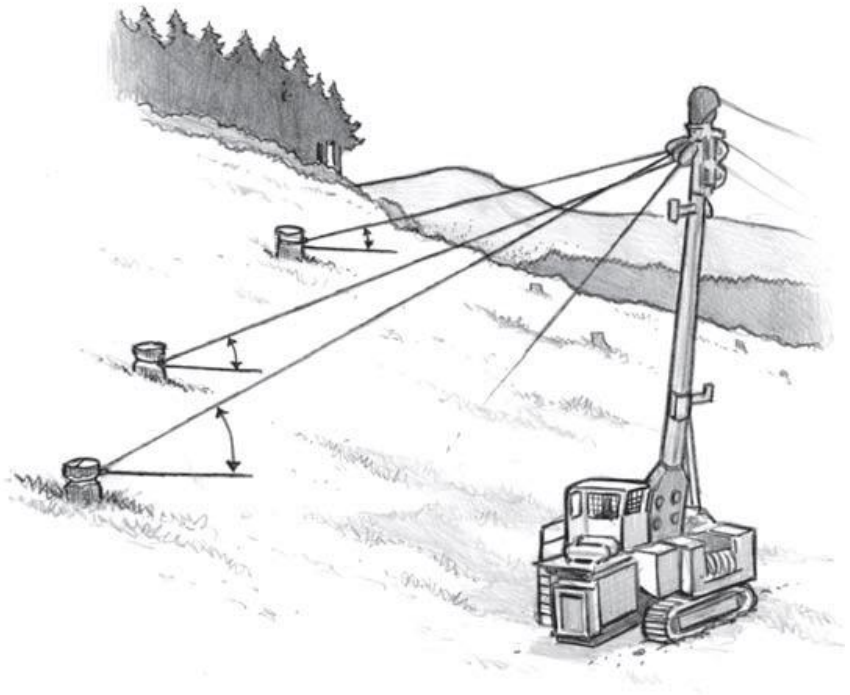
Douglas fir is preferred for anchors or, if unavailable, white pine or hemlock. Use extra caution with spruce, cedar, or hardwoods – consider using tiebacks or other multiple support.

The holding power of a stump multiplies by the square of the diameter – so double the diameter gives four times the holding power. The equation is modified, however, by factors of soil and species, direction of pull, and zones and angles of the guylines. Before relying on an anchor, load to maximum and watch the stump for movement.

Angle of the guyline measured horizontally

Angle of the guyline measured horizontally from the anchor point must be no greater than 50 degrees (or the manufacturer's recommendation).

Angles greater than 50 degrees can place a buckling force on the tower and cause a catastrophic failure. The flatter the angle, the more effective the anchor. An anchor above the height of the tower will be less stable. Guylines too far above the tower will create a lifting force that could actually lift the tower off the ground. Examine upward forces on the tower to assure stability. If a suitable anchor is not available, so a guyline exceeds a 50-degree angle, then additional precautions must be taken, such as adding guylines to oppose the load, or using narrower yarding roads or lighter loads.



The angle of the guyline, measured from the horizontal, must be no more than 50 degrees. Lower angles give greater stability

Anchor distances

Choose anchors that are equal distances away from the tower or lift tree.

Guylines that are shorter will tighten up quicker than longer guylines. A shorter guyline can take up the majority of the load and not share with the other guylines. This could overload the shorter guyline and cause it to fail. If anchors are not available equal distances from the tower or lift tree, make sure to adjust the tension on the guylines so all share the load.

Anchor inspection

Inspect all anchors daily

Yarding can reduce the strength of an anchor stump. High dynamic loads increase the risk of progressive failure. Check all guylines and anchors after several turns and on a daily basis. Look for signs of movement in stumps, mobile anchors, or buried deadman anchors. Any unstable guyline anchor must be immediately corrected.

Load balance

The back guys on the yarder must share the load. Regularly re-check tension on the lines. If balance is neglected, the load may shift to one stump and cause that stump to fail.

Adequate deflection

Inadequate deflection of the rigging lines can overload lines and increase the risk of rigging-system failure.

IMPORTANT!

Guylines that are straight back from the tower will load up quicker than guylines off to the side; a shorter guyline that is straight back will load up fastest.

Single stump anchors

As the industry moves into logging smaller trees, adequate guyline stumps are harder to find. Faced with fewer options, loggers must be able to identify a good anchor and understand how the forces applied to a stump during the logging process could affect its holding power. If a single stump is inadequate, multiple stumps or alternative anchors must be used.

Selection of anchors

A competent person must carefully choose the skyline, guyline, and running line anchors for position and strength. Many factors affect the suitability of an anchor point. Avoid using unsuitable anchor stumps as shown on the following page. If such weaker stumps must be used, take extra precautions to assure stability.

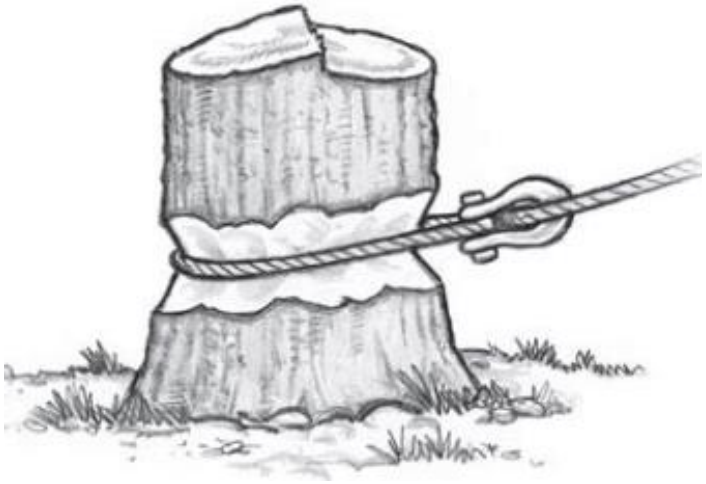
Choose stumps rather than trees for guyline anchors. Tailholds and intermediate supports for the yarding lines may use trees as anchors and support, but the yarder guylines should use stumps to avoid the possibility of a tree falling on workers at the landing site during the operation. If a tree must be used, tie it back to prevent it from falling.

Carefully select the anchor stump according to the species, size, and terrain. Select anchor stumps for position and strength. Each species of tree has a different root system and grows differently according to the soil moisture, density, and slope. The holding power of a stump increases with soil depth and density. Never assume the stumps in one setting will be the same as stumps in the next setting.

Generally speaking, on slopes, stumps have more root structure on the uphill side, and are therefore stronger on a downhill, rather than uphill pull.

Notching the guyline stump

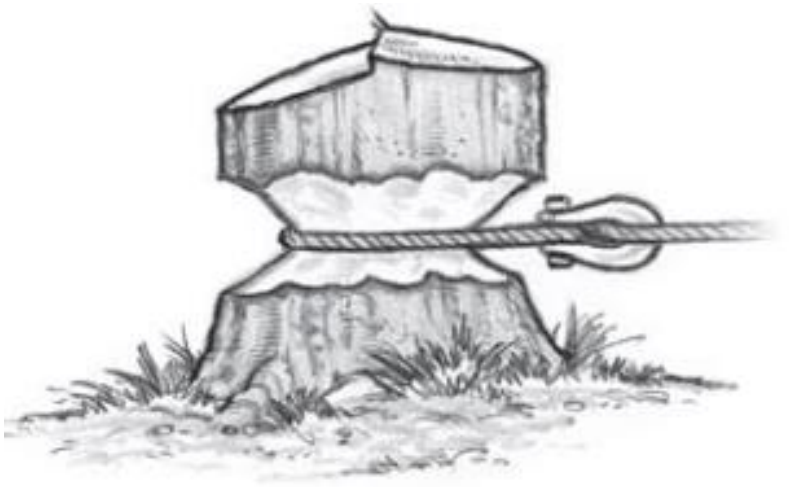
The common way to notch a guyline stump is with a power saw. Clear the area around the stump to work safely. If using a saw, wear protective gear. Two basic points are critical when notching a guyline stump.



Correct notching: good depth, in lead

IMPORTANT!

A notch that is too deep decreases the diameter of the stump and reduces its holding power.



Improper notching: too deep

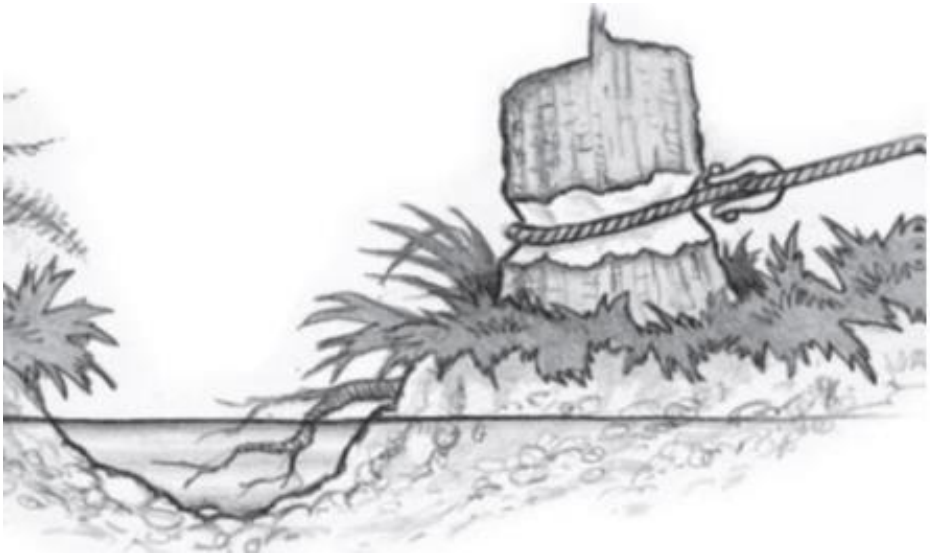
Improper notching: too close to top

Improper notching: shallow

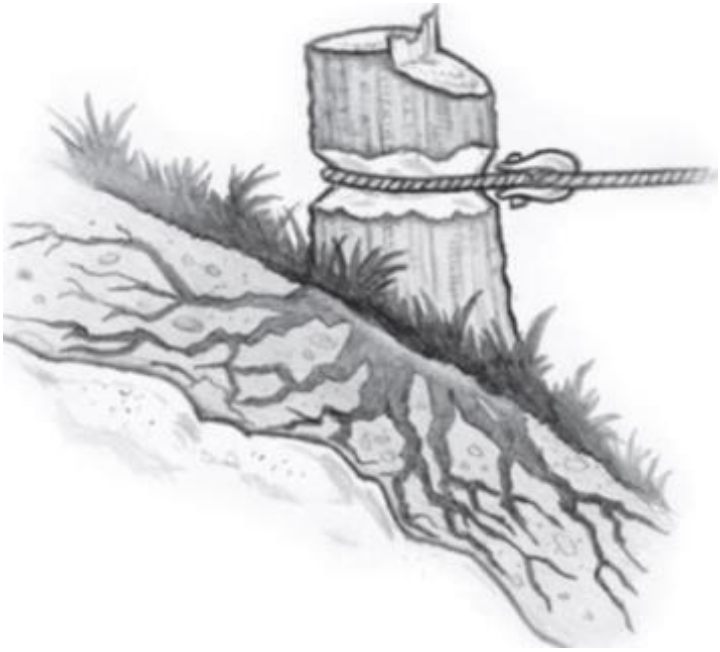
Unsuitable anchor stumps

Stumps on a rock face are unpredictable. Caution must be used if you are hanging on such a stump. The following are examples of unsuitable anchor stumps.

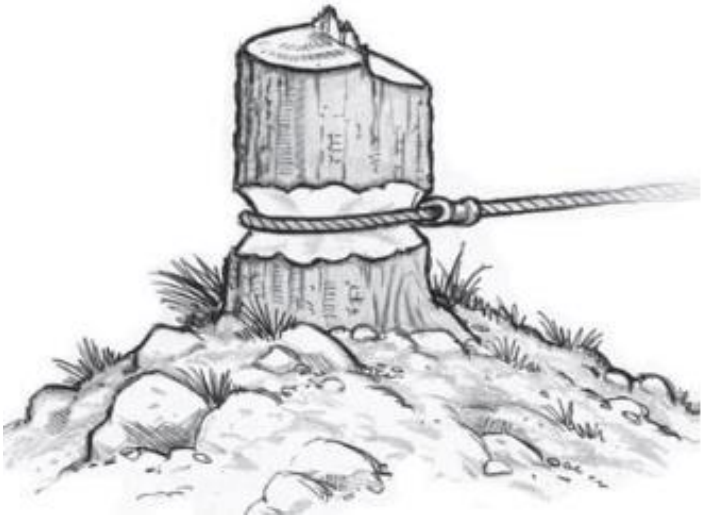
Stump disturbed by grade construction



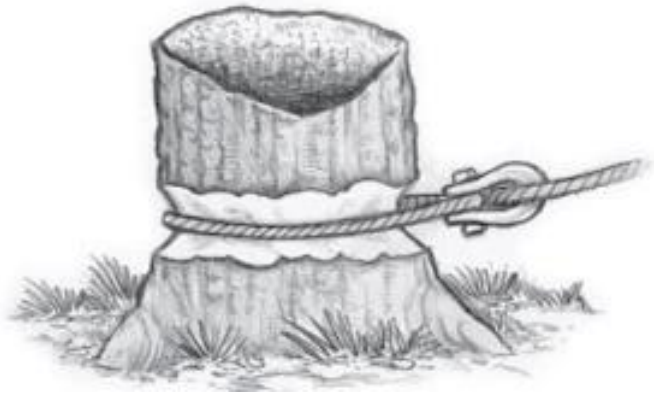
Stump at water table



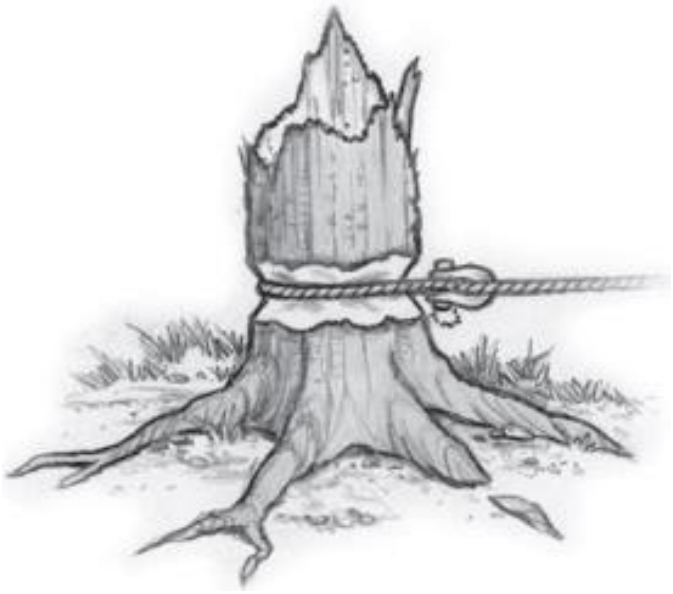
Stump on a shear rock face



Stump grown on loose rock



Stump with only shell wood



Stump of felled snag

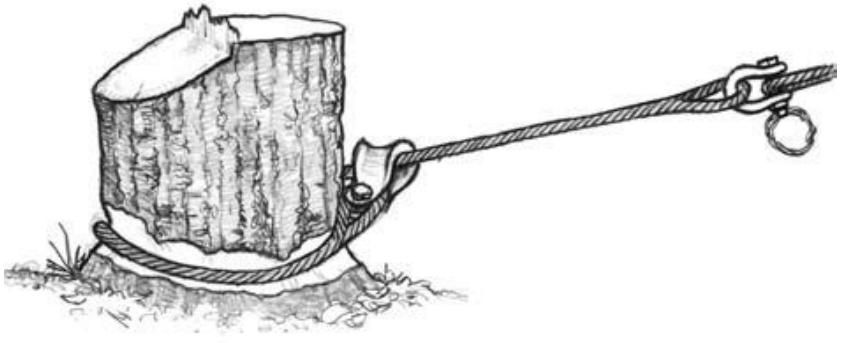
Depth

Stump anchors must be notched to a depth not greater than is necessary to safely secure the line to the stump. Cutting too deep reduces the diameter of the stump and effectively reduces its holding power.

Note: Deeper notching of swells, burls, and other irregularly shaped stumps is allowed so the line will be properly secured to solid wood.

