

YARDING and LOADING HANDBOOK

July 1981



WORKERS' COMPENSATION BOARD OF BRITISH COLUMBIA

YARDING and LOADING

HANDBOOK

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INTRODUCTION

This handbook describes safe and unsafe yarding and loading methods. The unsafe work practices shown and explained account for many of the serious and fatal accidents which occur in the forest industry each year.

The number of accidents could be drastically reduced if every forest industry worker and employer followed safe working practices.

Most fatal accidents in yarding and loading in recent years were the result of blatant disregard for the WCB Industrial Health and Safety Regulations. Further, and this is tremendously upsetting to everybody involved in the logging industry, there are no new circumstances surrounding these fatal accidents! Loggers are being killed the same way today as they were forty years ago.

The Workers' Compensation Board believes that if a concerted effort is made, the number of accidents could be significantly reduced. In some logging operations, labour and management have worked out safe yarding and loading procedures and have achieved enviable safety records. Their experience and assistance has been invaluable in formulating the WCB's Yarding and Loading Safety Regulations, and in developing the procedures described in this book.

The handbook is designed as a convenient reference manual and guide to effective and safe job procedures. All practices described are based on actual experience or practice in B.C. industry. As there are so many methods used to yard and load timber, it would be impossible to discuss every procedure. However, it is stressed that careful consideration should be given before using other than accepted practices.

Management and workers can prevent accidents in the forest industry by knowing and applying safe working practices at all times.

Workers' Compensation Board of British Columbia.

THE PROBLEM

Just how extensive is the safety problem in the yarding and loading phase of the forest industry? The following pages tally the grim toll. Unfortunately, these figures do not describe the pain and suffering associated with yarding and loading injuries. The worker, his family, relatives and friends all suffer when an injury occurs. When the injury causes a worker's death, those left behind suffer greatly, both emotionally and financially, for the rest of their lives. There are many hazards associated with logging and these hazards must be accepted as part of the profession. An experienced and knowledgeable logger will recognize hazards and carry out his duties without being injured. The ultimate goal for the industry is an accident rate of zero.

In/a two year period 27 yarding and loading accidents in coast logging operations investigated by the WCB showed:—

14 fatalities and 13 injured in 18 rigging accidents.

5 fatalities and 4 injured in 9 landing accidents.

In the rigging accidents investigated by WCB inspectors, failure to get in the clear resulted in seven workers being killed and eleven being injured by "up-ending" logs. Two chokermen were killed by one log.

In ten rigging accidents, logs up-ended into the full crews, hooktenders, rigging slingers and the chokermen. These workers were all together and not "in the clear".

In the landing accidents investigated, two chasers were killed and one chaser lost a leg through inadequate clearance of the log loader counterweight. Two chasers were killed by gut-hooked swinging logs.

The rigging accidents analyzed here are only those reported to the WCB and investigated by accident prevention officers. The total number of accidents, incidents, and near misses from up-ending or swinging logs and inadequate equipment clearance is not known but would be many times the number outlined above.

1978

13 — Fatalities in Yarding and Loading

2,303 — Workers injured in Yarding and Loading

1,204 time loss claims plus 1,099 medical aid (does not include first aid cases)

10 — Workers injured every work day in Yarding and Loading

1 — Worker every 2½ work days is killed or permanently disabled

39,472 — Days lost through injuries

1977

7 — Fatalities in Yarding and Loading

2,005 — Workers injured in Yarding and Loading

977 time loss claims plus 1,028 medical aid (does not include first aid cases)

9 — Workers injured every work day in Yarding and Loading

1 — Worker every three work days is killed or permanently disabled

32,238 — Days lost through injuries

1976

3 — Fatalities in Yarding and Loading

1,928 — Workers injured in Yarding and Loading

879 time loss claims plus 1,049 medical aid (does not include first aid cases)

9 — Workers injured every work day in Yarding and Loading

1 — Worker every 3.6 work days is killed or permanently disabled

28,925 — Days lost through injuries

1975

5 — Fatalities in Yarding and Loading

1,558 — Workers injured in Yarding and Loading

767 time loss claims plus 791 medical aid (does not include first aid cases)

7 — Workers injured every work day in Yarding and Loading

1 — Worker every 3½ work days is killed or permanently disabled

34,228 — Days lost through injuries

1974

- 7 — Fatalities in Yarding and Loading
- 1,900 — Workers injured in Yarding and Loading
1,007 time loss claims plus 893 medical aid (does not include first aid cases)
- 4 — Workers injured every work day in Yarding and Loading
- 1 — Worker every four work days is killed or permanently disabled
- 37,437 — Days lost through injuries

1973

- 9 — Fatalities in Yarding and Loading
 - 2,295 — Workers injured in Yarding and Loading
1,210 time loss claims plus 1,085 medical aid (does not include first aid cases)
 - 10 — Workers injured every work day in Yarding and Loading
 - 1 — Worker every 5½ work days is killed or permanently disabled
 - 37,316 — Days lost through injuries
-

**MOST FREQUENT SOURCES
OF ACCIDENTS FOR YARDING
AND LOADING CREW MEMBERS
FOR 1976 - 1978***

| Job | Most Frequent Accident Source | Second Most Frequent Source | Third Most Frequent Source |
|----------------------|--|--|--|
| Chasers | struck by logs | falls from logs | falls at ground level |
| Chokermen | struck by logs and chokers | falls from logs | over exertion in pulling line |
| Rigging Slingers | struck by logs and rigging | over exertion pulling rigging | falls from logs and stumps |
| Hooktenders | struck by logs | over exertion pulling rigging | falls at ground level |
| Loader Operators | falls from the machine | struck by logs | slipping on the machine and twisting the body |
| Yarding Engineers | falls from the machine | hearing loss | slipping on the machine and twisting the body |

*Source: WCB Claims Statistics

The following factors can be attributed as root causes of the above accidents:

- a. A lack of training,
- b. Inadequate supervision,
- c. Inattentiveness on the part of the individual,
- d. Failure to get in the 'clear'.

TRAINING WORKERS

WHAT IS THE FORMAT OF AN EFFECTIVE TRAINING PROGRAM?

A training program is a systematic program of instruction with a view to attaining worker efficiency in some subject. The key words are "systematic" and "worker efficiency". These words clarify the intent of the Industrial Health and Safety Regulations which focus on training. The three key I.H. & S. Regulations dealing with training are 8.18, 8.20 and 8.22.

***8.18 Employer's Responsibility**

Every employer shall ensure the adequate direction and control of workers in the safe performance of their duties.

8.20 Supervisor's Responsibility*

Every supervisor shall be responsible for the proper instruction of workers under his direction and control and for ensuring that their work is performed without undue risk."

* A supervisor is someone who instructs, directs or controls workers in the safe performance of their work, therefore, a worker in charge is a supervisor. By this definition, a supervisor could be almost anyone in the workforce; hook-tender, rigging slinger, or a mechanic training an apprentice.

***8.22 Authorized Operation of Machinery and Equipment**

Machinery and equipment shall be operated only by authorized persons. No person shall be authorized who has not been adequately instructed and trained, and who has not demonstrated an ability to operate safely the machinery or equipment."

Where there is a training program at a work site, there will be conformity with the intent of these regulations and, most importantly, the number of injuries will be significantly reduced.

How can a training program be systematic and lead to worker proficiency?

A systematic training program will include a written job procedure which describes:

- a. a step-by-step description of the job,
- b. a listing of the hazards of each step in the job description,
- c. a description of how these hazards can be overcome.

The written job procedures will be of no use unless the workers' supervisor goes through the job procedures verbally with the worker to make sure the worker has understood them. The written procedures will also be of no use unless the supervisor makes sure that the worker uses the correct work practices on the job. This is the only way that worker proficiency on the job can be achieved.

Who Should Conduct the Training?

I.S. & S. Regulation 8.20 states that every supervisor shall be responsible for the proper instruction of workers under his direction and control.

For the training program to be effective, the instructor should:

- a. recognize and accept his responsibility for training,
- b. have a thorough working knowledge of the job function he is trying to teach,
- c. be properly trained in teaching techniques,
- d. make no assumptions about the new workers or their prior knowledge,
- e. know how to communicate effectively,
- f. ensure the new worker is aware of how his work affects other workers,
- g. instill in the new worker an awareness that if he doesn't know what to do or how to do something — ask!
- h. instill an awareness in the worker that he has both legal and moral responsibilities for safety to himself and to his fellow workers.

Anyone who has to train someone else must follow an established training program. If that isn't done, training efforts will be haphazard and, most probably, ineffective. One final point has to be made with reference to training programs. Training never ends — it is never a static process. Procedures and circumstances change and all workers must be made aware of changes which directly affect them and be reminded of what they already know.

SET A GOOD EXAMPLE!

5. RESPONSIBILITY FOR SAFETY

Every individual in the organization must accept responsibility for safety if accidents are to be reduced and, it is hoped, eliminated from yarding and loading operations. If people don't accept their responsibilities for safety, the type of accident outlined below will happen again and again.

An Accident

In 1978 a tragic accident occurred on the coast which demonstrated clearly that responsibilities for safety must be accepted if fatalities are to be avoided.

A rigging slinger and two chokermen set chokers on two logs. Both logs in the turn were 40 feet long. After the chokers were set, the rigging slinger, followed by the two chokermen, took up a position approximately 35 feet to the side and at right angles to the butt rigging. The rigging slinger then blew "go ahead". As the turn started into the landing, one of the logs "jill-poked" into a stump and swung sideways. The rigging slinger saw the log coming. As he turned to get out of the way, he tripped and fell into a hole. That saved his life. The two chokermen weren't so lucky. The log upended and swung into the chokermen, killing them both.

Why hadn't the crew moved into the clear? Why did they remain in the danger area?

The subsequent accident investigation revealed several important failures in the employer's safety program. Management of the firm had failed to develop and maintain an effective accident prevention program at the work site. Management and supervisors had not ensured that the chokermen had been adequately instructed in the safety of their duties. And the workers themselves failed to "see" potential hazards and take action to avoid these hazards.

In other words: **EVERYONE IN THE ORGANIZATION AT THE JOB SITE FAILED TO ACCEPT AND CARRY OUT SOME OF THEIR RESPONSIBILITIES FOR SAFETY.**

This failure was not deliberate on anyone's part. No one deliberately set out to create the fatalities. But two men died — and that can't be ignored.

Therefore, if acceptance of personal responsibilities for safety is a critical part of preventing accidents, what are the legal responsibilities for safety for each member of the yarding and loading crew?

LOGGING MANAGER AND/OR SUPERINTENDENT — RESPONSIBILITIES FOR SAFETY

A working accident prevention program in any organization has to start with a real commitment to safety on the part of the most senior level of management in the company. The logging manager and/or superintendent, being the most senior representatives of management in an operation, must demonstrate the company's commitment to safety. This commitment to safety can be shown many ways.

The logging manager's responsibilities for safety include:

- providing the safest possible workplace by planning operations carefully. Good planning will not stop accidents but good planning can help eliminate conditions which can lead to accidents.
- make sure that new workers arriving at the operation are adequately trained and that follow-up job training programs are conducted and adequately maintained.
- initiating, maintaining and publicizing a comprehensive Industrial Health and Safety Program.
- ensuring that first aid facilities are adequate for the size of the operation and its location.
- ensuring that accidents involving worker injury or serious near-misses are investigated and that such accidents are reported to the Workers' Compensation Board as soon as possible.
- knowing and enforcing I.H. & S. Regulations and company safety policy.
- passing on knowledge to other employees.

It is most important that the top management

SET A GOOD EXAMPLE!

WOODS FOREMAN — RESPONSIBILITIES FOR SAFETY

Usually, the woods foreman supervises the yarding and loading activities of a logging operation. Safety policies set by the company management must be relayed through the woods foreman to the workers.

Woods foreman's responsibilities for safety include:

- assisting in the planning for setting layouts,
- ensuring that safe job procedures are developed, carried out and updated as required,
- investigating and acting to correct unsafe conditions and acts,
- knowing and enforcing the WCB I.H. & S. Regulations and the Company Safety Policy,
- organizing and implementing an effective safety program in the woods,
- once again, and it can't be stressed enough, the importance that the woods foreman passes on knowledge to other employees.

SET A GOOD EXAMPLE!

HOOKTENDER OR SETTING FOREMAN — RESPONSIBILITIES FOR SAFETY

Traditionally, the hooktender has been the man in charge of a yarding and loading crew. In more recent times, the hooktender's role has become less clear. Sometimes the yarding engineer is viewed as being the "foreman" on the landing, or possibly the responsibility goes to someone else with many years' experience.

For the purpose of this text, it is important to assign specific responsibilities for safety to the worker who is in charge of the setting. In the operation where you work, the setting foreman may be someone other than the hooker. It is imperative, however, that the company designate who is in charge of the setting.

The hooktender or setting foreman's responsibilities for safety include:

- knowing and enforcing the company safety policy,
- ensuring that only trained and authorized workers operate machinery (including power saws),

- enforcing company and WCB Safety Regulations,
- inspecting the side for hazards and taking action to correct those hazards,
- reporting to the woods foreman all accidents involving injury to workers and any serious near-misses.
- ensuring that equipment and facilities are kept in good condition — such as crummies, the yarder, the loader and power saws,
- detecting and referring troubled workers — that is, workers who for any reason are physically or mentally not fit to do the job,
- taking action on reported unsafe conditions and acts,
- developing safe work procedures to deal with the hazards encountered on any specific side,
- ensuring that landings are organized and kept clear of unnecessary material and equipment,
- passing on knowledge to other employees.

As for all supervision, it is most important for the hooktender to SET A GOOD EXAMPLE by performing his duties in a safe manner.

THE RIGGING SLINGER — RESPONSIBILITIES FOR SAFETY

The rigging slinger working under the direction of the hooktender, assists the hooktender in laying out the setting. When the side has been set up and production is ready to start, the role of the rigging slinger becomes very important. The rigging slinger must carefully plan ahead of time which logs should be included in the next turn and decide on a safe location for the rigging crew while the turn is being yarded. The rigging slinger also supervises the chokermen.

The rigging slinger's job is critical to the safety of the rigging crew as a whole.

The rigging slinger's responsibilities for safety include:

- ensuring that he is properly trained and fully understands his job,
- selecting turns for the most efficient and safe production possible,
- knowing and understanding correct work procedures for himself and the chokermen,
- ensuring that chokermen are trained in correct work practices and that they use correct work practices,

- ensuring that he and his chokermen are behind the turn and in the clear before signalling "go ahead",
- knowing and enforcing WCB I.H. & S. Regulations and company safety policy,
- passing on knowledge to other employees.

SET A GOOD EXAMPLE!

CHOKERMAN — RESPONSIBILITIES FOR SAFETY

The chokerman's job is to work with and directly under the supervision of the rigging slinger. The chokerman's job is not only to set chokers on the logs safely, but also to assist in many other related duties.

The chokerman's responsibilities for safety include:

- knowing how to do the job safely,
- asking for instruction if in doubt about work procedures,
- knowing and complying with safety regulations. These regulations were developed to try and keep people alive — therefore, take heed!
- following safe work procedures,
- taking appropriate action to ensure unsafe acts or conditions are corrected,
- not remaining on the work site if his ability to work safely is impaired by any means. Refer to I.H. & S. Regulations 8.28 and 8.30,
- moving into the clear — out of the bight — and staying there while the logs are being yarded into the landing,
- passing on knowledge to fellow workers,
- reporting any injury he sustains to his supervisor and the First Aid Attendant.

SET A GOOD EXAMPLE!

CHASER — LANDINGMAN — RESPONSIBILITIES FOR SAFETY

When the turn of logs is yarded to the landing, it enters the work area of the chaser. The chaser is responsible for ensuring that the turn is landed properly, building the logs in an efficient safe pile, unhooking the logs, limbing and bucking as required and assisting in keeping the landing clear of accumulated debris.

The chaser's responsibilities for safety include:

- knowing how to perform the job safely,
- knowing and complying with safety regulations,
- remaining in view of the yarder and loader operators or making sure they know where he is at all times,
- ensuring the logs are not landed until all workers and equipment are in the clear,
- ensuring that all log piles are stable,
- knowing and using accepted hand signals when communicating with the yarding engineer and loader operator,
- not walking under a suspended log or turn of logs,
- removing limbs from logs if they create a hazard,
- wearing personal protective equipment such as safety headgear, high visibility clothing, calk boots, and, if chain saws are used, leg protective devices,
- ensuring the minimum clearance of two feet is kept between the loader counterweight and any other object,
- reporting any unsafe acts or conditions to the supervisor,
- using safe work procedures,
- passing on knowledge to fellow workers,
- maintaining good housekeeping in the landing and keeping tools in serviceable condition.

SET A GOOD EXAMPLE!

LOADER OPERATOR – RESPONSIBILITIES FOR SAFETY

How the logs are handled and loaded can directly affect the safety of workers in the landing. The loader operator has considerable responsibilities for the safety of himself and other workers.

The loader operator's responsibilities include:

- knowing how to perform his job safely,
- knowing and complying with safety regulations,
- ensuring the loader is maintained in a safe operating condition and in accordance with the manufacturer's specifications,
- locating the loader to ensure that at least two feet of clearance is maintained between the loader counterweight and any object,
- ensuring the grapple or logs are not elevated or swung over workers,
- ensuring the landingmen and all other workers are in the clear before moving logs,
- knowing verbal and hand signals,
- operating the loader only when physically and mentally able to do the job correctly and safely,
- passing on knowledge to fellow workers.

SET A GOOD EXAMPLE!

YARDING ENGINEER – RESPONSIBILITIES FOR SAFETY

The yarding engineer operates the yarder and is directly responsible for the machinery which yards logs from the setting. He controls powerful machinery and therefore must be very proficient in its operation if accidents are to be avoided.

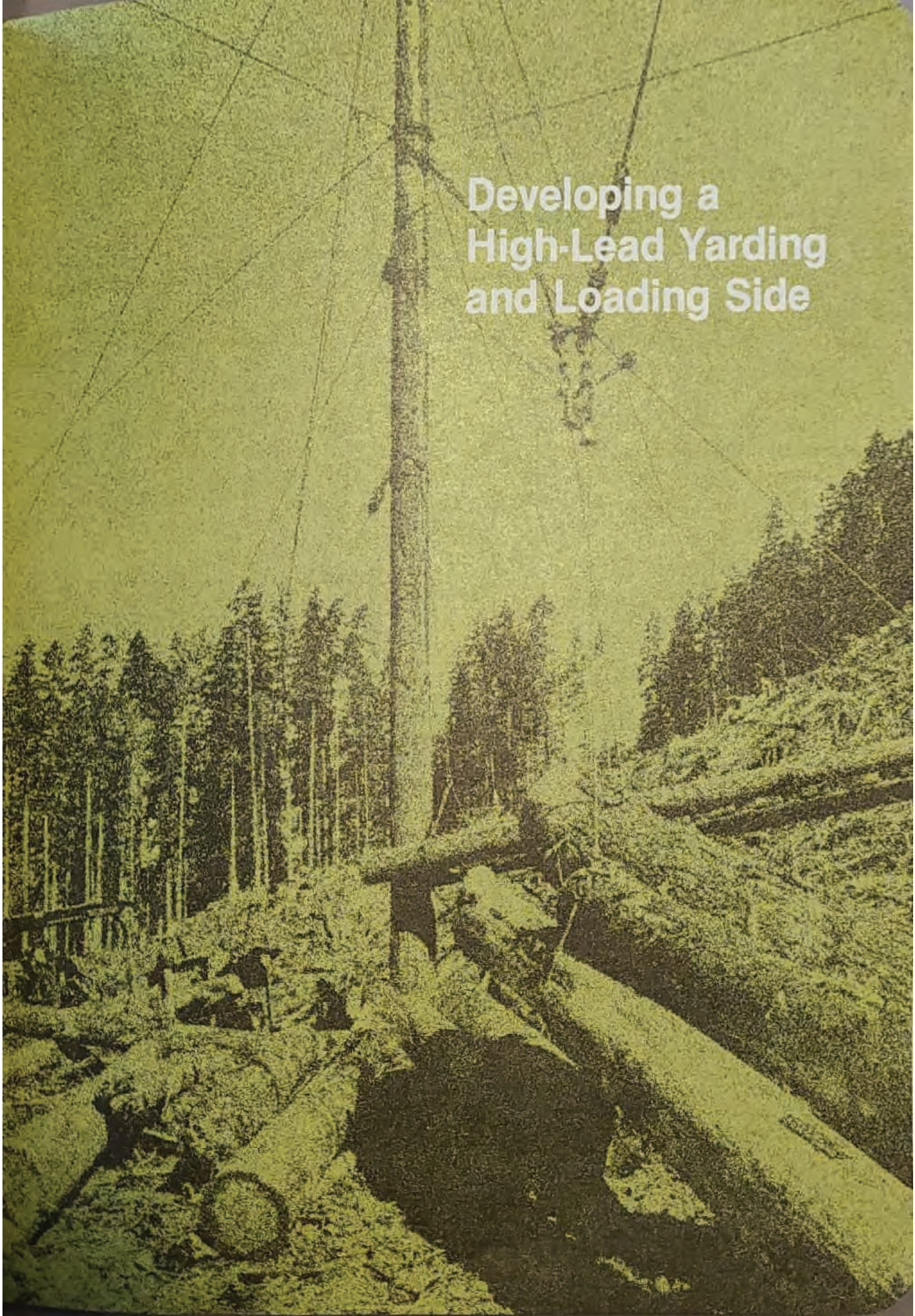
The yarding engineer's responsibilities for safety include:

- ensuring that the yarder is maintained in safe operating condition,
- ensuring that the yarder is rigged and operated in accordance with the manufacturer's specifications,
- ensuring that all workers are in the clear before landing the turn of logs,

- ensuring that two feet of clearance is kept between the counterweight of a log loader and any other equipment. If the clearance is not maintained, he must tell the log loader operator,
- knowing and complying with WCB and company safety regulations,
- reporting any unsafe acts or conditions to the supervisor,
- only operating the yarder when physically and mentally able to do the job correctly and safely,
- knowing verbal and hand signals,
- passing on knowledge to fellow workers.

SET A GOOD EXAMPLE!

Developing a High-Lead Yarding and Loading Side



This section of the Handbook describes how to develop a yarding and loading side. The discussion and diagrams cover the basic considerations of concern to all workers on a side. The information will be useful for familiarization and review of common problems encountered. All too often, serious or fatal injuries suffered by workers happen because one or more of the basic approaches to logging a setting have been overlooked by the planners or workers.

The following topics will be discussed in this section:

Section A — Planning and Rigging Up

1. Planning and Developing the Landing
2. Moving in and Rigging up the Yarder
3. Rigging up the Yarding Lines

Section B — Yarding and Loading

1. Yarding the Logs
2. Landing the Logs
3. Loading the Logs
4. Lowering the Spar and Moving

SECTION A — PLANNING AND RIGGING UP

1) Planning and Developing the Landing

a. Planning

No part of a logging side contains more activity than the landing. The location, size and organization of the landing greatly affects the overall safety and profitability of that side. It is surprising how often landings are not given the necessary planning. Decisions on landings should be made before the grade is constructed and before the timber is felled. Landings should be properly laid out and built to grade standards simultaneously with road construction whenever practical. This approach greatly aids the fallers in laying out and developing their work areas if the terrain permits. If the fallers know the landing locations and lay out the timber for the best yarding direction and method, the work and frustration for the rigging crew and the potential for a serious accident will be reduced and production increased.

Industrial Health and Safety Regulations 60.02 and 60.142 deal with planning, construction, arrangement and operation of landings in logging operations.

b. Location

Where possible, when deciding on the safest and most productive location for landings, three basic factors must be considered:

1. The development of a suitably sized landing for the logging method to be used.
2. The area to be logged in relation to topography and yarding distances.
3. Consistency with existing or future logging activities.

c. Size

The basic requirements for the size of landings is given in Industrial Health and Safety Regulation 60.142(1), which states:

"Landing and log storage areas shall be constructed, arranged, maintained and operated so that workers may work in the clear of moving logs, machines and equipment".

The practical application of this regulation requires that landings facilitate the safe landing and unhooking of a log without the aid of a loading machine. The landing must be of sufficient size to accommodate the type of timber being yarded.

d. Typical landing layout

When deciding on landing locations for a cable logging system, planners/engineers must know the type of logging equipment to be used. The most typical cable logging side consists of a steel spar yarder and a full or part-time loading machine. The workers and machines must be given the required room to safely and efficiently perform their tasks.

The typical highlead logging side generally consists of the following workers and equipment:

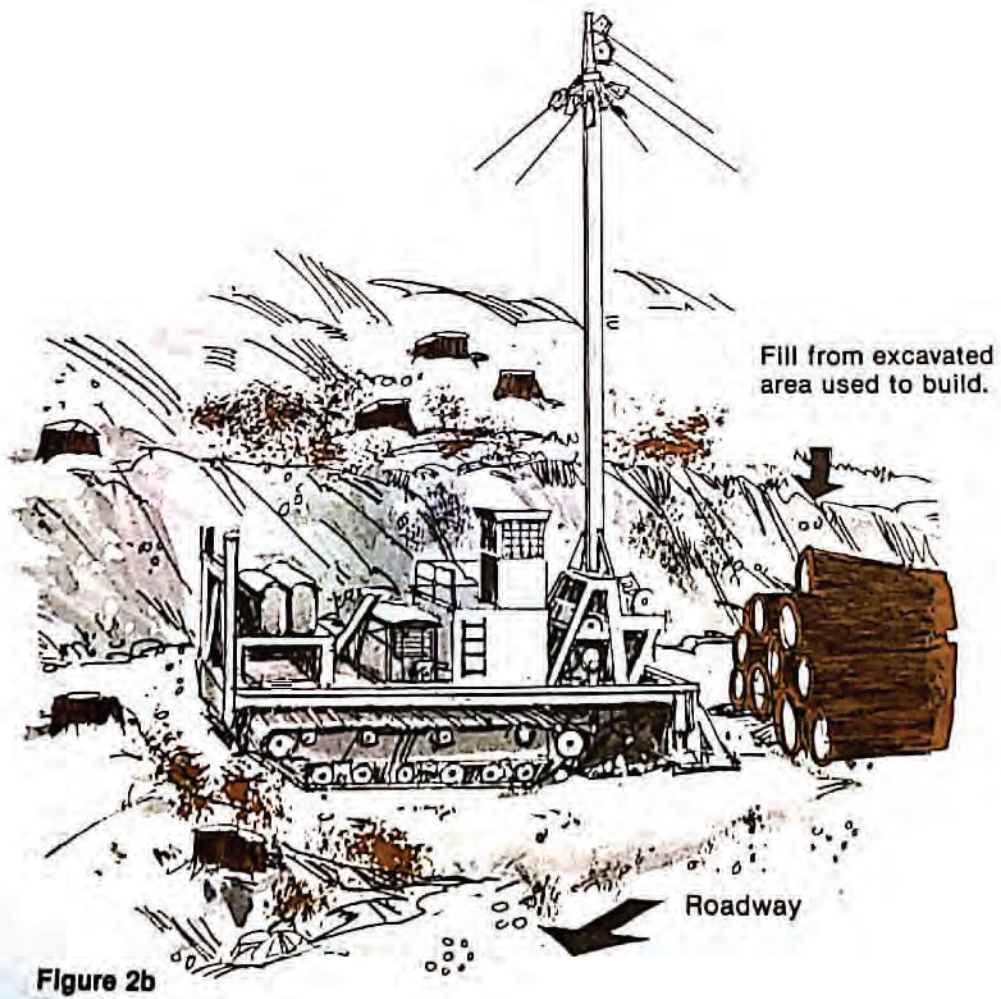
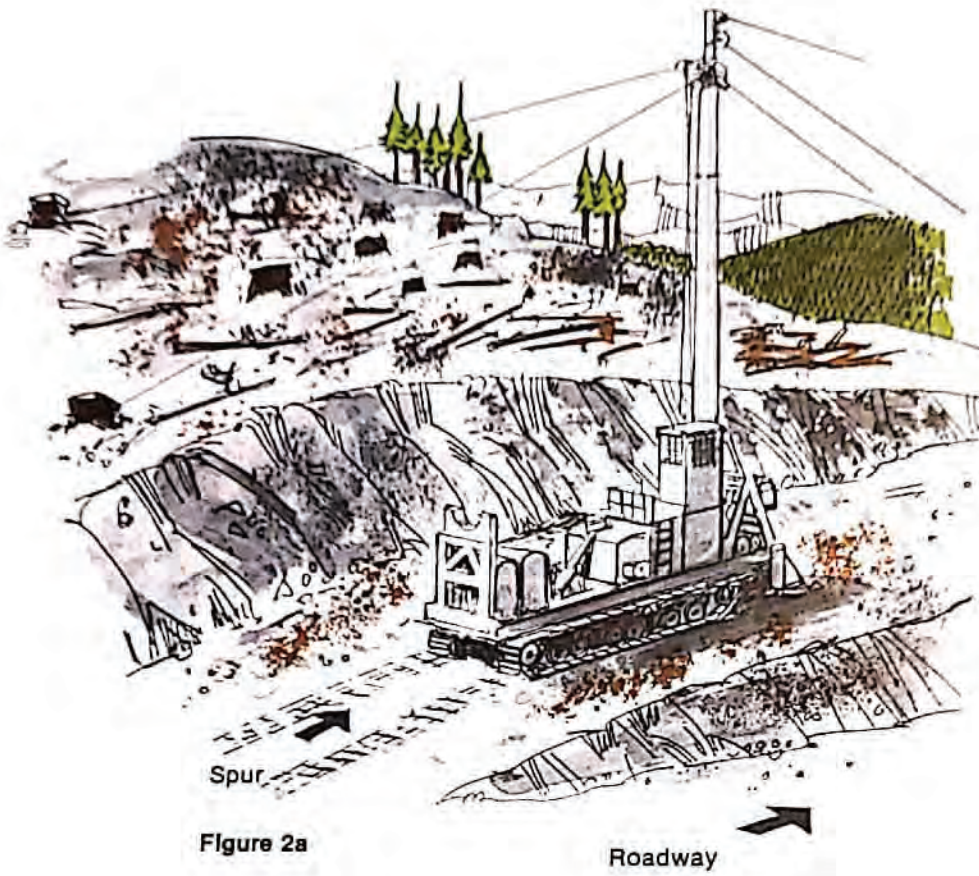
- one hooktender
- one mobile spar yarder and operator
- one chaser, although some operations may have a second loader or landing buckler
- one full-time or part-time log loader and operator
- three rigging crew members, usually two chokermen and one rigging slinger
- one or two crummies
- one log truck being loaded
- possibly, a fire truck or trailer

All landings must provide room to:

1. Allow for the safe landing of logs without the aid of the loader.
2. Build a stable pile and/or deck logs if this practice is required.
3. Permit the loader to work and keep 2' (61 cm) minimum clearance between the counterweight and other machines and objects throughout a full-circle turn.



Figure 1



e. Steep ground landings

With the depletion of easily accessible timber and with much of the remaining merchantable timber — "merch" — now at higher elevations and in tougher settings, more care must be taken in planning and building landings. As the ground becomes steeper, with slopes of over 80%, it becomes more difficult to find and build suitable landings. As shown in Figure 2a, it may be necessary to build a short spur above the landing on which to set up the mobile yarder. The advantage of this layout is that it allows the use of the road as part of the landing. Another common approach to the building of steep ground landings is to excavate material as shown in Figure 2b.

Other Considerations

Another consideration for landing location is the operator's line of vision. Wherever possible, locate landings so that the operator is able to clearly see as much as possible. Many serious incidents might have been avoided if the operator could have seen the rigging crew and turn as it started out of the woods.

Remember, when deciding on landing location, if there is not enough space available, each second a machine is tied up both safety and production will suffer. Machinery can be held up because it may take several attempts to land the logs and the confusion brings a serious risk of injury.

When the landings have already been selected and constructed and before the equipment is moved into the landing, it is recommended that the side foreman and hooker view the landing and the setting to be logged. This gives them an opportunity to discuss development of the setting and placing of the equipment so there is maximum production and safety for the crew.

f. Communication

When the crew and equipment arrive at the setting, the most important consideration the side foreman and hooker have is ensuring good communication. There are few other times during the development of the setting when there is a greater potential for a lack of understanding among the members of the crew.

By the time the mobile yarder arrives at the landing, all key members of the crew should know the overall plan for the development of the setting and the general considerations of positioning and rigging up of the spar, including:

- a. Where to park the crummy to ensure that it will be in the clear and ready for emergency use.

- b. The first location of the yarder.

- c. The general location of the guylines.

- d. Where the first road will be yarded and the logs will be landed.

- e. Where the loader and log trucks will be positioned.

- f. Where the loader may deck logs when there are no trucks in the landings.

- g. Potential hazards indirectly involved in moving in and rigging up the yarder. For example:

1. Loaded log trucks moving through or past the landing.

2. Other equipment being moved through the landing on low beds or under their own power.

- h. The second location for the mobile yarder in the landing, even if it is simply the same spot with the machine turned around.

If any worker on the crew is not present during this short general discussion, he must be given the information that concerns his work before he starts.

The short general discussion is extremely important. It promotes progressive and positive thinking among all members of the crew. Remember, it may have been two or more months since they carried out many of the tasks required to move and rig up the yarder. For those members of the crew with less experience, it is even more important. It is a basic requirement of Industrial Health and Safety Regulation 8.20 which states:

"8.20 Supervisor's Responsibility

Every supervisor shall be responsible for the proper instruction of workers under his direction and control and for ensuring that their work is performed without undue risk."

g. Position mobile yarder on solid ground

When locating the spar, always make sure that the ground is well drained. It is worthwhile to take a little extra time to chunk up a track or wheel, rather than have to tower down later to straighten up the spar. Remember, steel spar trees are designed to operate with a level base. If it is not possible to level the carrier, the spar must always be erected perpendicular to the base.

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Soft ground - Poor Drainage.



Figure 3a

Firm ground - Good Drainage.



Figure 3b

h. Installing a firm mat

It is most desirable to have flat firm ground or rock on which to place the spar pad. If the base

is not flat and firm, it is common practice to use a mat made of material that will prevent the pad from settling.

Correct

Stable positioning

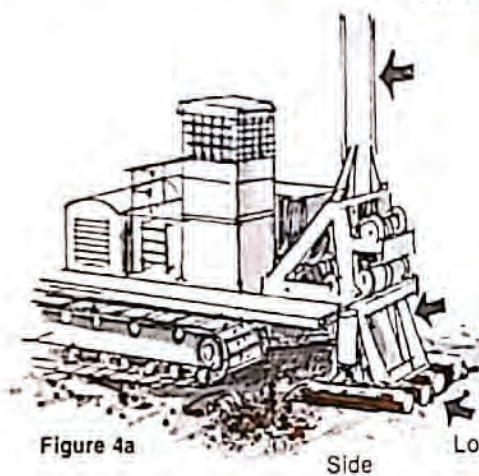


Figure 4a

Side

Log Mat

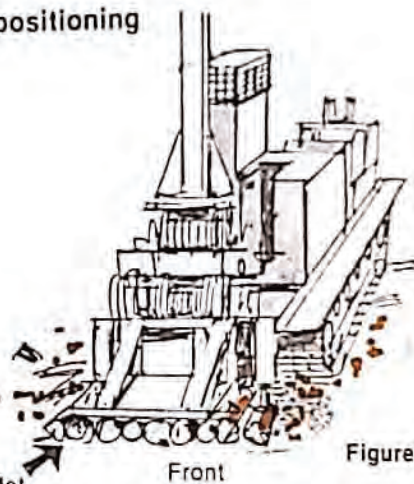


Figure 4b

Front

Incorrect

Unstable positioning

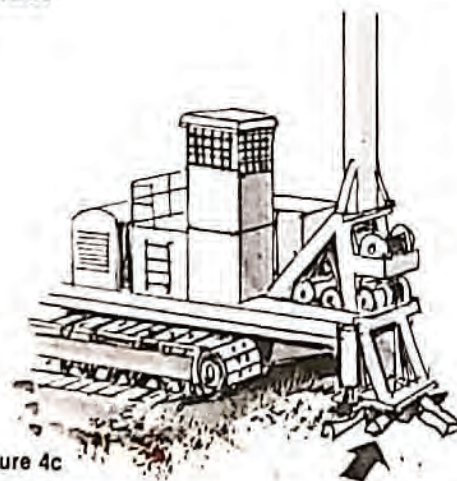


Figure 4c

Unstable Chunks

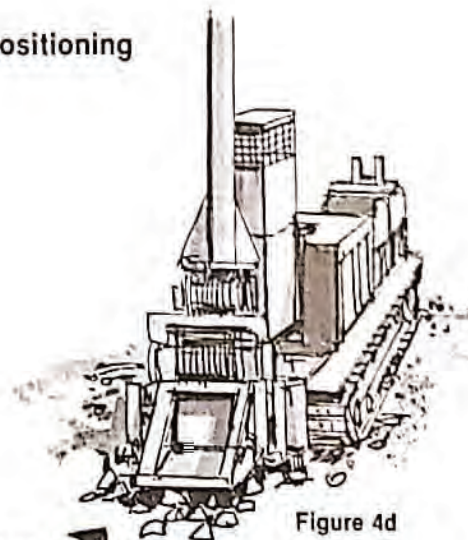


Figure 4d

Rocks

i. Blocking

When the spar is being jacked up for the positioning of the spar pad and log mat, ensure that stable blocking is used beneath the jacks and that all hydraulic lines and cylinders are in

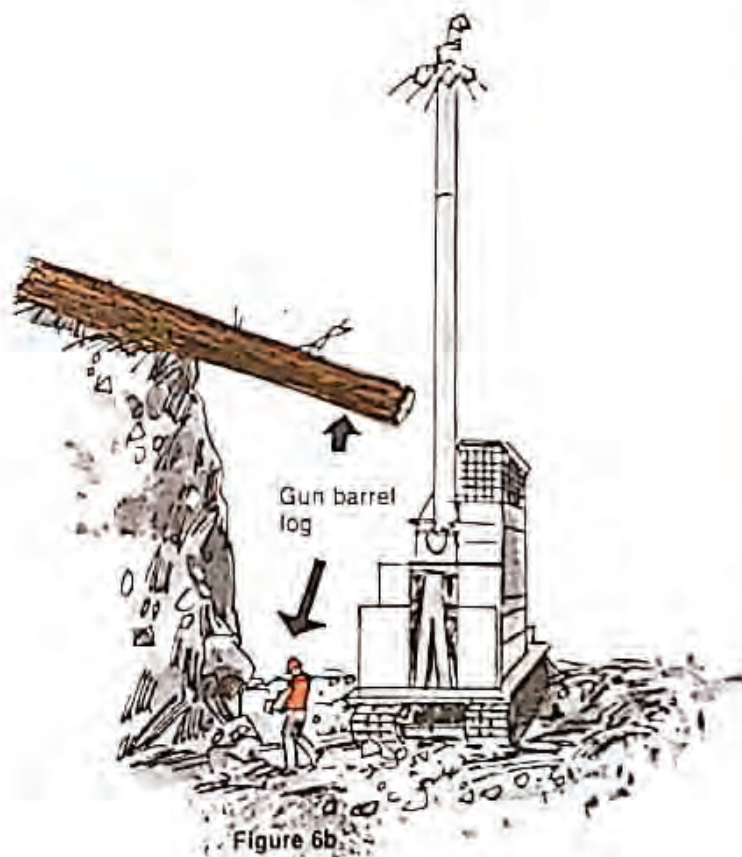
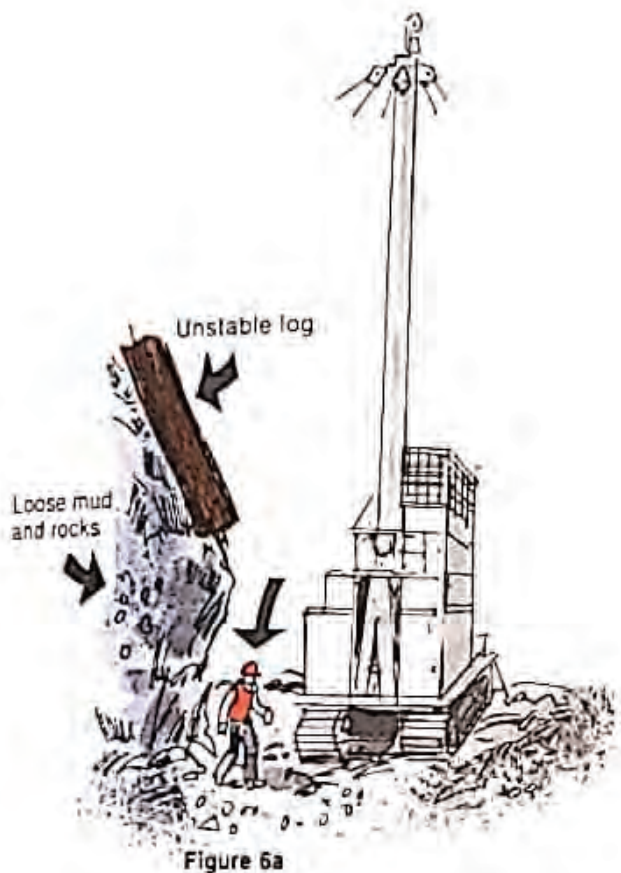
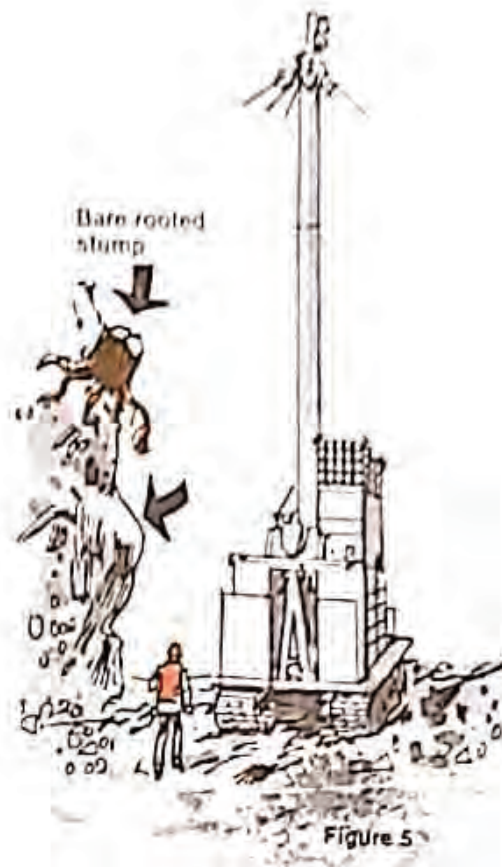
good shape and properly guarded. Many workers have been injured by blocks kicked out sideways from beneath the jacks and by being sprayed by high pressure streams of hydraulic oil from broken pipes and seals.

j. Gradecuts

In landings which have required a grade cut, there are a few specific hazards to be looked for, especially when the yarder is positioned adjacent to the cut bank. It only takes a short time to check for these hazards. An obvious hazard is that loose rocks, stumps and overhanging material may roll, slide or fall and injure members of the crew.

k. Unstable logs

Gunbarrel logs overhanging, or unstable logs lying on the bank could roll or slide.



Not-so-obvious potential hazards of a grade cut are mud and rock slides, and large chunks of rock which may slip from a rock cut. Many potential hazards of this sort are extremely difficult to foresee. However, by examining the grade cuts on the road to the landing, some indication of the ground movement potential can be determined. Be especially cautious after any extreme rainfall or dryness and after a freeze/thaw cycle if the material stability is suspect. The grade foreman can be a good source of information.

If, at a later date, it becomes necessary to yard over grade cuts, be aware that the stability of the slope may have changed. Stumps and chunks near the top of a face which were previously secure may now become dislodged and roll or slide into the landing.

2) Moving In and Rigging Up the Spar

a. Preparation for raising the spar

Once the yarder is suitably positioned in the landing and securely blocked, the next task is to raise the spar. With modern equipment, raising the spar in preparation for logging is a much simpler and quicker task than it used to be in the days of the cold deck or trackside spar trees.

Six-man crews can raise steel spars and be logging in a matter of hours. This great reduction in rig-up time gives the hooktenders less opportunity to consider their approach to the task, as well as less time to communicate with the crew.

In reality, many of the basic choices, work procedures and potential hazards have not changed. This is shown by the number of injuries to workers and substantial equipment damage due to hasty decision making, improper work procedures and, often, poorly maintained equipment.

The basic steps in preparation for raising the spar are:

1. Selection of the guyline stumps.
2. Notching of the guyline stumps.
3. Inspection of the guylines, blocks, shackles, ring and safety strap.
4. Stringing out of the guylines.

The basic decisions in the raising and the rigging of the spar will be guided by the manufacturer's design specification plate. It is a requirement of I.H. & S. Regulation 60.98(2) that each mobile yarder in the province have a design specification plate which plainly displays:

1. Name of manufacturer, and date of manufacture.
2. Model and machine serial number.
3. If yarder is designed for skyline, slackline or modified slackline systems, the minimum size of skyline, mainline and haulback line that can be used.
4. The maximum diameter of the mainline cable.
5. The minimum size, number and placement of guylines, if required.
6. The placement and number of outriggers, if required.
7. The permissible angles of yarding.
8. Any auxiliary equipment which may be safely fixed to the mobile yarder.
9. The name, address and qualifications of the source of the data required above.

b. Selection of the guyline stumps

The majority of yarders today are fitted with six guylines. Proper placement will ensure that at least three guylines oppose the pull of the yarding lines at all times, as shown in Figure 7.

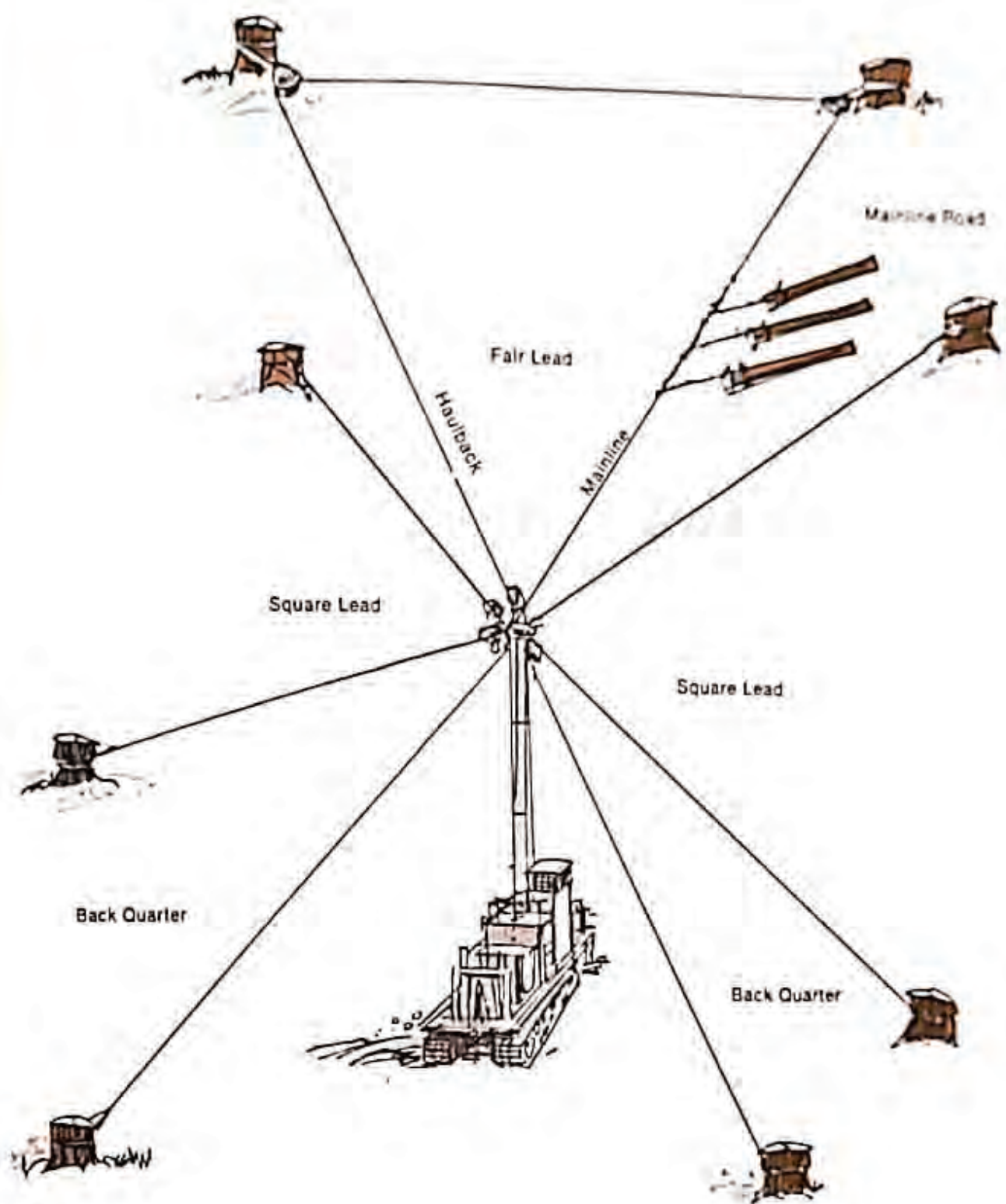


Figure 7

Angle of guyline at stump should be 45° or less.

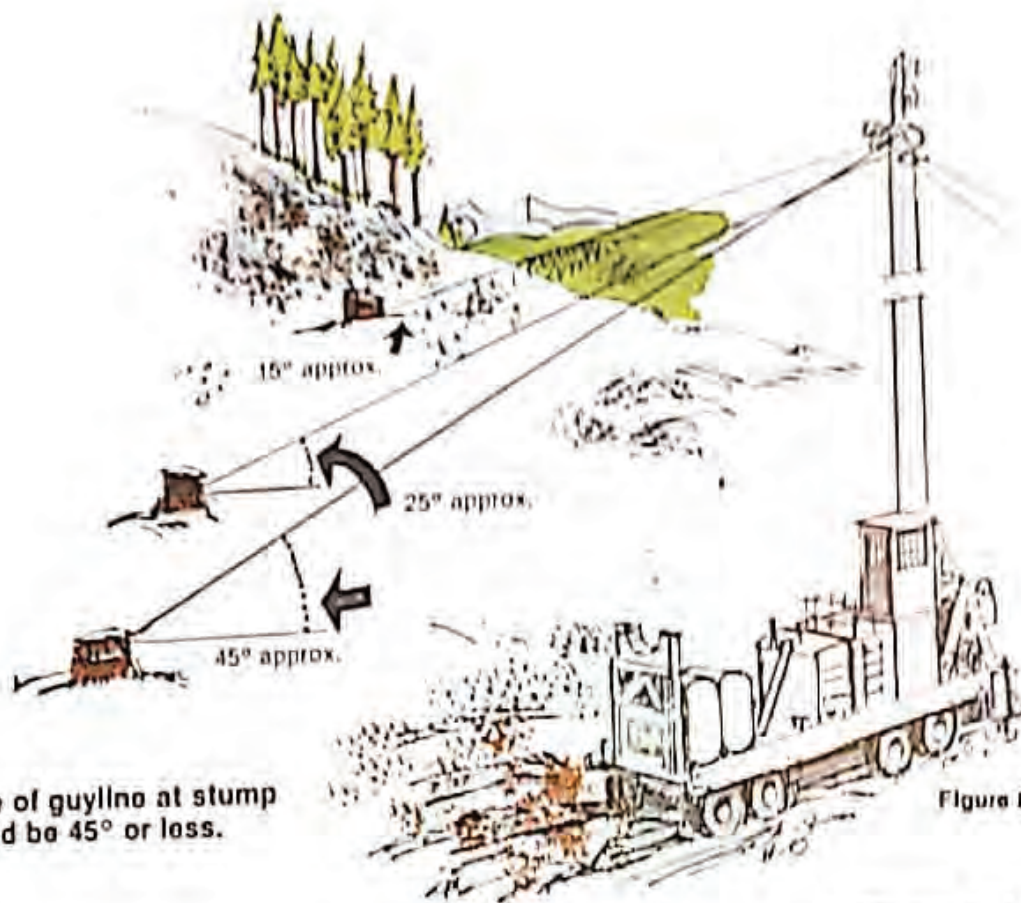


Figure 8

Stump disturbed by grade construction.

c. Angle of the guyline

When selecting the location of the guyline stumps, always try to ensure that the angle of the guyline at the stump is 45° to the horizontal or less. [I.H. & S. Regulation 54.16(2).]

This must be taken into account by the engineers who originally lay out the setting, especially on steep ground.

d. Stumps as tallholds for a guyline

There are many factors which affect the suitability of the stump to withstand the stresses of being used for an anchor. Each species of tree has a different root system which grows differently as soil moisture, density and slope change. Never assume the stumps in one setting will be the same as those in the next setting. There are a few basic conditions which should always be suspect, and should be paid particular attention when a stump is being used as a tallhold for a guyline. These are:

1. A stump which has been disturbed by grade construction.



Figure 9

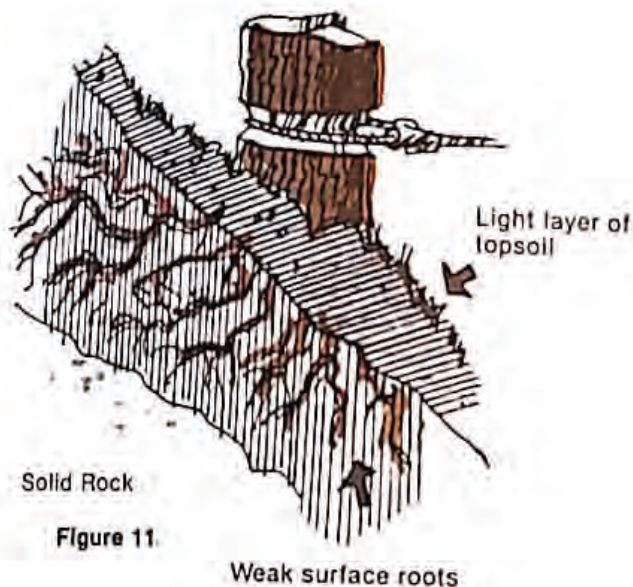


Figure 10a Creek

2. A stump located right at water table level.



Figure 10b Swamp



Solid Rock

Figure 11

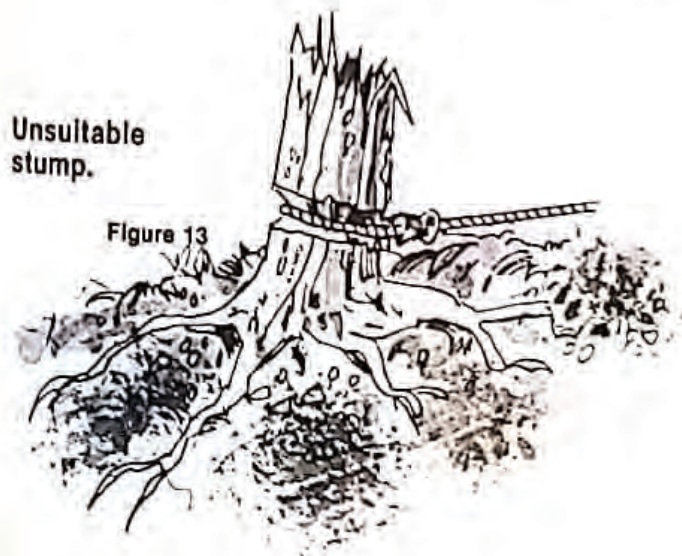
Weak surface roots



Loose rocks on knoll.

3. A stump located on a sheer rock face.

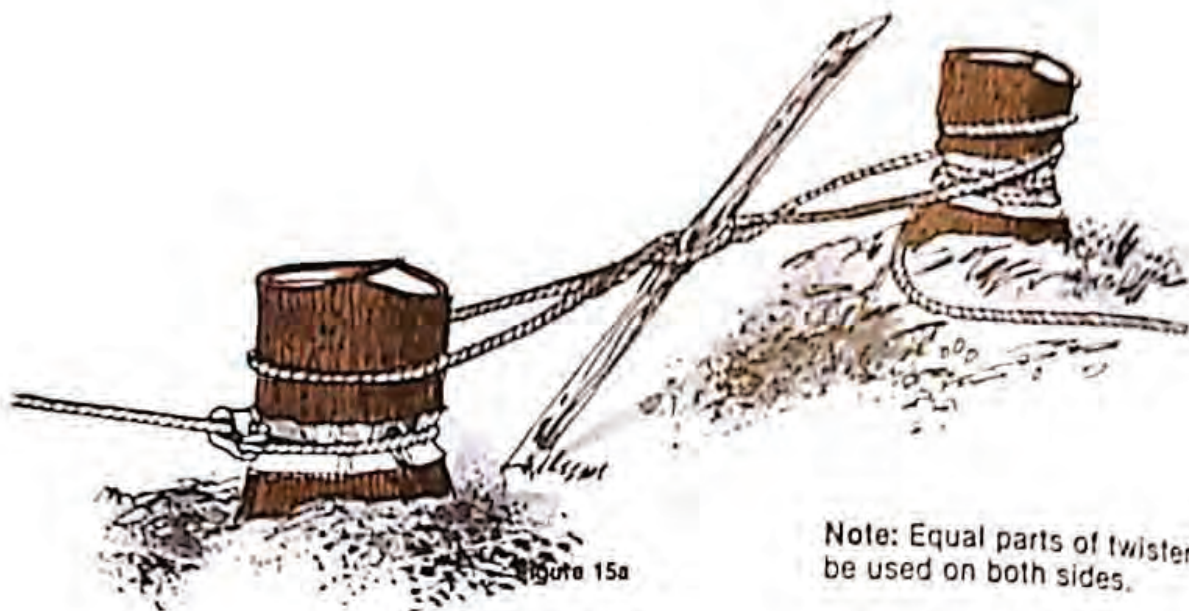
4. A stump which has grown over top of large loose rock or on top of a knoll.



Unsuitable stump.

5. A stump of a felled snag.

6. A stump with only shell wood or partially burned.



Note: Equal parts of twister must be used on both sides.

e. Twister tiebacks

Remember, it is much wiser to use a solid stump which is slightly out of lead, or further out from the spar, than to use a poor stump which is ideally located.

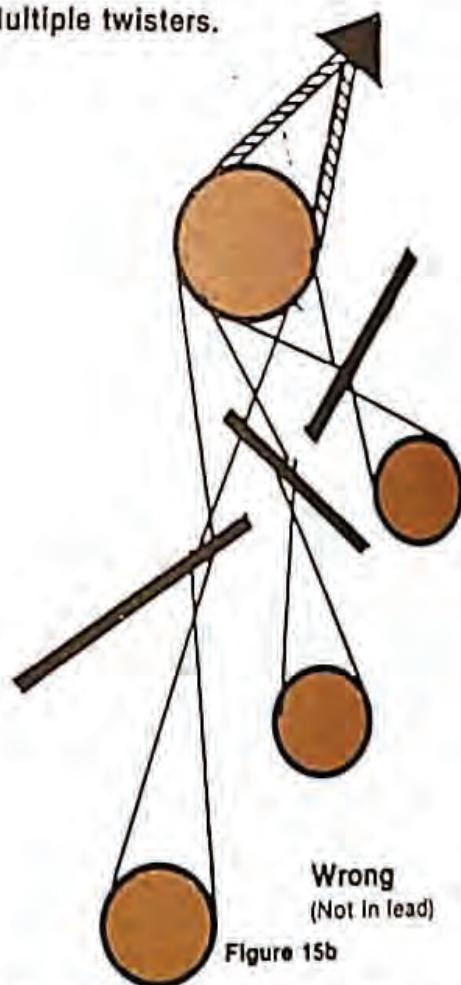
If good, solid stumps are not available, don't take a chance. Tie doubtful guyline anchor stumps back with one or more twisters, or tie back to one or more stumps with the guyline end. It only takes a few minutes to put on a twister. The consequences of not doing so could be a serious or fatal accident and, most likely, severe equipment damage.

Points to consider are:

1. Use a good strong sapling or sturdy limb of sufficient strength, diameter and length for the twister stick.
2. Locate the twister line close to the top of the stump unless there is concern about the roots pulling out.
3. Longer twister lines require additional twister sticks to take up the slack and prevent line damage.
4. When applying twister sticks, use care and caution to prevent the stick from releasing and causing injury to the workers.
5. While tightening, and when the final tensioning is complete, ensure that twister sticks are locked securely.
6. Never release a twister by cutting the twister pole with an axe or power saw.

Extra attention must be paid if only one worker is doing this job.

Multiple twisters.



Wrong
(Not in lead)

If it is felt that more than one twister is required, apply as many as necessary, ensuring they are kept in lead with the pull of the guyline.

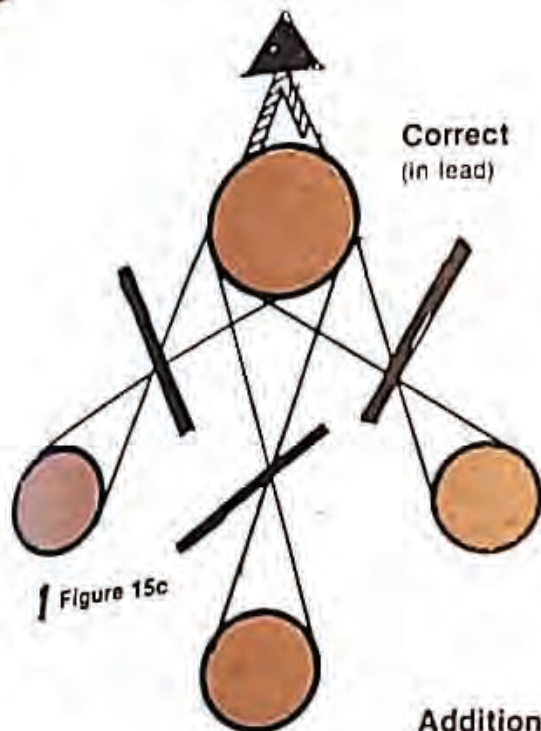
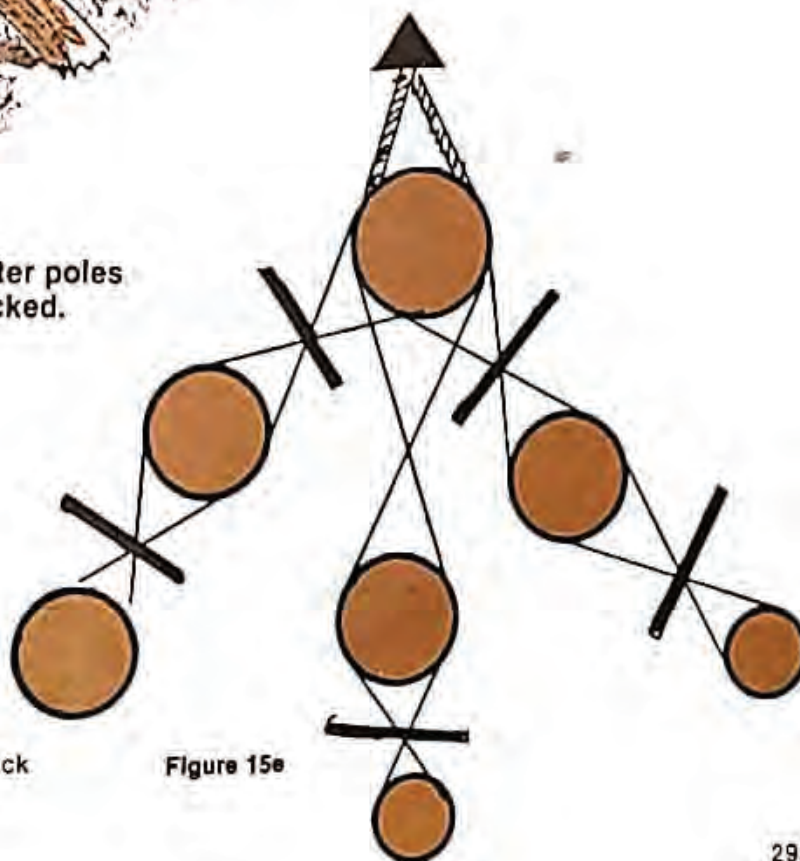
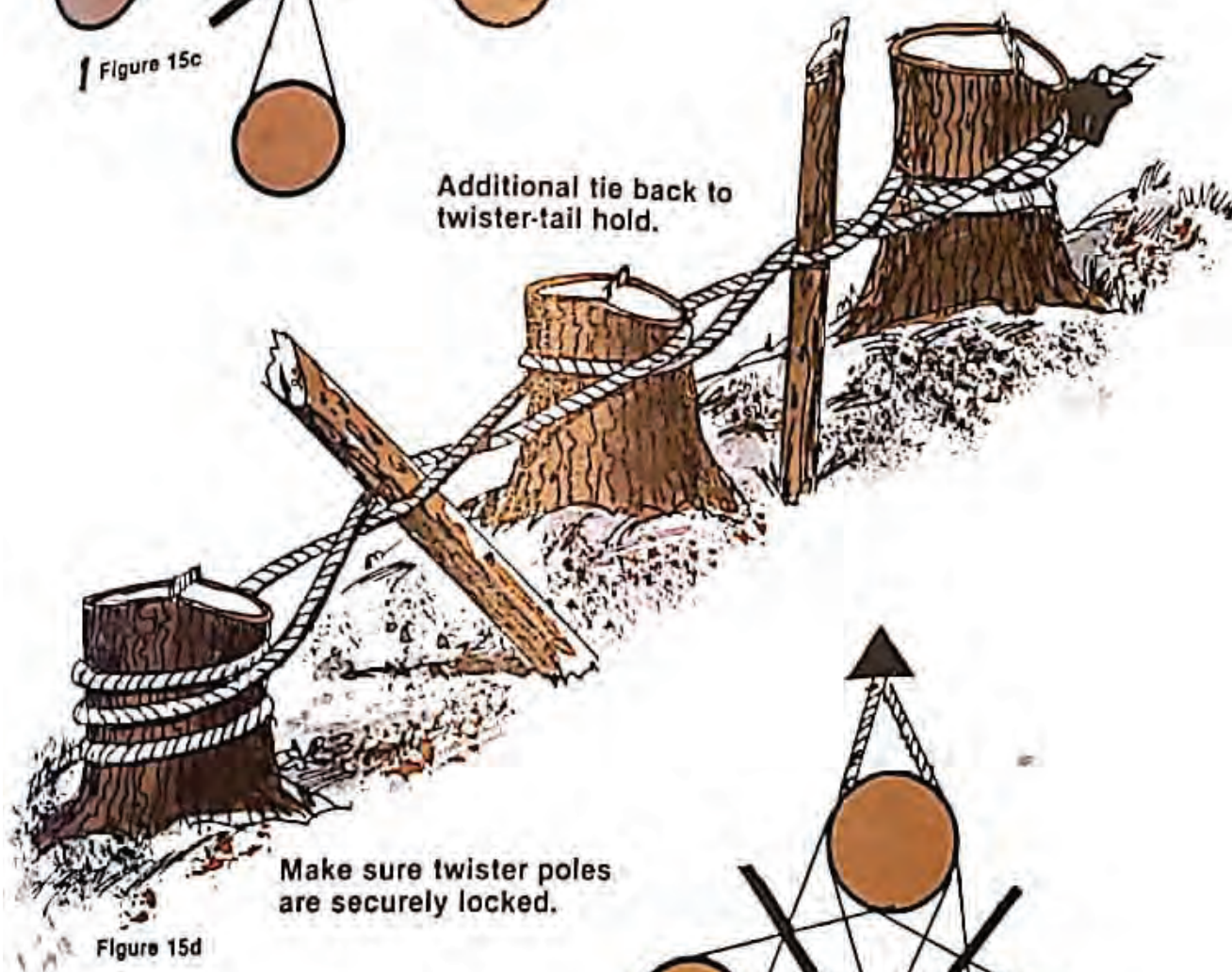


Figure 15c

It may even be necessary to tie back twister tailholds with additional twisters.

Additional tie back to twister-tail hold.



f. Notching of the guyline stumps —
I.H. & S. Regulation 60.102(4).

Once the guyline stumps have been selected, a means must be employed to ensure the guylines do not slip off the stumps. There are some commercial devices available which are acceptable to the Board for this purpose, but common industry practice is simply to notch the stumps with an axe or power saw.

Proper notching.

Notch is cut to good depth and is in lead with guyline.



Figure 16a

The two basic points to remember when notching a stump are:

1. That the stump is notched deeply enough to retain the guyline and to prevent slabbing on flare-rooted stumps.
2. That the notch is in lead with the guy line when practical, and if the stump height permits, there is sufficient wood left above the notch to prevent slabbing.

Improper notching.

Shallow notch not in lead with guyline.



Figure 16b

Improper notching.

Notch too close to top of stump.



Figure 16c

Improper notching.

Notch cut too deeply.



Figure 16d

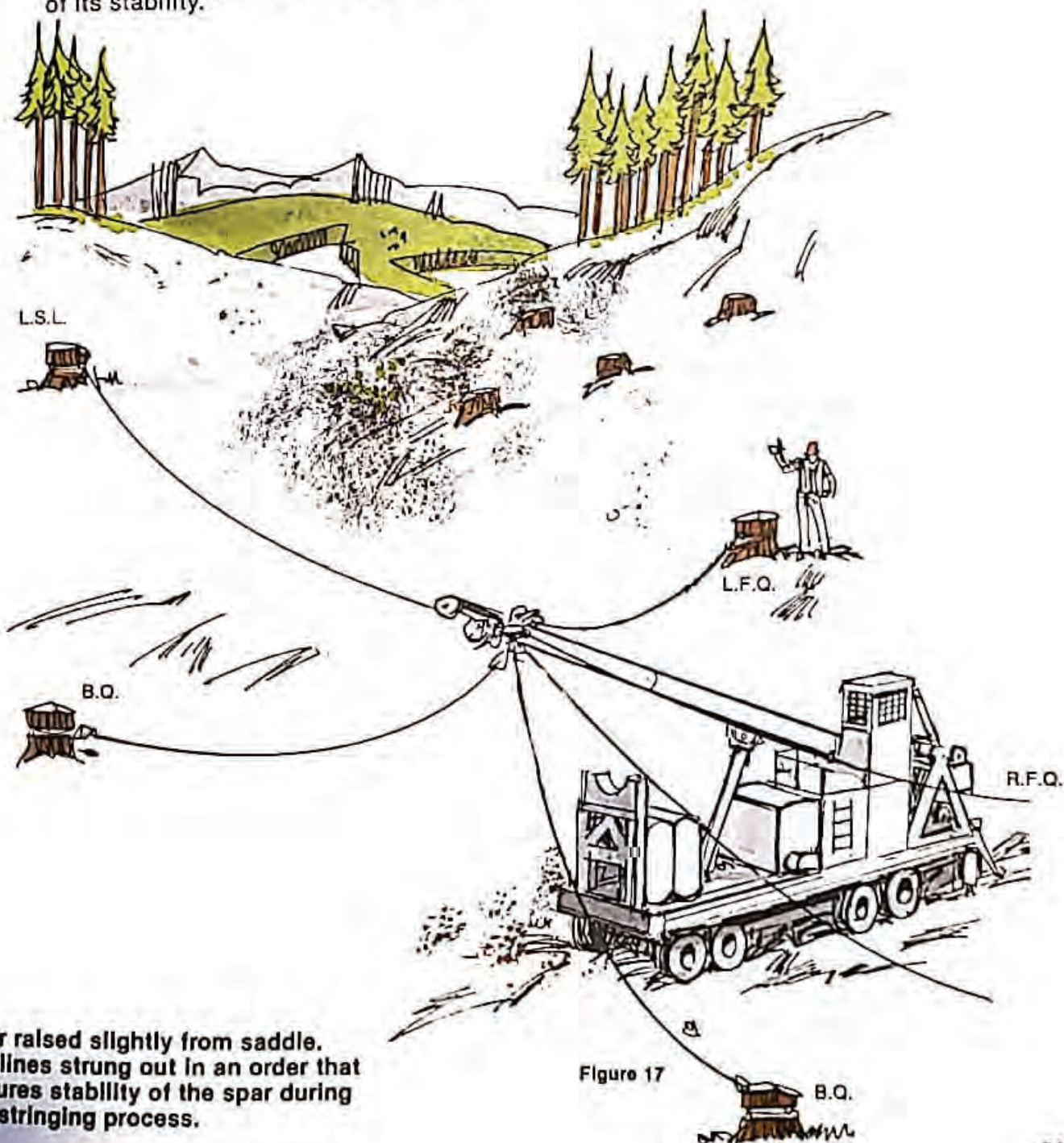
Remember, keep the notches down but don't cut off the roots! If a power saw is used, ensure that the operator is wearing both leg and hearing protective devices and that he brushes out around the stump to prevent possible kickbacks.