Position

Keep the notch in lead with the guyline and with enough wood above the notch to prevent slabbing. The notch needs to be as low as possible, but do not cut off the roots. By placing the notch low, less leverage is exerted that could pull the stump out of the ground.



Guyline attachment with sleeve and bell shackles, knockout pins, and mollies.

Now complete the quiz on the next page.

Select, Notch, and Prep Guyline Stumps—Self-Quiz

1. What is the most preferred type of tree to use as stump?

   ☐ Douglas fir

   ☐ White pine

   ☐ Cedar

2. Should you select anchors that are equal distances away from the tower or lift tree?

   ☐ Yes

   ☐ No

3. Guylines that are straight back from the tower will load up slower than guylines off to the side.

   ☐ True

   ☐ False

4. What should you choose for guyline anchors?

   ☐ Trees

   ☐ Stumps

5. A notch that is too deep decreases the diameter of the stump and increases its holding power.

   ☐ True

   ☐ False

6. Is a stump on a sheer rock face a suitable anchor?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Select, Notch, and Prep Guyline Stumps—Quiz Answers

1. What is the most preferred type of tree to use as stump?

   Answer: **Douglas fir**

2. Should you select anchors that are equal distances away from the tower or lift tree?

   Answer: **Yes**

3. Guylines that are straight back from the tower will load up slower than guylines off to the side.

   Answer: **False**

4. What should you choose for guyline anchors?

   Answer: **Stumps**

5. A notch that is too deep decreases the diameter of the stump and increases its holding power.

   Answer: **False**

6. Is a stump on a sheer rock face a suitable anchor?

   Answer: **No**

Multiple stump anchors

In the event that a single stump is not adequate, multiple stumps must be tied together or an alternative anchor type must be considered. If in doubt, use multiple anchors.

Avoid the zipper effect. Multiple anchors are only as strong as the weakest link. If one stump fails, the entire system can fail in a surge. If possible, isolate tieback stumps in multiples, so if one anchor fails, other leads will hold.

Common methods for combining the holding power of multiple stumps include (a) wrap and go back, (b) twister tie back, and (c) bridle block.

Wrap and choke

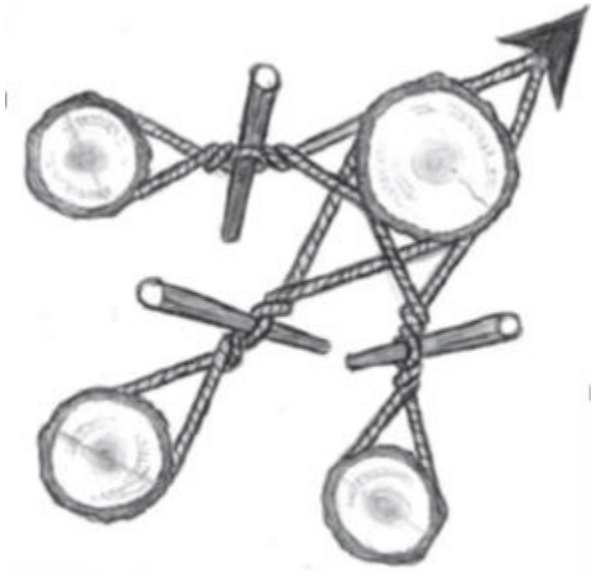
Wrap and choke stumps wrap the line around a front stump and anchor to the back stump. The front stump may hold approximately two-thirds of the load force and the back stump one-third, if the line transfers the load. When three stumps are used, the load to the third stump is negligible.

Twister tieback

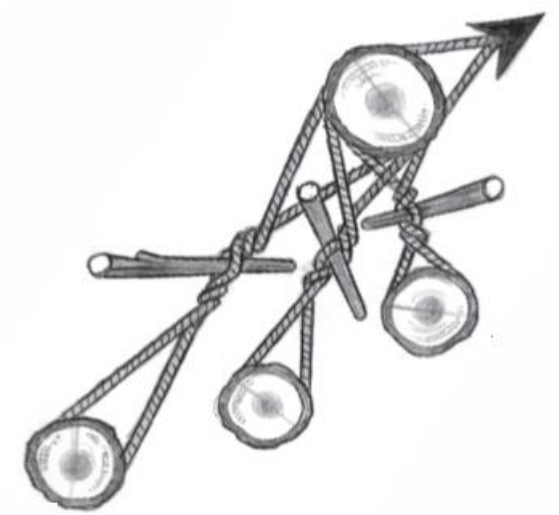
Twister tiebacks only take a few minutes to set up. To do it well, consider the following guidelines:

- Use a good, strong sapling or sturdy limb of sufficient strength, diameter, and length for the twister stick
- Locate the twister line close to the top of the front stump, unless there is concern about the roots pulling out while tightening the tieback
- Notch secondary anchors to prevent line slippage
- Wrap a piece of line around the front and back tree, and secure with a timber hitch wrapped under several times. Insert a sturdy stick in the opening created by the line and twist the line over itself until taut. Use a minimum of two wraps. Wedge the stick in the ground so it holds the wrap in the line
- Use caution when applying the twister stick. Keep it firm. Unexpected release can cause serious injury

Stump twister anchor



Effective setup: alignment in lead



Less effective setup: alignment not in lead

- Make sure the twister stick is planted securely, perpendicular to the twister lines. The rule is “firm but not tight”
- Don’t over-tighten by struggling to get one more turn on the twister stick. They need to be tightened before the load is placed on the original stump
- Longer twister lines require additional twister sticks to take up the slack and prevent line damage
- Never release a twister by cutting the twister pole with an axe or power saw. Carefully unwind the twister until the stored energy is completely released
- Two workers can apply tiebacks more quickly and safely together. Make sure a worker check system is in place when one worker does this job
- If two people do up the twister, then two people will undo it

Bridle block

Bridle stump anchors have a line tied to each stump with a block that floats on the line, allowing an even distribution of force to each stump (see diagrams on next page). Never place a dutchman in a guyline to place the guyline within its guy zone. Instead, consider a bridle block or other means to bring the guyline into line with an even distribution of force.

Cable clips and spikes

Guylines must be anchored to stumps with appropriate shackles or other connectors. When it is not possible to use a shackle and an eye to tie off the end of a line, use cable clips or spikes to secure the line.

Both of these options require special care to avoid injury. When cutting the guyline loose, always consider where the tail will go if the line takes off running. Never stand on the outside of the line.

Cable clips

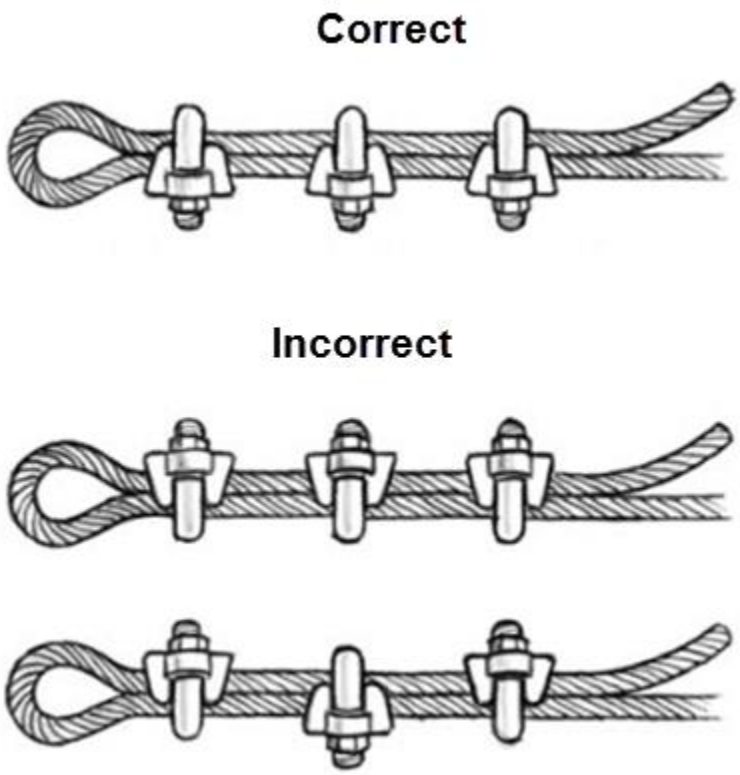
Cable clips are used to secure the end of lift-support guylines and jacklines. Select and notch a stump as shown earlier. Tighten the guyline or jackline using a rigging chain, come-a-long or power saw winch, or the strawline off the yarder. Take the end of the line and wrap the stump a minimum of three times, with the tail of the line pointing back at the support. Place the clips on the line as shown in the following images. Cable clips must be spaced at least six rope diameters apart. Nuts must be tightened evenly and re-checked after initial loading. When high-strength wire rope is used, one more cable clip must be added.

Guyline secured with cable clips

When removing cable clips from stumps, a reverse safety wrap must be applied and secured before loosening the last wrap. If there is strong tension in the line, use a come-a-long, power saw winch, or strawline to assist in lowering the line.

Cable clips must be attached correctly. Make sure the “U” section of the clip is in contact with the dead or short end of the rope as shown

in the following illustration. The middle and bottom arrangements are examples of incorrect attachments. A reminder on which way to place cable clamps is the term “Never saddle a dead horse.” Which means don’t use the saddle of the clamp on the dead end of the line.



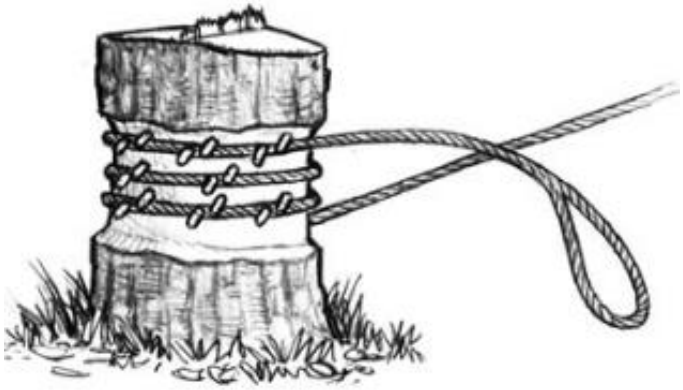
Cable clips

Spiked guylines

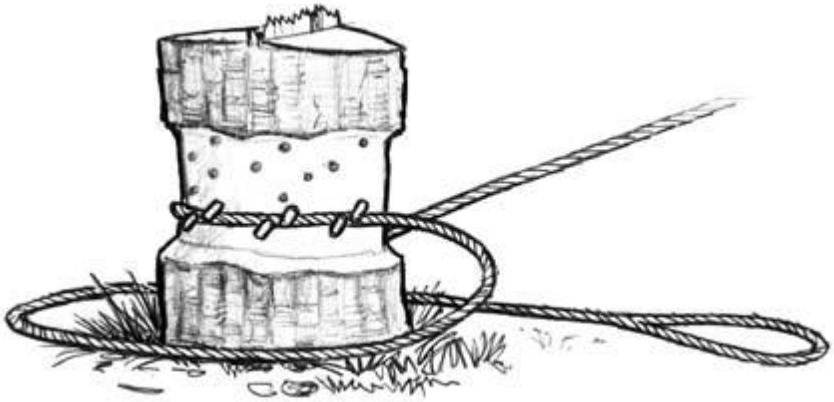
Spiked guylines are used in situations when additional guyline support is required and no drum is available on the yarder—typically for tailholds and supports for yarding lines. Spiked guylines require special precautions:

- Choose a stump that is large enough so that when the spikes are placed they will not degrade the stump to the point of being unsafe to use. Typically, larger lines use spiked guylines on larger stumps. Smaller lines may use cable clamps and tiebacks to multiple smaller stumps as necessary
- Spiked guylines must be anchored with at least 2½ wraps around the stump. The first strap with at least eight spikes or six staples in sound wood. The second with at least three spikes, and the top wrap, like the first, with eight spikes or six staples
- All the bark must be removed from the stump where the line is wrapped and spiked.
- Stay in the clear when the guyline wraps are being tightened. The guyline can be tightened with the strawline. You can hang a block in the guyline eye for a block purchase if you need get the guyline tighter

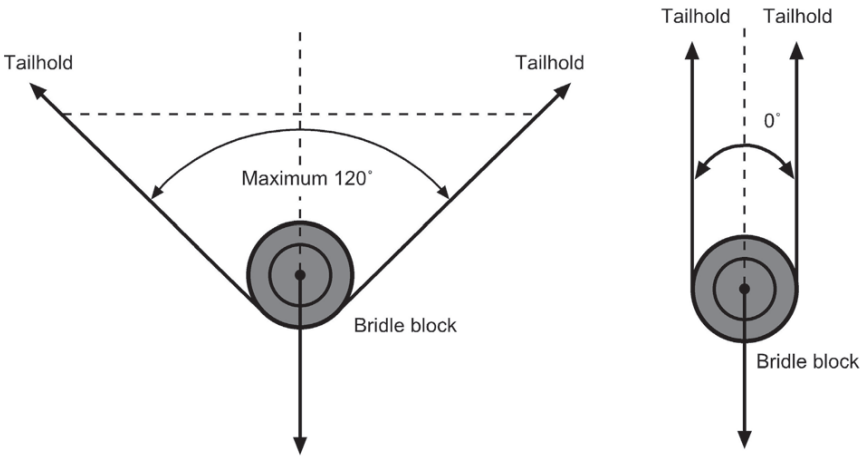
- When removing spiked guylines (or skylines) from stumps or trees, a reverse safety wrap must be applied and secured before loosening the last wrap, or the guyline must be held while the spikes are removed from the last wrap, and snubbed until the tension is relieved



Use eight spikes on the first wrap (or more to prevent the line from slipping), three spikes on the second wrap, and eight spikes again on the third wrap



Use reverse safety wrap when removing spikes



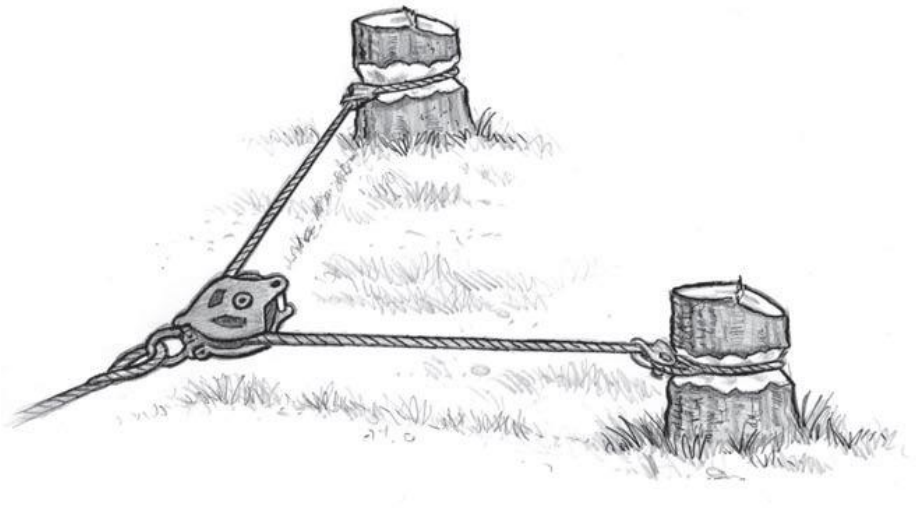
Bridle block angles

With a load of 10,000 pounds at a maximum angle of 120 degrees, each tailhold will receive 10,000 pounds of load.

With a load of 10,000 pounds at a minimum angle of zero degrees, each tailhold will receive a load of 5,000 pounds.

IMPORTANT!

Never exceed an angle of 120 degrees between the two legs of the strap. Wider angles increase the force on each stump. Angles more than 120 degrees produce a greater force than the original load. The less angle the better.



Bridle block

Now try the quiz on the next page.