Industrial Health & Safety Regulation 60.102 (4) states:

"Guylines shall be retained on anchor stumps by notches of sufficient depth to retain the wrapping lines, or by other means acceptable to the Board which provide equivalent security. The stump shall be secured by tie-backs to another anchor or anchors, if there is any doubt of its stability."

g. Stringing the guylines

When guyline stumps have been selected and notched, the next step in preparation for the raising of the spar is the stringing and attaching of the guylines to the stumps. To facilitate the handling and sorting of the guylines, the spar is usually raised a few feet out of the saddle as shown in the sketch below.



Spar raised slightly from saddle. Guylines strung out in an order that ensures stability of the spar during the stringing process.

Figure 17

When telescoping spars have auxiliary safety guylines they are anchored before the main guylines are strung and the top section raised. Care must be taken that the spar is not raised to the point where it becomes unstable and may be pulled over when the guylines are strung out. Refer to the manufacturer's instruction manual if there is any question about how high the spar can be raised without the support of the guylines. Unnecessary loads on the spar at this time should be avoided.

Remember that the spar is only being held

up by the raising system at this time. Raising systems are subject to possible failure, especially if they have not been properly maintained as outlined in the manufacturer's manual. Care must be taken to remain out of the bight should the spar suddenly drop. The final raising of the spar will be done by the guylines except when telescoping spars are being used.

The guylines must be strung out in an order which will ensure the stability of the spar during the stringing process.

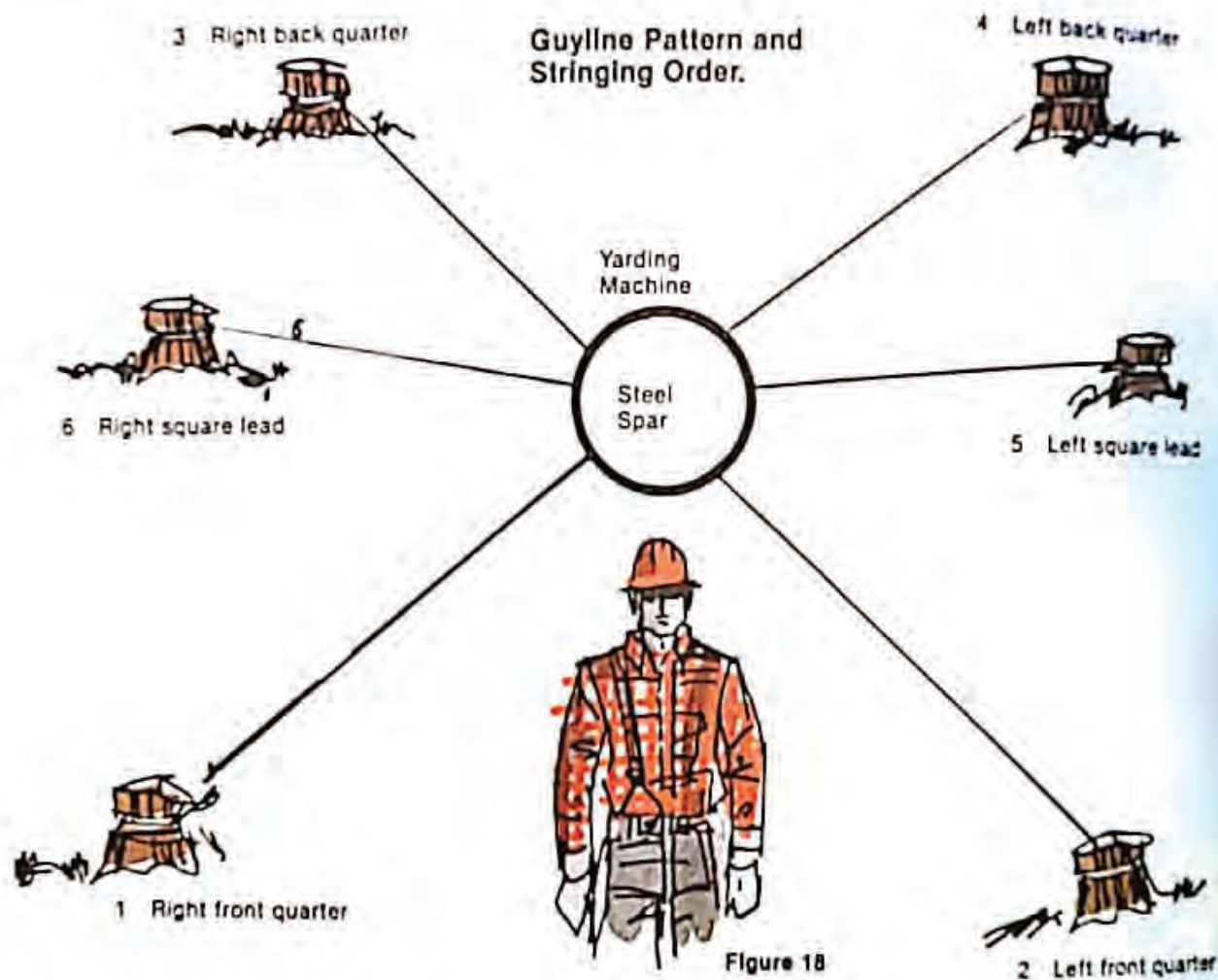


Figure 18

Most guylines on modern yarders are 1½" to 1¾" in diameter. The structure and weight of the guylines usually require the use of the strawline to pull the guyline to the stump. When pulling the guyline out by hand, be cautious of straining your back and ensure that enough help is available.

h. Stringing the strawline

The strawline is usually rigged in the following manner:

Points to note:

- the strawline is hooked several feet up the guyline to make it easier to connect the guyline to the stump. The strawline will prevent the guyline from running down the hill. However, this is not necessary on flat ground or when the guyline stump is located downhill
- where the strawline is connected to the guyline by a chain, the chain must be wrapped opposite to the direction of pull

- remember, the chain may slip, so keep in the clear!
- keep out of the bight area
- all line movement must be directed by proper whistle or hand signals
- ensure there is adequate slack in the guyline to prevent unnecessary stress on the spar

I. Siwashes

A siwash in any line is extremely dangerous. It is simply a bend in a line under tension. Common causes of siwashes are saplings, stumps and roots. They can be avoided by taking more care when stringing out the strawline. Siwashes create excessive wear on running lines and, if possible, lines should be kept clear.

Magnified portion shows strawline connected to guyline by pass chain.

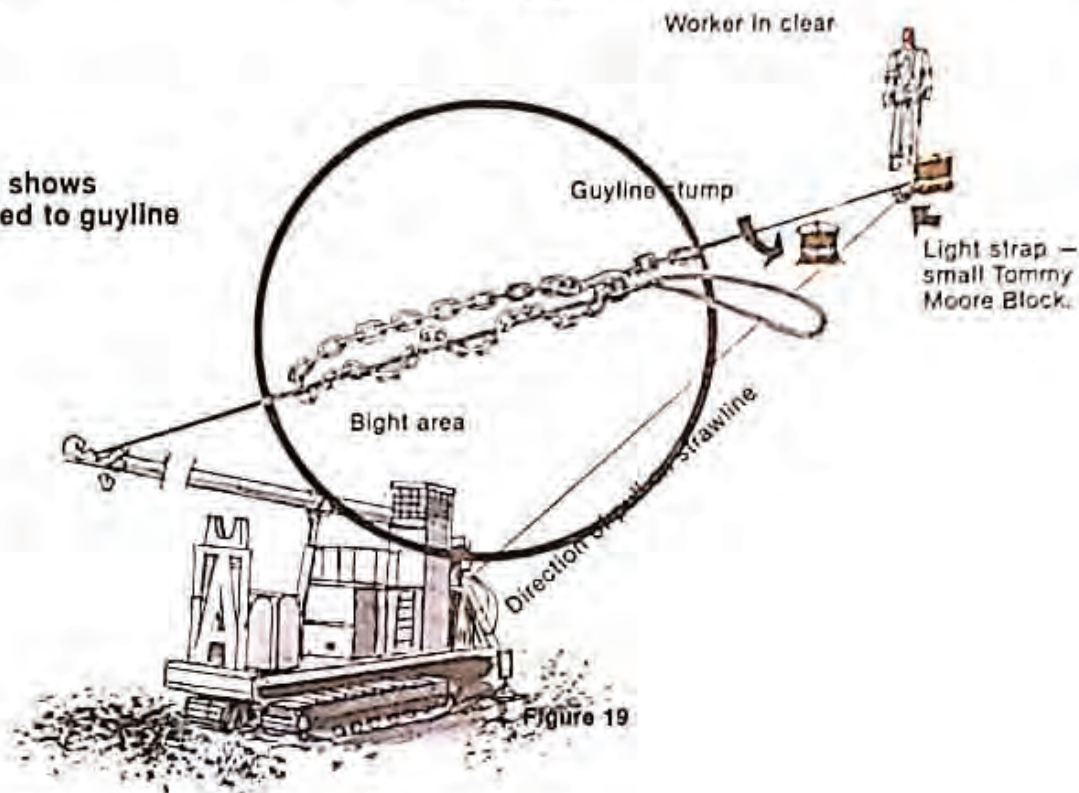


Figure 19

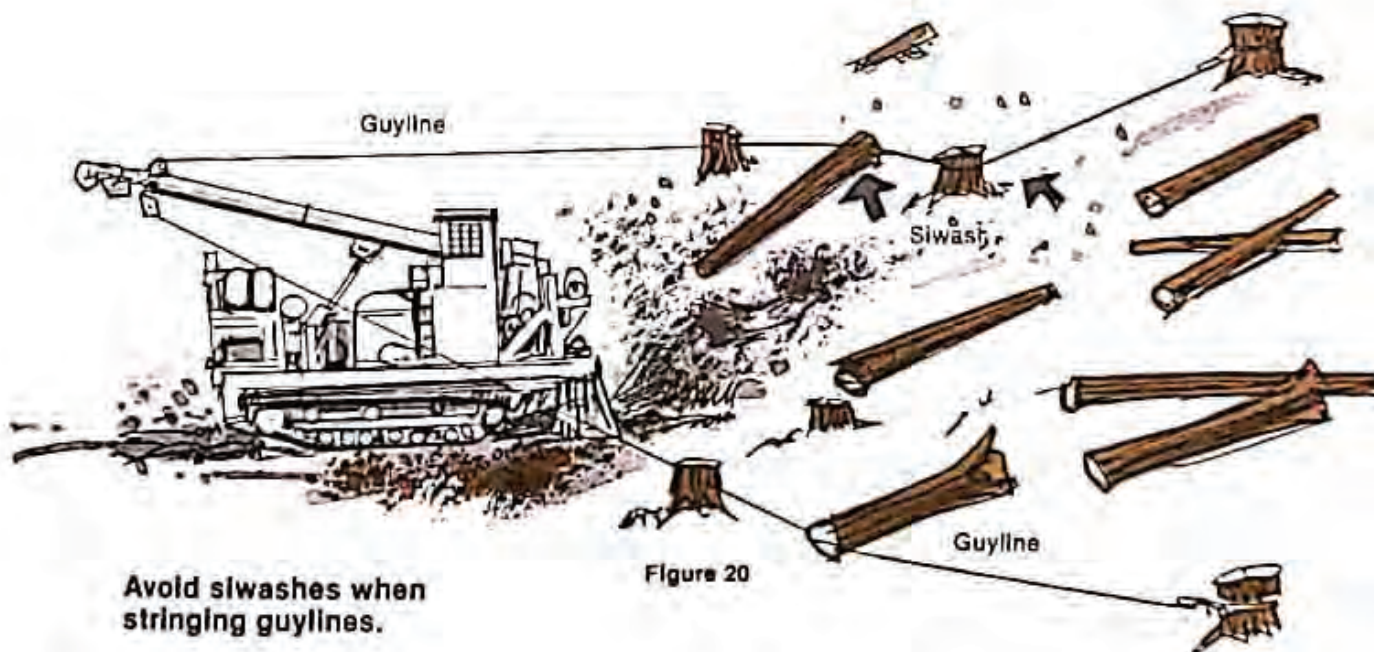


Figure 20

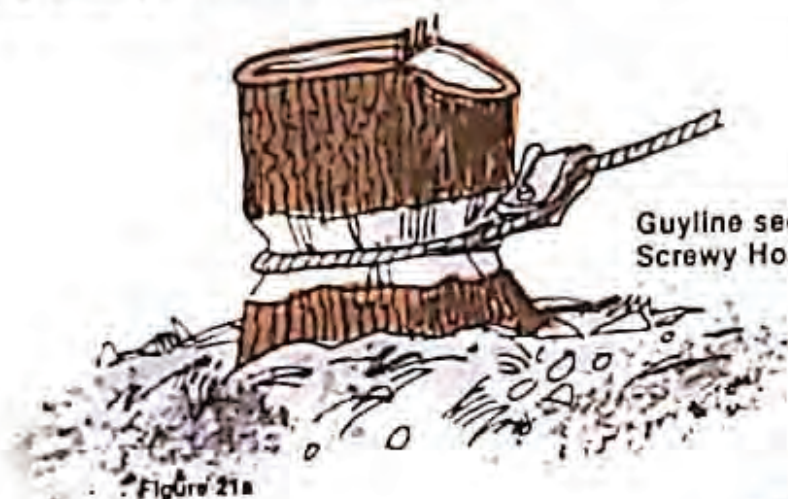
J. Guyline shackles

Proper sleeve or bell guyline shackles must be used to connect the guylines to the stumps and the guyline lead blocks to the ring at the top of the spar. The pins of the shackles must be secured against dislodgement. This can be done with either a proper pinlock or an adequate size Molly Hogan. Molly Hogans are recommended for the stump end of the guyline because of the ease of installation and removal.

If the guylines are going to be secured to the stump with spikes, the guylines must be wrapped a minimum of two and one half times

around the stump. The number and position of the spikes must be adequate to ensure that the guyline will handle the imposed loads safely.

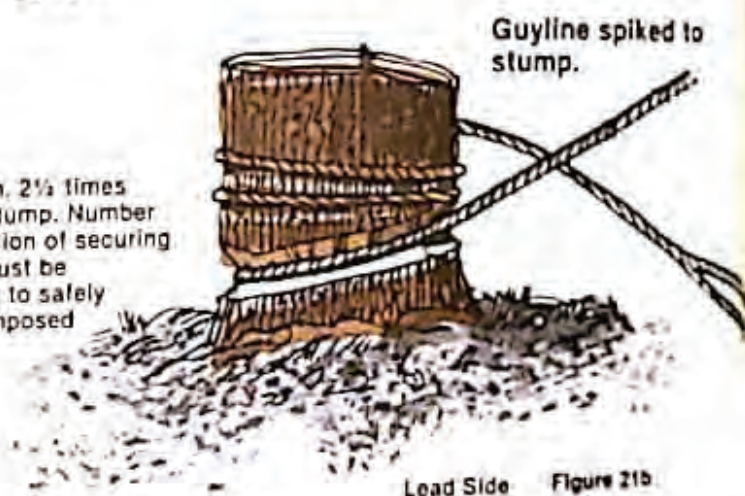
Wherever possible, guyline anchors should be selected at equal distances from the spar. The use of one or two guylines which are considerably longer than the others should be avoided. However, if the guyline is too short to reach the stump, a guyline extension must be added. The extension must be the same size and condition as the guyline and must be attached to the guyline with either a proper connecting guyline shackle or a connector.



Guyline secured with
Screw Hook.

Figure 21a

Wrap min. 2½ times
around stump. Number
and position of securing
spikes must be
adequate to safely
handle imposed
loads.



Guyline spiked to
stump.

Lead Side Figure 21b



On the first wrap, use eight
spikes or as many as neces-
sary to prevent line from
slipping until other wraps are
applied. On the second wrap,
use three spikes and on the
last wrap, use eight spikes.

Spiking side

Figure 21c

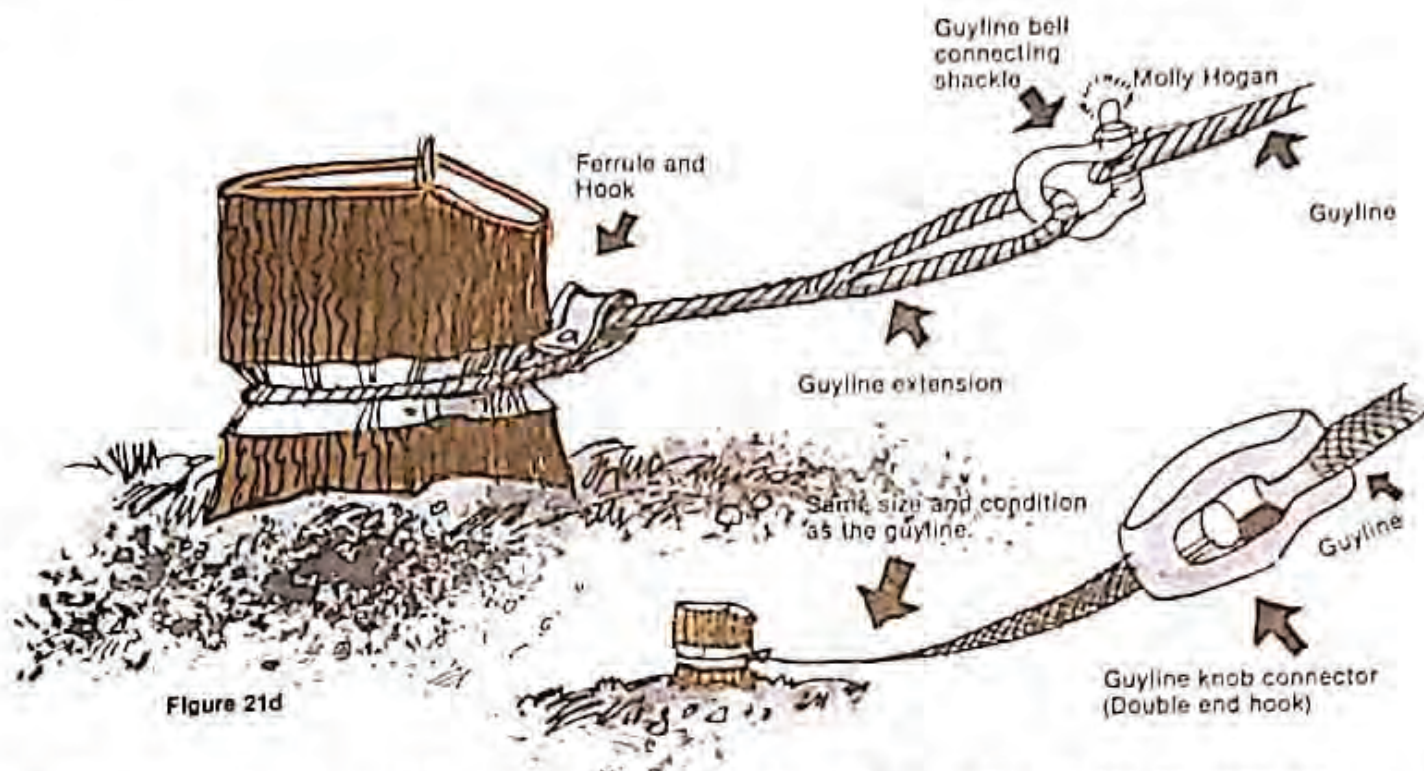


Figure 21d

The extension is usually connected to the guyline before the guyline is strung out.

Before the spar is raised, there is an opportunity to check the lines, blocks, shackles, and the rigging on top of the spar. Checking is a requirement of I.H. & S. Regulation 60.98(6).

This opportunity should be taken as it may be a considerable time before there is another chance to check this equipment.

k. Checking the lines

Industrial Health & Safety Regulations 54.18(23) outlines points to consider when checking the lines. Those sections of the lines that are subject to the most wear must be closely checked. They will include eye splices, knob connections and those sections of line which most often run through the blocks.

The basic wire rope rejection criteria as stated in the I.H. & S. Regulation 54.18(23) are as follows:

"Wire ropes shall be considered unserviceable and shall be permanently removed from service if:

1. In running ropes, six randomly distributed wires are broken in one rope lay, or three wires are broken in one strand in any one lay, or,
2. In standing ropes, there are more than two broken wires in one lay in sections between end connections, or more than one broken wire at one end connection, or,

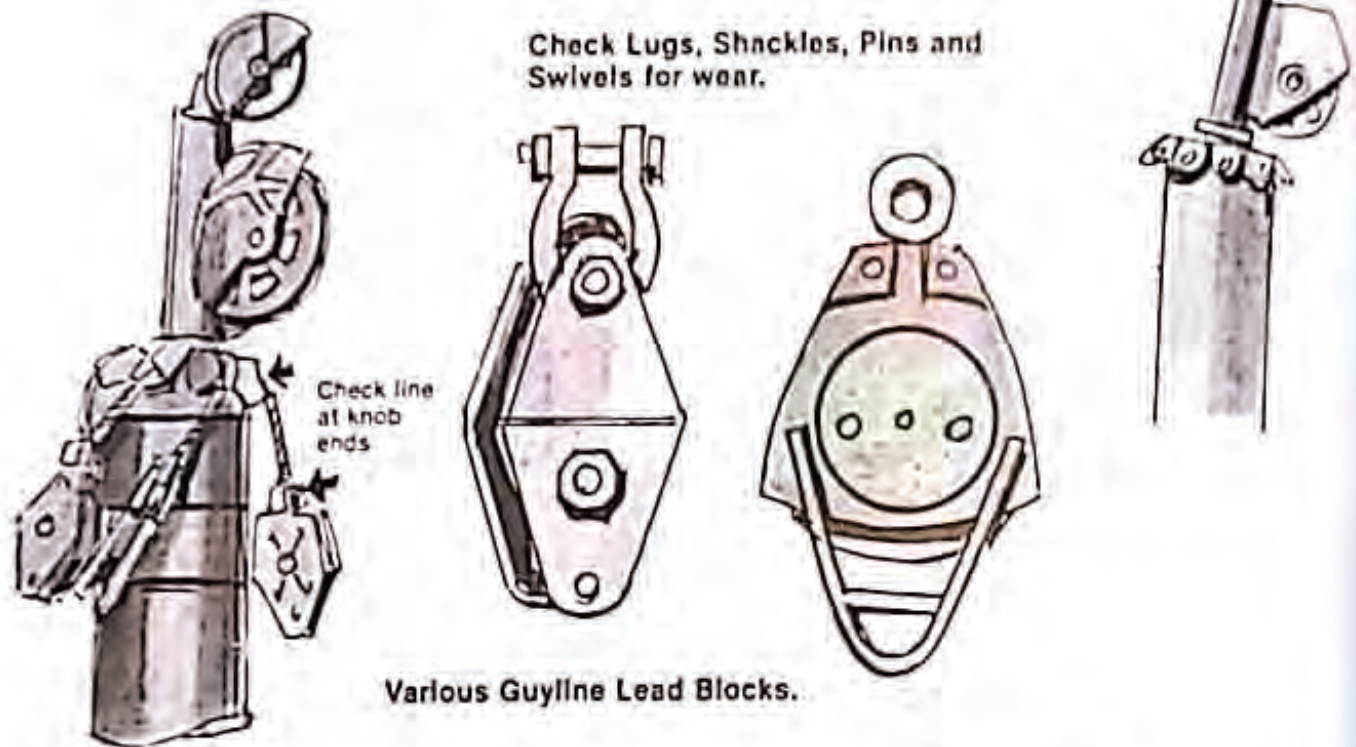
3. Wear, or the effects of corrosion, exceeds $\frac{1}{8}$ of the original diameter of outside individual wires, or,
4. There is evidence of kinking, birdcaging or any other damage resulting in distortion of the rope structure, or,
5. There is evidence of any heat damage, or,
6. There are reductions of normal rope diameter, from any cause in excess of:
 - (i) $\frac{3}{64}$ " (1 mm), for diameters up to and including $\frac{3}{4}$ " (19 mm), or,
 - (ii) $\frac{1}{16}$ " (2 mm), for diameters $\frac{7}{8}$ " to $1\frac{1}{8}$ " (22 to 29 mm) inclusive, or,
 - (iii) $\frac{3}{32}$ " (3 mm), for diameters $1\frac{1}{4}$ " to $1\frac{1}{2}$ " (32 to 38 mm) inclusive."

The correct way to measure wire rope diameter is from the outside of one strand to the outside of the opposite strand.

l. Checking the rigging on top of the spar

A thorough check for cracks, wear and deterioration must be done on the six guyline lead blocks and shackles. As with the lines, look very closely at those points which are subject to the most wear. The obvious points of concern are shown in Figure 27.

Figure 22



If any serious deformation is observed, make sure that the defective part is replaced before the spar is put into service. Non-destructive testing of the ring, shackles, and blocks is recommended at established intervals.

The haulback and mainline fairleads should be thoroughly inspected and greased. Ensure the stops which prevent a 360° full-circle rotation of the fairleads are not broken. If the stops are broken, have them replaced and check the running lines to ensure they are not crossed.

If there are dents in the spar sections, they must be scrutinized very closely. Most modern spars are made from $\frac{3}{4}$ " spiral rolled material and the slightest deformation will greatly reduce the strength. If there is any doubt concerning dents, the equipment should not be used until the manufacturer or a professional engineer has been consulted and his recommendations followed.

m. Raising the spar

When the mobile yarder is securely blocked and positioned, the rigging and fittings checked, the guylines strung and all the necessary greasing completed, the spar can be raised.

The specific procedures in the raising of the spars vary with the design of the yarder and the manufacturer's instructions.

n. Mechanical equipment

It may have been a long time since the mechanical equipment required to raise or lower the spar has been used. This makes it absolutely imperative that the operator carries out a thorough check of the equipment to ensure that it has been maintained properly and is operating safely. A good operator will always ensure that this check is included in the spar-raising procedures. The basic equipment checks shall ensure:

1. That the multiple throttle control valve is working properly.
2. That the hydraulics are working properly, that the motors will rotate both ways, and that all hydraulic lines are clear.
3. That the guyline drums and drives are properly secured.
4. That all the "dogs" and lever mechanisms are in good condition.
5. That all fuel and oil levels are adequate.
6. That the power take-off equipment to the hydraulic system and the levelling and raising jacks are working properly.

The common industry practice is to colour code the individual control handles so they are the same colour as the guyline drum and lead blocks. This avoids confusion.

o. Final raising of the spar

When raising the spar, there are five basic points to consider:

1. Position of workers
 - a. Positioned as instructed to perform assigned duties.
 - b. Safely positioned and clear of hazards.
 - c. Properly instructed and alert to all work activity and ready to react to unexpected and unforeseen hazards.
 - d. In good view, if required to give signals.
 - e. Not in danger from other traffic through the landing.
2. Guylines secured
 - a. Guylines are in the notches.
 - b. Shackles and hooks properly attached.
 - c. Guylines not fouled under roots, logs, or other material.
3. Back quarter guys
 - a. Sufficient slack throughout travel of raising ram.
 - b. Guylines tightened with sufficient and equal tension to control the spar.
4. Initial raising system
 - a. Hydraulic hose reel unspooling freely.
 - b. Raising ram properly positioned on the spar.
 - c. Raising ram base clear.
 - d. Levelling jacks positioned slightly clear of blocking. The spar controlled during raising by the guylines and not the levelling jacks — except with telescoping spars where jacks set on a mat or the ground are the main spar support.
 - e. The hydraulic system of the jacks on the telescoping spars is kept locked and placed in the float position when yarding starts.
5. Lifting the spar off the initial raising system
 - a. Front quarter guys equally tensioned.
 - b. Take up excess slack in the back quarters.
 - c. Square lead guys adjusted as required.
 - d. Keep mainline and haulback slack, free of lead blocks and haulback clear of mainline sheave.
 - e. Front quarters to be properly spooled. Workers to keep feet clear of line

tailhold and to stand on the platforms provided.

- f. Lift spar clear of raising assembly by tightening each guyline alternately.
- g. Keep the guylines equally tensioned as much as possible.
- h. Keep dogs in the positive position.
- i. If the guyline anchor stumps are located downhill, it may be difficult to raise the spar from the lifting assembly, therefore, guylines should be properly placed to ensure adequate lift.
- j. Keep spar plumb by checking clearance between the levelling jacks and blocking.
- k. Maintain as little slack as possible in the back quarter guylines as the spar approaches the upright position.
- l. After the back quarter guyline drum dogs are set, the spar is tightened by tensioning the front quarter guylines.
- m. When all guylines are tensioned so that the yarding lines are in lead, all drum dogs will be secured by gently reversing the drum back on to the dogs to prevent drum shaft or key damage.
- n. If during the spar raising process any stump movement is observed, other stumps that are secure shall be used if possible. Otherwise stumps must be adequately tied back before continuing.

3) Rigging Up the Yarding Lines

a. Stringing the yarding lines and changing roads

Other than skyline equipment, each yarder is equipped with three principal lines which are necessary for conventional yarding.

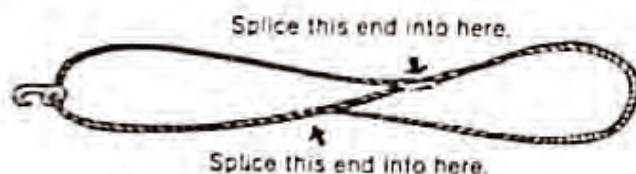
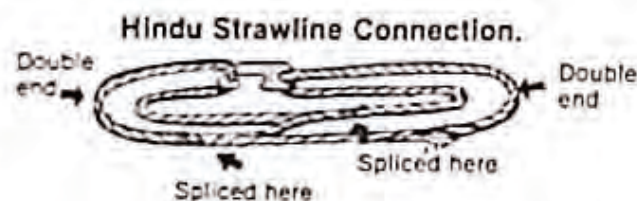
These lines and their basic functions are:

1. Mainline —
 - the mainline is the largest line on the yarder. Most modern yarders have a 1½ inch to 1¾ inch mainline. The size of the mainline will be specified on the design specification plate.
 - the function of the mainline is to yard the logs to the landing. It is shackled to the front end of the butt rigging.
2. Haulback
 - the haulback is shackled to the back end of the butt rigging and thereby to the mainline. The common line sizes are ¾ inch or 1 inch.

- the function of the haulback is to pull the butt rigging, chokers and mainline back out into the felled and bucked timber. It is kept tight when the turn is yarded in to the landing to provide lift and direction.

3. Strawline

- the strawline is the small cable which is strung manually and used to rig up or pull the haulback line through the haulback blocks back to the landing. The common line size is $\frac{3}{4}$ inch to $\frac{7}{8}$ inch.
- the strawline is divided into 200-300 ft. lengths, each of which is called an extension. A specially designed hook or "Hindu" type splice is used to connect these extensions.



The eyes should be spliced large enough so that the spliced sections are not at the ends.

Figure 23

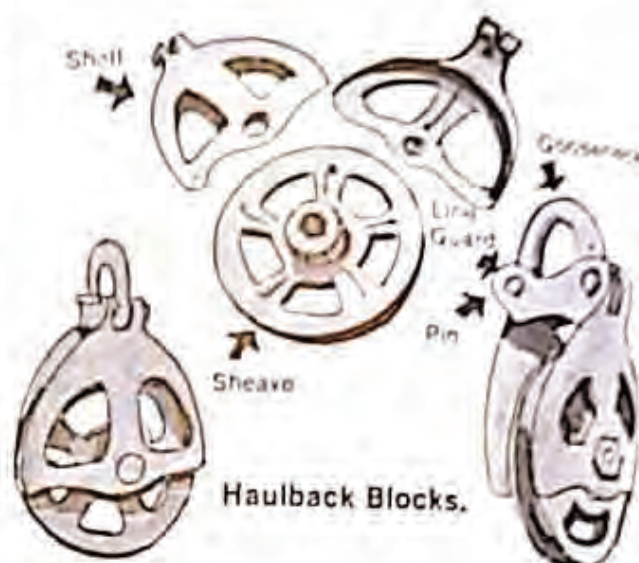
b. Rigging fittings

The basic rigging required for rigging the yarding lines with the strawline extensions are:

1. The Haulback Blocks

There are a number of haulback blocks designed to withstand the loading im-

posed by yarding activity. However, a haulback block should be selected with adequate sheave diameter to lessen the line wear.



Sheave sizes vary (10" to 22") and should be adequate diameter to minimize line wear.

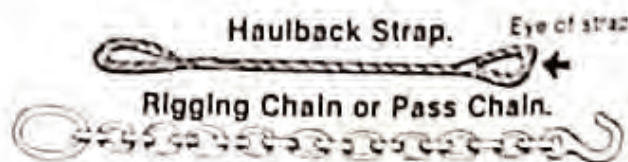
Figure 24

The weight of these blocks varies between 60 to 80 lbs. and must be lifted with care to avoid back injuries to the worker. Blocks must be kept well lubricated.

2. The Haulback Straps

Haulback blocks must be hung from both eyes of the strap. Eye splices must be tucked at least three times. Haulback straps shall not be made from discarded haulback line and straps with pressed eyes must be obtained from a reputable manufacturer.

3. The Rigging Chain or Pass Chain



Used to hook on to the bight of a line.

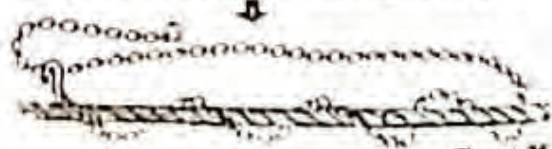


Figure 25

This chain is used to pull or hold a line by the bight. It must be wrapped against the direction of pull. The chain's main purpose is stringing guylines and preventing the haulback from running down steep slopes when changing roads.

4. The Butt Rigging and Chokers

This rigging assembly consists of a series of shackles, hooks, swivels and links.

The basic steps to be followed when rigging up the yarding lines are:

1. Selection of suitable stumps for the haulback blocks.
2. Notching the haulback stumps and hanging the blocks and straps.
3. Stringing the strawline.
4. Running the haulback around.
5. Tight lining the haulback to clear the lines.

Butt Rigging.



Figure 26

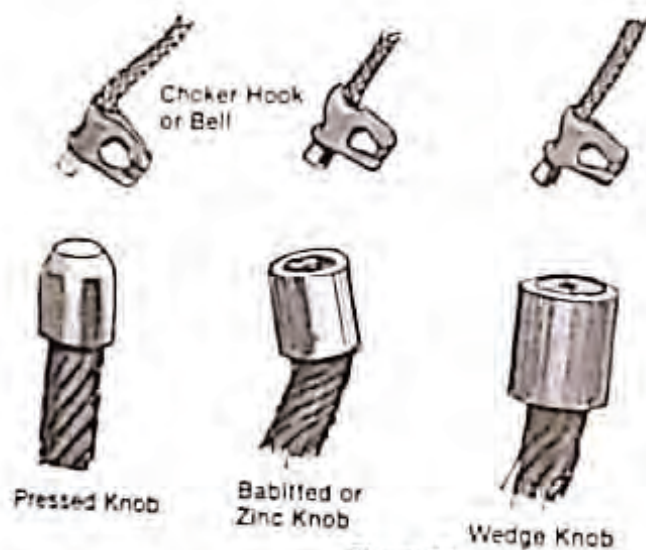


Figure 27

When locating yarding roads, make sure that neither rigging crews nor landing workers are in danger from run-away logs dislodged by yarding or loading activity.