Multiple Stump Anchors—Self-Quiz

1. In the wrap-and-go-back multiple stump, and three stumps are used, they all hold equal load.

   ☐ True

   ☐ False

2. In the twister tie-back system, you locate the twister line close to the top of the front stump.

   ☐ True

   ☐ False

3. The bridle stump anchor system allow for an even distribution of force to each stump.

   ☐ True

   ☐ False

4. Cable clips must be spaced at least how many rope diameters apart?

   ☐ 4

   ☐ 6

   ☐ 8

5. In spiked guylines, do you need to remove all the bark from the stump where the line is wrapped and spiked?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Multiple Stump Anchors—Quiz Answer

1. In the wrap-and-go-back multiple stump, and three stumps are used, they all hold equal load.

   Answer: **False**

2. In the twister tie-back system, you locate the twister line close to the top of the front stump.

   Answer: **True**

3. The bridle stump anchor system allow for an even distribution of force to each stump.

   Answer: **True**

4. Cable clips must be spaced at least how many rope diameters apart?

   Answer: **6**

5. In spiked guylines, do you need to remove all the bark from the stump where the line is wrapped and spiked?

   Answer: **Yes**

Alternate anchors

When adequate stumps are not readily available, alternate anchoring methods must be considered. Alternate anchors are typically more expensive and require additional time, special equipment, and in some cases engineering to set up.

Machine anchors

Machine anchors are the most versatile of the alternate anchor systems. They are easy to move and rig, and the fixed size of a particular machine provides consistent performance in comparable load situations. Machine anchors may be used for guyline or tail anchors. They are not suitable where access is limited or in positions that could interfere with other activities or where soil disturbance is an issue. Of course, using heavy equipment as an anchor for its sheer weight underutilizes expensive machinery.

The two most common types of machinery used for anchors are bulldozers and excavators. The following factors need to be considered for any machine anchor:

Size and weight of machine

The bigger and heavier the machine, the greater the holding power. Size is not the only factor. Follow the procedures for line attachment exactly to ensure the loaded line will exert downward pressure and maximize holding power. Experience is the best way to determine the stability of a particular machine. When experience is limited, apply lighter loads until assured of adequate stability.

Type of logging system

The type of logging system can greatly influence the forces being exerted on the machine. Uplift, side pull, or block purchase can all influence the holding power. When positioning the machine boom or blade, consider all forces being applied and compensate.

Condition of the soil and slope of the ground

Soil conditions and slope play an important role in the holding power of a machine anchor. Shallow or rocky soils will have less holding power than deep penetrable soils. A machine sitting on a relatively flat surface will have much more resistance to movement than a machine on uneven or downward sloping ground.

Holding aids

Look for embankments and stumps to help stabilize a machine anchor. With bulldozers, push a good volume of dirt in front of the blade; it is better if the bulldozer can be placed on the lower side of an embankment or with an upward slope.

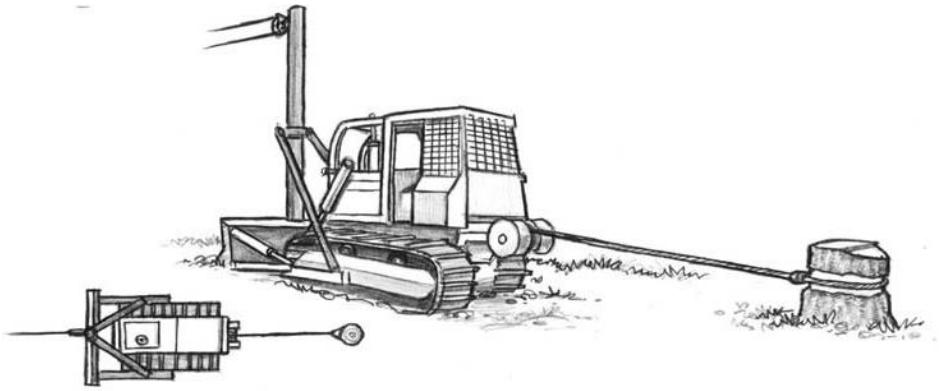
Horizontal and vertical angle of the line

Stability of the machine is greatly affected by the angle of the attached line. An angle that is too steep can apply upward pressure

that will reduce traction. Place the blade or boom so the pressure is applied straight on. Side pressure can make the machine tracks screw sideways or even overturn the machine. Tie back the machine to account for side pressures. Take extra precautions when multiple lines are attached.

IMPORTANT!

Any use of machines as anchors must be under the supervision of a competent person.



A bulldozer used as an anchor, tied back to a stump in lead with a raised spar to add lift to the back of the yarding road

Anchor security

As with any anchor system, ensure that the slack is pulled or rendered out of the system, before a load is applied. Regularly inspect anchors for any indications of movement. A tieback to a stump can be used to add stability to the machine.

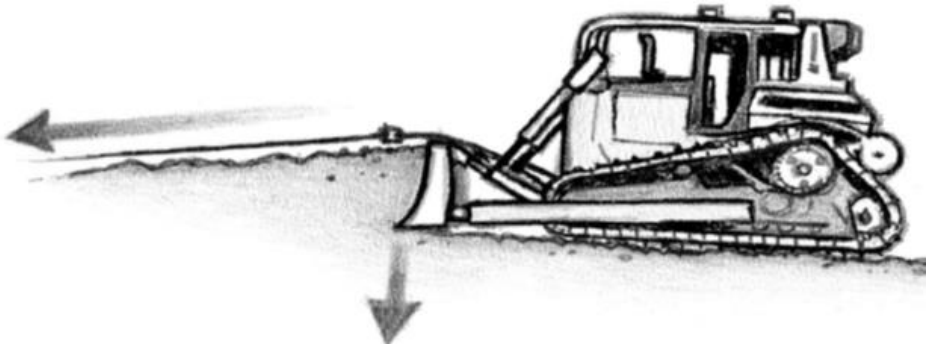
Bulldozers

The following steps are a reliable method for rigging a bulldozer anchor:

1. Place the blade in the direction of pull.
2. Place the machine on flat or up-sloping ground, or over an embankment, where possible.
3. Push up a full blade of dirt and park the bulldozer up against it.
4. Place the line over the top of the blade. Ensure the line is protected from the sharp top edge of the blade with a fixed sheave or shoe, or the equivalent. By placing the line over the blade, the line will create downward pressure, causing the blade to dig deeper as pressure is applied.
5. Tie off the line to the drawbar or around the winch at the back of the bulldozer.
6. Get in the clear. Ensure the operator is off the machine before the lines are tensioned.

IMPORTANT!

Never attach a line directly to the blade, which is not designed to withstand forward pressure.

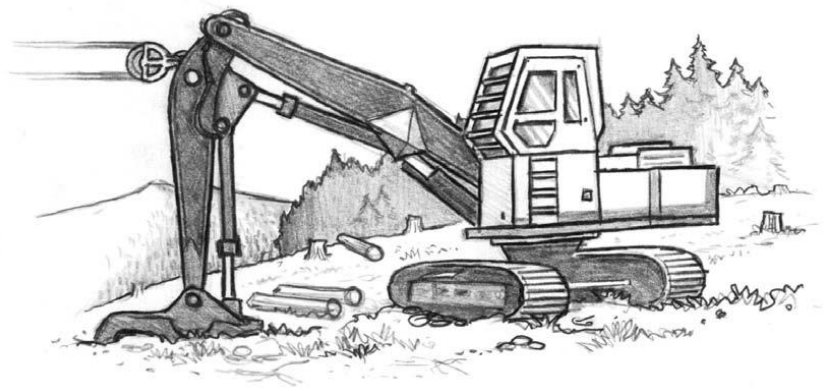


A bulldozer at a slight backward angle and dirt scooped in front of the blade gains stability by downward pressure in the direction of pull

Excavators

As with a bulldozer, try to find relatively flat ground for an excavator. Always face the direction of pull. Sideways forces are more of a problem with an excavator. The best position is up against a bank with the tracks parallel to the bank to oppose sideways movement. Sideways force can also be countered by orienting the tracks at 90 degrees to increase the effective width of the base. The rule of thumb is to keep the bucket ahead of the block on the stick.

Place the stick on the ground at an angle of 110 degrees to 130 degrees between boom and stick so the pull will push the stick deeper into the ground. Extending the stick more or less than this angle range will increase the lateral force and reduce holding power; less force will be directed down into the ground. Establish the attachment point on the boom as high as possible to maximize the downward pressure on the stick.



Attach the line higher up the stick and extend the stick to an angle of 110 degrees to 130 degrees to increase stability

Deadman anchors

A deadman anchor is a buried log or logs. Properly installed, a deadman anchor is more secure than a machine anchor and can be placed in uneven terrain or in areas where a machine anchor could be in the way of the operation.

A deadman anchors requires the following:

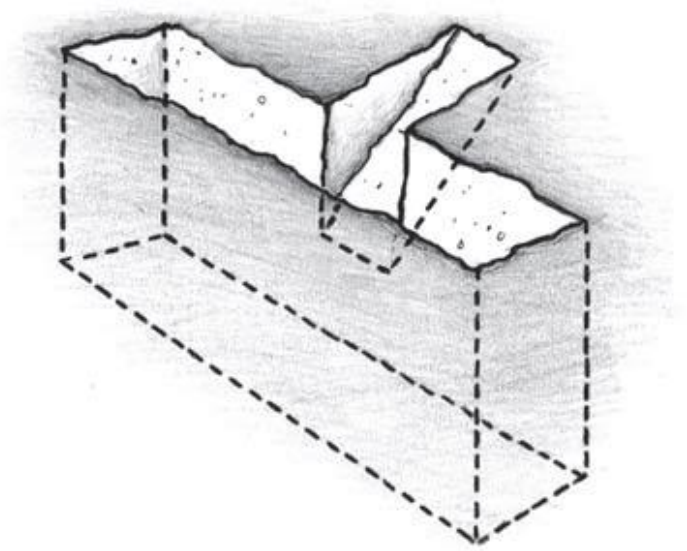
- Good soil depth
- Logs of adequate size and species (preferably fir)
- The ability to get an excavator to the site to dig a trench

Second support logs may be required if there is a steep upward pull on the deadman anchor or the single log is smaller than necessary. Observe the following steps when using a deadman anchor:

1. Determine the maximum load imposed on the deadman, the angle of pull, ground slope, soil type and compaction, and calculate the dimensions required for the log and the depth of the trench. A log of sufficient size is typically at least 16 feet long and 20 inches in diameter. The trench should be at least 4-5 feet deep. If available logs are too small, multiple logs wrapped in a bundle with a strap may provide sufficient holding power.
2. Bring in the excavator to dig the trench, ideally perpendicular to the direction of pull. The walls of the trench must be preserved at right angles, with an angled notch cut into the side facing the load where the line emerges. The notch should be no larger than the bucket width and at the center of the trench wall. The notch increases the horizontal pull and increases the holding power.
3. Place the line in the trench with the ends on each side at roughly equal distances. Place the log in the trench over the line and use the excavator to pull the line ends. If a second log will be used, pull the ends together on the side opposite the load and place the second log in the trench before pulling the ends together in the direction of the load.
4. Backfill the trench about half way, making sure the line ends are not buried.
5. Thread a chain through the eyes of the line and shackle the chain to the excavator to pull the lines even and tight.
6. Fill the rest of the trench, packing down the fill in stages with the excavator bucket. Do not disturb the front wall of the trench, which will weaken the anchor. Piling rocks on top of the deadman will help its holding power, if necessary.
7. Do not bury the line; the line connectors must remain plainly visible for inspection. Spray-paint across the ends of the line and the ground to detect anchor movement.

IMPORTANT!

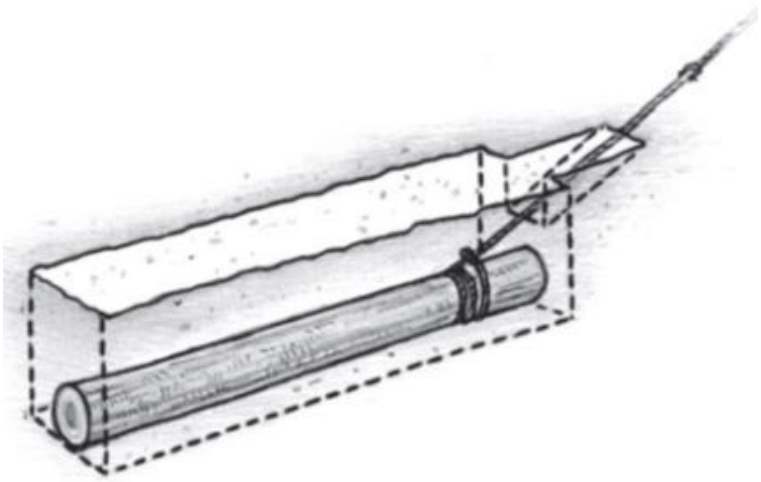
Beware of trench hazards. Workers should not need to enter the trench, but if it should be necessary, special precautions must be taken for any person working in a trench more than 5 feet deep.



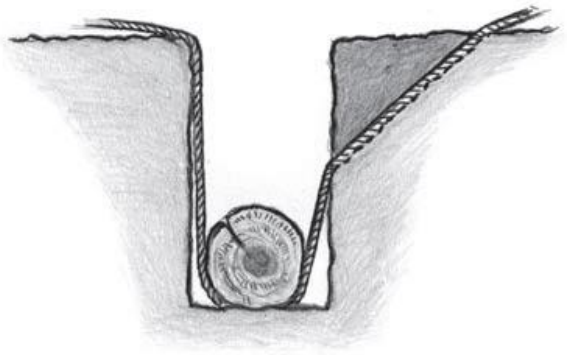
Install a small notch in the front face of the deadman trench to prevent vertical pull

IMPORTANT!

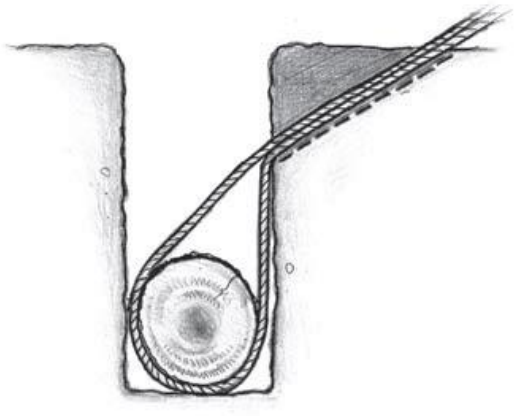
As the anchor point is brought closer to the yarder, the pull on the anchor is directed upward. A deadman closer to the yarder should be buried deeper.



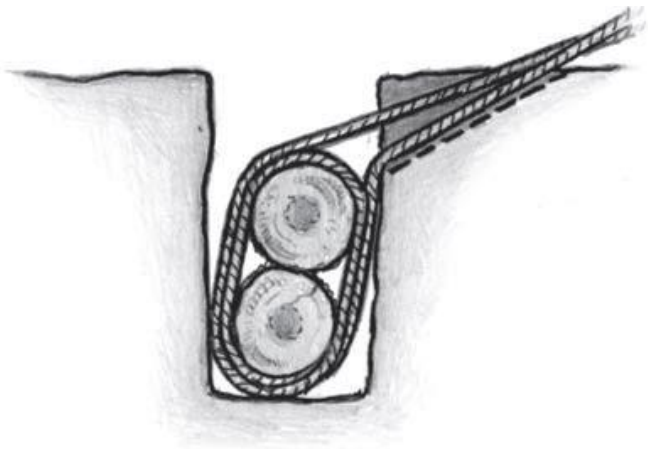
As a less secure alternative, if a perpendicular trench is not feasible, the trench can be installed parallel to the direction of the load



Place a strap in the trench with the ends extending on each side, and set the log



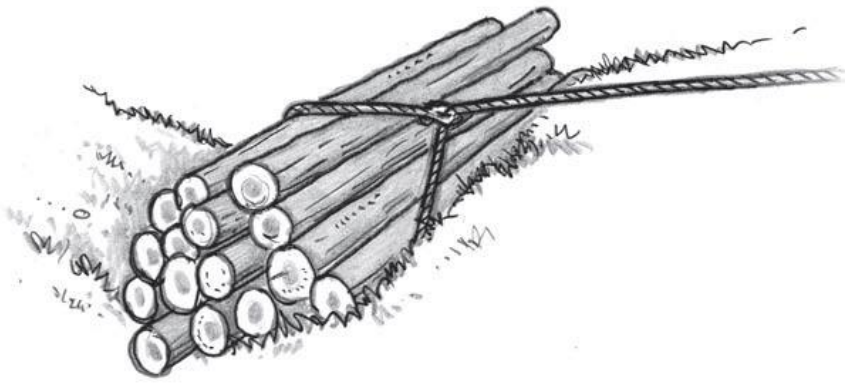
Pull both ends of the strap together and pull both eyes taut together before hooking up guylines



If only smaller logs are available, two logs may be wrapped together before setting in the trench

Log bundles

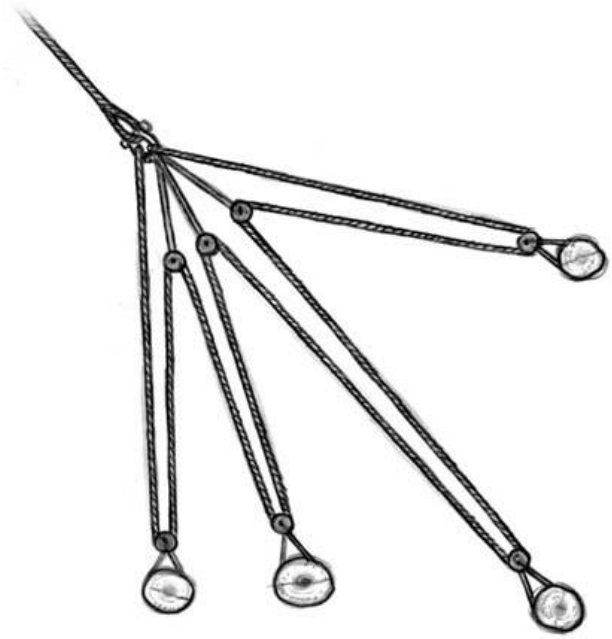
Log bundles can be used as an effective guyline anchor. A qualified individual must determine the maximum amount of pull that can be exerted on the line to be anchored. The weight of the bundle needs to be two to three times the exerted pull. The line needs to wrap around the entire bundle at its center, and the bundle positioned so both ends are secure and will not shift. The bundle must not be able to move.



Balance the load on multiple anchors

When using multiple minor anchors to support a line, take care to balance the load on the anchors. Use sheaves and straps to continually redistribute forces as the lines stretch and move. Without sheaves, one anchor can drop out, and the load will be shifted entirely to the remaining anchors.

Synthetic rope straps allow load sharing with variable lengths. Wire rope may require line clamps to align loading at proper lengths.



Place in a ditch or up against a bank in the direction of pull. The anchor needs to be monitored until a competent person is satisfied with its stability.

Rock anchors

Rock anchors may be necessary when other anchors are not possible. They are rarely used in British Columbia. Installation requires special equipment and training, and they are more costly and time-consuming to set up. Always follow the manufacturer's recommendations.

Rock anchor back-end

Here are two examples of a stump rig for a skyline and the twisters are rock anchors:

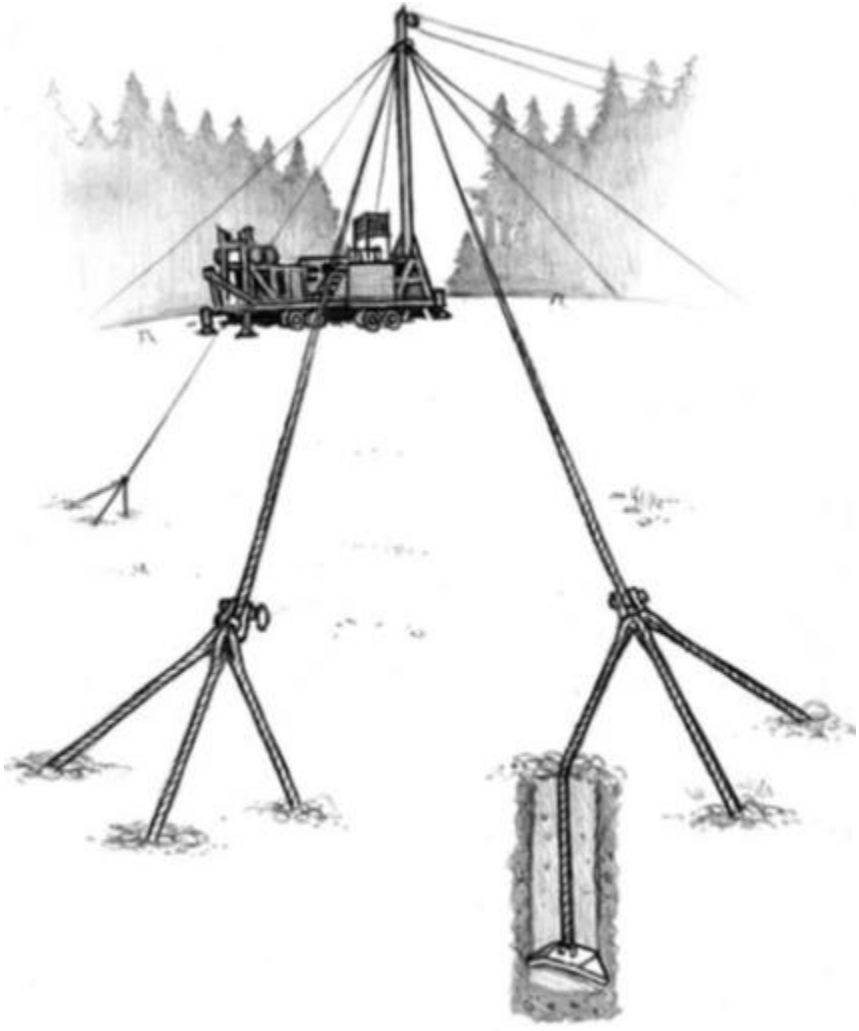
Tipping plates

Tipping plate anchors are used in clay, sand, or gravel. Manufactured in a wide variety of shapes and sizes, they are effective when installed correctly. In some conditions, a pre-drilled hole is used, then backfilled. In softer conditions, special vibrating installation equipment is required to force the anchor through the soil to a predetermined depth. The anchor is set by applying a heavy load.

When using tipping plates, do not directly attach guylines, skylines, or mainlines to the anchors. Attach a strap or system of straps from multiple anchors to hold the line. The combined strength of straps or

lines attached to multiple anchors must be equal in strength to the line held.

As with deadman anchors, do not bury the line; the line connectors must remain plainly visible for inspection. Spray-paint across the ends of the anchor line and the ground to supply an indicator for movement.



Tipping plates require multiple anchors for each guyline

Alternate Anchors—Self-Quiz

1. Which of the following alternate anchor systems is the most versatile?

   - ☐ Machine anchors
   - ☐ Bulldozers
   - ☐ Excavators
   - ☐ Deadman anchors

2. Using machine anchor, would shallow or rocky soils have more or less holding power than deep penetrable soils?

   - ☐ More
   - ☐ Less

3. For rigging a bulldozer anchor, where should you place the machine?

   - ☐ On flat or up-sloping ground
   - ☐ Over an embankment

4. The deadman anchor is not as secure as a machine anchor.

   - ☐ True
   - ☐ False

5. When using log bundle as an anchor, the weight of the bundle needs to be how many times the exerted pull?

   - ☐ 2-3
   - ☐ 4-5

Now check your answers on the next page.

Alternate Anchors—Quiz Answers

1. Which of the following alternate anchor systems is the most versatile?

   Answer: **Machine anchors**

2. Using machine anchor, would shallow or rocky soils have more or less holding power than deep penetrable soils?

   Answer: **Less**

3. When using an excavator as an anchor, it should:

   Answer: **Face the direction of pull**

4. The deadman anchor is not as secure as a machine anchor.

   Answer: **False**

5. When using log bundle as an anchor, the weight of the bundle needs to be how many times the exerted pull?

   Answer: **2 – 3**

Key Point 4.6: Spot the Rigging (Utility Person Only)

Spotting the rigging

This duty is usually performed by the rigging slinger but the utility person should be able to perform this task also:

- 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. 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

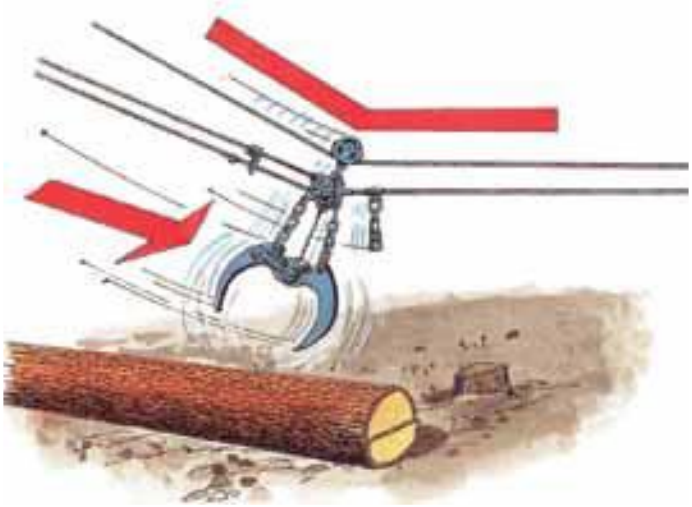
Spotting the grapple

Once the operator has yarded all the logs he can see, the spotter or utility worker then walks the yarding road to spot or guide the grapple onto the remaining logs. Hand signals must not be used; because of distance and limited visibility, all communications must be verbal. The crew must use UHF hand-held radios coordinated to a specific frequency. The use of a headset by the operator is recommended to ensure clear communications. Speak in a normal voice and keep your volume constant. Have a back-up log if you miss the first one.

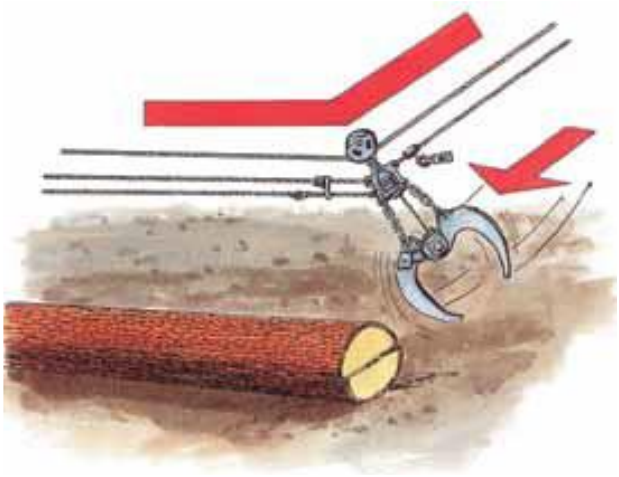
Some grapple yarders have cameras that are mounted onto the grapple and the video displayed is used by the operator to properly position the grapple. These cameras are effective and reduce the amount of spotting that needs to be done.

The amount of radio spotting of the grapple by the spotter is a direct reflection of the quality of planning and layout. Radio spotting of logs is a much slower process when compared to the operator's ability to see all the logs. Safe grapple yarding is directly proportional to the operator seeing the logs and having sufficient line deflection.

Stand in a safe position when talking a grapple onto a log



Slacking mainline



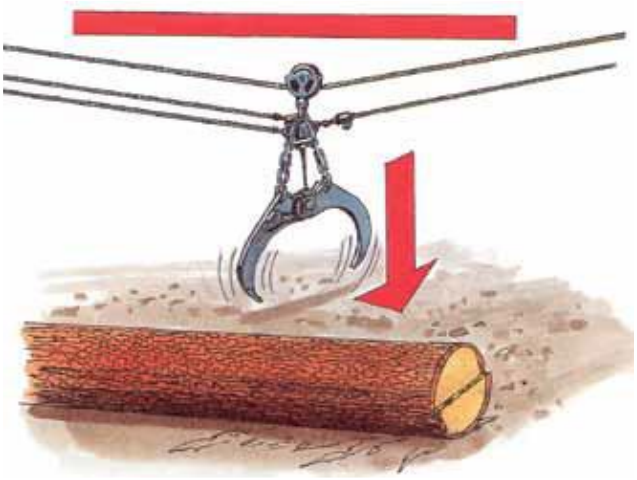
Slacking haulback

The movement of the grapple is no different than any other load suspended from two points. When you slack the front end (the mainline), the grapple travels toward the tailhold. When you slack the back end point of suspension (the haulback), the grapple moves toward the yarder. When both lines are slackened at the same rate, the grapple drops almost straight down. The distance that the grapple moves forward or back depends on how high it is suspended above the log.

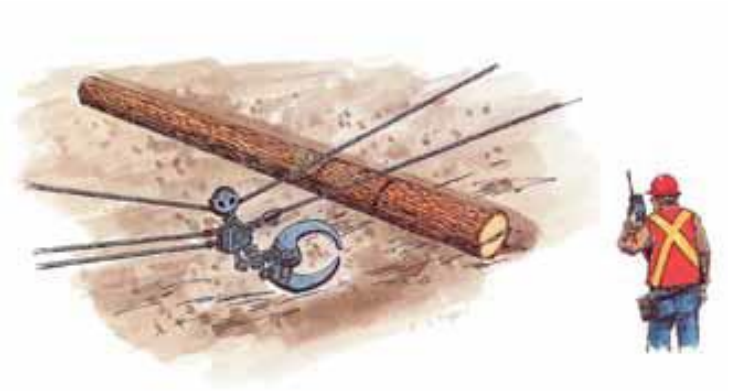
Often the grapple will rotate and miss the log as it is being slacked down. When the grapple misses the log, the spotter asks the operator to tightline. The spotter waits until the grapple is over the log and then requests slack.

It is important to use appropriate verbal signals consistently.

The concept of “close and hold” must be recognized. When spotting a log that is difficult to see from the clear area, a spotter must use the command “close and hold”, then move to a safe area and say, “close and go ahead.”



Both lines slackened



Grapple missed log

Grapple tightlined back on log

Grapple yarding verbal signals

To instruct operator to	Signaller says
Grapple log and go ahead	Close and go
Close grapple but not go ahead	Close and hold
Stop rigging	Stop
Open grapple	Open
Move empty grapple back	Back
Ahead on strawline	Ahead on the strawline
Slack mainline	Mainline
Slack haulback	Haulback
Lower grapple	Down
Slack strawline	Slack strawline
Swing to operator’s left	Swing left
Swing to operator’s right	Swing right
Hold haulback and go ahead on mainline	Tightline

This reduces the potential for injury caused by the operator receiving a command from an uncoordinated or overpowered transmitter. If there is interference from another radio, yarding must cease.

Whether the operator visually positions the grapple on a log or the log is grappled by radio spotting, the grapple must be positioned close to the end of the log. If the log is gut-hooked, the grapple should be repositioned once the log is swung into lead. Grappling the log close to the end minimizes log breakage and reduces the hazard to the ground crew of upending swinging logs and jill-poked logs in the landing.

Standing in the clear

Before giving the go-ahead signal, the spotter must ensure that he is well in the clear. “In the clear” means above and behind the log and grapple. Particular attention must be given to the hazard of the haulback side whip.

When yarding uphill, the spotter must always walk far enough across the sidehill to be clear of any logs and chunks that may be dislodged by the turn.

In the clear as turn moves to landing

Now try the quiz on the next page.

Spot the Rigging (Utility Person Only)—Self-Quiz

1. Is it safe to stand directly under elevated rigging?

   ☐ Yes

   ☐ No

2. The rigging is usually kept elevated until the chokers are untangled.

   ☐ True

   ☐ False

3. In spotting the grapple, can you use hand signals?

   ☐ Yes

   ☐ No

4. When both lines of the grapple are slackened at the same rate, it drops almost straight down.

   ☐ True

   ☐ False

5. What is the verbal signal for “lower grapple”?

   ☐ Lower

   ☐ Down

6. What is the verbal signal for “close grapple but not go ahead”?

   ☐ Close

   ☐ Close and no-go

   ☐ Close and hold

Now check your answers on the next page.

Spot the Rigging (Utility Person Only)—Quiz Answers

1. Is it safe to stand directly under elevated rigging?

   Answer: **No**

2. The rigging is usually kept elevated until the chokers are untangled.

   Answer: **True**

3. In spotting the grapple, can you use hand signals?

   Answer: **No**

4. When both lines of the grapple are slackened at the same rate, it drops almost straight down.

   Answer: **True**

5. What is the verbal signal for “lower grapple”?

   Answer: **Down**

6. What is the verbal signal for “close grapple but not go ahead”?

   Answer: **Close and hold**

Key Point 4.7: Check Guylines Often when Yarding Operations are in Progress

Re-check guylines and anchors

Once all lines are in place, re-check the guylines for correct tension to ensure they still share the load. Test the setup by passing several light turns over the system first, and re-check all the anchors again. Look for any signs that stumps, mobile anchors, or buried deadman anchors have moved. Check all connectors to ensure they have not shifted or are coming unconnected.

After several initial turns and daily, re-check all guylines and anchors.