Two tailhold stumps are required. Where possible, the stumps should be located where they equally share the stresses imposed by the yarding lines.

Correct

Stumps share stresses imposed by yarding lines equally.

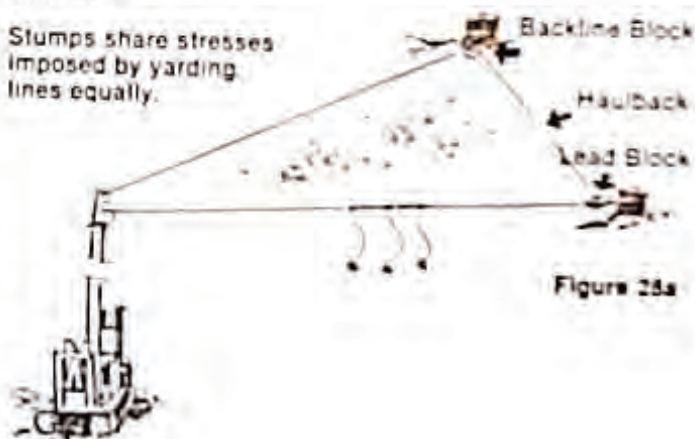


Figure 28a

c. Selection of location for suitable tailholds for the haulback blocks

The hooker and side foreman have planned ahead and have determined the location of the first road. On sloped ground, the yarding road should be strung to the highest point of the yarding quarter so that the crew can remain in the clear on the upper side and in the logged off area after the first road is yarded. This procedure is also good for the recovery of run-away logs.

Not rigged correctly.
Too much stress on
Roadline Block.

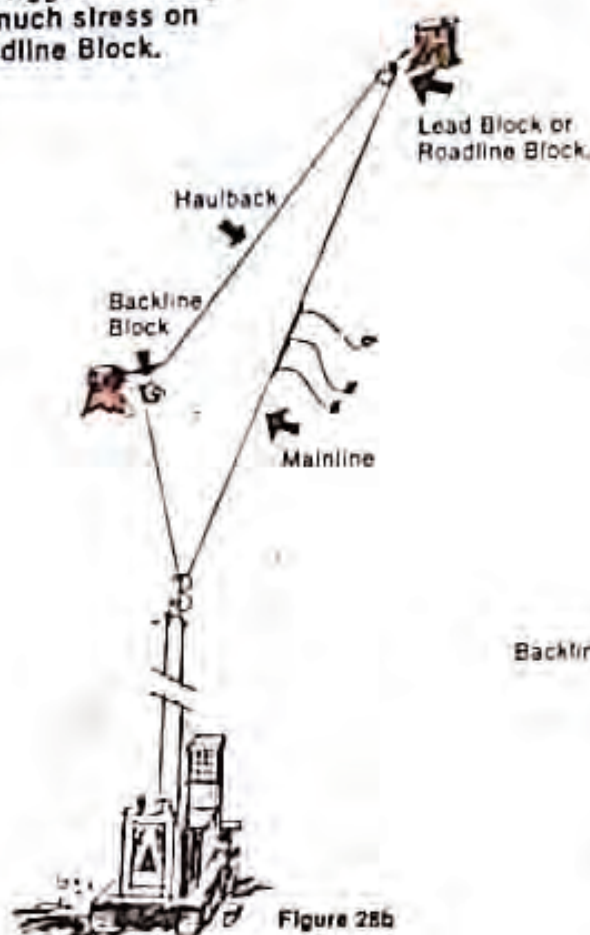


Figure 28b

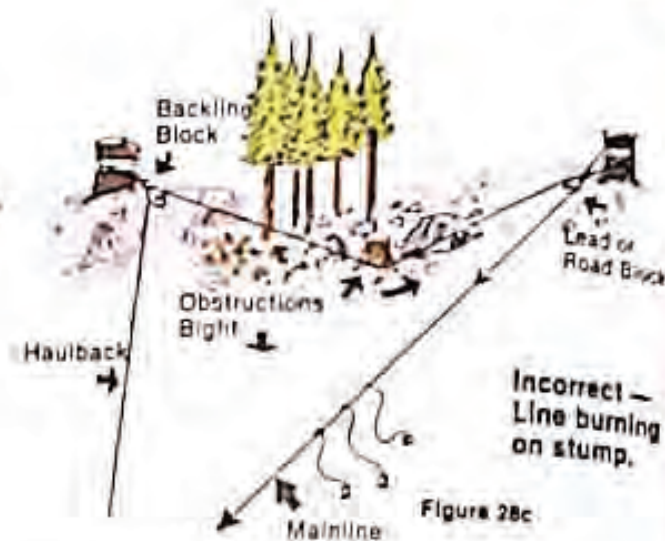


Figure 28c

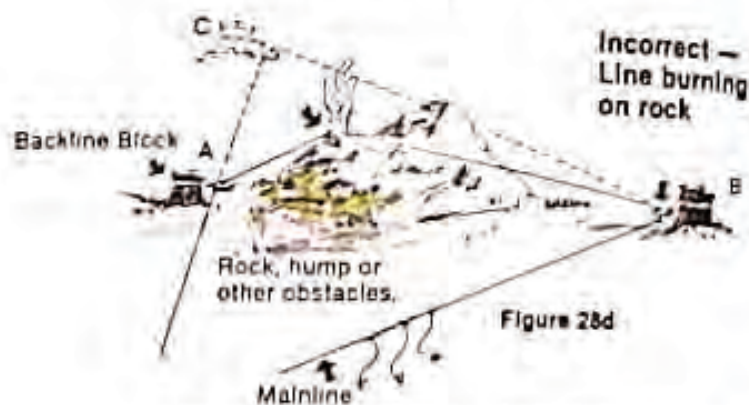


Figure 28d

Poor choice of stump. Should have chosen stump C for the Haulback rather than stump A.

d. Line clear of obstructions

Proper location of the haulback stump anchor will minimize wear on the haulback line caused by siwashing. Wherever possible, the lines should run clear of any obstructions. Care should be taken to avoid creation of a reverse bend in the line.

Correct — Line clear of obstacles.

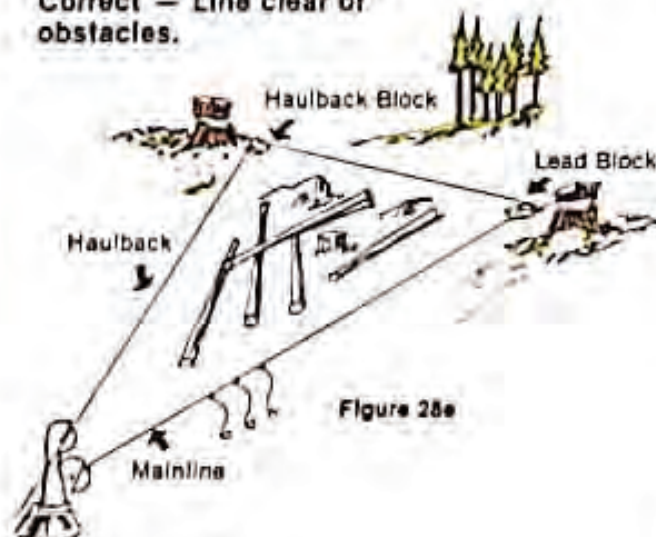


Figure 28e

e. Stump suitability

The basic considerations one should make when choosing a haulback stump anchor for the yarding lines are the same as those for the guylines stumps. If there is any question as to a stump's capability, don't take a chance. Tie it back.

f. Notching the haulback stumps and hanging the blocks and straps

The same basic principles of proper notching of guylines stumps also apply to haulback stumps. The notches must be deep enough to retain the haulback straps. Double wrapping a stump to avoid notching is not permitted.

Haulback straps must be hung so that both eyes are in the block gooseneck and are in lead.

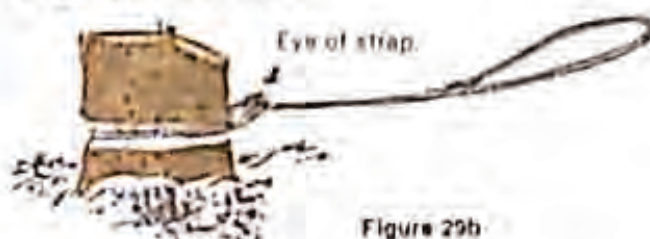
Straps must be long enough to allow the block to align with the angle of the haulback, which will prevent the line from burning on the shell of the block.

Never choke a stump with a strap by threading one eye of the strap through the other eye except for strawline use or when only using a light pull.

Hanging Haulback Blocks and Straps.



Do not choke a stump to hang a corner block.



When hanging the blocks in the strap, it is recommended that the heads of the pins face the roadline side to prevent the Molly end of the pin from being inadvertently struck and forced out by the butttrigging.

The haulback strap must:

1. Be of sufficient size and strength for the line being used.

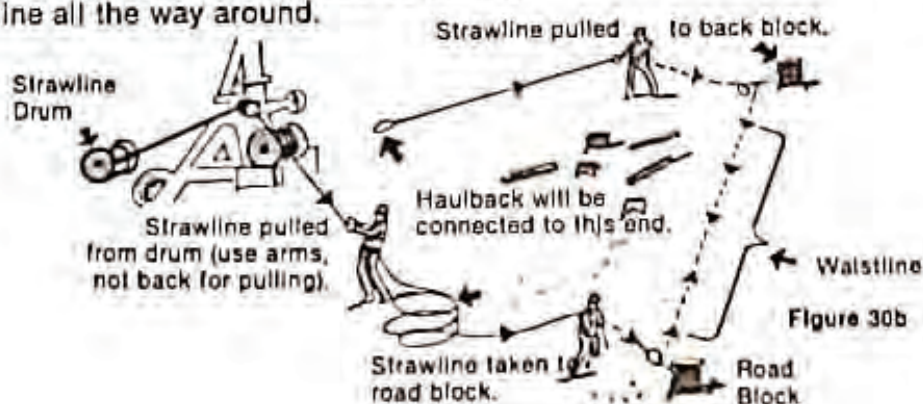
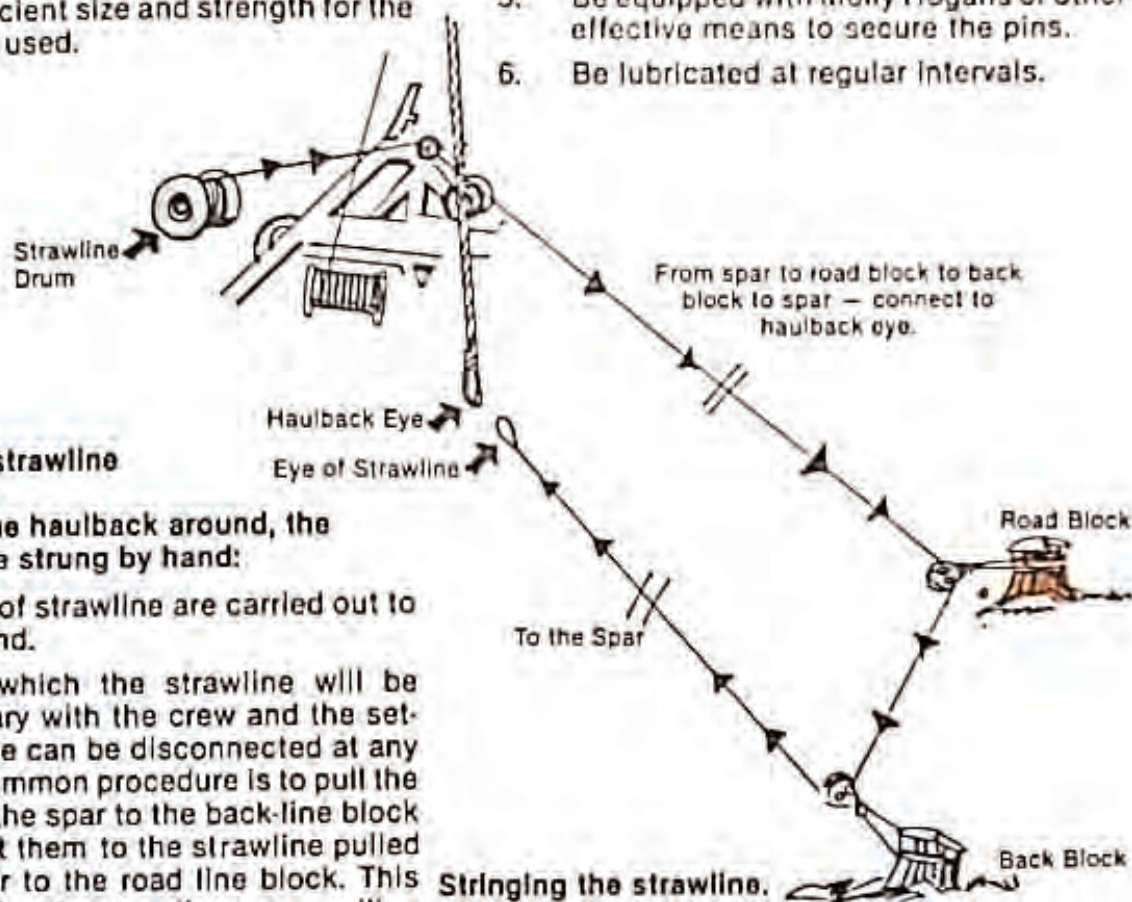
2. Have a line guard between the gooseneck and sheave.
3. Have a tight fit between the shell of the block and sheave to prevent lines from jumping the sheave.
4. Be fitted with proper pins.
5. Be equipped with Molly Hogans or other effective means to secure the pins.
6. Be lubricated at regular intervals.

g. Stringing the strawline

In order to pull the haulback around, the strawline must be strung by hand:

At times, coils of strawline are carried out to string the back-end.

The order in which the strawline will be strung out will vary with the crew and the setting. The strawline can be disconnected at any extension. The common procedure is to pull the extensions from the spar to the back-line block and then connect them to the strawline pulled out from the spar to the road line block. This method for stringing the strawline saves pulling the strawline all the way around.



STRAWLINE SHOULD BE STRUNG AS CLOSE TO LEAD AS POSSIBLE IN ORDER TO MINIMIZE SIWASHES AND BIGHTS.

Care must be taken to ensure that strawline extensions are connected properly so they do not unhook when the line is slack or coiled. On favourable or short settings which are clear of saplings, the strawline may be strung by walking the bight to the back end. This is done by connecting the strawline to the end of the haul-

back in the landing, then pulling the bight to the back end. Care must be taken to avoid crossing the lines.

On long steep settings where the lines would run away if the strawline inadvertently unhooked, Mullies are often used to connect strawlines.

If lines are crossed they will turn on each other and cannot be cleared by tightlining.

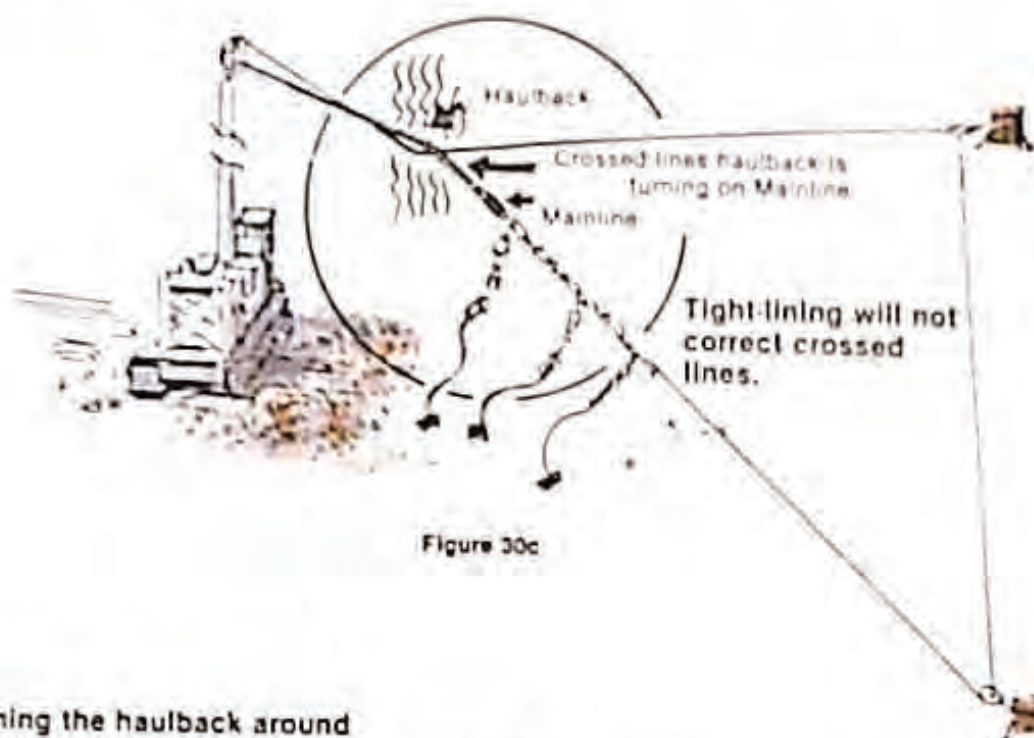


Figure 30c

h. Running the haulback around

After the strawline has been strung, the haulback is run around. Because of the danger from the strawline under tension, care must be taken to ensure that all workers are clear of any siwashes, bights, or potential hazards caused by breakage of the strawline.

Due to the difficulty of stringing the line exactly in lead, it should never be assumed that the strawline is completely free of siwashes.

When straightening out a siwash in the strawline, the line should always be slacked and workers must stand on the clear side of the siwash.

When the haulback is run around, the hooker is usually watching the tailblocks to ensure:

- The strawline and haulback are running clear in the blocks.
- The straps and blocks are properly aligned.
- The straps are correctly positioned in the stump notches.

At this stage, the hooker will usually clear the siwashes at the back-end. However, it is not always possible to observe the lines all the way to the spar, therefore the rigging crew must be alert for additional siwashes and keep well in the clear.

When the eye of the haulback reaches the landing, the strawline is unhooked and the haulback is shackled to the butt rigging which is connected to the mainline. It is common to hang the bell of the shackle in the eyes of the haulback and mainline. The eye of the strawline is then secured to the base of the spar, tightened and the brake applied. This is done to eliminate the hazard of a loose line on the ground, which may flip up and injure a worker.

i. Tightlining the haulback to clear the lines

It is necessary to tightline the mainline and haulback to clear out any siwashes before yarding commences, and to be sure of the stability of the haulback stump anchors.

SECTION B – YARDING AND LOADING

Before yarding starts, the loader must be positioned properly to load and deck logs, and to keep the landing clear. Often there is little choice in positioning the loader, but priority must be given to keeping two feet (61 cm) between the counterweight and all obstacles. The loader must also be clear of the turns being landed by the yarder. Whenever possible, the loader shall be placed so that the loader operator has a full and unobstructed view of the landing operations. This is a requirement of Industrial Health & Safety Regulations 60.158 and 60.156(1).

If yarding starts before the arrival of the loader, those logs which may affect the building of a safe, stable pile must be choked and rearranged.

1) Yarding the Logs

Using radio whistles, the rigging slinger, assisted by the chokermen, directs the movement of the rigging and the choking of the logs.

Yarding operations normally start near the landing and work towards the back-end of the setting. Special care must be taken until yarding activity is clear of the landing and guylines because of the hazards of congested work areas.

A knowledge of the following basic work procedures for rigging crews is essential to avoid injury and to maintain effective production.

a. Spotting the rigging

The rigging slinger will spot the rigging where the turn is to be hooked-up.

When the rigging has been spotted, the crew shall remain clear until the rigging has been slacked down to stop the swinging of the chokers.

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

b. Selecting and choking the turn

Before the rigging is spotted and without endangering himself, the rigging slinger will select the turn. He will approach the butt rigging before the chokermen and tell them which logs to choke. He will also warn them of specific hazards of this turn.

The following are points to consider when selecting a turn of logs:

1. To prevent hangups as the turn is pulled clear, select logs and attach the

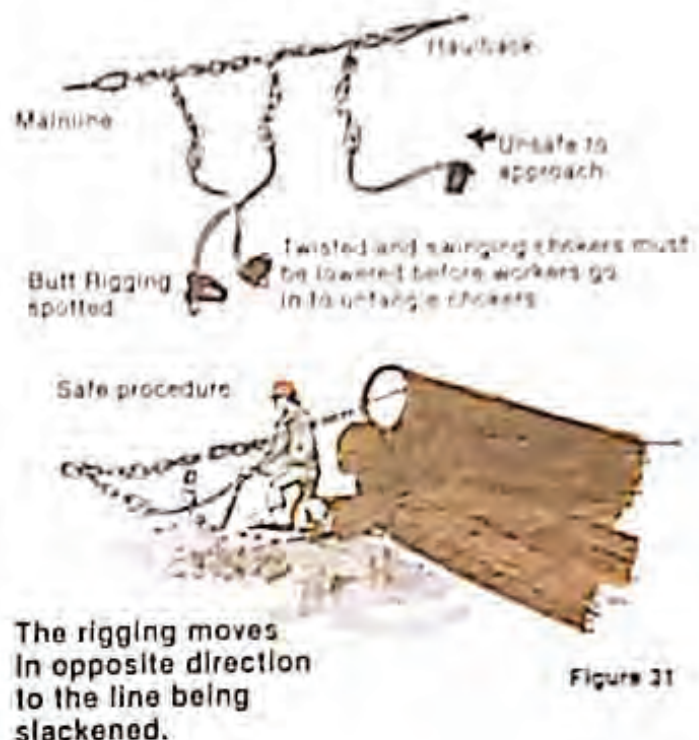


Figure 21

chokers so that logs will pull clear of the stumps.

2. The heaviest logs shall be placed in the front chokers to facilitate yarding and landing, prevent small log breakage, and minimize the strain on the butt rigging.
3. Logs should be choked near the end to reduce the hazard of swinging and upending logs and to facilitate safe landing of the turn.
4. To avoid the problems of stretching and springing, and from excessive slacking of the lines, select only those logs within easy reach.
5. Turns shall be kept to a size which can be safely handled by the yarding equipment. The heaviest log or a one log turn should be hooked on the front choker.
6. Small logs must be choked properly to avoid breakage.

7. Where a kick or a roll is necessary to yard a log clear, extra choker length must be used.
8. Select logs for the turn from the top of the felled and bucked area and those that require little digging to secure the choker. Tight logs can be freed by squaw hitching or other methods.
9. Logs should be choked at the end nearest the spar so they do not upend or swing.
10. Other than large full length trees, large swell butted logs should be choked at the small end.
11. If logs are brushed up, yard out a light turn from behind to clear out brush.
12. Chokers must be set properly on crossed logs to avoid "Figure eights" which can cause cutting and damage to the chokers.
13. Always approach and set chokers from the upper side unless it is certain that the log will not move.

c. Proper setting of a choker

When placing the choker on the log always go over the top of the log with the knob unless instructed otherwise for some specific reason.

If you have to move to the other side of the log to push the knob through, ensure that the log will not roll.

d. Getting in the clear

Once the chokers are set, the next most important step for personal safety is to get in the

Proper setting of chokers.



Figure 32

Always go over the top of log with the knob except in certain rare circumstances.

clear before the go-ahead whistle is blown by the rigging slinger. This is in accordance with WCB I.H. & S. Regulation 60.144(1). The entire rigging crew should leave the butt rigging in the same direction, the rigging slinger being the last man out.

"In the clear" means:

- BACK BEHIND ON THE UPHILL SIDE OF THE TURN AND OUT OF REACH OF ANY UPENDING LOGS
- OUT OF THE BIGHT
- IN THE LOGGED OFF AREA
- IN A POSITION WHERE MOVEMENT WILL NOT BE OBSTRUCTED

e. Signalling the turn to the landing

When the rigging crew is in the clear, the rigging slinger will blow a go-ahead signal, and the crew must watch the turn until it is yarded free. If there is any concern about the turn, the go-ahead-slow signal shall be given.

f. Hang-ups

When a hang-up occurs, it is usually the hooktender or the rigging slinger who "fights" it. It is recommended that hang-ups be fought by repositioning the choker, rather than repeated signals of tightlining and skinning back and forth. If logs are unhooked at a hang-up and only one log is sent in to the landing, this log should be hooked to the front choker. Rigging crews are exposed to many hazards and they must be aware of these when fighting hang-ups.

Industrial Health and Safety Regulation 60.144(2) states:

"No worker shall be near rigging, which is stopped at a hang-up, until the rigging has been slacked to reduce the hazard."

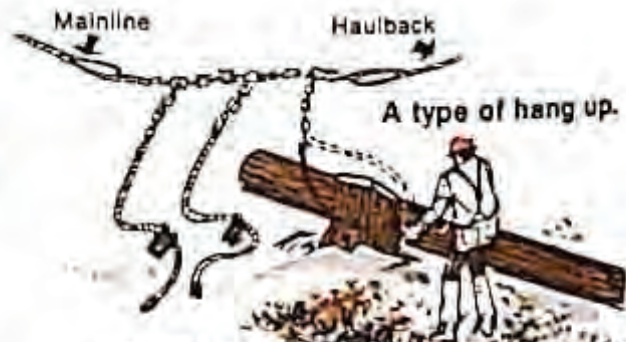


Figure 33

Slack rigging before approaching. In this case simply lift the choker over the stump.

Dropping In.

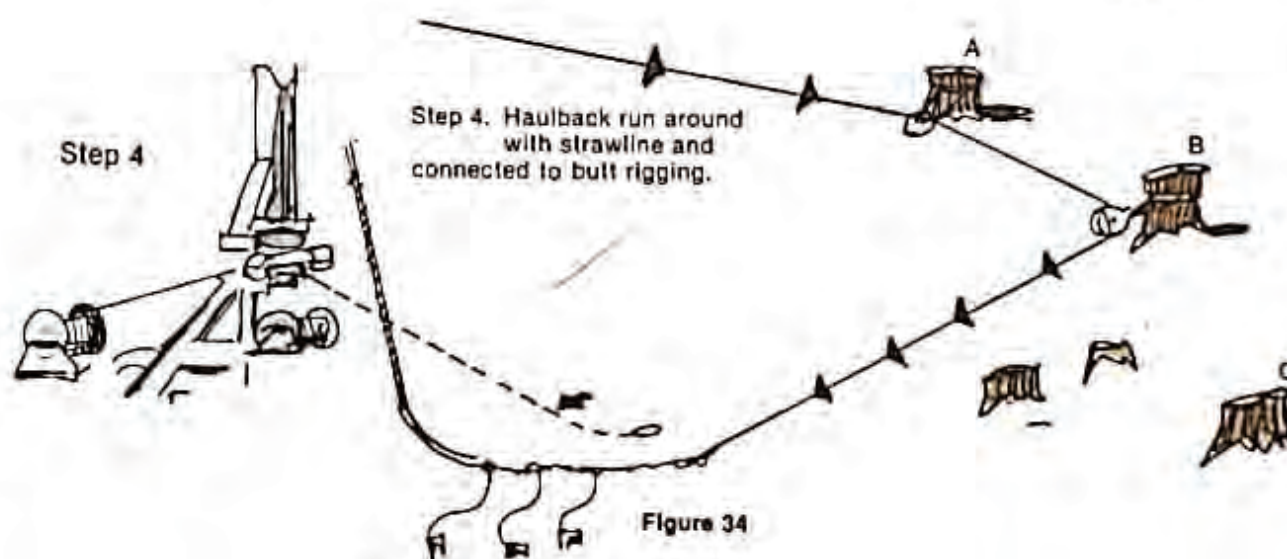
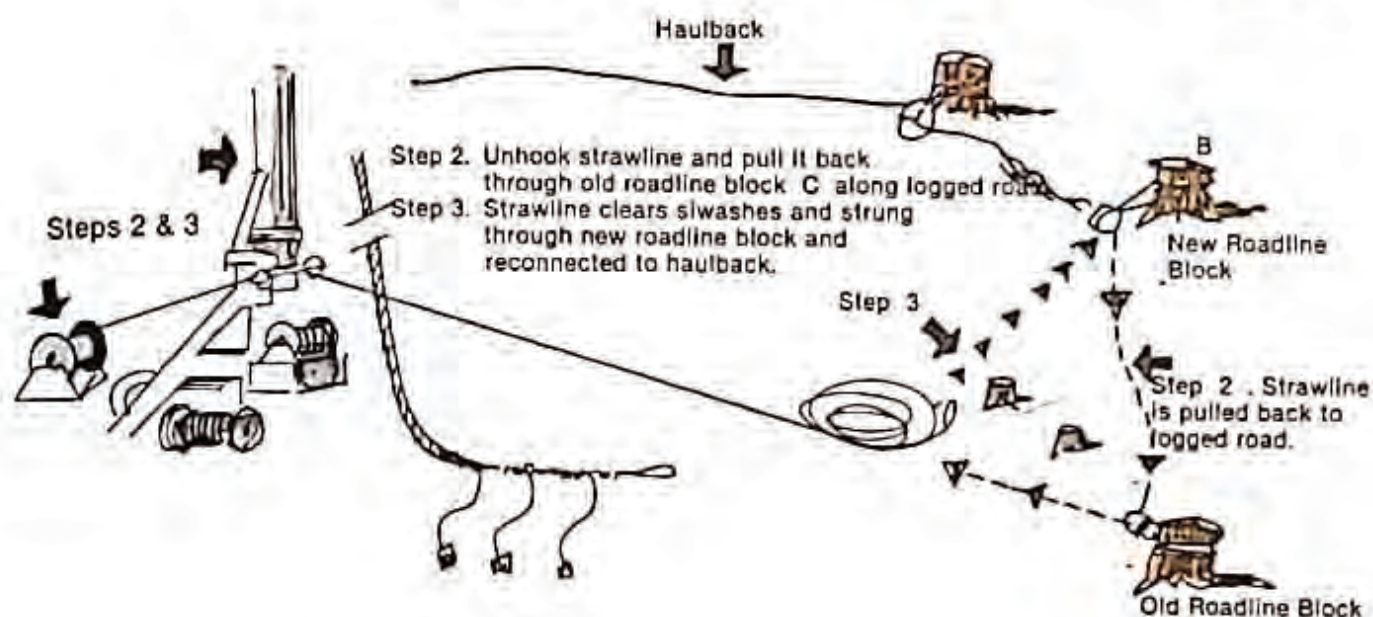
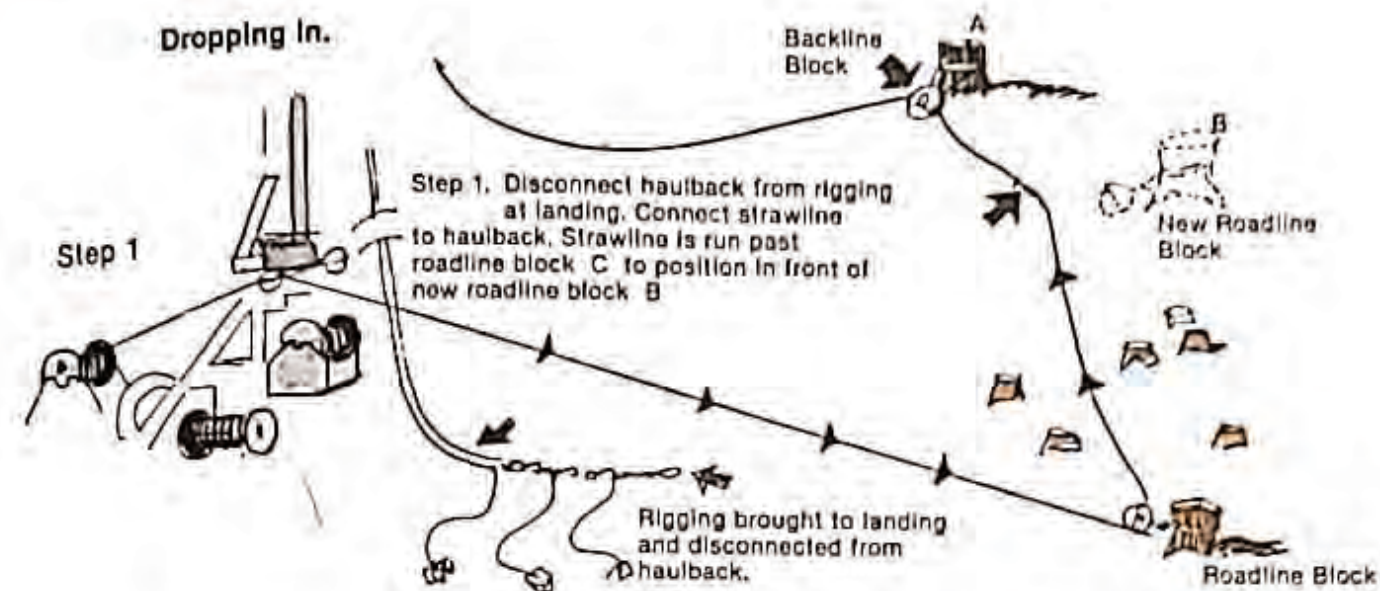


Figure 34

g. Changing roads

There are five common methods used for changing the location of yarding lines:

1. Dropping In

When dropping in, the strawline is run around and disconnected at or beyond the road line block. The strawline is pulled back down the logged road to a position clear of siwashes, strung back up to the new location of the road line block, then reconnected to the haulback. The haulback is then run around and connected to the butt rigging. Refer to Figure 34.

2. Dropping In Using an Extra Block

The extra block is hung at the next yarding road. Strawline extensions are then strung through this block near the existing backline block.

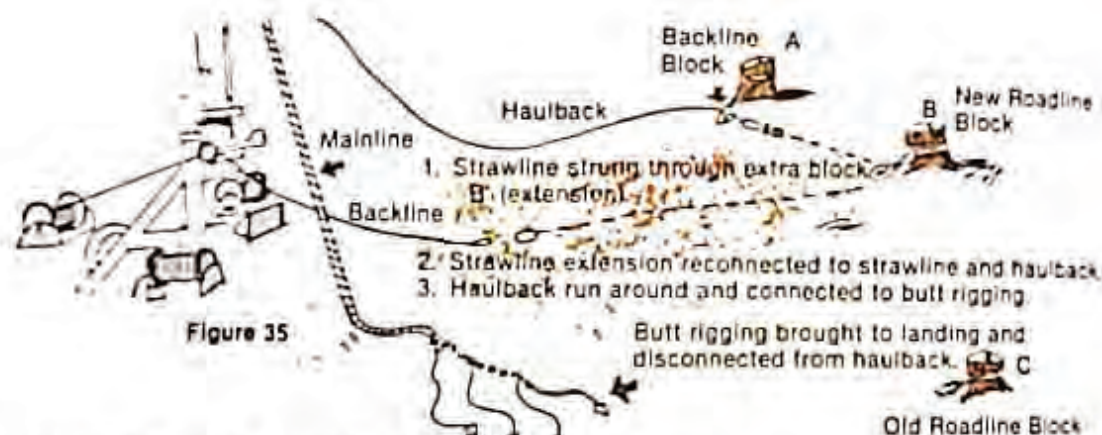
The end of the extension should be located to facilitate an easy hook-up.

The other end of the extension is strung down the new yarding road to a point clear of siwashes. The strawline is then run in from the old road line block, spliced and connected to the prestrung extension on the new yarding road.

The haulback is then run around and connected to the butt rigging.

This method takes less time, as the extra block and extensions are pre-set. Refer to Figure 35.

"Dropping In" using an extra block.

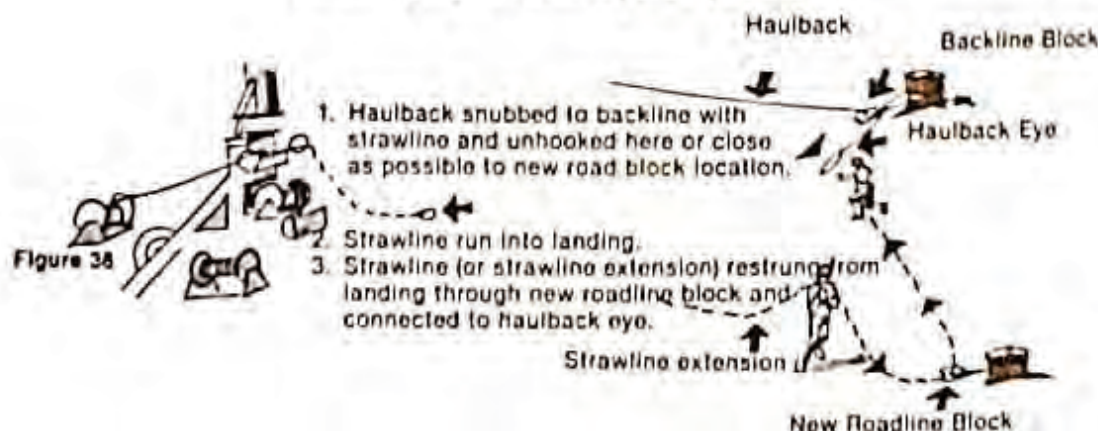


3. Re-Stringing the Entire Yarding Road

The haulback is snubbed to the back-end with the strawline, which is then unhooked and run into the landing. The strawline is then restrung out from the

landing, through the new roadline block and connected to the haulback eye. On sloped settings, the eye of the haulback will be chained to prevent the line from running down the hill.

Re-stringing the entire yarding road.



4 Up-Ending or Swapping Lines

The haulback is snubbed with the strawline all the way around through the blocks and back into the landing. The haulback should be spotted well out past the landing so that the haulback can be stacked to the ground. A suitable strawline extension off the drum is selected and unhooked near the eye of the haulback.

The strawline end is then hooked to the

extension end, which has been unhooked from the haulback eye.

The haulback is then hooked to the strawline extension, which is now lying down the old road line. Care must be taken to keep the haulback line on top to prevent crossing. The haulback is then run around and connected to the butt rigging. When lines are swapped, this creates a new tight area. Workers must be aware of this and stay out of the tight of the haulback and mainline.

Upending or swapping lines.

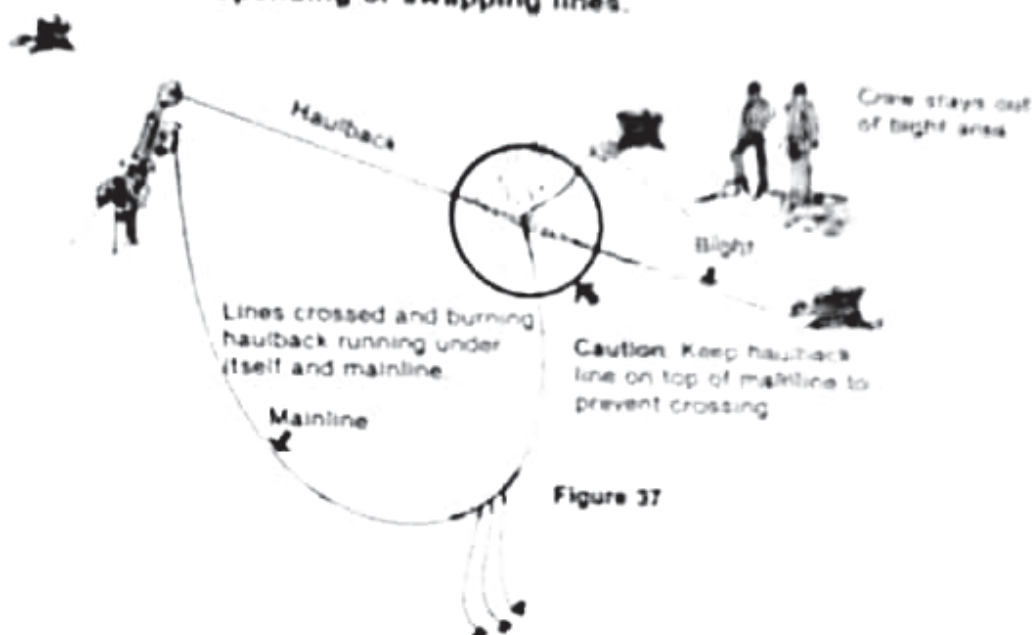


Figure 37

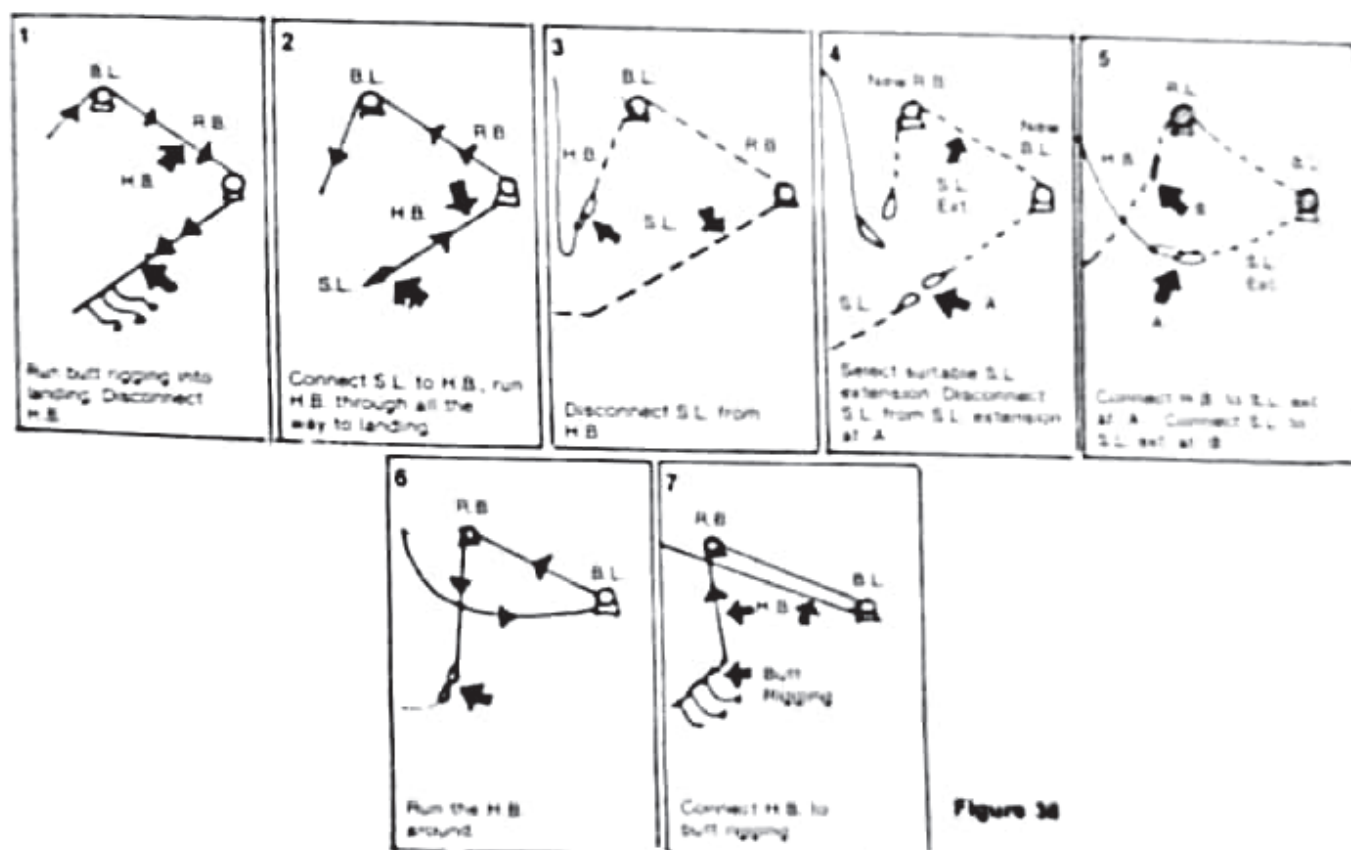


Figure 38

5. Moving Both Lines Ahead

When both the road line and back-line are moved at the same time, a spare block is set a number of roads ahead, at the intended new back-line location.

Strawline extensions already sent out on the rigging can be prestrung from the back-end to near the front end, depending on the ground formation.

The haulback is snubbed all the way around through the tail blocks to near the landing, and hooked to the end of the new prestrung extensions which are strung down from the new back line location.

The strawline end is then pulled out and hooked-up to the prestrung extension down the new road line location.

While this is being carried out at or near the landing, the existing back line block is moved over and hung at the new road line location.

The haulback is then run around through the newly-located blocks, back to the landing, then hooked up to the butt rigging.

At times, depending on the hooktender's decision, this can be accomplished by "jumping" or stringing only the back-end to the new locations. Both lines are then tightlined over when the rigging is hooked up.

When tightlining lines clear at any time, it is best to remove the chokers to prevent them from flying, or tangling around guylines.

When changing roads on slopes where there is a danger of the haulback running away, a light chain must be fastened to the bight of the haulback before the strawline is unhooked. The chain can be hooked to a block or a short strawline strap can sometimes be hooked to a sapling or such. Refer to Figure 40.

Moving both lines ahead.

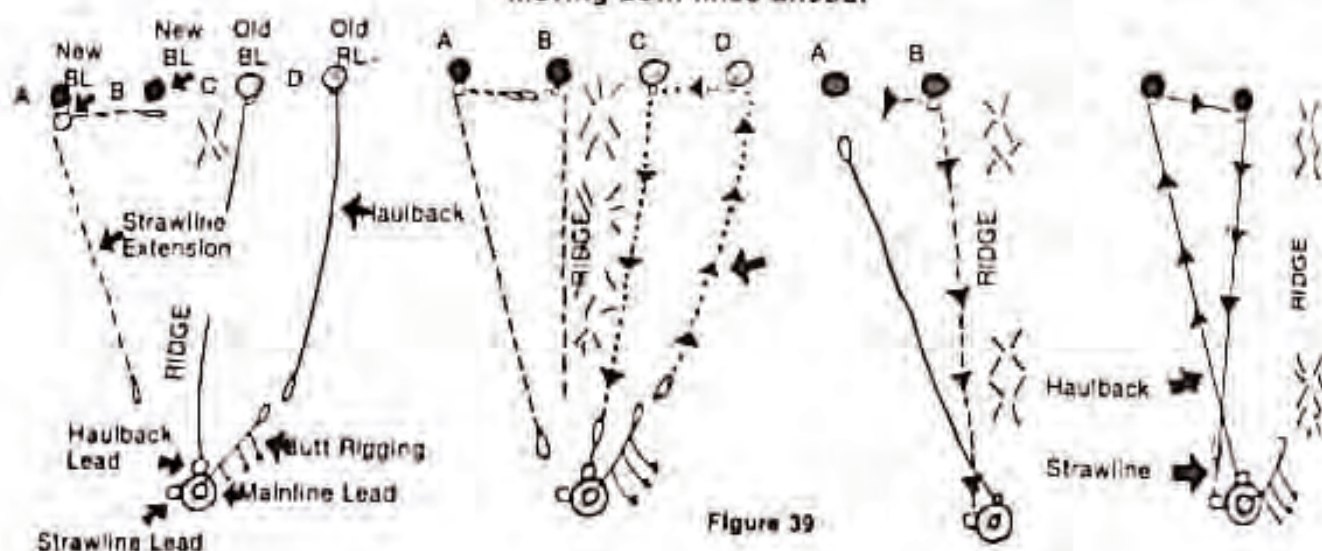


Figure 39

1. Set spare block at new backline location A.
2. Prestring Strawline extension.
3. Disconnect Butt rigging from Haulback.
4. Snub Haulback through all blocks back to landing.
5. Move block from old back line to new load line.
6. String new load line by pulling back strawline extension from old Backline and connect woods end to pre-strung strawline extension at new roadline block B. Connect other end to strawline strung up from landing.
7. Connect Haulback to pre-strung strawline at landing.
8. Run Haulback around through all the newly located blocks back to landing.
9. Disconnect Haulback from strawline extension.
10. Connect Haulback to Butt Rigging.

If there is a danger of a runaway on steep slopes, secure haulback with light chain before strawling unhooked.



Figure 40

There are various other methods of changing lines, but the above five methods represent the basic procedures.

WHATEVER METHOD IS USED, AN EFFORT MUST BE MADE TO POSITION THE BACK LINE AHEAD OF THE ROAD LINE IN THE FELLED AND BUCKED TIMBER WHENEVER PRACTICAL.

2) Landing the Turn

As the logs approach the landing, the operator must throttle back, tightline, or slack the lines as required to safely land the turn.

On steep approaches it may be necessary to slack the haulback when near the landing and let the logs slide or roll a short distance into the landing. This may require repositioning the logs so that they may be unhooked safely or decked suitably.

If the haulback is braked too much, the turn can be tightlined or "ballooned", causing the ends of the logs to swing in all directions, striking and damaging equipment, and creating a serious hazard to workers.

When landing the turn from the low side or other levels where logs are already decked in the landing, it is often necessary to brake the haulback to lift or tightline the end of the logs over the end of the pile.

If the logs being landed are not tightlined, they can strike the ends of the decked logs and drive them forward, injuring workers or damaging equipment.

Whatever action is necessary to land the turn safely, the chaser must be in the clear, out of all danger zones, particularly the area between the spar and the incoming turn. He must be in view of the operators or the operators must be sure he is in a safe location.

Unhooking the turn

When the logs have been landed and before the chaser approaches to unhook the turn, the rigging must be slacked down only enough to unhook the chokers.

The stability of the logs must be assured by both the chaser and the operator before unhooking is attempted. When any logs do not appear secure, the turn shall be picked up and repositioned until it is certain that the logs will not roll or slide.

The loader operator must not swing the boom or grapple into the area, unless signalled by the chaser.

At times the loader operator may be signalled to lift a log to free a fouled choker hook, or to reposition an unstable log.

When logs are being unhooked, the chaser shall approach the logs from the upper side and shall unhook the lower logs first.

If a choker hook is fouled, it should be cleared with the equipment. Many workers have been injured when logs rolled on them as they tried to free fouled hooks.

When a tagged log is being landed, workers must be extra careful to be in the clear, as it is more difficult to tightline a tagged log onto the pile. Tagged logs do upend and swing more readily. Whenever possible, the tagged choker should be shortened before landing the log.

When a tagged log is unhooked in the landing, the choker must be shortened up before the hook is pulled free. This is done to prevent the tagged choker from swinging throughout the landing and also to eliminate having to slack the rigging down again.

Extra tightlining is necessary to land gut-hooked logs, which create additional hazards. The chaser must be aware of all turns approaching the landing, signal the engineer accordingly, and take any action necessary to land the turn safely.

Accidents or injury in the landing area can be prevented if all workers follow proper landing work procedures and maintain good communication and understanding.

3) Loading the Logs

Positioning and operating the loader in a landing are normally the responsibilities of the loader operator and the hooker. However, there are a few general points which apply to all the crew members on the site.

Workers must remember that the loader operator's vision is limited, and that his job requires a lot of concentration. Landing workers and others entering the landing have a responsibility to make sure that the loader operator knows where they are. It is also the responsibility of the loader operator to ensure that the regular landing workers are clear of the operation area.

Workers have been injured when they have tried to outrun the machine or assumed they knew the operator's next move.

Landings are very active work areas and the 24" clearance can be lost without the workers realizing it. The loader operator and the other landing workers must continually be checking that this clearance is maintained. Lives can depend on this.

Running in the rigging

The strawline is normally used to snub the haulback around for better spooling of the line onto the drum. The blocks and straps are often hung on the bight and eye of the haulback and yarded into the landing. Since the blocks and straps may hang up and fly or dislodge a log in the pile, workers must remain in the clear. Care must be taken to prevent the blocks on the haulback eye from fouling under the back end of the pile, which is difficult to clear. If the haulback requires manual spooling, the line should be run in slowly.

4) Towering Down and Moving

The procedure for towering down will depend on the design of the tower. The procedures are usually the reverse of those followed for raising the spar.

It is most important that all guylines remain attached to the stumps until the spar is resting in the saddle or has been lowered to the first stage on the telescoping spar. This ensures the stability of the spar and prevents it from being pulled forward by the weight of the front quarter guylines.

Except with the front quarters, the dogs must be set once the guylines have been slacked off. If the slack must be picked up on a guyline, the dogs must be kept in position.

To prevent the mainline or haulback from pulling tight and fouling, ensure the lines are adequately slacked and that the butt rigging is not fouled.

If the levelling jack blocking has been removed, it must be put back for the removal of the mat. With the blocks in position, it is easier to observe the side angle of the spar as it is being lowered.

To prevent the guyline drums from continuing to unspool when the spar is lowered onto the raising cylinder, the front quarter guys should be slacked alternately. This is not necessary when the spar has adequate raising guyline drum brakes or the necessary valve system.

The back quarter guys should be kept snubbed up until there is no danger of the spar being pulled forward.

Once the tower is down and the guylines unhooked from the stumps, remove the shackles or hooks from the ends of the guylines to prevent hang-ups as the lines are spooled in. The guylines should be run in cautiously in case the guyline stub-connecting shackles should hang-up. Never put unnecessary loading on the spar during raising or lowering operations and ensure that only qualified workers operate the controls.

The machine must be snubbed or pulled on adverse grades by a machine which is capable of securely holding the yarder if the engine or braking power fails. This is very important because many of the older spar carriers still in use do not have adequate braking systems. Check brakes before moving to ensure that all braking systems are in good condition.

When moving mobile yarders over rough grades, take care to avoid damage to the spar from flexing in the carrier saddle.

7. RIGGING BACK SPARS

a. General Information

There are numerous skyline and scabline (running skyline) methods of logging used in the forest industry. Unless it is possible to locate the anchors or blocks high enough to give adequate lift, a backspar will be required.

Backspars are normally not subject to heavy stresses if properly positioned stumps can be obtained, except with backspars for slackline operations where the skyline is sideblocked out to clear heavy turns.

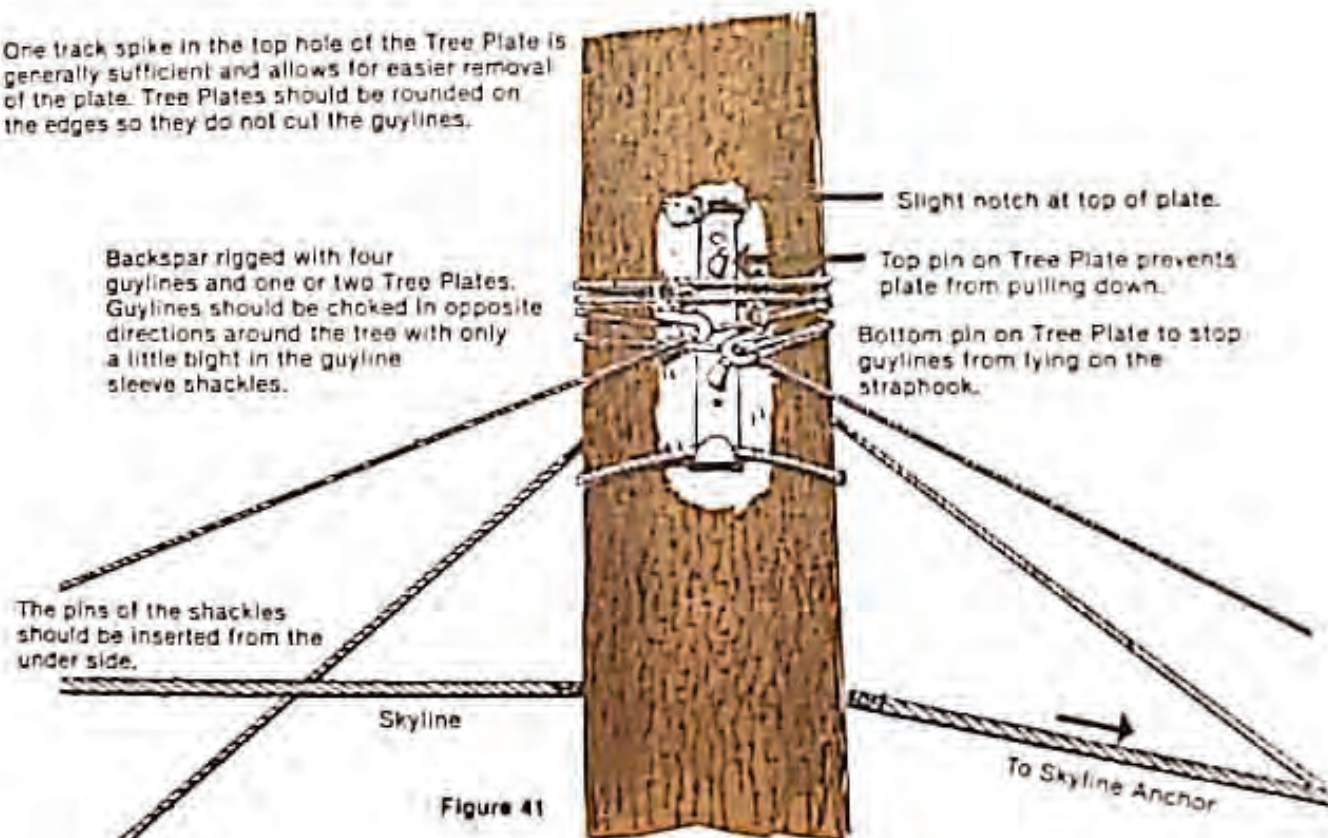
Some important factors in rigging all types of backspars are:

1. Only sound, sturdy, well rooted trees should be used.
2. Species of high strength such as fir, spruce or hemlock are preferable. If balsam, cedar or pine are used, choose a larger tree.

3. A backspar should not be rigged any higher than it must be to provide the necessary lift. The higher a backspar is rigged, the more leverage is imposed, and it will require more support to prevent failure. It is seldom necessary to hang the rigging higher than 50 feet (15 meters).
4. As a rule, trees smaller than 30 inches (76.2 cm) at the butt should not be used as backspars. Rigging should not be hung on the tree where the diameter is less than 18 inches (45.72 cm) unless the timber being logged is generally light and the tree is well guyed.
5. Any backspar used without guylines should not be smaller than 48 inches (1.2 meters) butt diameter. Special concern should be given to the height and location of anchors.
6. All backspars should be topped unless a supervisor decides that it is safe not to.
7. When the yarder is in operation, workers must not be within the tree

- length of a backspar that is not guyed or one that is guyed but not topped.
8. The location of suitable backspars is most important for logging a volume of timber efficiently. However, it is often necessary to sacrifice good locations to obtain a sturdy backspar and anchors.
9. It is not necessary to bark backspars where rigging is hung except when rigging can slip because sap is running, or if tree plates are being used.
10. Most backspars are rigged to support skylines that are held and tightened on drums and can be raised and lowered easily, except with the conventional scabline (running skyline) systems. Stationary or heel line held skylines are rarely used now.
11. When a backspar is rigged and the skyline tightened and a light turn yarded, a quick check on the tension in the guyline will show their effectiveness. Any guylines that are not supporting their intended load should be relocated. The skyline can easily be lowered for this purpose.

One track spike in the top hole of the Tree Plate is generally sufficient and allows for easier removal of the plate. Tree Plates should be rounded on the edges so they do not cut the guylines.



12. Adequate strength rigging must be used.
13. Trees used for anchors must be tied back securely.
14. Skyline anchors, trees or stumps should always be tied back.
15. Generally, it is advisable to select a good skyline anchor which could be located on either side of the backspar, then select suitable guyline stumps to support the loading.
16. Normally, when rigging a backspar across a steep slope, the skyline anchor

is selected on the low side. Shorter guylines at a better angle to support more, can be located on the upper side. The higher the skyline anchor, the less stress there is on the backspar.

17. Avoid using a steel sheave block to support a skyline, as the skyline will weaken at this point.
18. Where there are excessive loadings or the backspar is less than normal size, at least two tree plates should be used to prevent the guylines and shoe strap from cutting into the tree.

The following diagrams show several ways to properly anchor guylines and skylines:

Skyline anchor tied back with end of skyline.



Figure 42

The anchor should be far enough back to keep a low angle from the backspar. The anchors must be barked and notched where the wraps are located. With heavy rigging, it may be necessary to add additional tie backs. Unless large stumps are used, the bottom of the stump should also be tied back to prevent the roots from pulling out.

When heavy skylines are used or when light skylines are lying down on steep slopes, the eye of the skyline must always be restrained before unhooking the anchor shackle. This will apply whether the shackle is a sleeve or a knock out type when the skyline is wrapped or choked on the anchor.

A knock out shackle or heavy sleeve shackle may be used to choke the last tie back anchor. It is not necessary to wrap this stump, as there is less stress at this point.

- The pin of the knock out shackle should be on the right of the skyline to make it easier to knock out.
- Care must be taken to watch for the shackle flyline when the pin is hammered out.
- When the shackle is secured, leave as little tight as possible in the skyline to relieve the strain on the shackle, this makes it easier to remove.

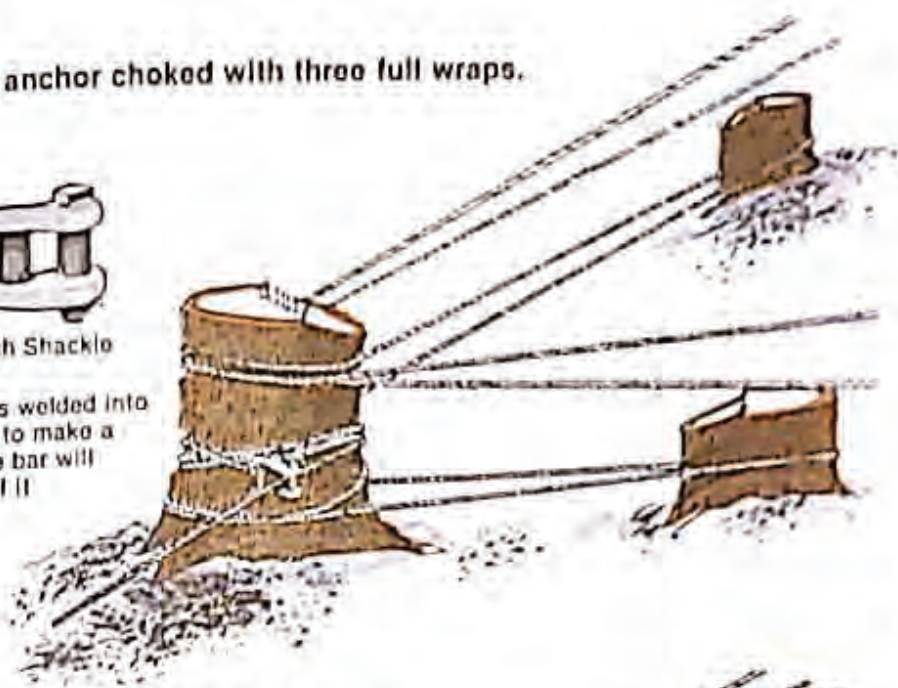
Skyline anchor choked with three full wraps.



Catch Shackle

Sometimes a bar is welded into a straight shackle to make a catch shackle. The bar will catch the skyline if it runs loose.

Figure 43



Skyline anchor tied back, top and bottom.

Short tag strap used to facilitate hooking up and unhooking the skyline. The shackle pin should not be through the eye of the skyline, as it can easily foul when the skyline is cut loose.

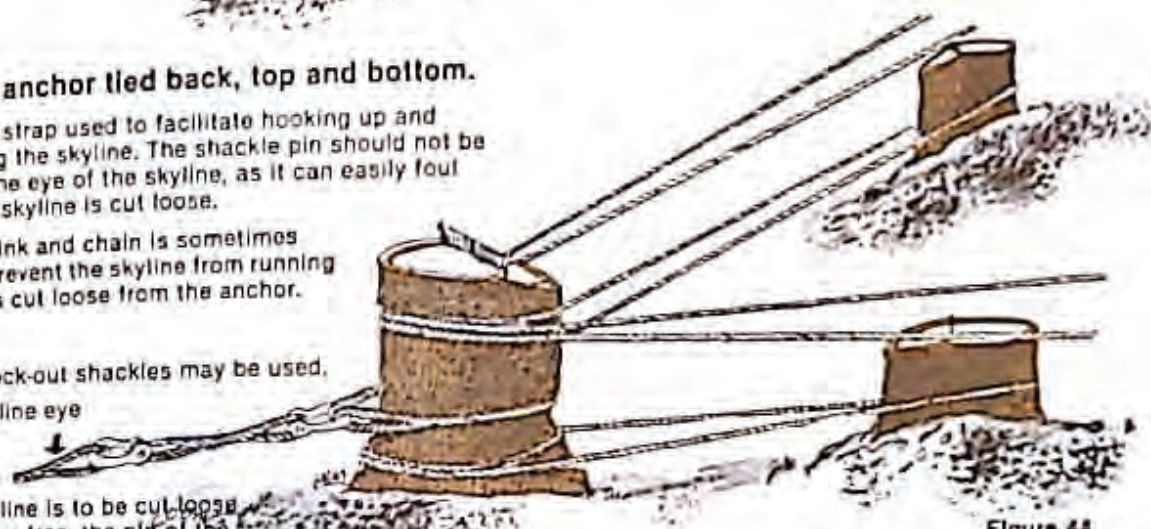
A finger link and chain is sometimes used to prevent the skyline from running when it is cut loose from the anchor.

Knock-out shackles may be used.
Skyline eye

If the skyline is to be cut loose and let run free, the pin of the knock-out shackle must be in the eye of the skyline.

Unless the anchor stump is large and solid it should be tied back at the bottom to prevent the roots from pulling out.

Figure 44



Anchor tree tied back.

Tightening backspar guyline with rope blocks or come-alongs.

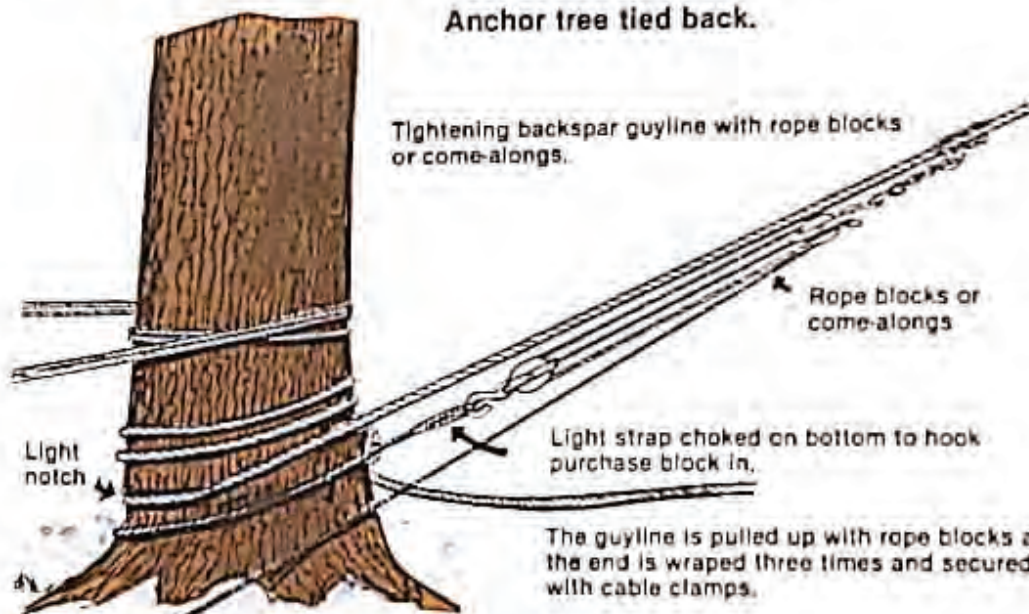
Rope blocks or come-alongs

Light notch

Light strap choked on bottom to hook purchase block in.

The guyline is pulled up with rope blocks and the end is wrapped three times and secured with cable clamps.

Figure 45a



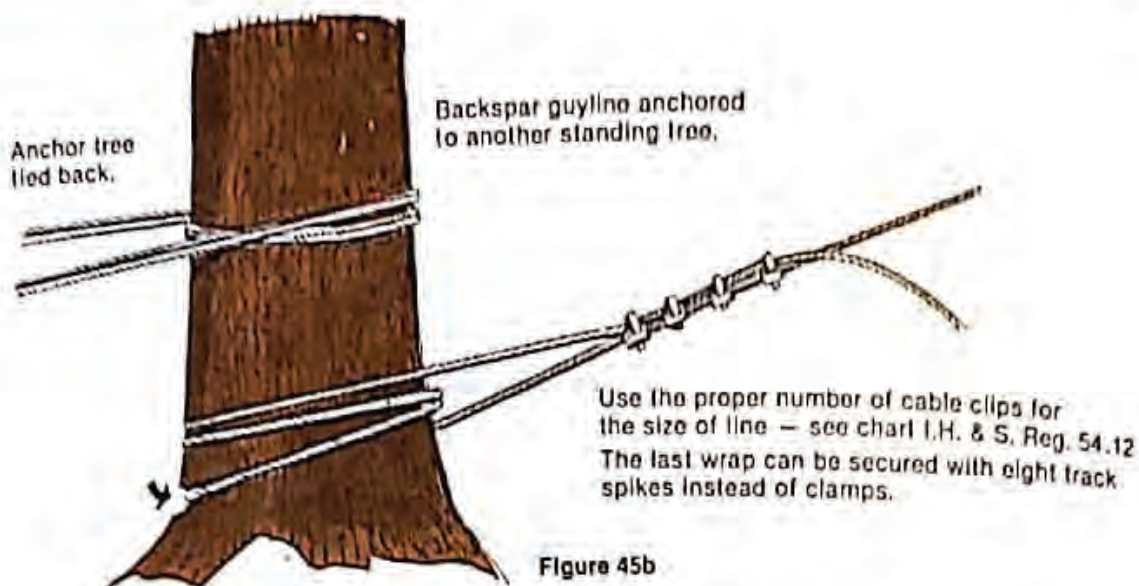


Figure 45b

b. Backspar: Example 1

Rigged with two, three or four guylines, with skyline hung in a light shoe, jack or suitable block.

1. The skyline anchor should be far enough behind the backspar so that the angle to the horizontal at the anchor does not exceed 20° . This will lessen the forward stress on the backspar and the lift on the anchor. This angle will vary depending on the location of suitable skyline anchors.
2. The anchor should be to the side of the skyline road, far enough to apply a light loading against the two opposing guylines rather than a straight downward stress on the backspar. This angle will vary depending on the location of suitable skyline anchors.
3. Unless two guylines are used on each side of the backspar, the anchor should

form a 10 to 15 degree angle at the rear of the shoe between the skyline and an imaginary line in lead with the skyline road. This will allow for stress changes if there is side blocking on either side of the skyline road.

4. The combined breaking strength of the two opposing guylines must equal or exceed the breaking strength of the skyline used.

e.g.: a backspar supporting a $1\frac{1}{4}$ " (35 mm) skyline with a breaking strength of 173,000 lbs. (79,000 kg) should be rigged with guylines of a combined breaking strength of not less than 173,000 lbs. (79,000 kg). This would require two 1 inch (25 mm) diameter guylines, giving breaking strength of $2 \times 96,000 \text{ lbs.} = 192,000 \text{ lbs.}$ (87,000 kg).

5. If guylines of a lesser breaking strength are used, additional guylines must be positioned against the skyline stress.

Backspar example one — Plan View of skyline and guyline anchors.