Guyline layers and drum torque

A full guyline drum reacts differently than an empty drum, because the torque changes as spooled line increases the working diameter of the drum. Layers of line on a drum are like gears in a transmission: the first layer like low gear, exerting high torque at a low speed, and the top layer like high gear, with low torque at high speed. Operators should use extra caution when guylines are extended far out, leaving an empty drum. The drum's extra torque can over-tension a line.

Now try the quiz on the next page.

Check Guylines Often when Yarding Operations are in Progress—Self-Quiz

1. Once all lines are in place, you need to re-check the guylines for correct tension to ensure they still share the load.

   ☐ True

   ☐ False

2. Is it necessary to re-check all guylines and anchors after several initial turns?

   ☐ Yes

   ☐ No

3. A full guyline drum reacts differently than an empty drum.

   ☐ True

   ☐ False

4. The first layer is like high gear, exerting low torque at a high speed.

   ☐ True

   ☐ False

5. The top layer is like high gear, with low torque at high speed.

   ☐ True

   ☐ False

Now check your answers on the next page.

Check Guylines Often when Yarding Operations are in Progress—Quiz Answers

1. Once all lines are in place, you need to re-check the guylines for correct tension to ensure they still share the load.

   Answer: **True**

2. Is it necessary to re-check all guylines and anchors after several initial turns?

   Answer: **Yes**

3. A full guyline drum reacts differently than an empty drum.

   Answer: **True**

4. The first layer is like high gear, exerting low torque at a high speed.

   Answer: **False**

5. The top layer is like high gear, with low torque at high speed.

   Answer: **True**

Key Point 4.8: Do Basic Splices

You need to be able to demonstrate your ability to do basic splices.

For all of the splices which follow, your trainer will demonstrate how to perform the steps, as for some of the procedures there are many steps. Use these pages as a reference.

The logger's eye splice

This procedure has 56 steps.

Starting procedure

When splicing the second eye for a strap, the already-spliced eye should be in the position shown. The eye must be vertical and the cut off strands upright before the line is spiked secure. This will result in a curved strap that will fit nicely around a tree or stump.

The eyes will be turned correctly to fit in the shackle or gooseneck. This procedure is recommended for use with lines over ½" as demonstrated here.

Step 1: Spiking the line down securely

Whenever possible select a solid high stump on which to spike the line down.

- Drive four spikes into the stump, two on each side and the proper distance apart to hold the lines together.

- Keep the spikes well back from the edge of the stump to avoid splitting out.
- Drive the two spikes on the strand side down far enough so that the line can just be slipped in under the heads.
- Drive the other two spikes down only far enough so the lines can be inserted between the head of the four spikes. If they are driven too far down, the lines cannot be inserted.
- Leaving a good long end, insert the strand end first.
- Hold the strand end tight against the two spikes.
- Leave a large loop before inserting the other line between the four spikes.
- It is hazardous to try and spike down a small loop as the line can spring off the spikes violently.
- Some splicers secure the strand end with additional spikes before making the loop.
- When both lines are fitted between the spikes with a large loop, drive the spikes down to hold the line from springing out, but loose enough to allow adjustment to the loop and strand end.
- Drive one or two spikes in about half way between the two lines.
- Adjust the length of strand end desired, about 4 ft. (1.2 m).
- Spike the strand end secure.
- Adjust the loop to the size of eye desired, then spike it solid.
- Drive all spikes down solid.
- Be certain that the side to be spliced into is spiked solid so it will not turn when the splice is being made.

Step 2: Starting the splice

- Be sure to use properly tempered long marlin spikes.
- Work from the strand side and, using a soft hammer, drive the marlin spike under two strands.
- Start as close as possible to the stump.
- The marlin spike can be inserted more easily if it is driven in slightly, turned in the direction of the lay then driven through. Hold it tightly while inserting the spike so the spike does not jump out.

- If the spike pierces the core, drive another spike in clear in the correct place.

Step 3: Selecting and inserting the first strand

- When the spike is inserted clear under two strands, drive it well in, to open the line.
- Roll the spike down the lay of the line.
- Select a strand that is about two strand widths below the lay where the spike is.
- This is important to make a neat, tight splice and to bring the remaining strands into their proper place without bulging out.
- This first strand, when tucked, should be laid across sharply.
- Take the selected strand and press it across the line firmly to bend it into position.

- Without twisting the strand, insert it in the opening made by the spike.

- The strand is now ready to pull through into its first position.

Step 4: Rolling in and tucking the first strand

- Make sure that there is no twist in the strand and then pull it in firmly.
- Maintain tension on the strand to prevent it from slipping back.

Step 5: Completing the first tuck of #1 strand

- Keep a firm tension on the strand and bring it back under the line.

- Pull on the strand firmly and at the same time roll the spike back up the lay, pushing the strand ahead, as far up as it will go.
- Sometimes it may be necessary to tap the strand behind the spike to get it to lay in tightly.
- Keep a tension on the strand to prevent it from springing back. Pull the spike out.
- Tap the two overlaying strands lightly to help hold the tucked strand in place.

Step 6: Tucking the next strand #2

- Drive the spike in, one strand further down the line and under two, as shown.

Step 7: Second step in tucking strand #2

- Roll the spike down along the lay.
- Drive the spike well in to make a large opening.
- Press the strand firmly over the top to kink it slightly before inserting.
- Insert the strand and pull all the way firmly.

Step 8: Completing first tuck of strand #2

- Keep a firm tension on the strand and bring it back underneath.
- Roll it up the lay, tight against strand #1.
- Maintaining the tension, tap the strand tightly to set it in firmly.
- Remove the spike.

Step 9: Continuing the splice

- For strands #3 and #4, follow the same procedure used for strands #1 and #2.
- Be sure to keep all strands in tight, ensuring that they do not bulge out on the strand side.
- Take care to roll the strands as far up the lay as possible.
- Do not remove the spike yet.

Step 10: Inserting the spike for the second tuck of strand #1

- After #4 strand is tucked once and rolled up tight, leave the spike in.

- Roll the spike back up the lay and press down firmly.
- This will open the line slightly and expose the core, making it easier to insert a second spike.
- Drive a second spike down between the core and under two strands.

- This can also be done by removing the first spike and driving it the same way as when tucking the four strands, but two strands away from the last strand instead of only one.
- This method could be used throughout the splice, and the end result would be the same.

- When the second spike is inserted, remove the first spike from the line.

Step 11: Inserting #1 strand for its second tuck

- Drive the second spike well in to form a good opening.
- Roll the spike down along the lay, keeping the unravelled strands #5 and #6 and the core on top of the spike.
- Take #1 strand under the splice and pull it up solidly against the underside of the splice. This will tend to bend the strand slightly so it will lay in better.
- From the splice side, insert the strand through the opening on the upper side of the spike, underneath the two strands.
- Make sure strands #5, #6 and the core are on top, outside the loop of strand #1.

Step 12: Continuing with #1 strand

- Pull strand #1 all the way through with the spike in this position.
- Make sure that the strand is pulled up tightly, and there is no loop left underneath.
- Keep a strong, steady tension on the strand to prevent it from springing back underneath, creating a loop.

Step 13: Near completion #1 strand, second tuck

- Pulling hard on the strand, roll the spike up the lay, forcing the strand ahead of it.

Step 14: Completed second tuck of #1 strand

- Keeping a strong tension on the strand, roll the spike all the way, forcing the strand as far as it will go.
- Keep firm tension on the strand until the spike has been removed.

Step 15: Inserting the spike to tuck the #1 strand for the third time

- Drive the spike in, one strand down the line from where #1 strand is protruding on the second tuck.
- The spike is driven one strand away, and under two strands, exactly the same distance apart as the first four.
- Drive it well in to make a good opening.

Step 16: Inserting #1 strand for the third tuck

- Roll the spike down the lay of the line.
- Before inserting the strand, press the strand over and down into the position where it will be when tucked.
- This will tend to bend it, making it easier to pull in tight.
- Insert the strand and pull it all the way up tightly with the spike in this position.

Step 17: Completing the third and final tuck of strand #1

- Holding a tension on the strand, pass it under the line.
- Pull it firmly to the line side, and at the same time roll the spike up the lay, forcing the strand up tight as far as it will go.
- Do not hammer on top of the strand if it does not lay right in, because this will force it back underneath, forming a loop. If it does not lay right in, roll the spike back down the lay and pull from the other side again, but harder this time.
- Do not remove the spike when the third tuck is completed.

Step 18: Commencing the first tuck of strand #5

- After strand #1 is tucked in tight on the third tuck, leave the spike in the line.
- Roll the spike down the lay of the line to where it was when tucking the last strand.
- Drive it in to make a good opening, as strand #5 will go in the same place.
- Insert strand #5 as with the other strands.
- Pull it all the way through, up tight with the spike in this position.

Step 19: Completing the first tuck of strand #5

- Holding a good tension on the strand, pass it under the line.
- Still pulling on the strand, roll the spike up the lay, forcing the #5 strand up tight against the completed tucked #1 strand.
- This first tuck can be tapped in to shorten the strand side, because it is the first tuck and cannot be driven back.
- It is important to pull these first tucks in as much as possible to make a professional job.
- Leave the spike in the line.

Step 20: Preparing to tuck strand #2 for the second time

- Roll the spike back up the lay as when tucking strand #1 for the second time.
- Press the spike down solidly to help open the line, exposing the core. This will make it easier to insert the second spike.
- Insert the second spike alongside the core and under two strands exactly as shown in Step10.

Step 21: Tucking strand #2 for the second tuck

- Follow the same procedure as with strand #1 throughout the remainder of the splice.

Step 22: Completed second tuck of strand #2

- The completed second tuck of strand #2 is shown in this illustration.

Step 23: Starting third tuck of strand #2

- This illustration shows the starting position of the third tuck of strand #2.

Step 24: Completed #2 strand, tucked three times

- Leave the spike in to start the first tuck of #6 strand.

Step 25: Starting first tuck of strand #6

- Roll the spike down the lay. Insert #6 strand for the first tuck. Pull it through, up tight.

Step 26: Completing first tuck of strand #6

- Pass the strand under the splice and roll it into place with the spike for completion of the first tuck of strand #6. Leave the spike in.

Step 27: Preparing to tuck strand #3 the second time

- Insert the second spike to place the second tuck of strand #3.

Step 28: Starting second tuck of strand #3

- Remove the first spike. Roll the second spike down the lay.
- Pull #3 strand up hard under the splice to bend it. Insert it through the opening above the spike.

Step 29: Completing second tuck of strand #3

- Pull the strand through firmly so it is tight underneath.
- Pull the strand firmly. At the same time, roll the spike up the lay of the line, forcing the strand as far as it will go. Remove the spike.
- This completes the second tuck of strand #3.

Step 30: Preparing third tuck of strand #3

- Drive the spike through, one strand away and under two, as before.
- Roll the spike down the lay, keeping a good opening.
- Bend the strand and insert it with the spike in this position.

Step 31: Completing third tuck of strand #3

- Pull the strand through from the strand side.
- Place the strand back under the splice.
- Pull it hard from the line side.
- Roll the spike up the lay, forcing it into place. This completes the third tuck for strand #3. Do not remove the spike.

Step 32: Tucking the core

- When tucking the core for the first time, use the same procedure as for any strand.
- Roll the spike down the lay of the line.
- Drive the spike to make a wide opening as the core is slightly larger than a strand.
- Insert the core and pull it through from the strand side.

Step 33: Still tucking the core

- Pass the core under the line. Pull it tight.
- Roll the spike up the lay, forcing the core in tight against the #3 strand.
- Leave the spike in the line.

Note: The first tucks of #5, #6 and the core are tucked in the same place, behind the third tucks of #1, #2 and #3.

Step 34: Tucking #4 strand again

- Tuck #4 strand for the second time.
- Roll the spike up the lay, press down and drive in the second spike.

Step 35: Still tucking #4 strand

- Remove the first spike and roll the other one down the lay.
- Bring the #4 strand under the line, then pull it up firmly to bend it.
- Insert the strand and pull it through from the line side.

Step 36: Still tucking #4 strand

- Keep a firm tension on the strand.
- Pull it hard from the strand side. At the same time, roll the spike up the lay, forcing the strand in tightly.
- Keep tension on the strand when removing the spike.
- The #4 strand is tucked two times.

Step 37: Still tucking #4 strand

- Tuck #4 strand for the third time.
- Drive the spike one strand away from the tucked core and under two.

Step 38: Still tucking #4 strand

- Roll the spike down the lay of the line.
- Force the strand across the top of the splice to bend it a little.
- Insert the strand from the line side and pull it through tightly from the strand side.

Step 39: Final tuck #4 strand

- Keep tension on the strand.
- Pass it under the splice.
- Pull it firmly from the line side. At the same time, roll it into place with the spike up the lay.
- Leave the spike in.

Note: There are no strands left to go in with this tuck.

Step 40: Starting to tuck #5 strand again

- Tuck strand #5 for the second time.
- Roll the spike up the lay and press down to open the line.
- Drive in the second spike between two strands and the core.
- Remove the first spike.

Step 41: Still tucking #5 strand

- Roll the spike down the lay.
- Bring strand #5 under the line.

- Strand #5 is protruding with the third tuck of strand #1. Strand #5 will be the lower strand of the two. If the two strands are pressed together, follow them to make sure you have the correct strand #5.
- Bend the strand and insert it from the strand side.

Step 42: Still tucking #5 strand

- Pull the strand through, up tight from the line side.
- Holding the tension, pull the strand up the lay from the strand side.
- Roll the spike up the lay, forcing the strand in place.
- Remove the spike.

Step 43: Final tuck #5 strand

- Tuck #5 strand for the third and final time.
- Drive the spike in, one strand away from #5 and under two strands.
- Roll it down the lay.
- Force the strand over the top of the splice to bend it.
- Insert the strand from the line side.

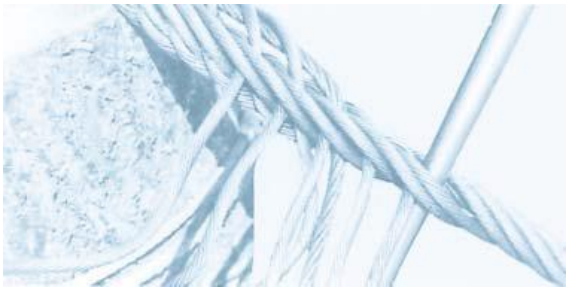
Note: If you are splicing unusually tight line, and it becomes difficult to insert the spike, have a bar held under the splice and on the stump.

Step 44: Still on final tuck of #5 Strand

- Pull the strand through up tight from the strand side.
- Keeping a tension, pass the strand back underneath.

Step 45: Finished final tuck #5 strand

- Pull the strand firmly from the line side.
- Roll the spike up the lay, forcing the strand into place.
- This completes three tucks of #5 strand.
- Leave the spike in.



Step 46: Starting to tuck #6 strand again

- Tuck the #6 strand for the second time.
- Roll the spike up the lay and press down to open the line.
- Drive in the second spike between the core and two strands, as with the other five strands.
- Remove the first spike.

Step 47: Still tucking #6 strand the second time

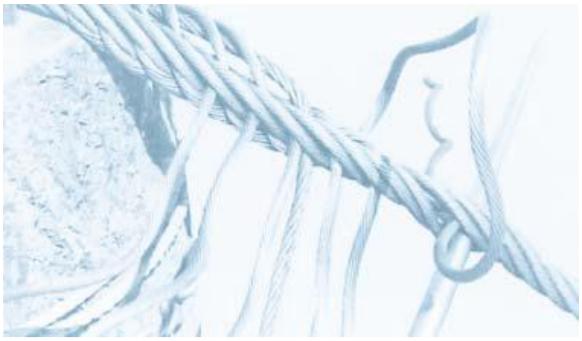
- Roll the spike down the lay.
- Drive the spike in to make a good opening.
- Pull the #6 strand up underneath firmly to bend it slightly. Be sure you have the correct strand. Strands #2 and #6 will be in the same lay.
- Insert #6 alongside the spike from the strand side.

Step 48: Finishing the second tuck of strand #6

- Pull the strand through tightly from the line side.
- Pull the strand back up the lay of the line from the strand side.
- Roll the spike up the lay to force the strand into place. This completes two tucks of strand #6.
- Remove the spike.