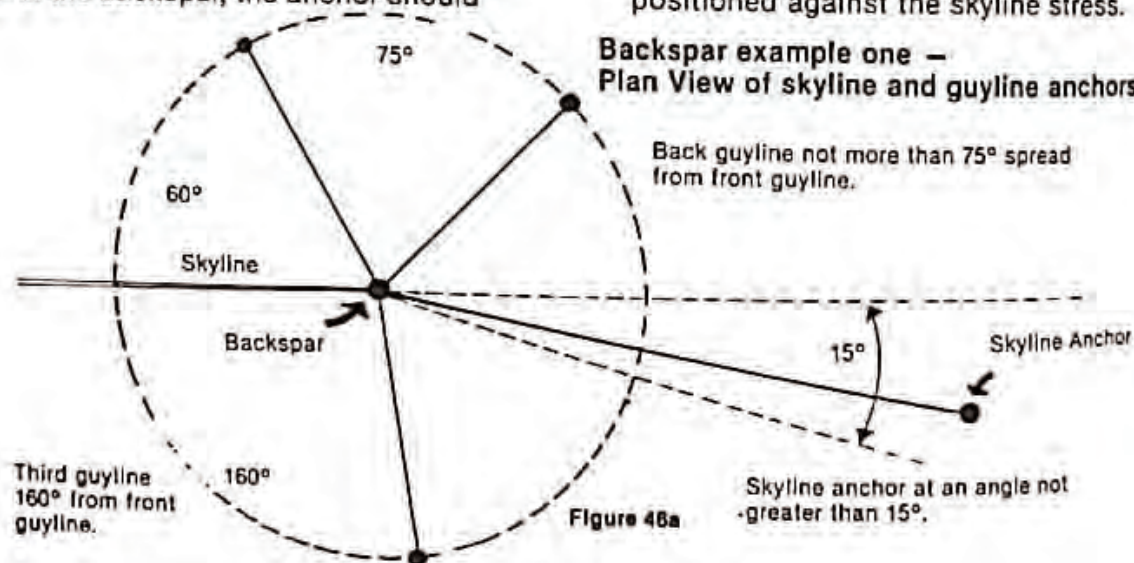
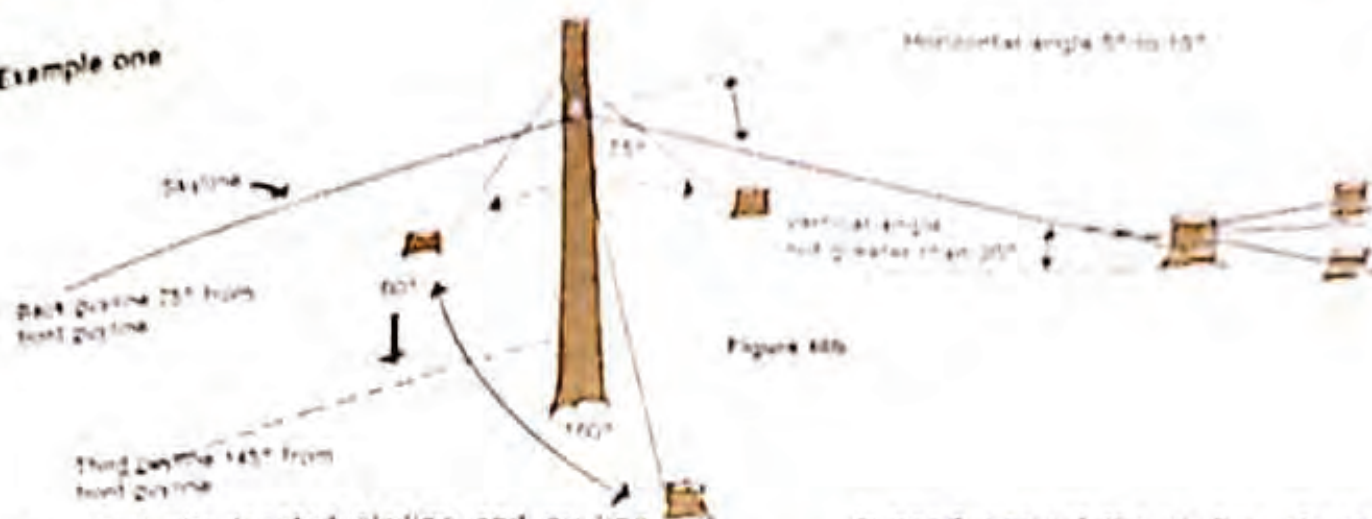


Figure 46a

Skyline anchor at an angle not greater than 15° .

Example one



6. Perfectly located skyline and guyline anchors are not always available, the following is a guide for rigging backspars:

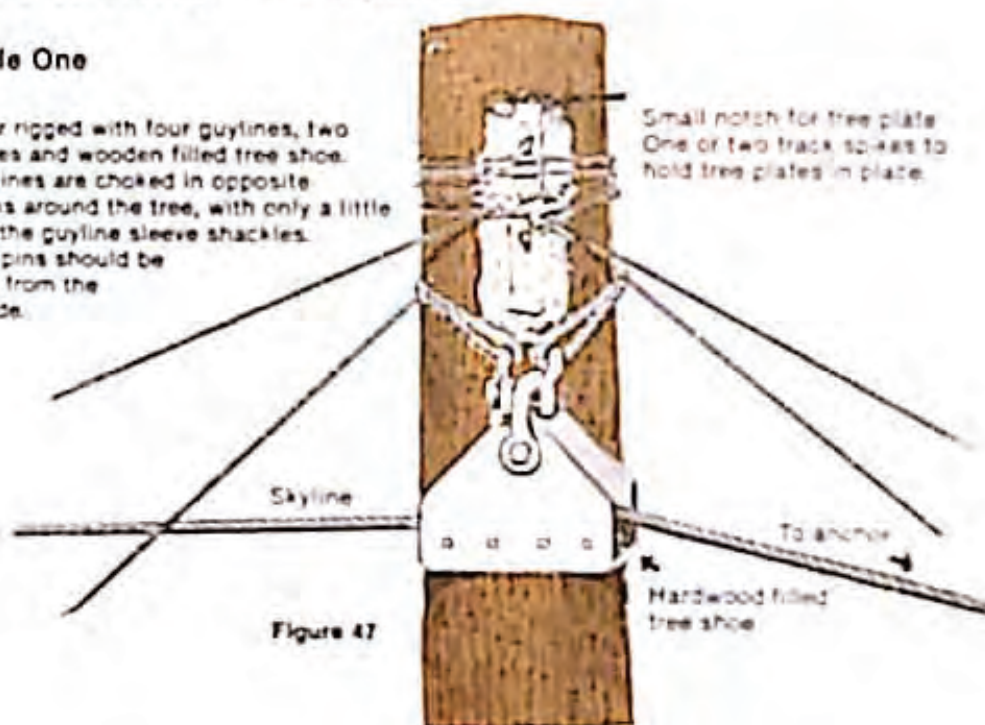
- Guyline angles at the guyline stump to the horizontal should not exceed 45° .
- When three guylines are used, with two placed against the skyline stress, they should be positioned as follows:
 - front guyline, 60° from the skyline
 - back guyline, 75° from the front guyline
 - the third guyline on the same side as the skyline should be placed not more than 160° from the front guyline, calculated around the front side of the backspar.
 - the three guylines should be placed so that the backspar is supported in all directions, but with the greatest

support against the skyline stress and the third guyline placed to prevent the backspar from being pushed back, or, more importantly, ahead.

- The skyline shoe, jack or block should have hardwood fillers or sheaves and should allow the eye of the skyline to pass through easily. Sometimes aluminum sheaves are used. Care should be taken to avoid placing the skyline anchor too far back as this will make the skyline work more in the jack shoe or block.
- The skyline shoe strap must be attached with both eyes or "Dees" to the skyline shoe and be made with wire rope of at least the same strength as the skyline.

Example One

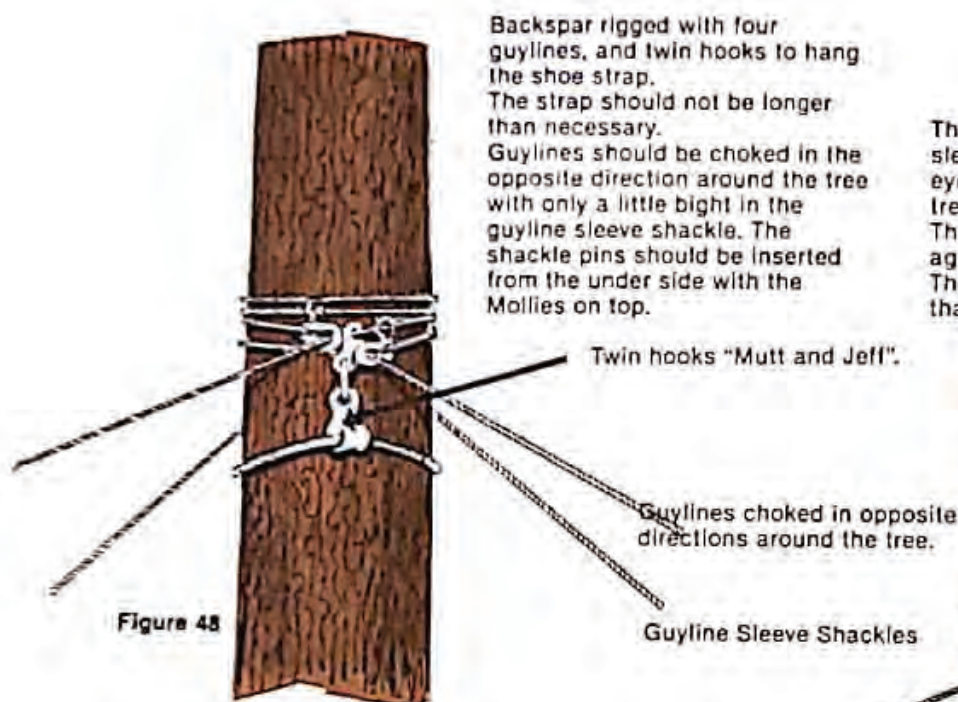
Backspar rigged with four guylines, two tree plates and wooden filled tree shoe. The guylines are choked in opposite directions around the tree, with only a little bight in the guyline sleeve shackles. Shackle pins should be inserted from the lower side.



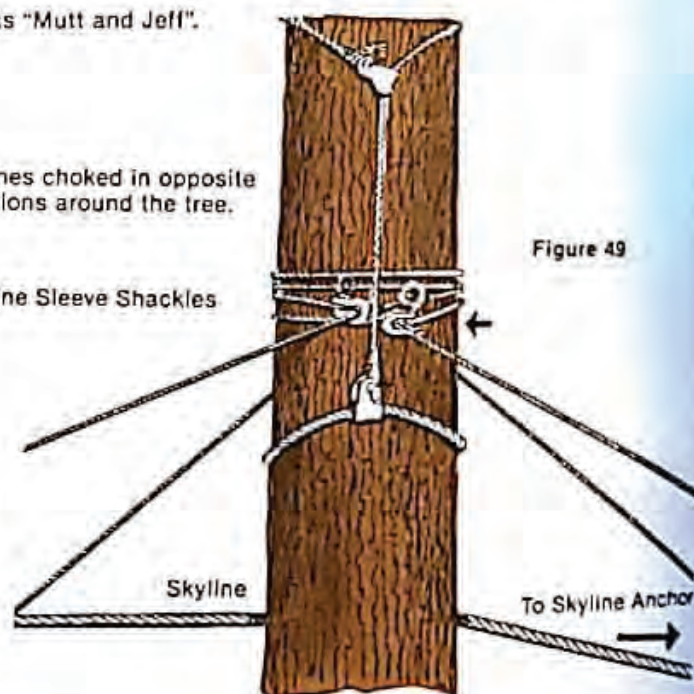
9. The strap can be hung over the two opposing guylines unless a tree plate, twin hooks ("Mutt and Jeff") or other acceptable methods are used to hold the strap.
10. The strap and guylines must be checked thoroughly before every rig-up for signs of cutting or wearing.
11. A light strap can be used to prevent the shoe strap from slipping down the backspar. It is choked above the

guylines with a guyline sleeve shackle and another sleeve shackle the other eye of the strap is fitted in just below where the guylines are hung. The shoe strap is hung in this second shackle.

12. Large knots can also be used to prevent the strap from slipping down, providing the strap is not too long and the tree is big enough.



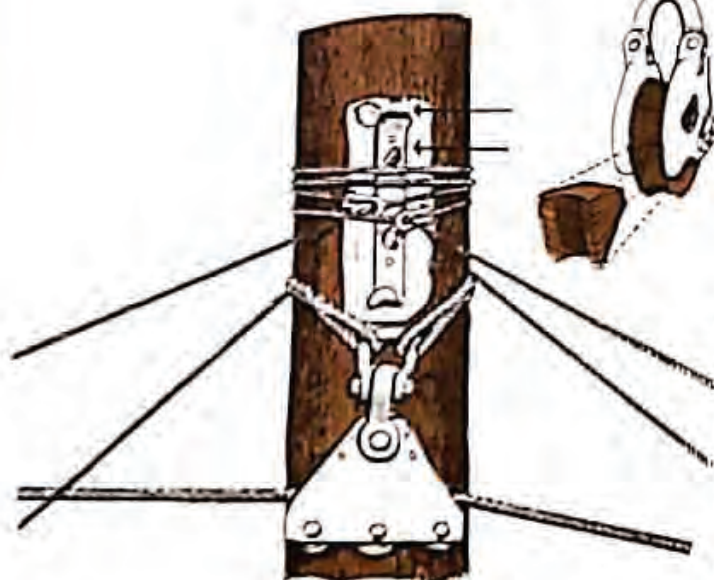
The shoe strap may be hung from a sleeve shackle which is attached to the eye of another strap, choked around the tree above the guylines. The shackle pin heads must be against the tree. The shoe strap should not be longer than necessary.



d. Backspar: Example 2

There are a number of methods using backspars for scabline (running skyline) operations. As with all systems, suitable rigging, a sturdy tree which is adequately supported and good anchors are important.

The arrangement shown in this example appears to be the most practical, easiest to rig up, and will exert the least stress on the backspar.



c. Slackline Backspar

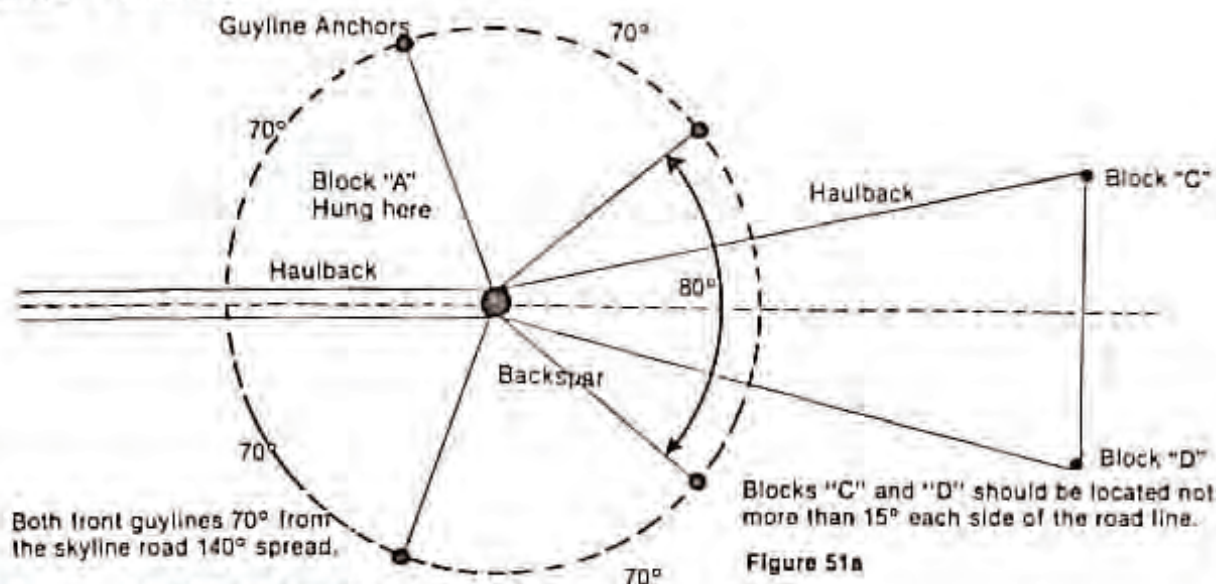
A backspar rigged for slackline operations has added side stresses because the skyline is sideblocked over on both sides of the skyline road. This particularly applies if sideblocking near the backspar.

- Four guylines should be used, two guylines on each side of the backspar, because the angle of stresses will change when logging from one side to the other.
- The skyline anchor should be at a sufficient angle from the skyline road so that when sideblocking on the opposite side to the skyline, the skyline will not bind against the inside of the shoe, jack, or block. In turn, this equipment should not bind against the backspar.

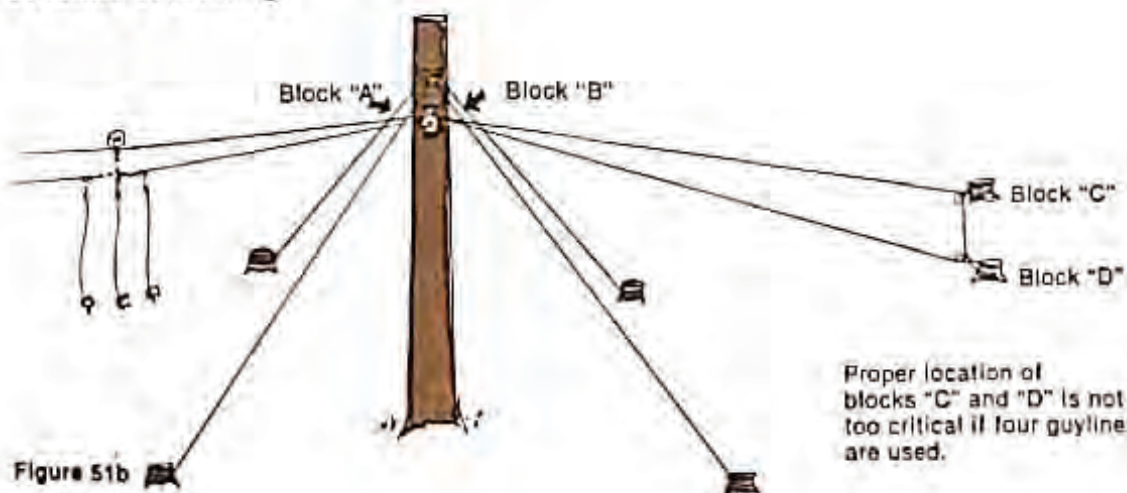
c. If a wooden filled shoe is used, binding is not so critical as long as it is not excessive and the backspar is sturdy and well guyed.

d. Some skyline jacks are fitted with two or three small diameter sheaves in line and this distributes the loading on the skyline. Generally skyline jacks can be dismantled for easy handling.

Example two — Backspar rigged with four guylines — Plan View.

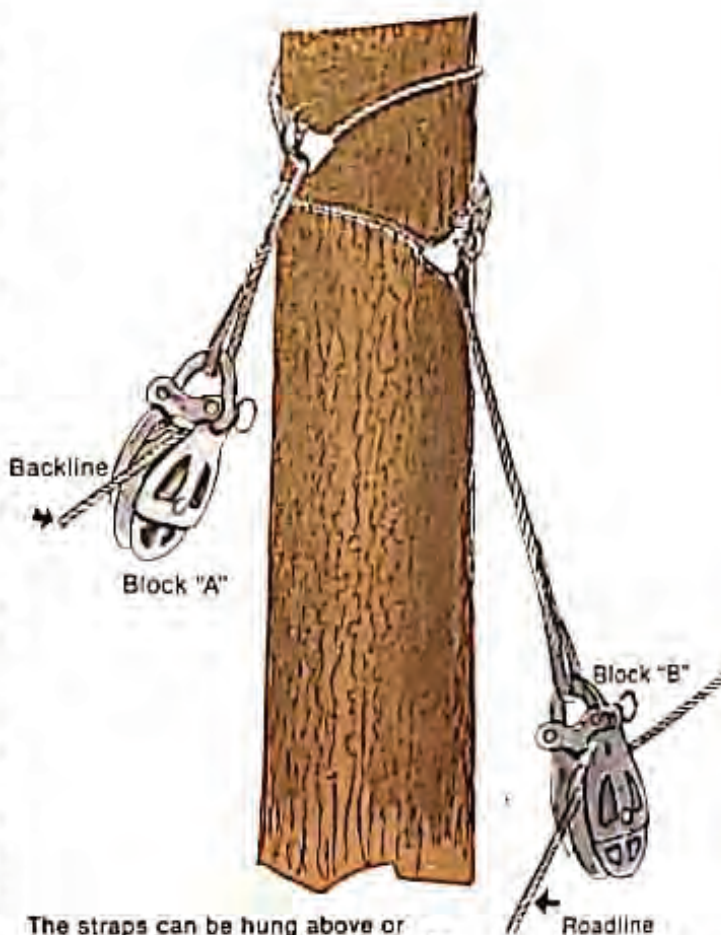


Example two — Backspar rigged with four guylines, scabline or running skyline.



Points to consider:

1. With large equipment and when tight-lining heavy turns, a minimum of four guylines should be used.
2. However, fewer guylines can be used when operating with lighter yarders and with careful positioning of blocks "C" and "D".
3. When four guylines are required, two should be placed on either side of the tree supporting the bights held in blocks "A" and "B". The guylines should be approximately 90° apart.
4. When four guylines are 90° apart, the backspar is supported equally in all directions and the location of blocks "C" and "D" is less important.
5. Blocks "A" and "B" should be hung in the conventional manner with both eyes of the strap in the shackle or gooseneck. Larger straps choked with guyline sleeve shackles may be used to hang blocks "A" and "B" as they have less loading than blocks "C" and "D". The advantage of using heavier choked straps is that they will not slip down when in place, as conventional straps do, if the straps are not the proper length.
6. It is necessary with this arrangement to ensure that blocks "C" and "D" are placed far enough back to lessen the load on the backspar. These blocks must also be placed to the side to provide equal loading on both sides of the tree.
7. Blocks "C" and "D" should be hung equal distances from the backspar to put equal strain on each anchor.
8. Straps for blocks "A" and "B" should be choked in opposite directions around the tree to prevent twisting the tree under heavy loads.
9. The straps should be hung with the shackles placed directly above where the block will hang when yarding, with only a little bight in the strap and with the head of the shackle pin against the tree.
10. By using longer straps, blocks "A" and "B" will be allowed to swing out and spread farther apart, which helps keep the haulback from wrapping.
11. Sometimes block "B" is hung lower to help keep the lines apart.
12. The straps should be checked thoroughly before every rig-up.
13. Where there are adequate guylines, there is less chance of the backspar falling during sideblocking of the rigging to reach for logs or when tight-lining logs out from either side near the backspar.



The straps can be hung above or below the guylines providing that the blocks hang below the guylines. The straps can be hung together or apart as long as they are not rubbing against each other. They should be choked in opposite directions around the tree.

Figure 52a

e. Backspar: Example 3

This arrangement is similar to Example 2 except no guylines are used.

Example three

When guylines are not used choose a sound, sturdy and well rooted backspar. The blocks should be hung low to lessen any leverage forces. Corner blocks "C" and "D" must be located properly so that equal side stresses and a straight downward loading are imposed on the backspar.

Figure 52b

Workers must not be within a tree length of the backspar when the yarder is in operation.



The blocks should be hung in both eyes of the straps, heavier straps, choked with guyline sleeve shackles, may be used to prevent the straps from slipping down the tree. The straps should be hung in opposite directions around the tree with only a little bight in the shackles.

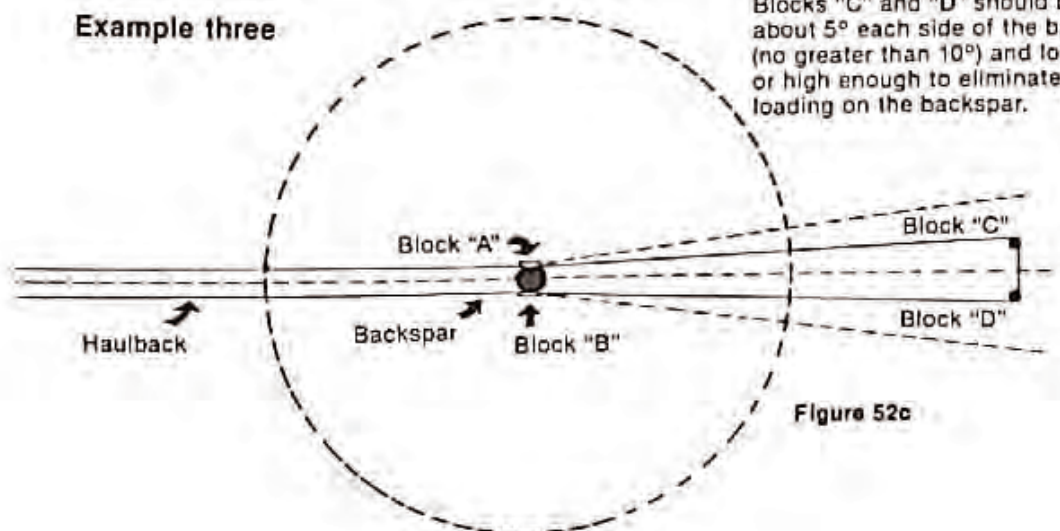
Block "A"
Block "C"
Block "B"
Block "D"

Be certain to locate the corner blocks "C" and "D" well back or high enough to prevent a forward force on the backspar.

Points to consider:

1. The backspar should be larger and rigged lower than if it was rigged with guylines.
2. The tree must be sound, sturdy and well rooted.
3. The tree should not be less than four feet (1.2 meters) butt diameter and the rigging not hung higher than 30 feet (10 meters) unless a large, sturdy tree is used.
4. Blocks "A" and "B" can be hung as described in Example 2.
5. The positioning of blocks "C" and "D" is most important. They must be hung to the rear far enough back or high enough so there is no forward loading on the tree.
6. The blocks should be positioned to the side so that the horizontal angle of the bights held in blocks "A" and "B" are equal and do not exceed 10°.

Example three



Blocks "C" and "D" should be located about 5° each side of the backspar (no greater than 10°) and located far enough back or high enough to eliminate a forward loading on the backspar.

Figure 52c

7. If blocks "C" and "D" cannot be positioned high or far enough back and at equal distances to the sides, then guylines should be used.
8. The haulback must be slacked if logs are being yarded out from around the backspar until the turn is yarded clear under the scabline. Care must be taken if the rigging is being sideblocked over on either side to reach for logs.
9. Workers must not be within the tree length of the backspar when the yarder is in operation.

I. Backspar: Example 4

Another simple arrangement which is often used as a temporary method of getting extra lift is to merely hang a block a short distance up a tree to support the bight of the haulback.

Points to consider:

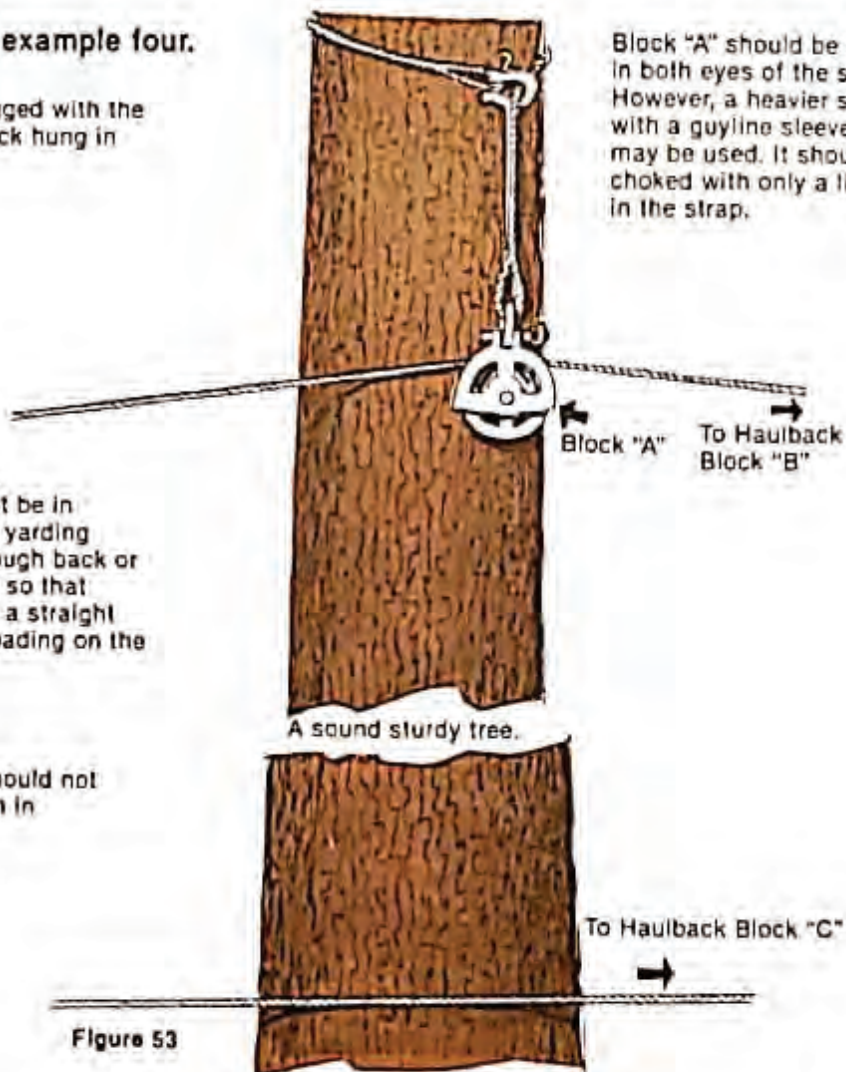
1. Only sound, sturdy, well rooted trees should be used.
2. Often this arrangement is used without the support of guylines and this makes the proper location of block "B" very important.
3. Block "B" must be placed in line with the road line, just clear enough so that the haulback does not burn against the inside of the block if the block is binding against the tree.
4. Block "B" must also be hung far enough back or high enough so there is no forward loading on the backspar.
5. A tree used without guylines should not generally be smaller than four feet (1.2 meters) at the butt and block "A" should not be hung higher than 26 feet (8 meters).

Backspar example four.

Backspar rigged with the scabline block hung in the tree.

No guylines. Block B must be in line with the yarding road, far enough back or high enough so that there is only a straight downward loading on the tree.

The block should not be hung high in the tree.



Block "A" should be hung in both eyes of the strap. However, a heavier strap choked with a guylino sleeve shackle may be used. It should be choked with only a little bight in the strap.

Figure 53

6. Block "A" should be hung in both eyes of the strap. However, because of the light loading on the block, a heavier strap choked with a guyline sleeve shackle may be used. This will also prevent the strap from slipping down.
7. The guyline shackle should be placed directly above where the block will hang when tight, with only a little bight in the strap, and with the shackle pin head against the tree.
8. If block "B" cannot be located properly, guylines must be used.
9. Blocks "B" and "C" should be hung equal distances from the backspar to provide equal strain on each anchor.
10. If logs are to be yarded out on either side near the backspar, the haulback must be slacked until the turn is yarded clear, under the scabline road.
11. The rigging should not be sideblocked to pick up stray or extra logs unless the haulback is kept slack until the turn is cleared.
12. Workers must not be within the tree length of the backspar when the yarder is operating.

g. Backspar: Example 5

This system of using one block at the top of the tree and one at the bottom is not too practical because the full loading is placed on the backspar and guylines.

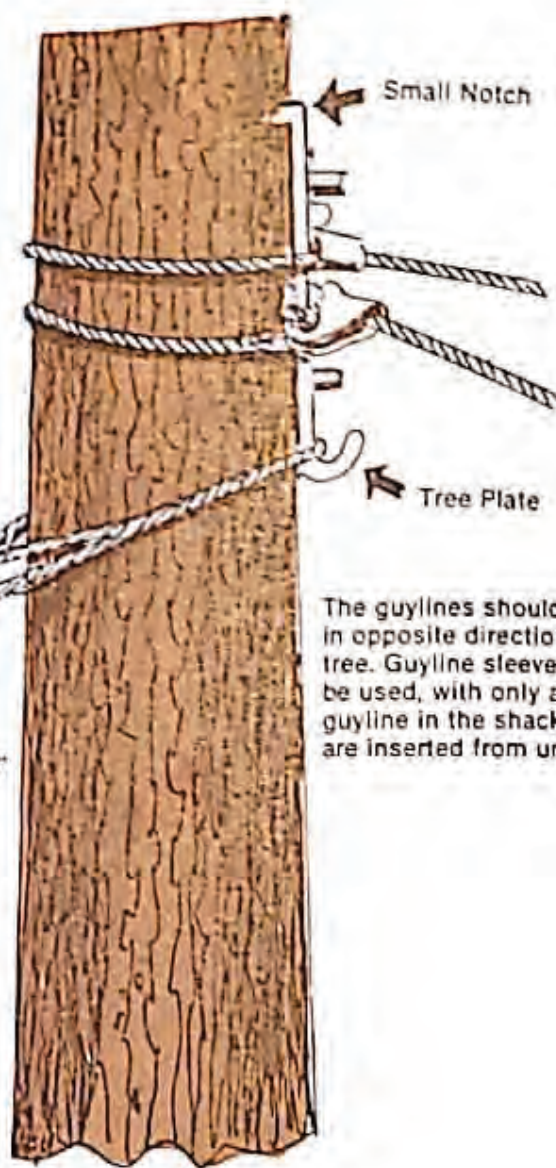
Points to consider:

1. The top block "A" exposed to the greatest stress shall be hung with a strap as required by I.H. & S. Regulation 60.120.
2. The strap can be hung over the top of guylines or directly below in a hook arrangement. If the strap is a proper fit, it may simply be hung around the tree.
3. The position of the block will require that the gooseneck be hung in the two eyes of the strap. Otherwise, to avoid twisting, two shackles would have to be used.

4. This system can be used with a minimum of two equal size guylines, each with a breaking strength not less than the breaking strength of the haulback being used.
5. The guylines should be evenly spaced in relation to the scabline with the spread not greater than 60°. The guylines should be secured to solid, substantial anchors.
6. The guylines are choked to the tree using proper guyline sleeve shackles with the pin heads set in from the lower side.
7. The guylines are choked around the tree in opposite directions and secured with only a small amount of bight in the shackles.
8. The block and guylines should not be hung on the backspar where it is less than 22 inches (56 cm) in diameter.
9. Block "B" hung at the bottom of the backspar can be hung with a regular haulback strap, with a small notch to keep it positioned.
10. For a little extra lift or to keep the line clear of rocks, the bottom block "B" can be hung on a long, larger size strap choked to the tree with a guyline shackle.
11. Because there is less stress on the bottom block when it is hung out in this manner, a strap of the same size as that used on the top block is adequate.
12. To log by using the top block "A" only is not acceptable, except on certain lighter equipment.

Backspar example five

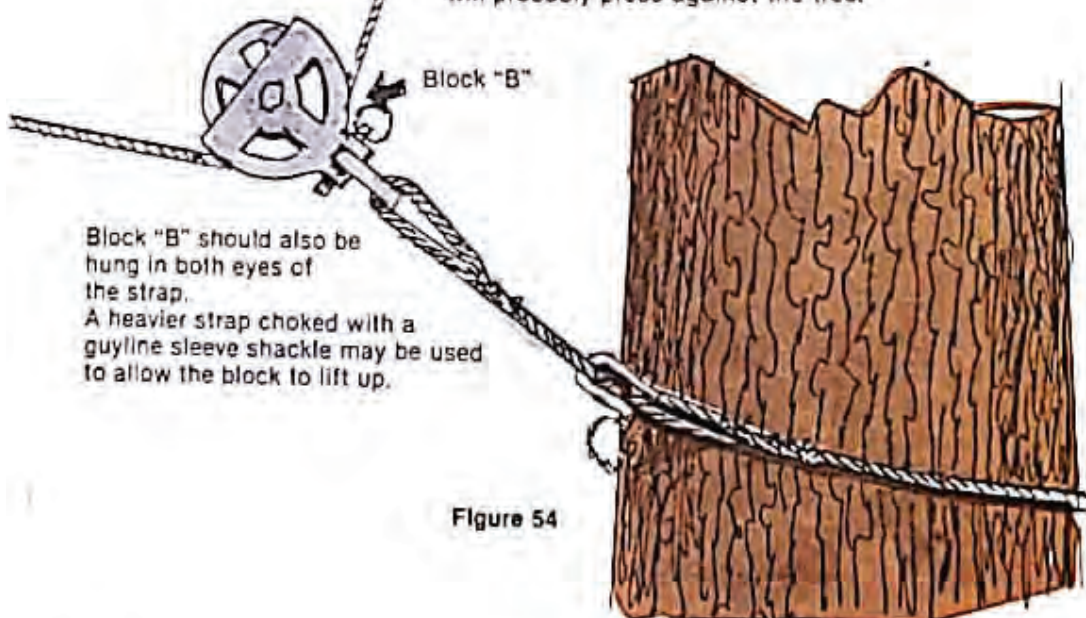
Block "A" must be hung in both eyes of a suitable heavy strap. A shackle should not be used to fit the block to the strap.



The guylines should be choked in opposite directions around the tree. Guyline sleeve shackles must be used, with only a little bight of the guyline in the shackle. The shackle pins are inserted from underneath.

If a shackle is used, the block will hang the wrong way. The block and shackle will twist and the line will burn on the shell of the block. At least two guylines must be used, located directly behind the backspar with the spread between the anchors no greater than 60°.

The shackle pin should be inserted from the top, as the head will probably press against the tree.



Block "B" should also be hung in both eyes of the strap. A heavier strap choked with a guyline sleeve shackle may be used to allow the block to lift up.

Figure 54



MAJOR HAZARDS ENCOUNTERED AND PRECAUTIONS REQUIRED TO AVOID ACCIDENTS

8. MAJOR HAZARDS ENCOUNTERED AND PRECAUTIONS REQUIRED TO AVOID ACCIDENTS

a. Hooktender and rigging crew

1. Hazards of Swinging and Upending Logs

Causes:

a. Logs choked with long ends

b. Gut hooked logs

c. Ground lead

d. Hang-ups before and after logs are yarded free, even when the logs are properly choked and there is relatively good deflection.

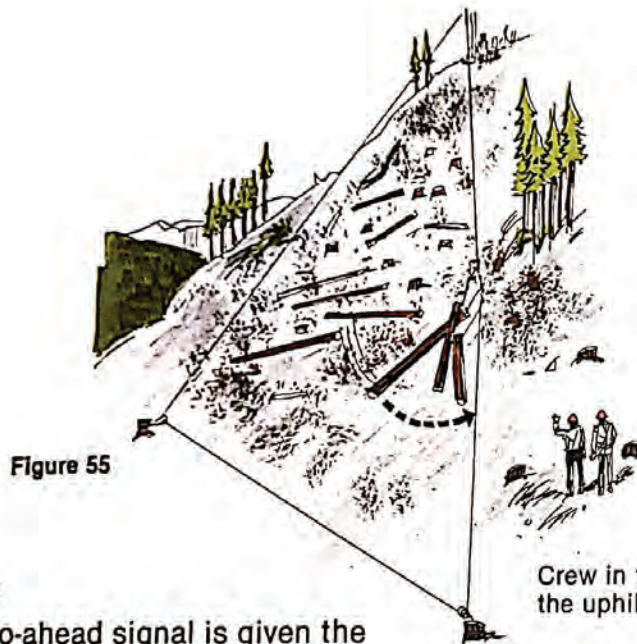


Figure 55

Precautions:

a. Before the go-ahead signal is given the rigging slinger shall ensure that the rigging crew is well in the clear and out of the danger area of the longest log to be yarded.

b. The rigging crew shall be positioned in the clear on the upper logged-off area to

Crew in the clear on the uphill side.

the rear of the turn and out of the sight of the haulback.

c. Logs shall be choked with short ends whenever possible.

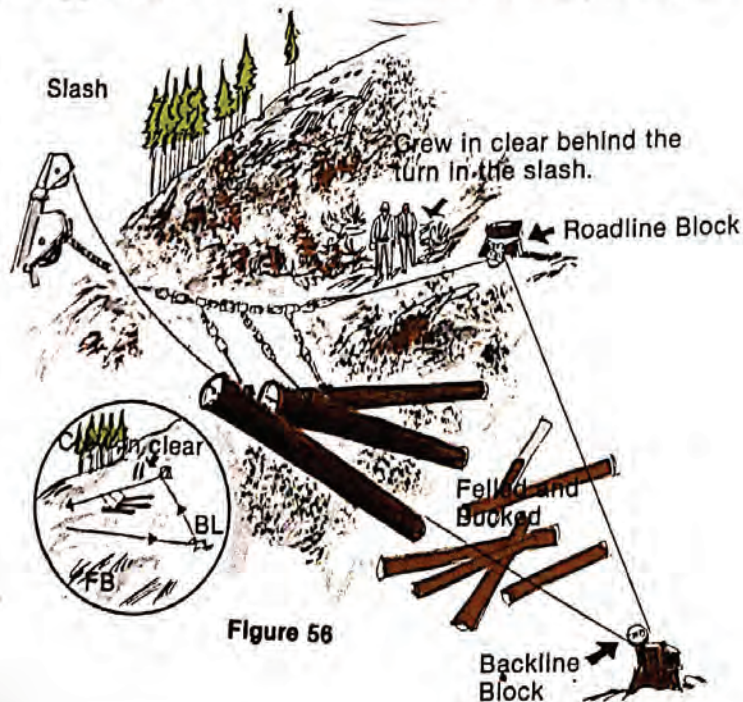
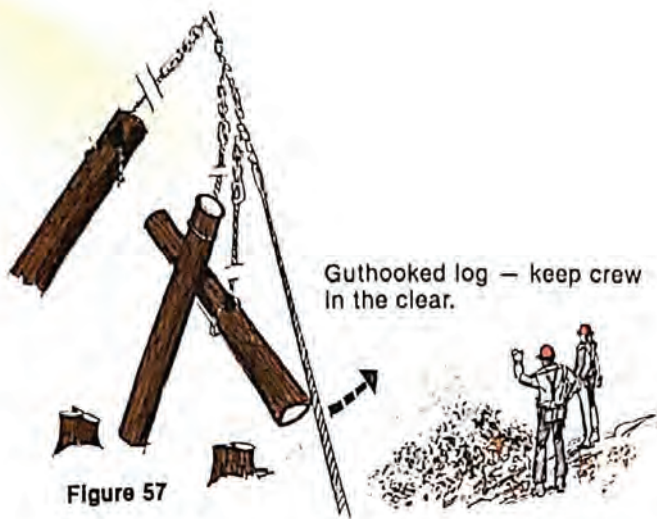


Figure 56



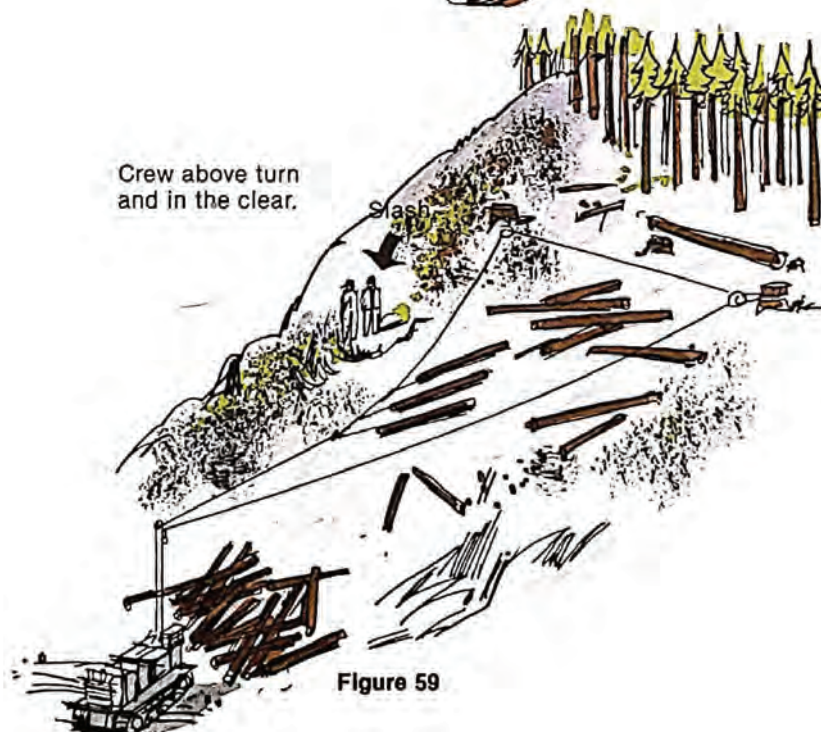
IF WORKERS CANNOT SEE WHAT IS HOLDING A LOG, THEY MUST ASSUME IT CAN MOVE AT ANY TIME AND MUST NOT ENTER OR WORK BELOW IT. OTHER WAYS MUST BE FOUND TO CHOKE OR DISLODGE THE LOG.

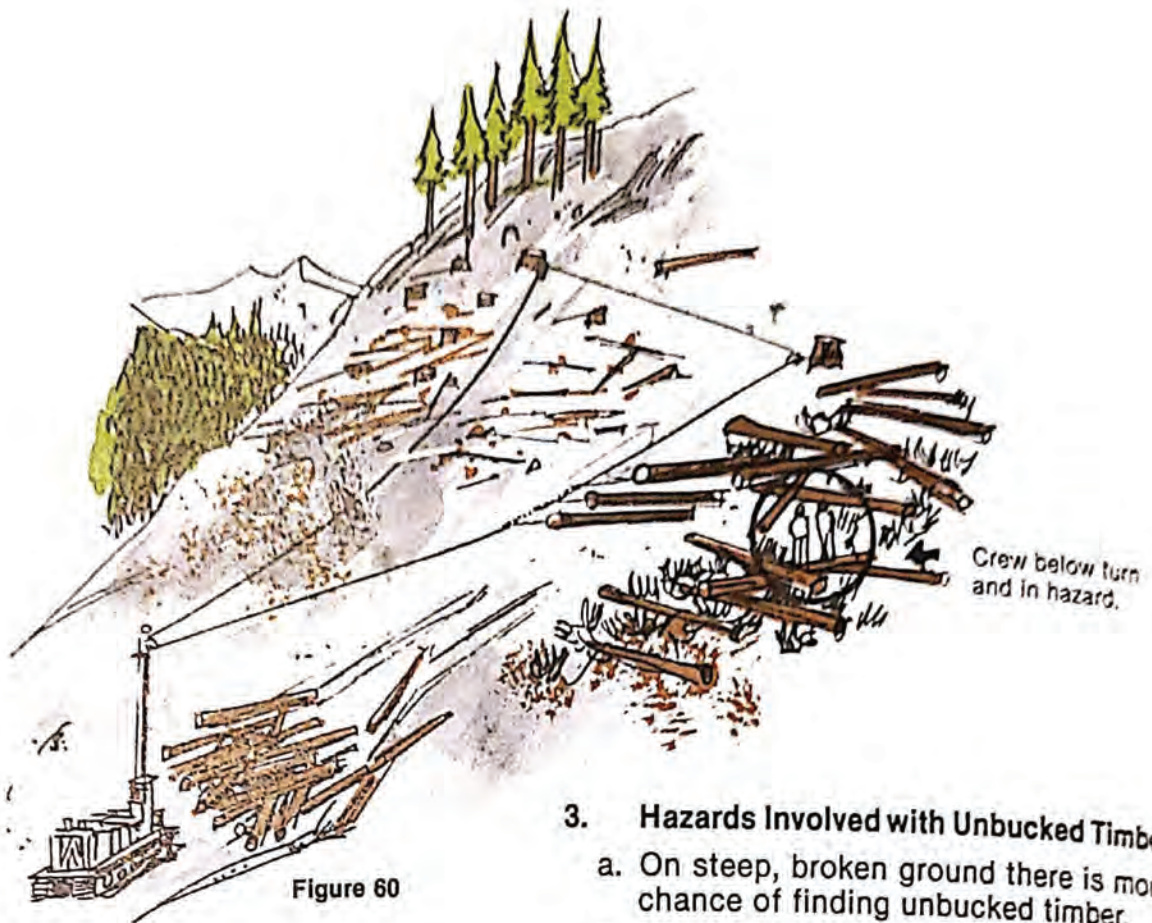
REMEMBER — TIMBER IS ROUND, IS SUBJECT TO GRAVITY FORCE AND WILL ROLL IF NOT SECURE.

2. The Hazard of Rolling Logs, Rocks and Other Objects

Precautions:

- The rigging crew shall return to the clear logged-off area before the turn is moved.
- The slope shall be yarded from the highest point down.
- Nobody may work below unstable logs, rocks or other material.

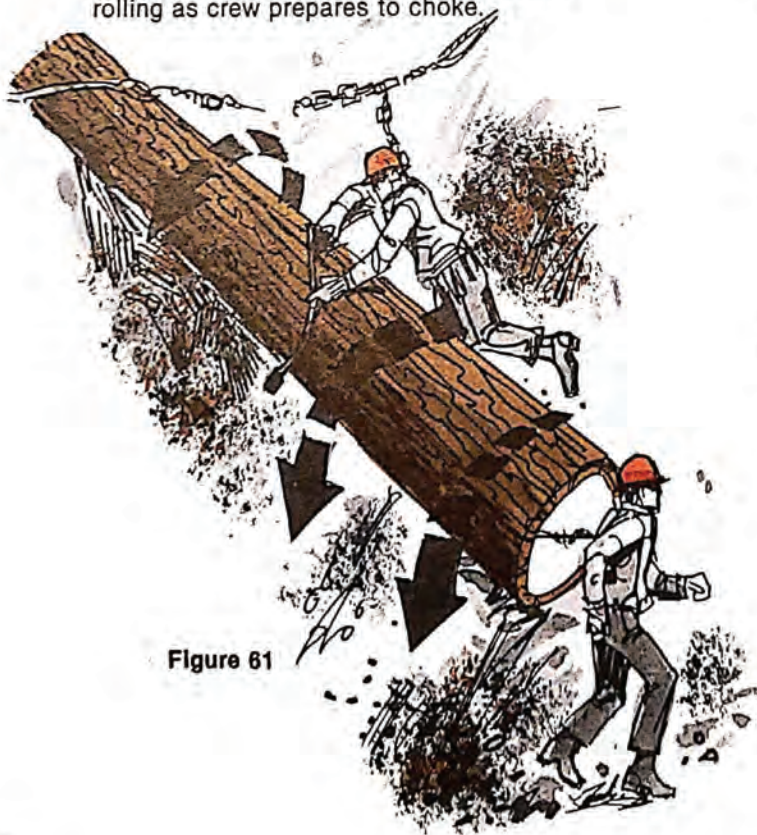




3. Hazards Involved with Unbucked Timber

- a. On steep, broken ground there is more chance of finding unbucked timber.
- b. Full length logs can dislodge other logs and material, causing it to roll or slide. The worker may not always be able to see the entire length of the log.
- c. Unbucked logs may drag other trees that were not expected to move at all.
- d. Even where ground is favourable for bucking and a boomstick is the longest log expected, logs not bucked or not completely bucked off may be encountered.
- e. A straight pull on an incomplete cut which has only a little holding wood will allow a tree or log to be yarded some distance before it flexes and breaks off.
- f. The entire volume on some settings may be unbucked to facilitate yarding, particularly in small timber.

Sloped ground. Log not supported, starts rolling as crew prepares to choke.



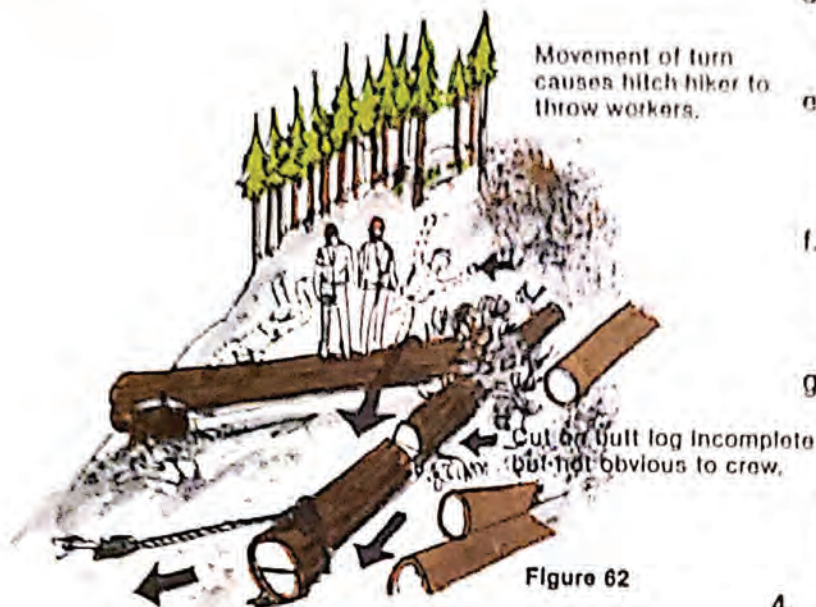


Figure 62

Precautions:

- When yarding on rougher ground, expect to find more unbucked logs and take the necessary precautions.
- Always remain far enough away before signalling go-ahead, and retreat to the clear logged-off area behind and above the turn. When an area is just being opened up and there is no logged-off area, the crew must take extra care to get well in the clear of any moving logs.
- Do not remain below anything that can be dislodged when the turn is yarded free. Always remain in the logged-off area above and behind the turn.

- Never stand on cuts of a tree that is hooked up, unless you are certain that the cuts are complete.
- Always be alert and ready to signal "stop" if something hazardous seems possible or if something unexpected occurs.
- Where entire settings are left unbucked, timber must be felled to facilitate yarding and hooking up. All other precautions for rigging crews shall be taken.
- Landings shall be large enough to land the length of logs being yarded without making additional hazards to workers and without requiring the assistance of the loader except when landing the occasional long log.

4. The Hazards of Opening up a Quarter

Unbucked timber increases the dangers of sidehills and settings.

— Refer to:

The Hazards of Swinging and Up-ending Logs, page 64.

The Hazards of Rolling Logs, Rocks and Other Objects, page 65.

- Rigging crews are exposed to extra hazards from felled and bucked timber because they cannot go to a logged-off area and get in the clear.
- Rigging crews are exposed to the hazard of dislodged materials as the turn is yarded free.

Hazards: Dislodged objects.

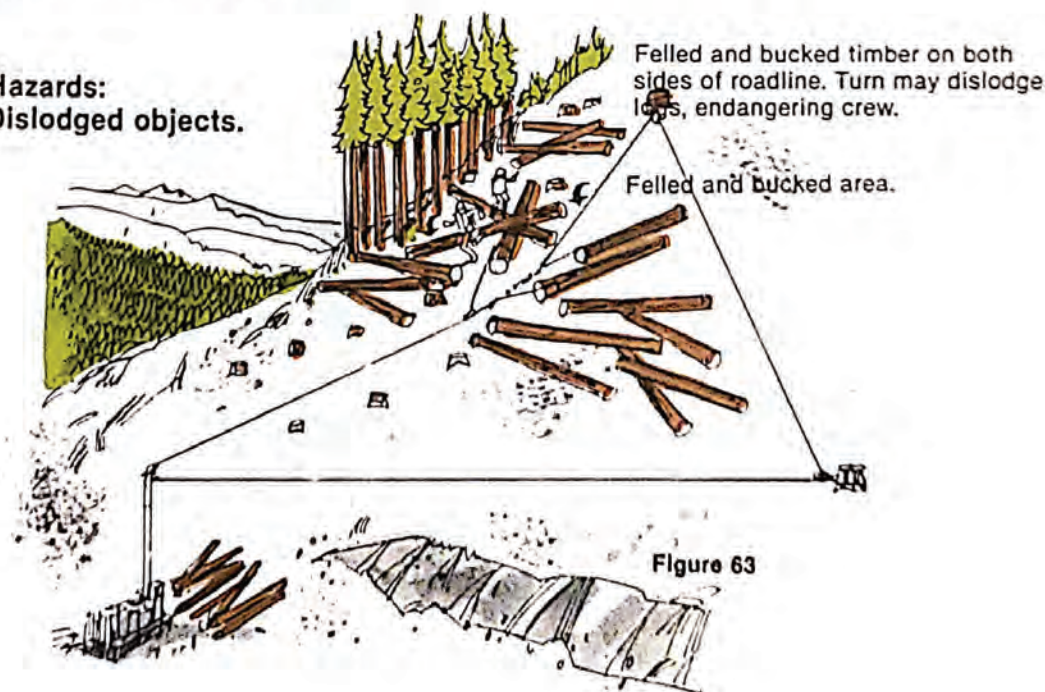


Figure 63

Precautions:

- Always start the first road on the highest part of the slope, ensuring that logs, rocks and other material which may become dislodged will not endanger workers.
 - Greater distance and effort is required to get into the clear because there is no clear, logged-off area.
 - Be aware of long logs.
 - Do not set chokers or stay below unstable logs or other material.
 - The hooktender should be with the crew whenever they are exposed to unusual or extra hazards.
5. The Hazard of Working Below Landings on Steep Ground

Hazards:

- The landing must be adequate for the turn to be landed and unhooked without

using the loader to prevent the turn from running back down the hill. The logs shall not be decked by the yarder in such a way that they can slide back down the hill when they are moved by the loader, or when the chokers are pulled free.

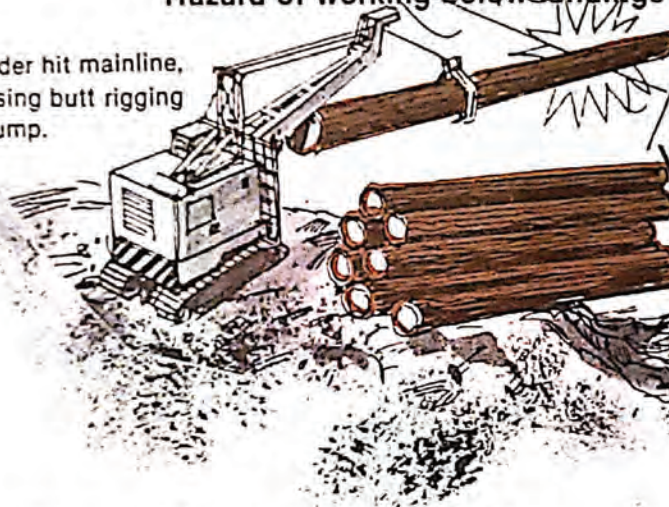
- The swinging loader boom, snorkel or log in the grapple striking the mainline when the crew is setting the chokers.
- The loader may throw debris over the bank.
- Unstable rocks or stumps at the edge of the landing may be dislodged.
- Rocks or other objects may be kicked loose by the turn and run back down the hill towards the rigging crew.

Precautions:

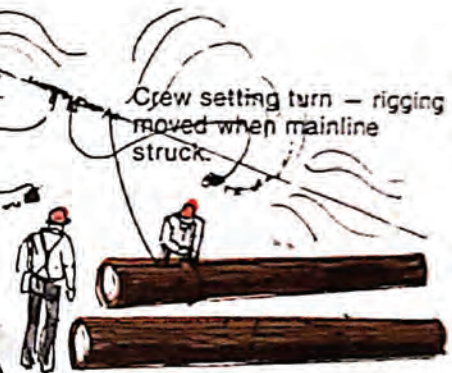
- Both the rigging crew and the landing crew should discuss the adequacy of the landing with the hooktender.

Hazard of working below landings on steep ground.

Loader hit mainline, causing butt rigging to jump.



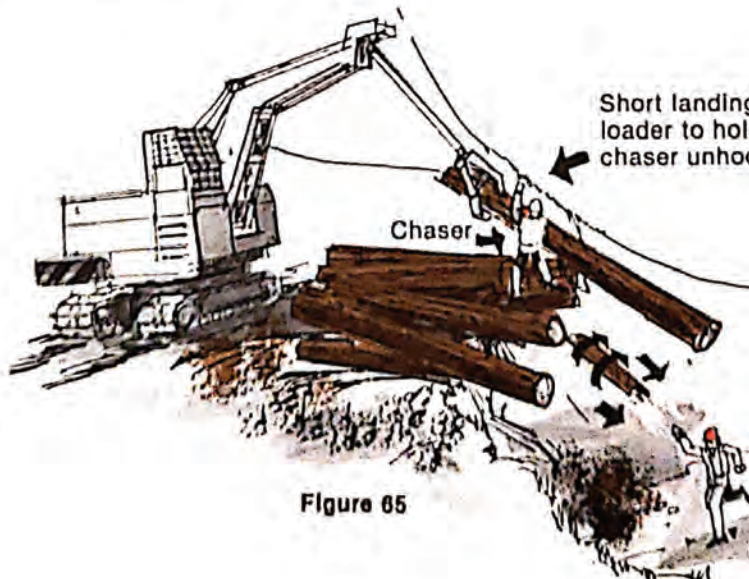
Crew setting turn — rigging moved when mainline struck.



Landing too small. Loader does not have working room. Logs wind rowed on edge of incline are unstable.

Figure 64

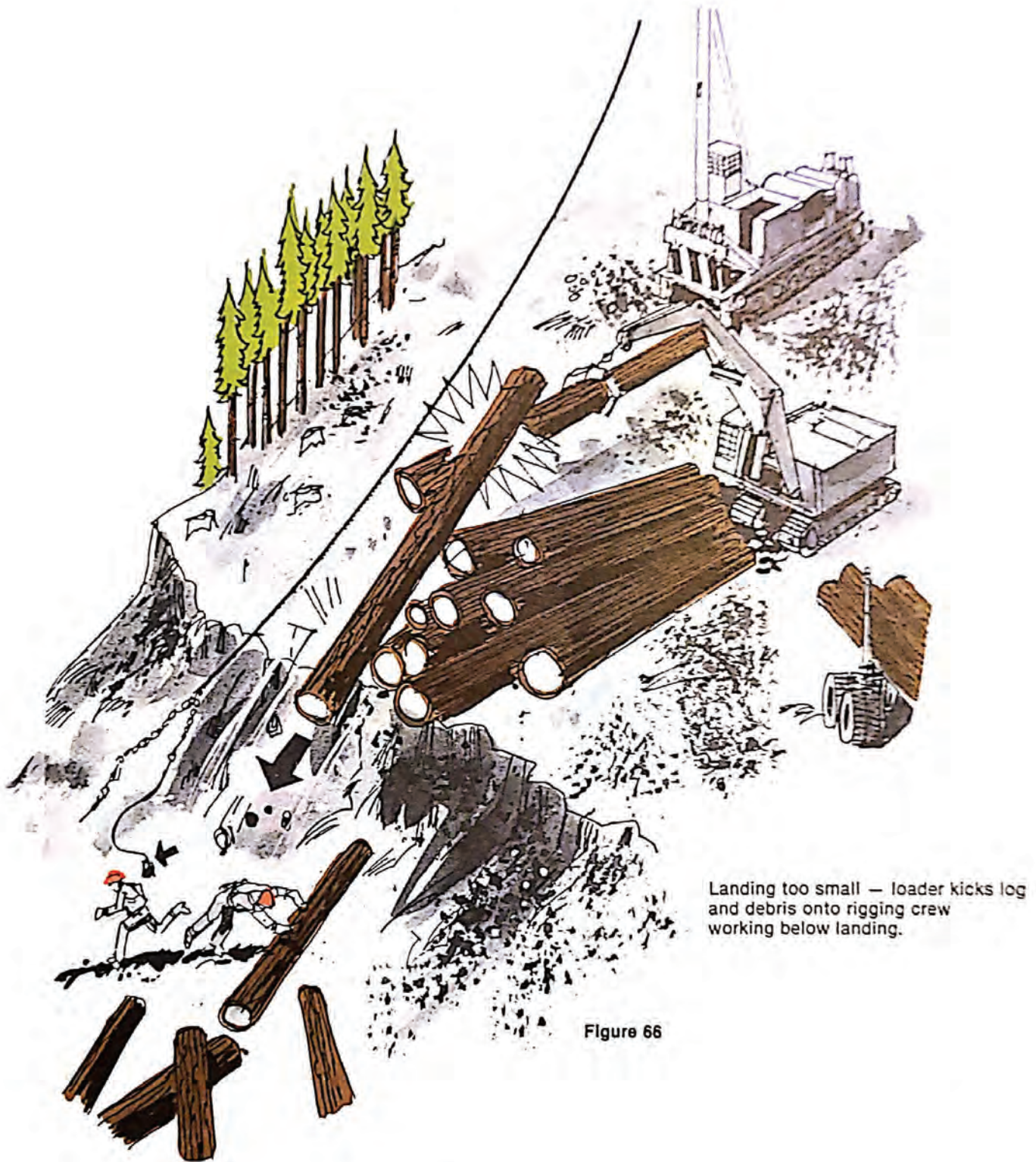
Short landing requires loader to hold log while chaser unhooks turn.



Danger of logs and debris sliding down slope towards crew working below.

Figure 65

Hazard of working below landings on steep ground.



Landing too small — loader kicks log and debris onto rigging crew working below landing.

Figure 66

REMEMBER AN UNBUCKED TREE, TOP AHEAD, WILL RUN FURTHER AND IS LESS PREDICTABLE THAN A BUCKED LOG. ALWAYS WATCH FOR OBJECTS COMING BACK DOWN THE HILL.

- b. Ensure loader operator knows the hazards to rigging crew and takes the necessary precautions to protect them. (Have snorkel removed if necessary).
- c. When safe to do so, dislodge any unstable objects on the edge of the landing. Always watch for objects coming back down the hill.
- d. If there is a danger of any logs or other objects being dislodged from the landing, stay well to the side across the face of the slope and on any high ground nearby.
- e. Remember, rocks or logs can shear off in any direction.
- f. Before landings are cleaned out and material pushed over the bank, advise

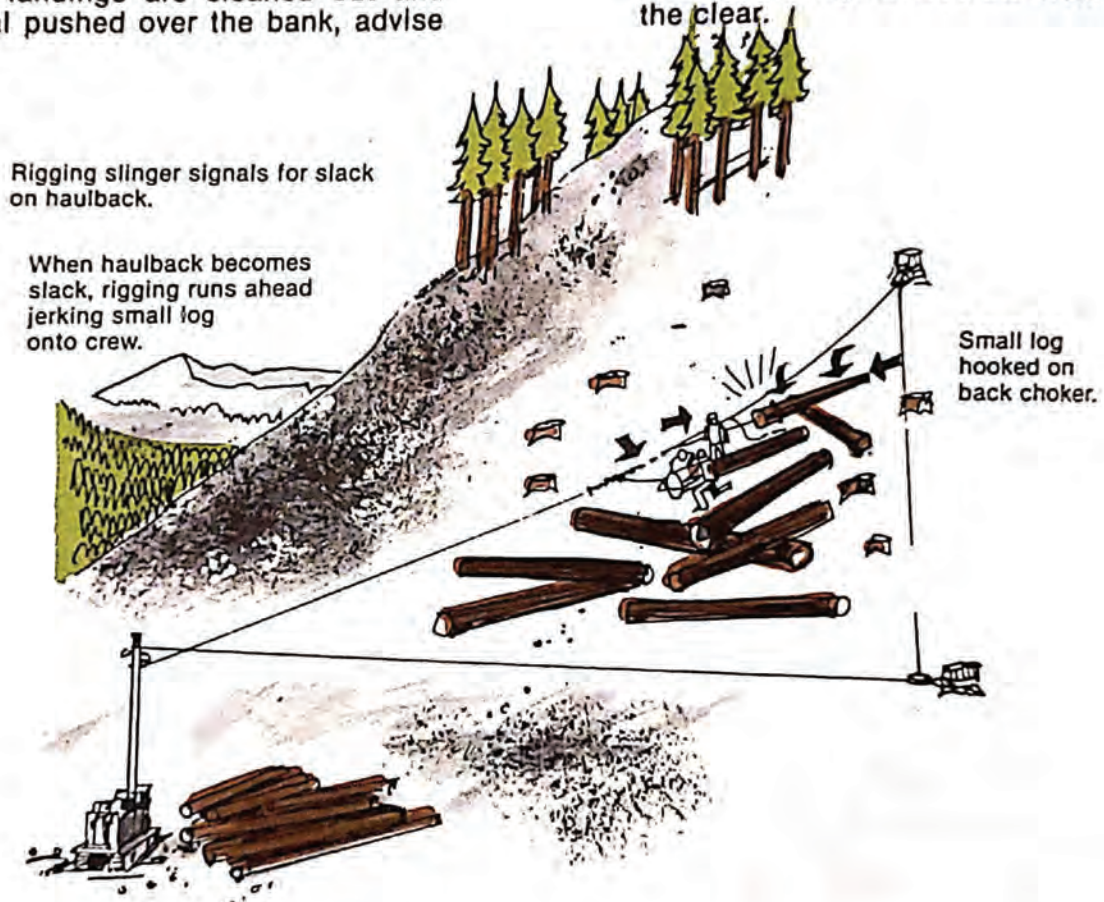
the rigging crew.

6. The Hazard of the Rigging Pulling Choked Logs Downhill when the Haulback is Slacked While Setting the Turn

On steep slopes, if the haulback is slacked too much or runs unexpectedly when setting the turn, the weight of the mainline and rigging can pull a clear, light log that is already hooked up on the back choker ahead onto the crew.

Precaution:

When setting turns on steep slopes, do not slack the haulback if the back chokers are already hooked up to light or unstable logs unless the crew is in the clear.



7. The Hazard to Workers Positioned in the Bight of Yarding Lines when the Backline is Located Behind the Road Line

- a. Crew is exposed to hazards if the tail-block, strap or anchor falls.
- b. The haulback can throw roots or chunks, creating a hazard to crew if

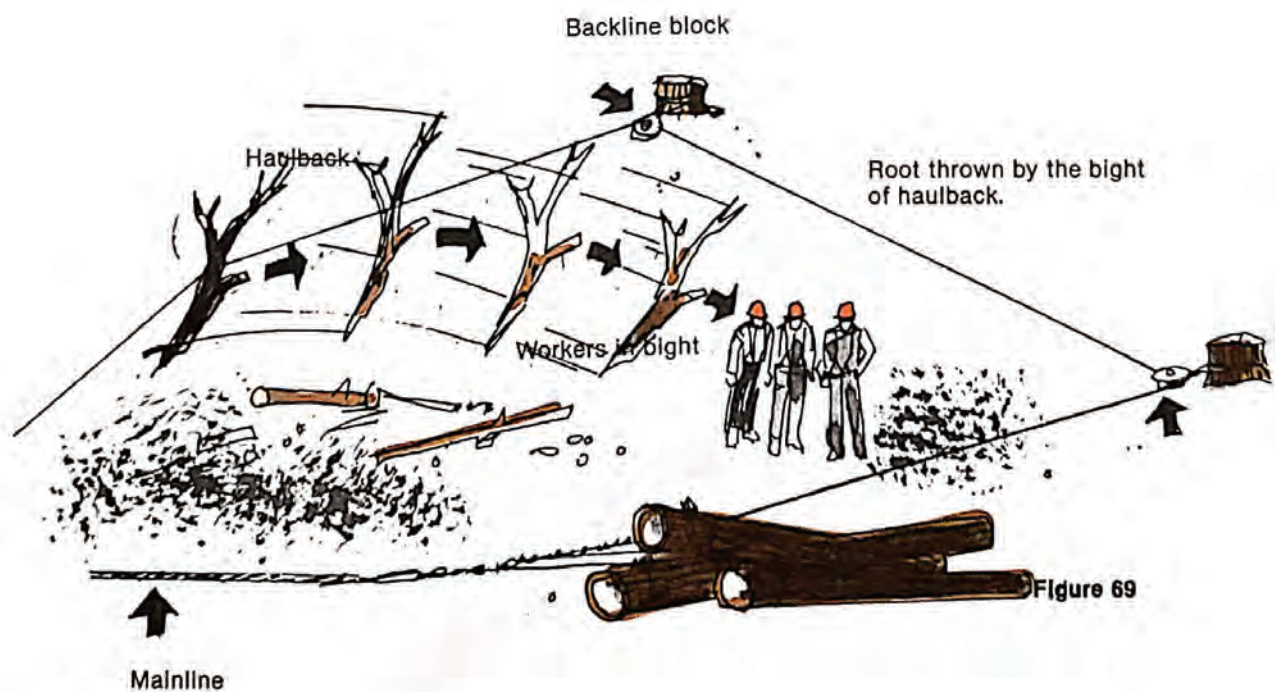
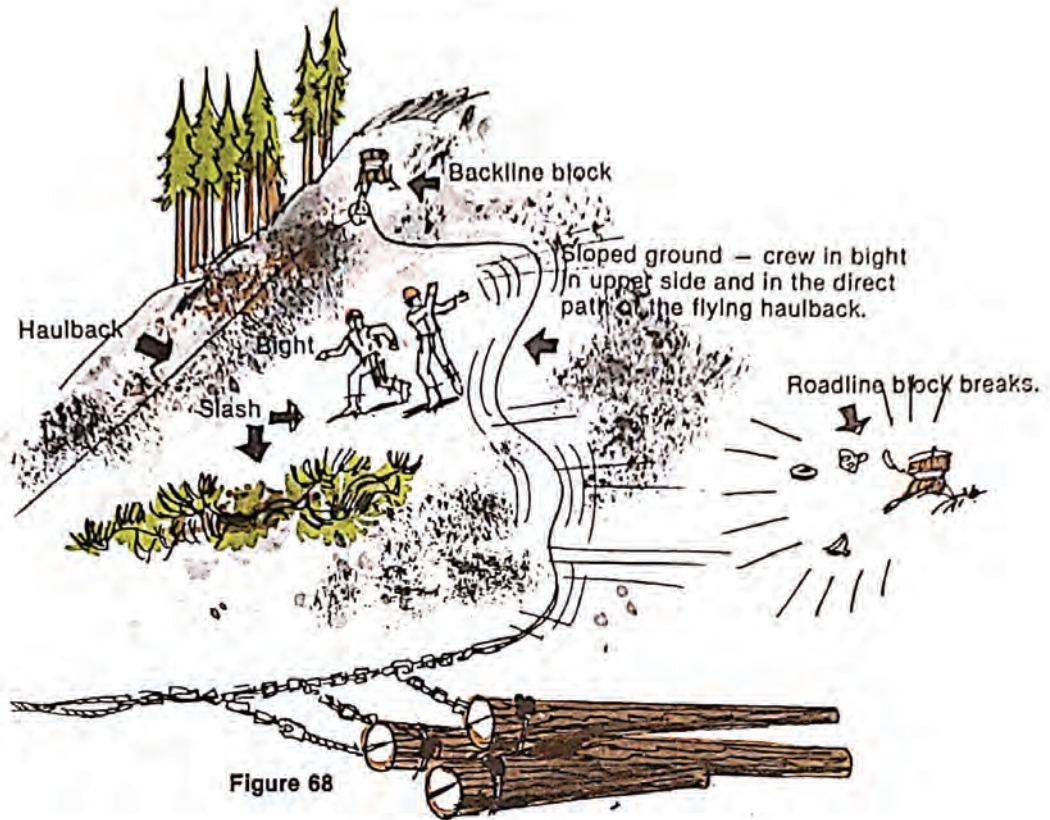
they are within range.