Step 49: Starting the third tuck of strand #6

- Tuck strand #6 for the third and final time.
- Drive the spike in from the top of the line, angled down the lay, one strand down from strand #6 and under two.
- Roll the spike down the lay.
- Bend the strand as before and insert it as shown.



Step 50: Finishing the third tuck of strand #6

- Pull the strand firmly through from the strand side.
- Hold the tension on the strand and pass it to the line side.
- Pull it firmly up the lay.
- Roll the spike up the lay to force it into place.
- This completes three tucks of strand #6.
- Leave the spike in.

Step 51: Starting the second tuck of the core

- Tuck the core for the second time.
- Roll the spike up the lay and press it down to open the line.
- Insert the second spike as before, alongside the core and under two strands.
- Remove the first spike.

Step 52: Still tucking the core the second time

- Roll the spike down the lay of the line.
- Drive it in to make a good opening as the core is slightly larger than the strands.
- Bring the core under from the line side and pull it up firmly to bend it a little.
- The core is in the same lay as #3 but it is easily recognizable.
- Insert the core in the space on the top side of the spike, as for the other strands.

Step 53: Finishing the second tuck of the core

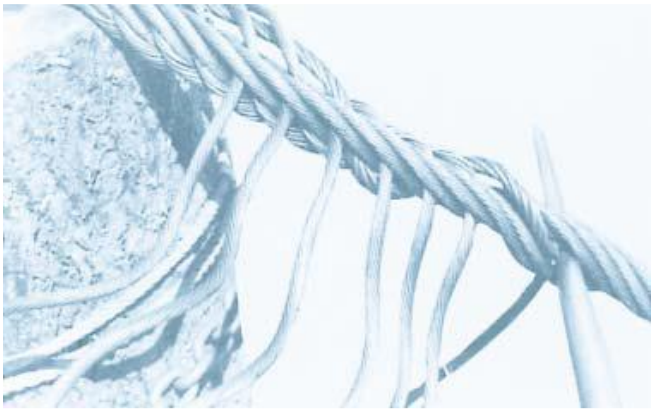
- Pull the core through tightly from the strand side.
- Keep tension on the core.
- Pull it over the top of the splice, up the lay.
- Roll the spike up the lay to force the core into place.
- This completes two tucks of the core.
- Remove the spike.

Step 54: Starting the third tuck of the core

- Tuck the core for the third and final time.
- Drive the spike from the top in the direction of the lay, one strand away from the core and under two.
- Roll the spike down the lay, making a good opening.
- Bend the core and insert it as shown.

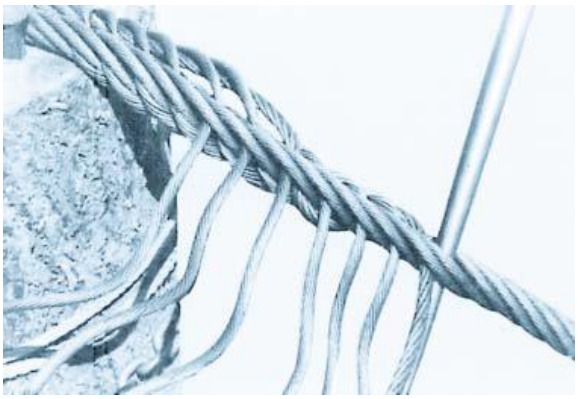
Step 55: Still tucking the core the third time

- Pull the core through tightly from the strand side.



Step 56: Finishing the third tuck of the core

- Bring the core back under the splice and pull it up the lay from the line side.
- Roll the spike up the lay, forcing the core into place.
- This completes the splice with all the strands and core tucked three times.
- Remove the spike.



Completed strap

- Because the first strand was kept crossed over sharply, the remaining strands have not bulged out. The second eye

splice of a strap was made with the first eye in the correct position (eye vertical with the strands upright) and the strap and eyes are curved correctly for easier hanging. This is most important when splicing short straps.

Now try the quiz on the next page.

Logger's Eye—Self-Quiz

1. This procedure is recommended for use with what diameter lines?

   ☐ Over ½ in. (38 mm)

   ☐ Under ½ in. (32 mm)

2. How many spikes do you drive into the stump to hold the line down?

   ☐ Two spikes

   ☐ Four spikes

3. To start the splice, you drive the marlin spike under how many strands?

   ☐ Two strands

   ☐ Four strands

4. How many times do you tuck the first strand?

   ☐ Two times

   ☐ Three times

5. How many times do you tuck the core?

   ☐ Two times

   ☐ Three times

Now check your answers on the next page.

Logger’s Eye—Quiz Answers

1. This procedure is recommended for use with what diameter lines?

   Answer: **Over ½ in. (32 mm)**

2. How many spikes do you drive into the stump to hold the line down?

   Answer: **Four spikes**

3. To start the splice, you drive the marlin spike under how many strands?

   Answer: **Two strands**

4. How many times do you tuck the first strand?

   Answer: **Three times**

5. How many times do you tuck the core?

   Answer: **Three times**

Farmer’s eye

As with the previous splice, your trainer will demonstrate this procedure to you.

The Farmer’s eye is formed by unraveling the line in two sections and laying the sections together again in a loop.

The farmer’s eye is known by several names including:

- Molly Hogan eye
- Flemish eye
- Canadian eye

The Farmer’s eye is mainly used in temporary or emergency situations where there will not be any excessive loadings.

Unless sufficient clamps are used, the Farmer’s eye is not as strong as a spliced eye.

If the Farmer’s eye is yarded backward through the brush it will generally pull apart.

Sometimes the Farmer’s eye is formed by dividing the line into two and four strands. However, unless clamps are used, it is better to divide the line three and three.

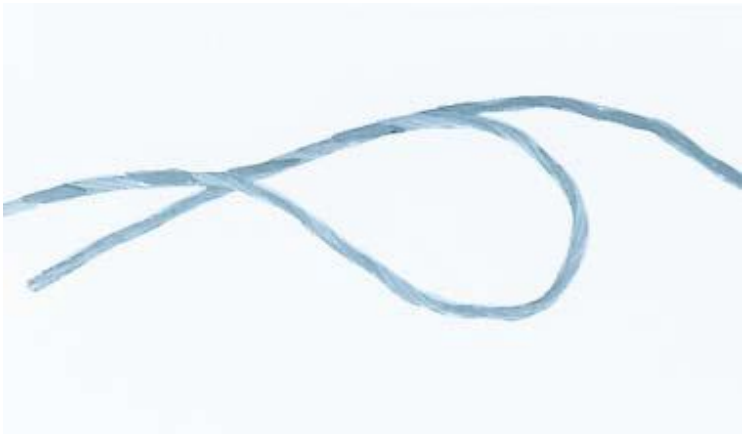
The heavier the line used to make the eye, the larger the loop should be, to make it easier to form the eye.

Forming the Farmer’s eye

Step 1

- Split the line in half, with three strands in one section and three strands plus the core in the other.

- Be sure to unravel enough line to make the size of eye desired, leaving sufficiently long ends to wrap together after the eye is formed.



Step 2

- Form the loop for the eye from the section with three strands and the core. It is easier to wrap the lighter section around the one with the core.

If making the eye by splitting the line into two strands and four strands plus the core, use the four strands and core to form the loop.

When forming the loop, leave ends long enough to wrap together at least two or three times.

Both ends are wrapped to the bottom and crossed.

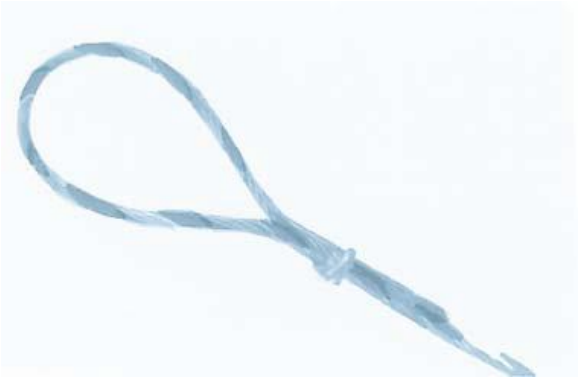
Step 3

- Cross the two ends over and wrap them together to the end.

The eye is completed with the strands crossed over and wrapped together again.

With two or more clamps attached, depending on the use, the eye will take as much stress as the line.

The eye is not suitable for use where it will be dragged through the brush, because it will be torn apart.



Farmer’s Eye, with the wrapped ends clamped to the line

The Farmer’s Eye can be strengthened considerably by tucking the strands after the eye is formed rather than just rolling the ends together.

Farmer’s Eye—Self-Quiz

1. The Farmer’s Eye is also known as the Molly Hogan Eye.

   ☐ True

   ☐ False

2. The Farmer’s eye is used for temporary or emergency situations where there will not be any excessive loadings.

   ☐ True

   ☐ False

3. You form the loop for the eye from the section with three strands?

   ☐ True

   ☐ False

4. If making the eye by splitting the line into two strands and four strands plus the core, which do you use to form the loop?

   ☐ The two strands

   ☐ The four strands and core

5. Is the Farmer’s Eye suitable for use where it will be dragged through the brush?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Farmer’s Eye—Quiz Answers

1. The Farmer’s Eye is also known as the Molly Hogan Eye.

   Answer: **True**

2. The Farmer’s eye is used for temporary or emergency situations where there will not be any excessive loadings.

   Answer: **True**

3. You form the loop for the eye from the section with three strands?

   Answer: **False**

4. If making the eye by splitting the line into two strands and four strands plus the core, which do you use to form the loop?

   Answer: **The four strands and core**

5. Is the Farmer’s Eye suitable for use where it will be dragged through the brush?

   Answer: **No**

Connecting Molly Hogans

A Molly Hogan is a strand of line wrapped around in the lay of the strands a number of times to form a circle. If the strand is wrapped around in a circle sufficiently often, the Molly can be used as a link to join lines and rigging.

A Molly is normally used in an emergency, or temporarily, until proper connecting devices can be obtained. The use of a Molly Hogan on a skyline or standing line is prohibited.

Mollies are used to connect strawlines on steep terrain to prevent the extensions from coming unhooked. A Molly is used on running lines where shackles cannot be run through leads such as on reefing lines, mainline and haulback extensions.

Mollies must be checked often, because they wear rapidly and cut the eye splices that they are joining.

Often on running line extensions, two Mollies are used together to join the eyes. If this is done, they must be of the same diameter, but need not have the six full wraps.

A Molly made properly with six full wraps and either tucked or rolled is a strong connecting link, although it will suffer from rapid wear and cutting.

Step 1

- To make a proper Molly, get a long strand.

The smallest diameter Molly that should be made with a 7⁄8 in. (22 mm) line strand requires a strand 15 ft. (4.5 m) long.

To make a full, six-wrap Molly with the ends rolled in will require 20 ft. (6 m) of strand, to allow for trimming.

When the first wrap is made, the circle should have a minimum of five corners.

A larger diameter Molly, with more corners, will require more strand.

Below is the wrong way to wrap a strand when making a Molly.

Step 2

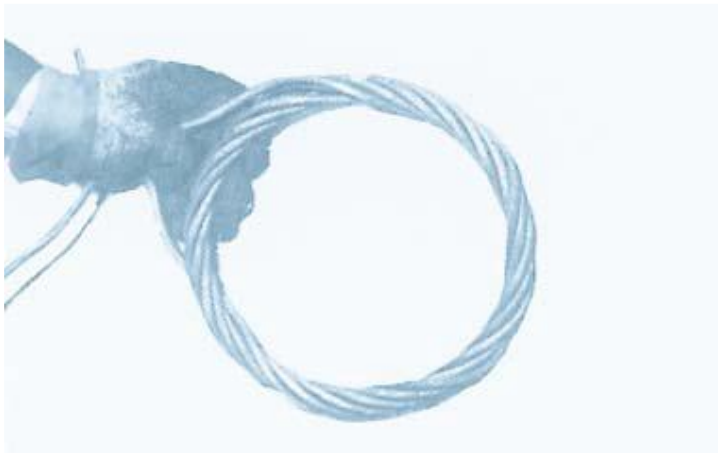
- Start a Molly from any section of the strand.
- Start the Molly from the middle of the strand to avoid handling the long strand ends.

Here, the Molly is started at one end with the bight of the strand pushed through when wrapping.

Here's a Molly with five full wraps.

With five wraps, the Molly is full and there appears to be no lay for another wrap.

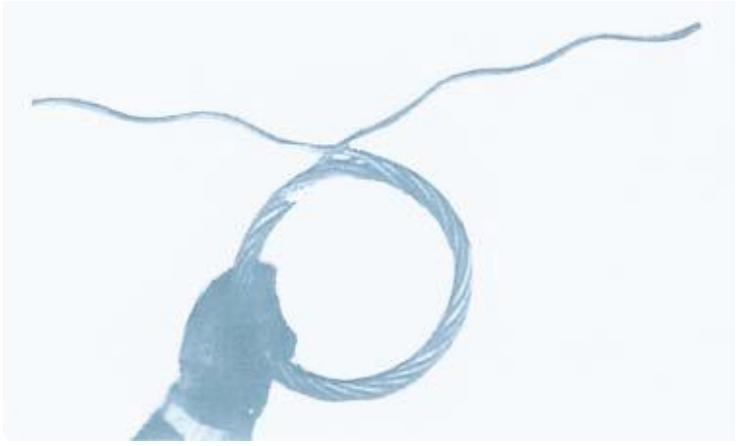
The sixth wrap is laid over the closed five wraps and appears to lay on the top.



Step 3

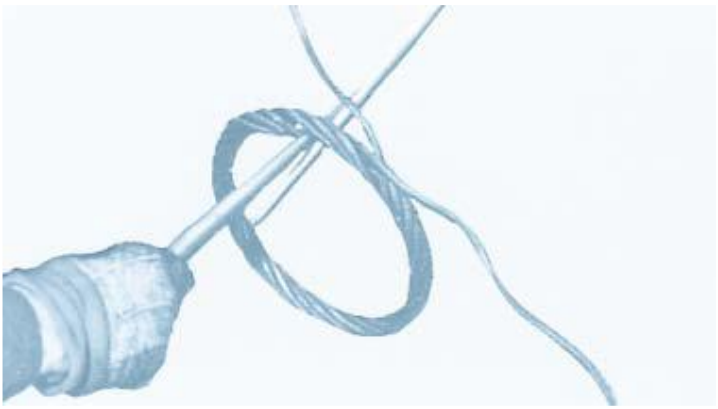
- Hammer the sixth wrap around the marlin spike to lay it in.

The Molly now has six full wraps. The strands should be crossed at every wrap.



Step 4

- Cross the strands to roll the ends in.
- Push the spike through the centre of the Molly, with the point coming out where the strand is to be rolled in.
- Each strand must cross over the other at the start of rolling in.

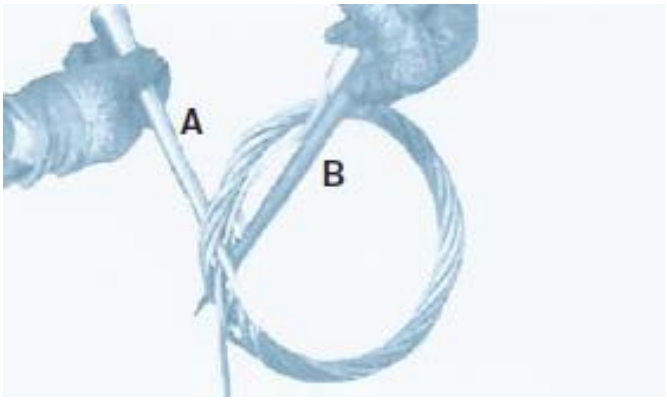


Step 5

- Push spike B through the same place as spike A but from the other direction.

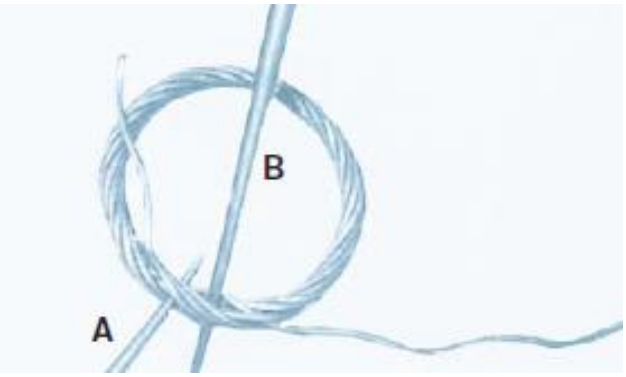
Step 6

- Place the strand to roll in between the spikes.
- Cross the point of spike A over spike B and force the strand into the centre of the Molly.



Step 7

- Bring spike A back, keeping it tight against the strand, and roll the strand inside the Molly.

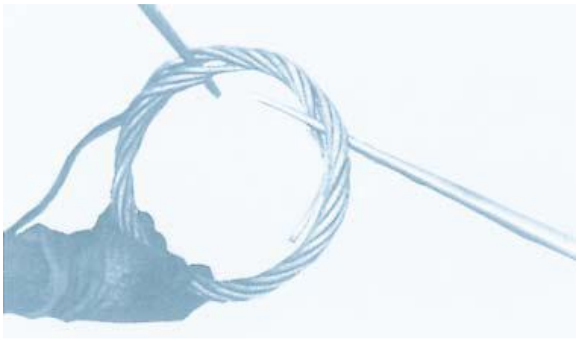


Step 8

- Roll the strand to the end, being careful not to fray the strand end.

The spike cannot be rolled all the way around because of the circled Molly.

- Use a short spike and push it in and out to roll the strand in.



Step 9

- Bend the two strands around. Trim the ends so that they will not touch when they are rolled in.
- Roll in the other strand in the same way.
- Be sure that the strand is crossed over the first strand to be rolled in.

The strands are crossed over each other, then rolled in.

This illustration shows the completed Molly, with six full wraps, the rolled in strands crossed and with no ends protruding.

Note: The Molly shown has been made small for illustration purposes. It is much easier to make a larger Molly, starting with a longer strand and making a bigger circle.

Molly Hogans—for securing pins

Molly Hogans can be used in place of cotter pins or bolts to retain shackle and block pins. An advantage is that tools are not required to attach or remove the Mollies.

When using Molly Hogans, be sure the strand is long enough and it is large enough to fill the hole in the pin. It should be slightly smaller than the pinhole, so it can be pulled through easily.

Be sure that the Molly is wrapped correctly and in the right direction.

Be sure that the Molly is wrapped sufficiently to prevent it from pulling out if it is caught on brush or knots.

Step 1

- Use a strand large enough in diameter to fill the hole in the pin.
- Make the Molly small, normally with four corners.
- Wrap the strand at least two full circles before threading through the pin.

Step 2

- Pull the strand up tightly after threading it through the pin.
- Wrap the strand at least one and a half circles after threading it through the pin.

This will keep the Molly from pulling out if it gets hung up.

As a guide for the person who has to unravel the Molly after use, leave the end that has been threaded through the pin longer than the other end.

Now try the quiz on the next page.

Connecting Molly Hogans—Self-Quiz

1. A Molly is normally used in an emergency, or temporarily, until proper connecting devices can be obtained.

   ☐ True

   ☐ False

2. Can you use a Molly Hogan on a skyline or standing line?

   ☐ Yes

   ☐ No

3. On running line extensions, two Mollies are used together to join the eyes. Do they need to be of the same diameter?

   ☐ Yes

   ☐ No

4. The smallest diameter Molly that should be made with a 7⁄8 in. (22 mm) line strand, requires a strand 20 ft. (6 m) long.

   ☐ True

   ☐ False

5. When the first wrap is made, the circle should have a minimum of how many corners?

   ☐ Four

   ☐ Five

6. The strands should be crossed at every wrap.

   ☐ True

   ☐ False

Now check your answers on the next page.

Connecting Molly Hogans—Quiz Answers

1. A Molly is normally used in an emergency, or temporarily, until proper connecting devices can be obtained.

   Answer: **True**

2. Can you use a Molly Hogan on a skyline or standing line?

   Answer: **No**

3. On running line extensions, two Mollies are used together to join the eyes. Do they need to be of the same diameter?

   Answer: **Yes**

4. The smallest diameter Molly that should be made with a 7⁄8 in. (22 mm) line strand, requires a strand 20 ft. (6 m) long.

   Answer: **False**

5. When the first wrap is made, the circle should have a minimum of how many corners?

   Answer: **Five**

6. The strands should be crossed at every wrap.

   Answer: **True**

Threaded strawline connection

As with the other splices, your trainer will demonstrate to you how to do this splice.

This method is often used to avoid tying a knot in the line to secure the Strawline hook, as with similar connections. However, this is not the preferred way to splice Strawline as the hook sits sideways and can get hung-up. The knotted Strawline connection is better.

The hook should always be on the live side of the line. The live side should not be split, as when the connection is made by splitting and opening the live side of the line to insert the dead end through, instead of unravelling the dead end as illustrated in this section.

The connection can be made as long or short as desired. If it is too short, it is difficult to wrap the end to make it more secure from unhooking.

The hook is always in the same position, and the connection can easily by wrapped or hooked up straight if desired.

The illustrations are of 3⁄8 in. (9.5 mm) wire core strawline.

Splicing strawline by the turning method

This method is shown in the section on the Threaded Strawline Connection.

Inexperienced splicers often splice strawline by tucking the six strands and the core through once then turning the eye over and tucking all the strands through for the second time. However, after turning the eye over again to tuck the strands and core through for the third time, it is difficult to tuck all the strands the last three times, and some of the strands may be left tucked only twice.

If the splicer follows the method shown in this illustration, it will be possible to tuck all the strands and the core without difficulty.

An experienced splicer can complete the three tucks by following the Logger's Splice method, without spiking the strawline down.

Step 1

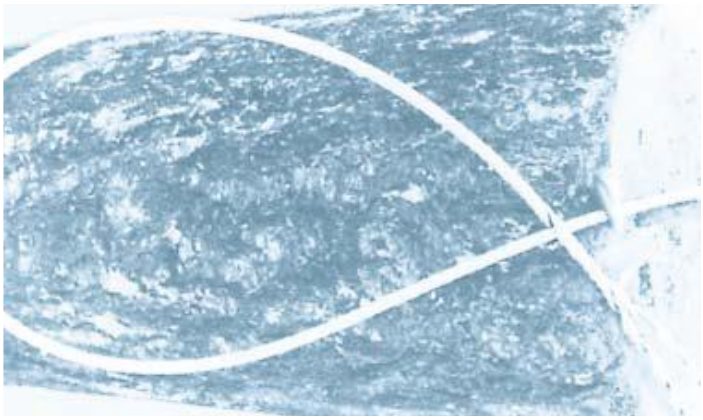
- Select the proper size hook for the strawline being used.
- Thread the line through the hook before starting the splice.

Step 2

- Split the line in two as shown and unravel 24 in. (60 cm) or a little more or less, depending on the size of connecting end desired.

Step 3

- Make a mark on the line approximately 6 ft. (180 cm) from the end, or 4 ft. (120 cm) from the unraveled point.
- Make a loop closing at this point.



Step 4

- Wrap the unraveled strands together over the live section of line at this point.
- Keep the hook clear on the upper side of the loop, as shown.

Step 5

- Make one more wrap of the unraveled strands.

Note: There is one wrap over the live end where marked, then one more wrap, to help keep the strands together.

Step 6

- Make the third wrap of the unraveled strands over the live end of the line.
- Make sure that the hook is on the section of the line between these two wrap-over points.

Step 7

- Make one more wrap of the unraveled strands.
- Start to splice the unraveled ends into the live section of line.
- Ravel the unraveled strands together again.

Note: The method shown here is for making the full, three tuck Logger's Splice when the line is not spiked or secured down. It is done by turning the splice over from time to time to tuck all strands three times.

- Tuck the first strand under two, keeping the lines tight and close together.

Step 8

- Tuck the second strand under two, as shown.

Step 9

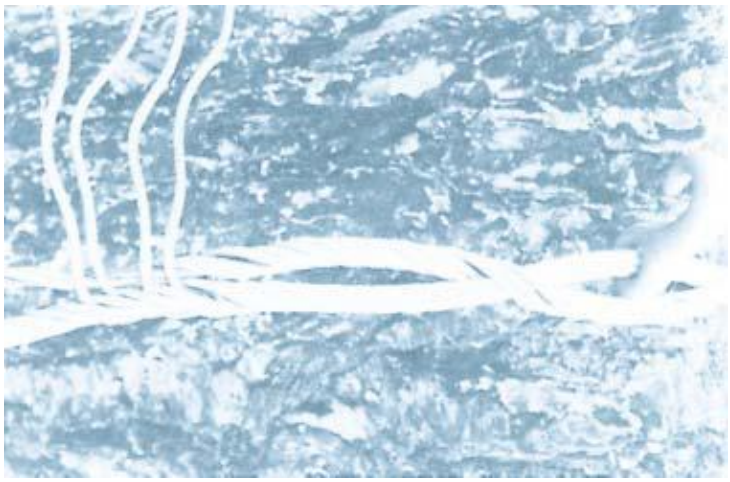
- Tuck the third and fourth strands. Keep all four strands pulled up tight.

Step 10

- After the first four strands are tucked through once, turn the whole splice over. The strands tucked once are now on the right, or splicer's side.

Step 11

- Tuck the four strands through for the second tuck.
- Pull them all up tight. They will not slip back loose as readily as before.



Step 12

- Turn the splice back to its original position when starting the splice.
- Tuck the #1 strand through, over one and under two for its third and final tuck.
- Do not remove the spike.

Step 13

- Tuck the next strand, #5, into the same place. Pull it up tight for its first tuck.

Step 14

- Tuck #2 strand over one and under two for its third and final tuck.
- Tuck the next untucked strand, #6, into the same place for its first tuck.

Step 15

- Tuck #3 strand over one and under two for its third and final tuck.

- Tuck the last untucked strand, which is the core, into the same place.

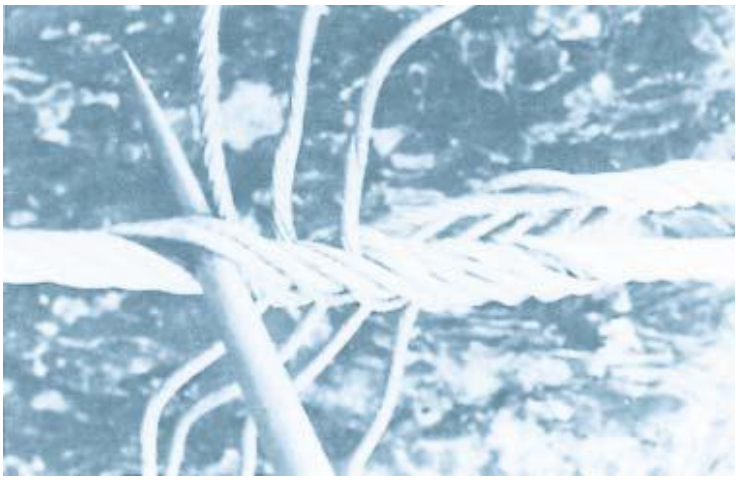
Step 16

- Tuck the last protruding strand, #4, over one and under two for its third and final tuck.

Note: There is no strand left to be tucked in with this strand. (The two strands and the core are wrapped around the strands tucked in the same place for illustration only.)

Step 17

- Turn the splice over again.
- Tuck the #5, #6 strands and core through, over one and under two for their second tucks. As these protrude with #1, #2 and #3 strands, be careful to select the proper strands. The core strand, being tucked last, is easy to identify.



Step 18

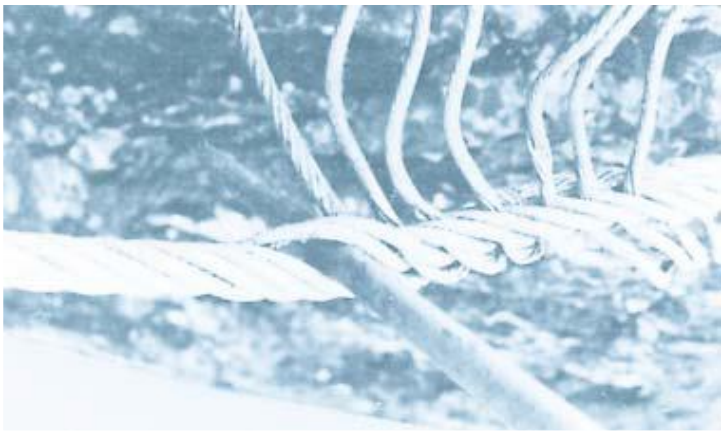
- Turn the splice over again to its original position.
- Tuck the #5 strand over one and under two for its third and final tuck.

Step 19

- Tuck #6 strand over one and under two for its third and final tuck.

Step 20

- Tuck the core over one and under two for its third and final tuck.

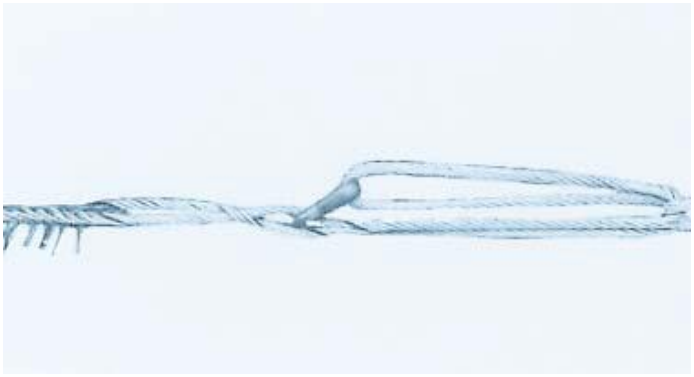


Step 21

- In the completed splice, tuck all strands and the core three times.

Note: The splice can be made in the same sequence as the spiked down Logger's Splice, but it is simpler this way for inexperienced splicers.

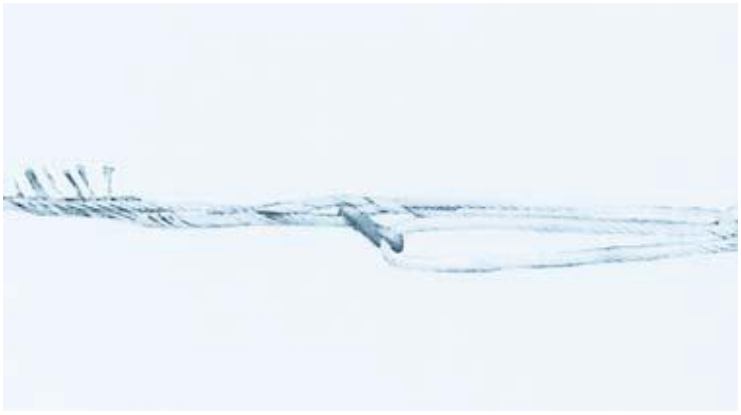
This illustration shows the completed connection, pulled tight.



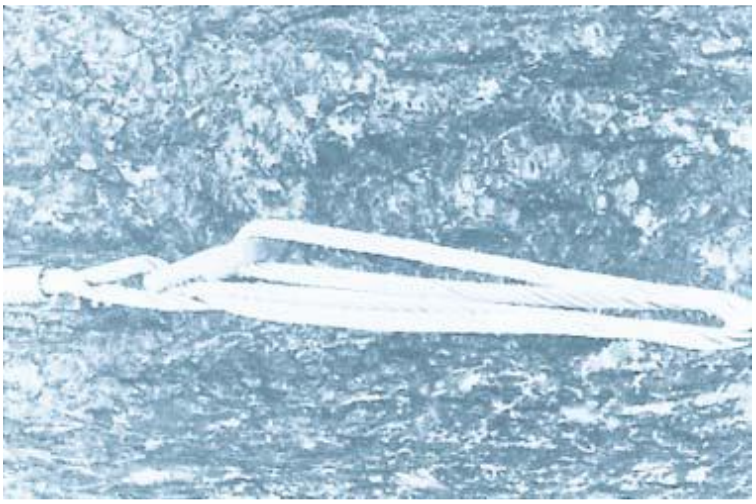
Note: The hook should always be on the live section of the line.

Step 22

- Once the connection is pulled tight, wrapped the eye to make it more secure from unhooking.



This is the same type of connection, but made with a pressed fitting instead of a splice.



Now try the quiz on the next page.

Threaded Strawline Connection—Self-Quiz

1. This method is often used to avoid tying a knot in the line to secure the Strawline hook.

   ☐ True

   ☐ False

2. Is it necessary to select the proper size hook for the strawline being used?

   ☐ Yes

   ☐ No

3. Make a mark on the line approximately how many feet from the end?

   ☐ 4 ft.

   ☐ 6 ft.

4. After how many strands are tucked through once, turn the whole splice over?

   ☐ 3 strands

   ☐ 4 strands

5. How many times do you tuck the core in total?

   ☐ Two times

   ☐ Three times

Now check your answers on the next page.

Threaded Strawline Connection—Quiz Answers

1. This method is often used to avoid tying a knot in the line to secure the Strawline hook.

   Answer: **True**

2. Is it necessary to select the proper size hook for the strawline being used?

   Answer: **Yes**

3. Make a mark on the line approximately how many feet from the end?

   Answer: **6 ft.**

4. After how many strands are tucked through once, turn the whole splice over?

   Answer: **4 strands**

5. How many times do you tuck the core in total?

   Answer: **Three times**

Knotted strawline connection

This connection is similar to the Threaded Strawline Connection. It is used on each end of sections of strawlines to form extensions.

The method of tying a knot in the line to secure the hook has been used for years, but is generally being replaced with the Threaded Strawline Connection.

The connection can be made as long or short as wished. However, if it is made too short, it is difficult to wrap the end around to prevent unhooking.

The knot securing the hook is tied one way or the other, depending on whether the open side of the hook is to face in or out on the connection.

When the hook is placed to face in, as shown in the illustrations, it is a little more difficult to wrap the end.

Strawline connections and spliced connectors occasionally come unhooked and are not always reliable when working on long, steep sidehills. Ordinary eye splices joined with Molly Hogans may be used instead of the strawline connectors.

The illustrations show the Knotted Strawline Connection assembled with 3⁄8 in. (9.5 mm) wire core.

Step 1

- Select the proper size hook for the line being used.
- Thread the line through the hook before starting the splice.

Step 2

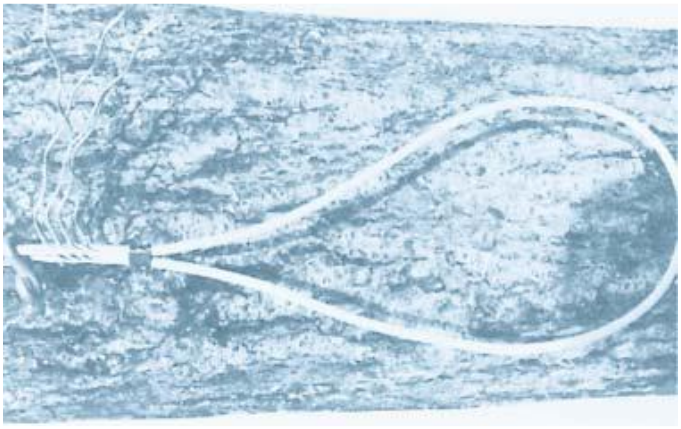
- Make a loop approximately 54 in. (137 cm) around.
- Keep about 12 to 14 in. (33 cm) of end for tucking.

Step 3

- Tape or tie the lines together to keep the strands tight until they are further tucked.

Step 4

- Start the splice by tucking four strands as shown.



Step 5

- Complete the splice, tucking all strands and the core three times.

Step 6

- Tie an ordinary knot with the hook hanging on the low side, by the eye.

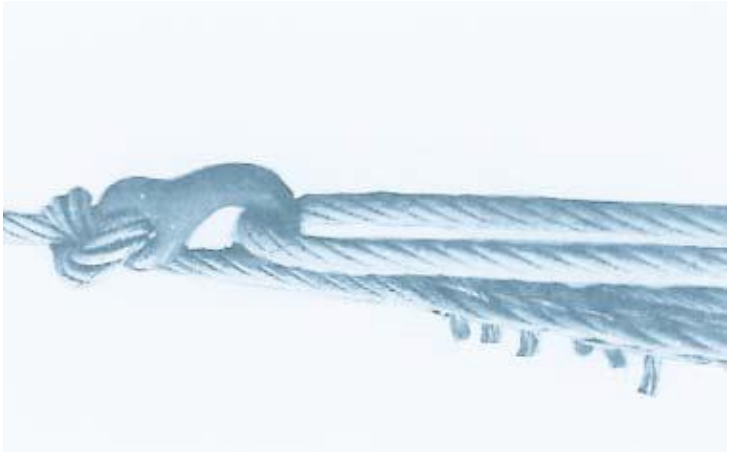
The direction in which the knot must be tied is dictated by the direction in which the hook was put on. For a connection as shown in Step 7, make the knot as shown here.

If the connection is to be made with the hook in the open position, the knot must be tied in the opposite direction, as shown here.

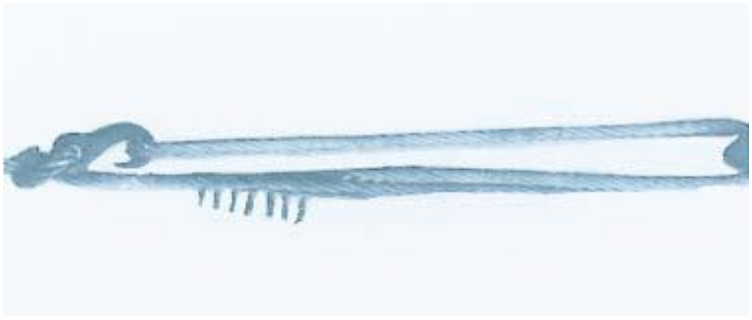
Step 7

- Before pulling the connection tight, make certain that the knot is a short distance away from the strand ends. The strand

ends can interfere with hooking and unhooking if they are too close.



This illustration shows the completed connection, pulled in tight.



Strawline spliced connector

The spliced connector is used for connecting strawline eyes together, joining mainlines and haulbacks when threading, and for general light bullcooking purposes.

Spliced connectors made from heavier line and sturdier hooks are sometimes used around skyline operations.

Spliced connectors can be made by splicing two short eyes, like a short strap, with the hook in one eye. In this case, the spliced connector is double at both ends but it is not as strong overall as the method illustrated.

Spliced connectors and strawline extensions easily come unhooked before they are pulled in and formed. They should be kept under strain or laced until they become formed.

Spliced connectors and strawline connectors, even when formed, may occasionally come unhooked. They should not be relied on when working on long steep sidehills. Ordinary eye splices joined with Molly Hogans are preferable on steep sidehills.

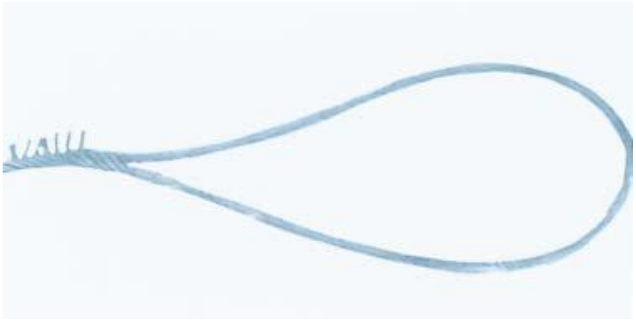
Spliced connectors and strawline connectors used for threading high lead sheaves or blocks should be laced even when wrapped, especially if they are not adequately formed.

The illustrations show the spliced connector made with 3⁄8 in. (9.5 mm) wire strawline.

Step 1

This connector is made with 3⁄8 in. (9.5 mm) strawline, approximately 10 ft. 6 in. (3.2 m). The length can be varied, depending on the length of spliced connector desired.

- Splice an eye approximately 45 in. (114 cm) around.

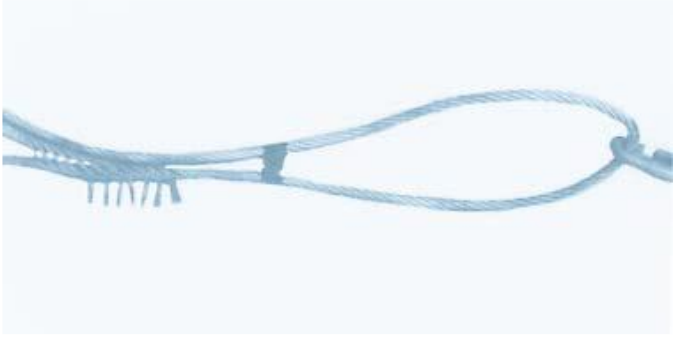


Step 2

- After measuring and cutting the length of line desired, thread on the hook.
- Lay the spliced eye flat in the position it was when starting and finishing the splice. Thread the hook on so that the closed side of the hook is on the same side of the line as the top side of the splice.
- From the end of the splice already in, measure off about 16 in. (40 cm). Bend the line by hammering it slightly where the hook is, at the point of the eye. The line must be bent in the direction as shown in the illustration.

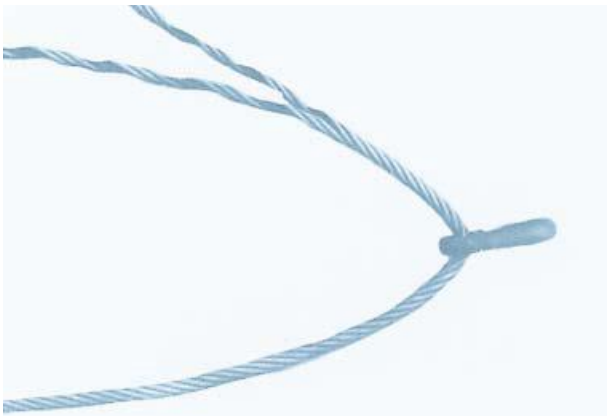
If the hook is not to be locked in as shown, bend the line in the opposite direction.

Note: The tape is only used for illustration purposes.



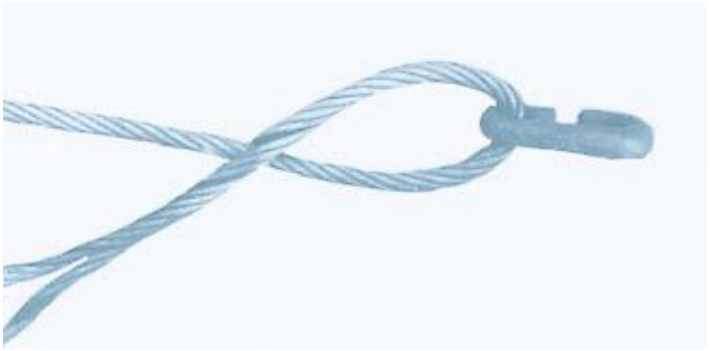
Step 3

Split the cut end of the line in two and unravel close to the hook.



Step 4

- Close the strands over the live part of the line and ravel up to the end.
- Lock the hook to prevent it from sliding down the spliced connector and make it easier to hook up.

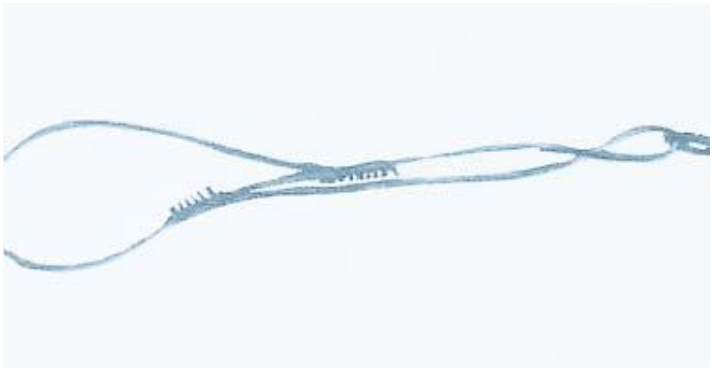


Step 5

- Keep the original eye flat in the position described in Step3.
- Splice the now ravelled up end into the live part of the already spliced eye, about 4 in. (10 cm) from the splice. Do not splice into the strand or dead side of the eye.

Step 6

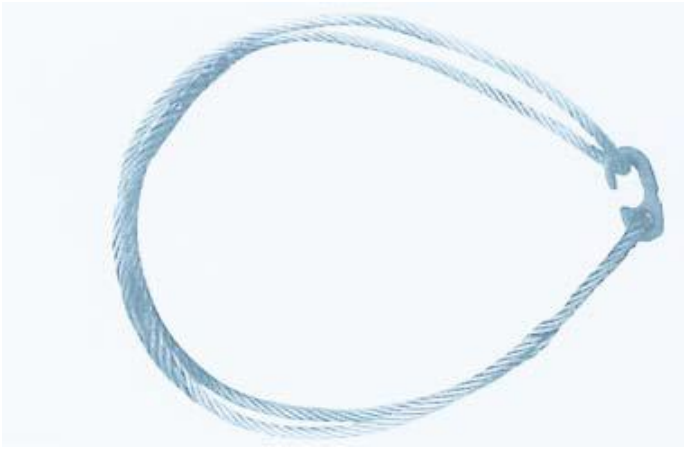
- Trim the strand ends.
- Lay the spliced connector out flat.



Note: Both splices are in their original positions, with the open part of the hook underneath or facing away.

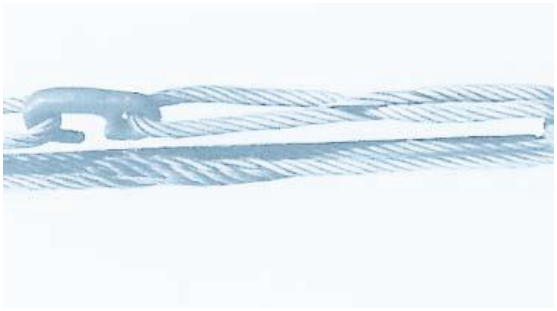
Step 7

- Hook up the spliced connector which will bend naturally to the illustrated position.



If the open side of the hook is required to be facing out, the spliced connector can be bent backwards against its natural bend and then pulled tight. However, it would be better to reverse the hook in Step 2.

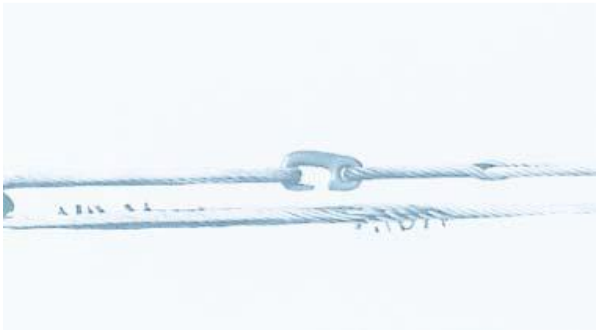
This illustration shows the locked-in hook.



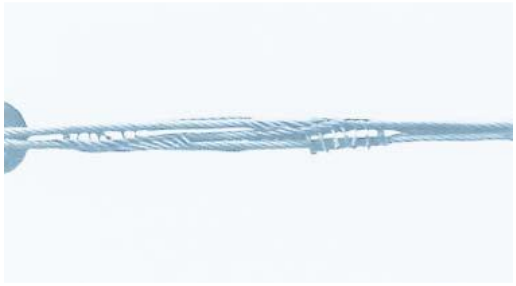
Step 8

- Using a shackle in each end, pull the spliced connector tight and hammer lightly to form it a little.

Using shackles instead of the eyes of line to pull the spliced connector tight will permit it to even-up better.



This illustration shows the splice at the back side of the spliced connector.



This illustration shows the completed spliced connector tucked three times, locked in hook, and the open part of the hook to the inside of the spliced connector.

Now try the quiz on the next page.

Knotted Strawline Connection—Self-Quiz

1. When the hook is placed to face in, it is easier to wrap the end.

   ☐ True

   ☐ False

2. Strawline connections and spliced connectors occasionally come unhooked and are not always reliable when working on long, steep sidehills.

   ☐ True

   ☐ False

3. You start the splice by tucking how many strands?

   ☐ Three

   ☐ Four

4. Can you rely on spliced connectors and strawline connectors when working on long steep sidehills?

   ☐ Yes

   ☐ No

5. In the Strawline spliced connector, can you splice into the strand or dead side of the eye?

   ☐ Yes

   ☐ No

Now check your answers on the next page.

Knotted Strawline Connection—Quiz Answers

1. When the hook is placed to face in, it is easier to wrap the end.

   Answer: **False**

2. Strawline connections and spliced connectors occasionally come unhooked and are not always reliable when working on long, steep sidehills.

   Answer: **True**

3. You start the splice by tucking how many strands?

   Answer: **Four**

4. Can you rely on spliced connectors and strawline connectors when working on long steep sidehills?

   Answer: **No**

5. In the strawline spliced connector, can you splice into the strand or dead side of the eye?

   Answer: **No**