- c. If crew stays out of the bight in the unlogged area they are exposed to hazards from rolling or moving timber. Refer to figure 73.

Precaution:

- a. Locate backline ahead of the road line wherever possible. This allows the rigging crew to stay in the clear, on the

Hazard to workers in the bight when backline is behind roadline.



- b. Ensure loader operator knows the hazards to rigging crew and takes the necessary precautions to protect them. (Have snorkel removed if necessary).
- c. When safe to do so, dislodge any unstable objects on the edge of the landing. Always watch for objects coming back down the hill.
- d. If there is a danger of any logs or other objects being dislodged from the landing, stay well to the side across the face of the slope and on any high ground nearby.
- e. Remember, rocks or logs can shear off in any direction.
- f. Before landings are cleaned out and material pushed over the bank, advise

the rigging crew.

6. The Hazard of the Rigging Pulling Choked Logs Downhill when the Haulback Is Slacked While Setting the Turn

On steep slopes, if the haulback is slacked too much or runs unexpectedly when setting the turn, the weight of the mainline and rigging can pull a clear, light log that is already hooked up on the back choker ahead onto the crew.

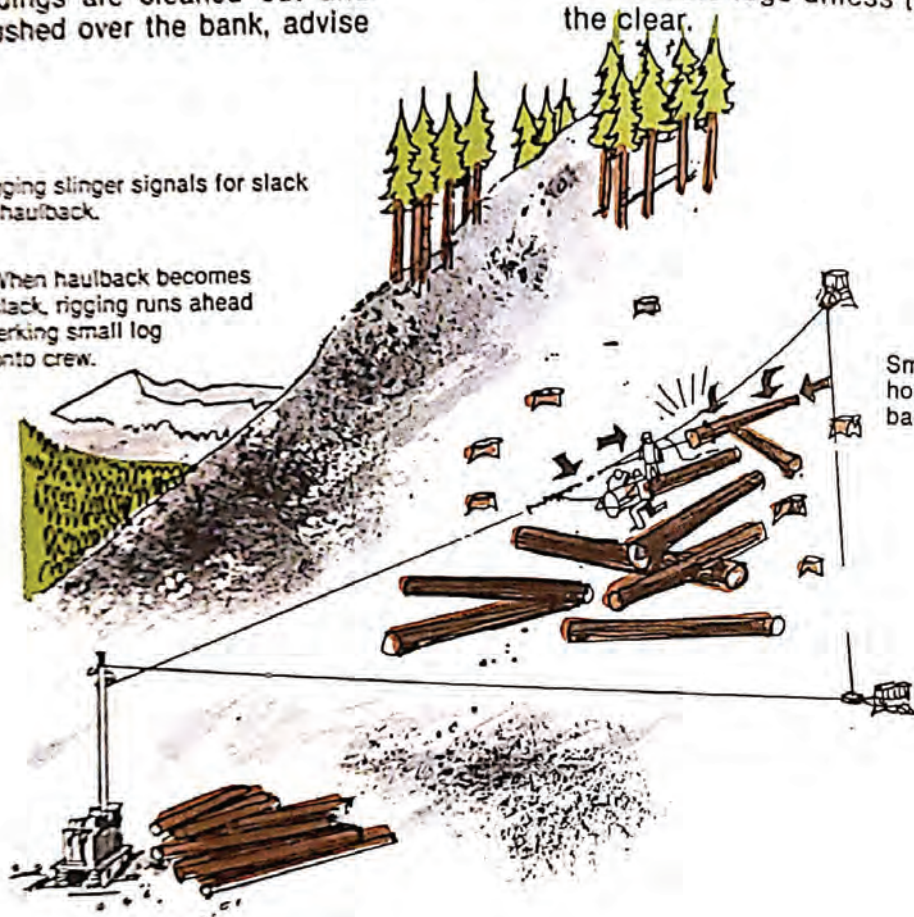
Precaution:

When setting turns on steep slopes, do not slack the haulback if the back chokers are already hooked up to light or unstable logs unless the crew is in the clear.

Rigging slinger signals for slack on haulback.

When haulback becomes slack, rigging runs ahead jerking small log onto crew.

Small log hooked on back choker.



7. The Hazard to Workers Positioned in the Bight of Yarding Lines when the Backline Is Located Behind the Road Line

- a. Crew is exposed to hazards if the fall-block, strap or anchor fails.
- b. The haulback can throw roots or chunks, creating a hazard to crew if

they are within range.

- c. If crew stays out of the bight in the unlogged area they are exposed to hazards from rolling or moving timber. Refer to figure 73.

Precaution:

- a. Locate backline ahead of the road line wherever possible. This allows the rigging crew to stay in the clear, on the

Steep ground — crew out of the bight on upper side of the backline but still exposed to hazards.

Chunk tight-lining down backline towards crew.

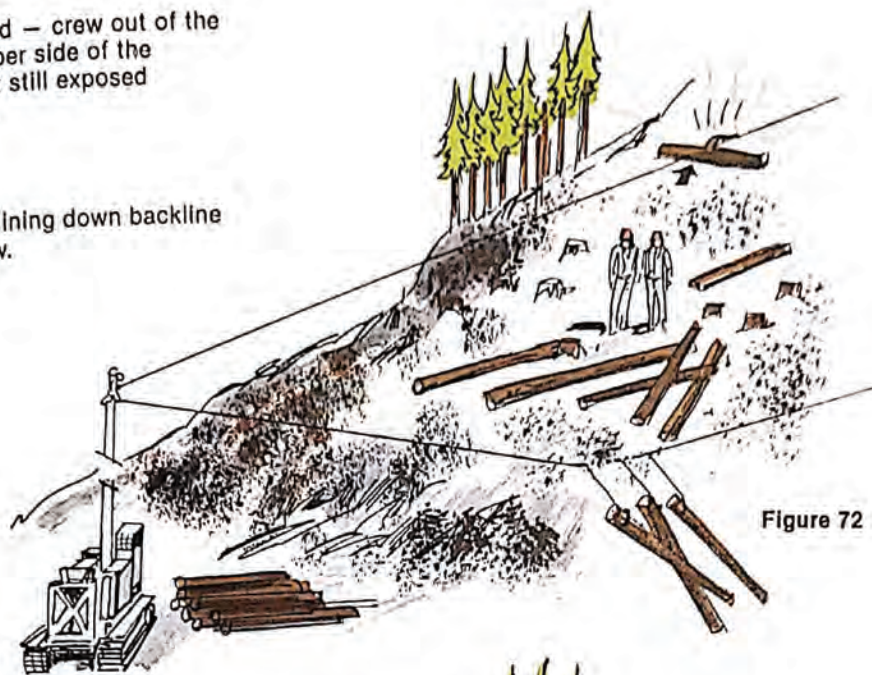
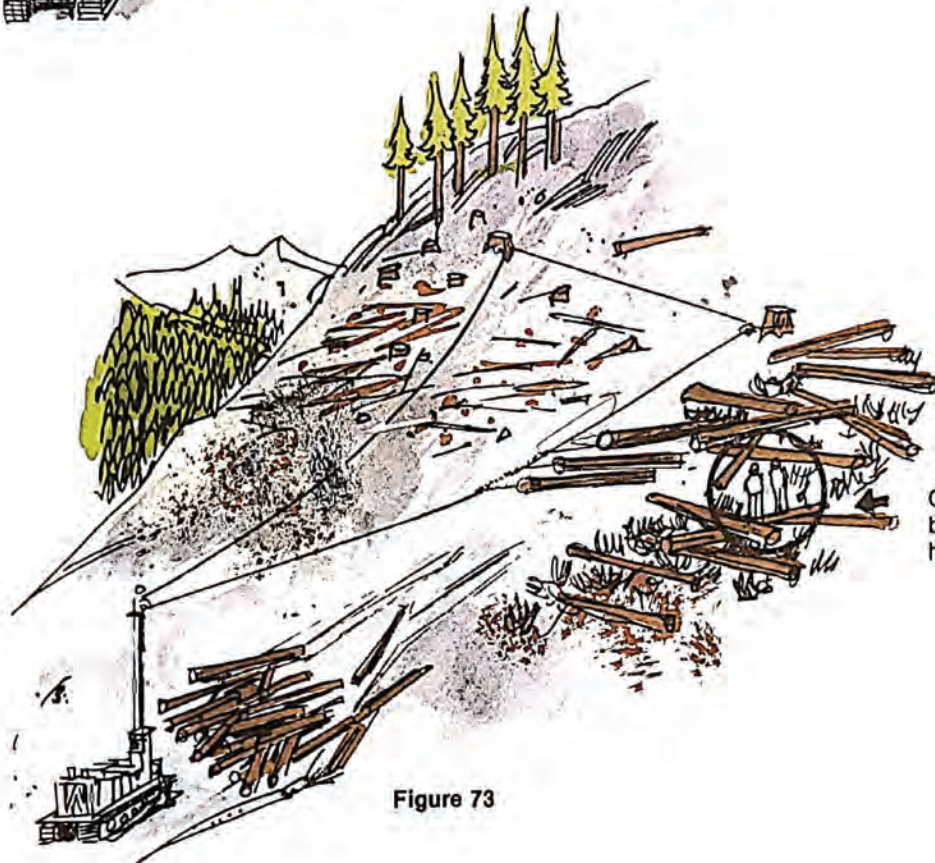


Figure 72



Crew out of the bight but in a hazardous location.

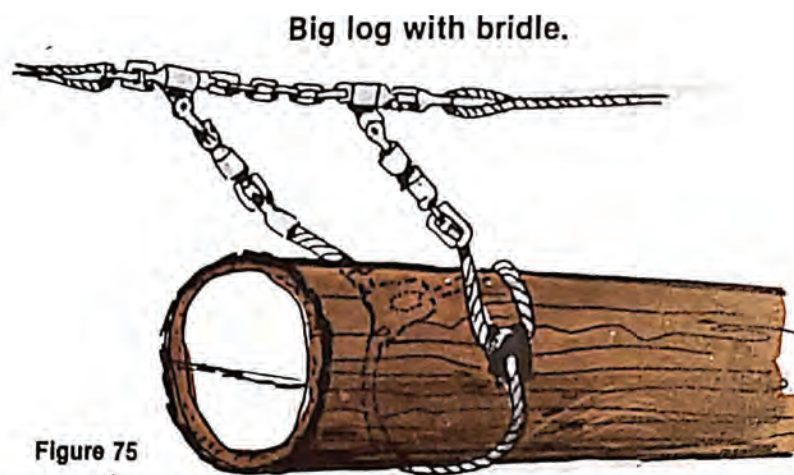
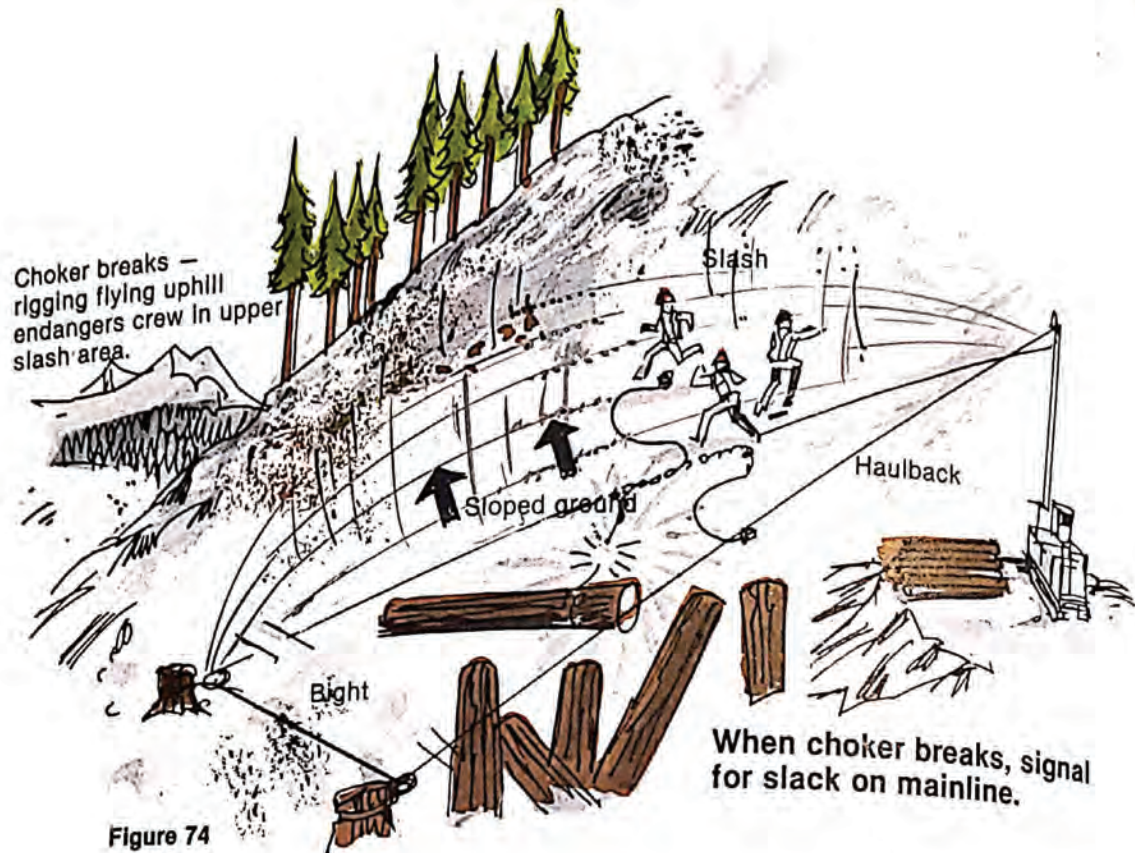
Figure 73

9. The Hazard of the Turn Running when Yarding Across a Slope

When yarding across a hill and where the turn cannot be held from running into the felled and bucked timber, a danger exists if the chokers break. The rigging being tightlined to hold the turn up could fly back up the hill, past the road line to where the crew is positioned. Refer to figure 74.

Precautions:

- Try only to hook up turns light enough that they can be held clear of the felled and bucked timber.
- When necessary, the crew must move further up the hill into the clear.
- Immediately signal for slack if a choker breaks.
- Hook up large logs with a bridle to prevent the chokers from breaking. Refer to figure 75.



10. The Hazard of Hooking Improper Turns, Tough Yarding and Reefing Heavy Turns

- Turns which are too heavy or hooked up improperly cause avoidable hangups. These hangups create more hazards when they are being cleared. They also reduce production.
- Reefing and heavy pulling puts unnecessary strain on the spar and rigging. It also exposes workers in the landing to undue risks from rigging failure.

Precautions:

- Select turns light enough to be yarded without reefing.

- Choke logs with a short end when possible.
- The hook tender will select roads to facilitate yarding.
- The hook tender will use other logging methods when necessary, to reduce the occurrence of hangups. He may use a scab line, move the spar to shorten yarding or yard from a different direction.
- Use a skyline, if the yarder is equipped for it.

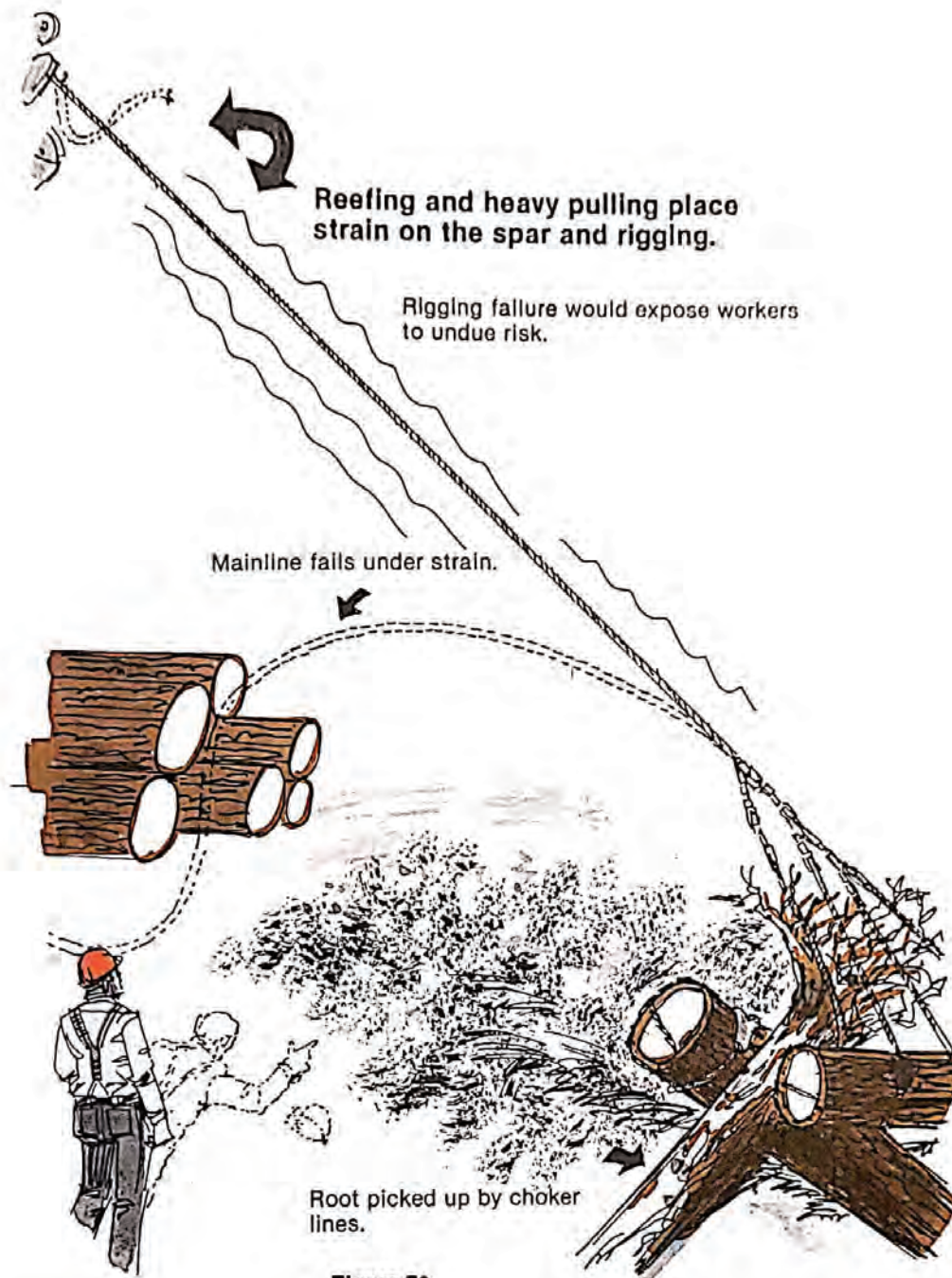


Figure 76

11. The Hazard of Fighting Hangups

- a. Rigging under tension may spring or pull loose.
- b. Material loosened or disturbed by the hangup could spring or move unexpectedly.
- c. Rigging may drop unexpectedly. There is a possibility of a log swinging or up-ending even after the "stop" signal is given.
- d. Possibility that the operator has not heard the "stop" signal. The operator may have stopped for a few seconds for some other reason and may go ahead at any time.
- e. When hangups are recurring, the worker fighting the hangup may not be clear if a log should swing. The repeated fighting of hangups may cause the crew to gradually stand closer and closer to the turn when giving signals.
- f. After the turn is yarded clear of the hangup, rock and other material may be dislodged and may roll back and strike workers.

The hazard of fighting hang-ups.

Sloped ground — downhill yarding — front log hung-up. Worker unhooks log to reset choker. He is short of slack, calls for rigging to "Go Ahead Slow" so the logs above in motion.

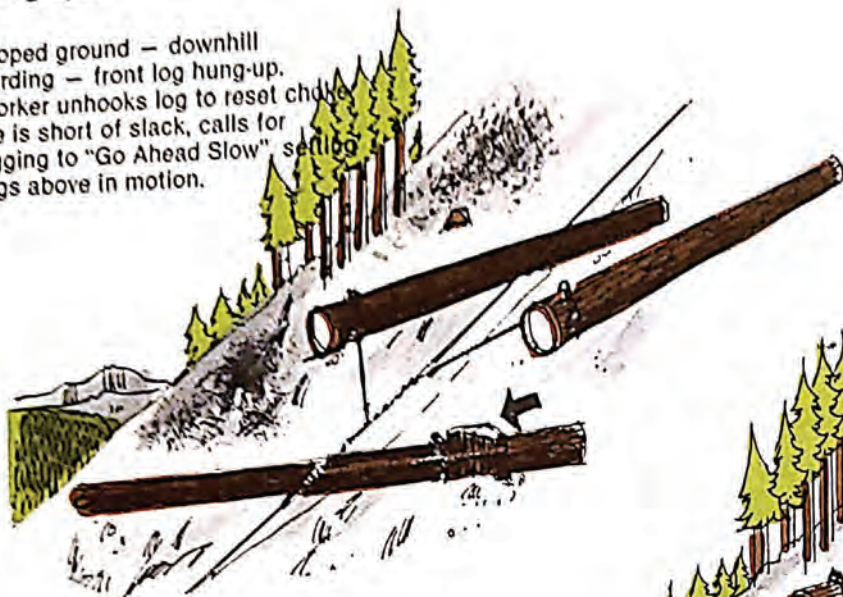


Figure 77a

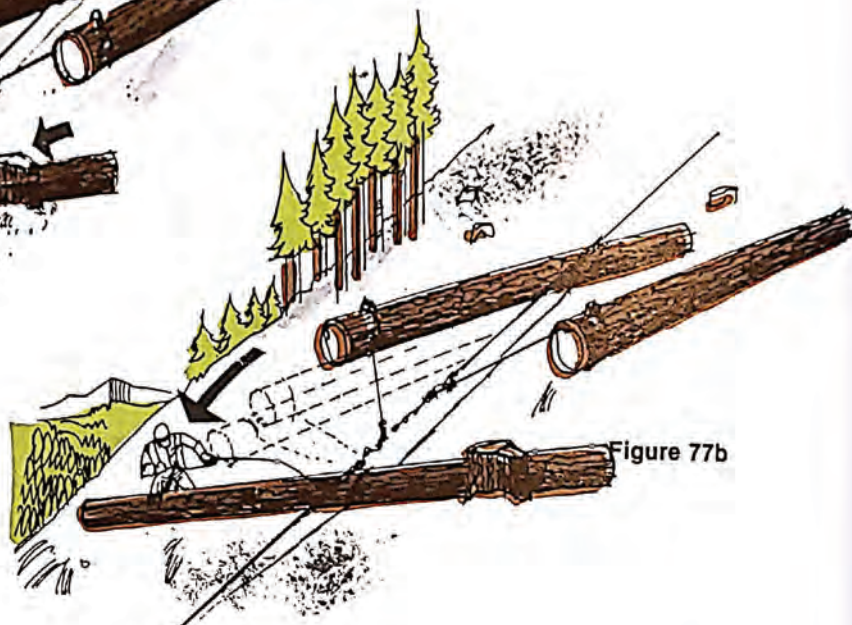


Figure 77b

Loose rocks are a serious hazard in uphill yarding.

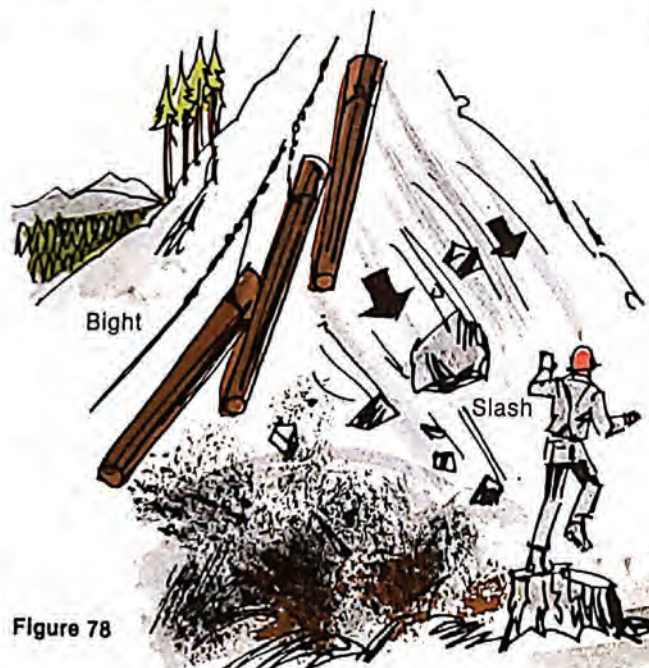


Figure 78

Trapped windfall sapling bending under pressure. Near breaking point.

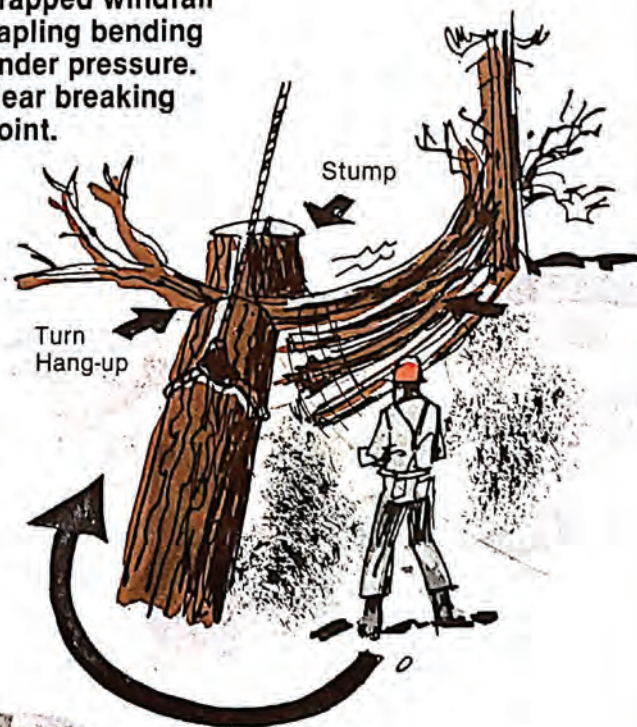


Figure 79

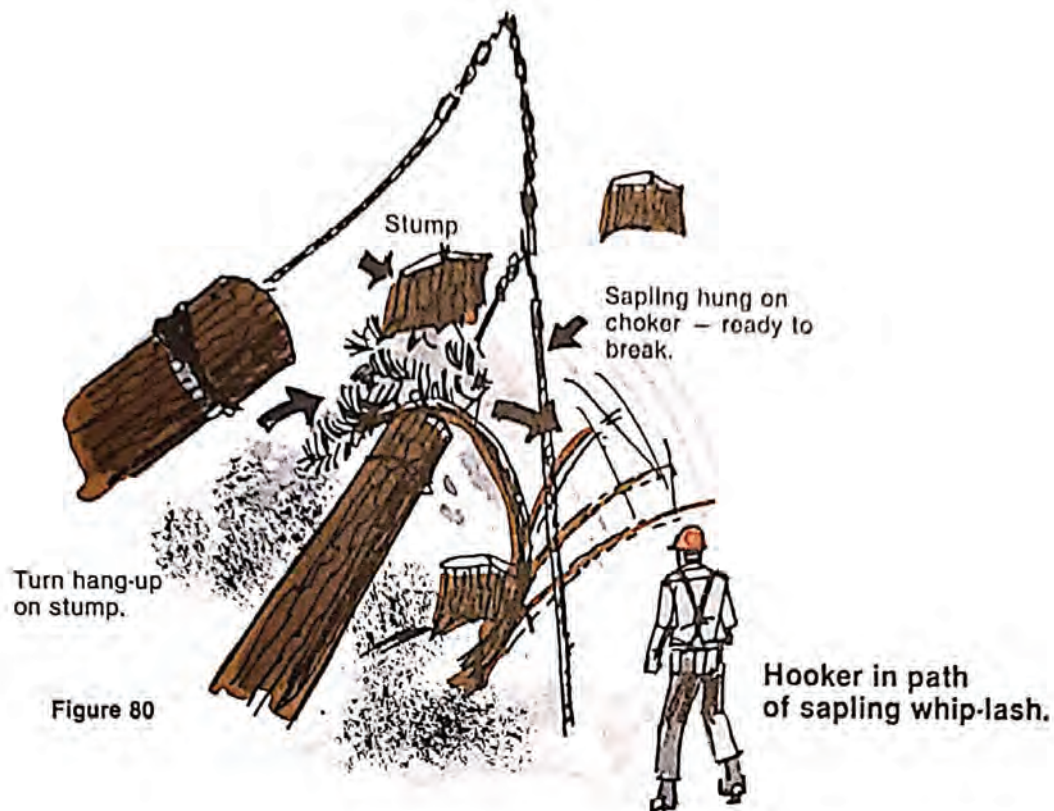


Figure 80

Precautions:

- a. Approach hangups from the upper side.
- b. Slack the rigging down before entering the area.
- c. Do not stand or work under elevated butt rigging.
- d. Watch for saplings sprung ahead by the turn.
- e. Move well into the clear if yarding the chokers free — pulling the hook.
- f. Never get below the turn when yarding uphill.
- g. When fighting a hangup while resetting a choker, never rely on the whistle signal when not in the clear. The whistle may fail or the yarding engineer may not hear your "stop" signal and may continue to follow to "go ahead slow" or "give slack" whistle.
- h. Be aware of objects sliding down behind the turn, if yarding downhill.
- i. Find a safe location for workers who must fight recurring hangups.
- j. When upending or swinging a log, get well into the clear and do not rely on the log swinging in the expected direction.
- k. Ensure that other workers nearby are in the clear before giving the go-ahead signal.
- l. Be alert for rocks and other objects which could be kicked loose by the turn when yarding uphill.
- m. Ensure that the whistle is operating properly or that the worker with the whistle can hear and see the hooktender's signals.
- n. If hangups keep happening in a particular area, consider moving the road line.

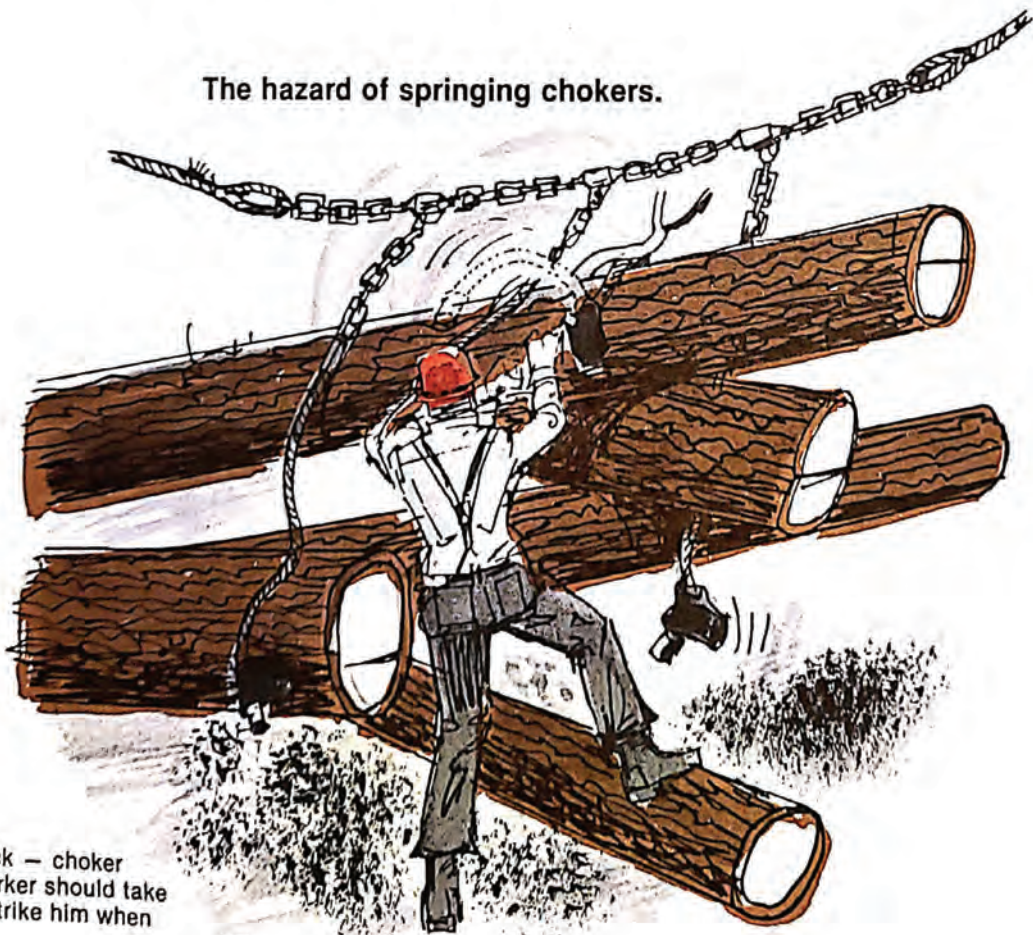
WHEN FIGHTING HANGUPS — ALWAYS LOOK THE SITUATION OVER CAREFULLY FOR HAZARDS.

Hazard of swinging chokers.



Figure 81

The hazard of springing chokers.



Butt rigging slack — choker knob fouled. Worker should take care it doesn't strike him when pulled free.

Figure 82

12. Hazards of Springing and Swinging Chokers

- a. Swinging chokers when the rigging is suspended.
- b. Chokers may hang up and then spring free when hooks are dragging on the ground.
- c. Springing chokers when chokers are being pulled over to the turn by the rigging crew.

Precautions:

- a. Remain in the clear, at least two choker lengths away, until the rigging is spotted.
- b. When chokers are swinging, the hooks must be slacked onto the ground to stop the choker movement before the crew approaches.
- c. Be careful when pulling a choker over to a log. If a choker knob and hook are badly fouled, walk over and unfoul it rather than jerking it free.

13. Hazards when Hooking up the Turn

The most dangerous part of the yarding and loading operation is hooking up the turn and starting it in to the landing. Adequate training and safe work procedures are vital to control the risk to rigging crews.

- a. The rigging slinger must have control over the chokerman.
- b. The whistle must be working properly.
- c. Without endangering himself, the rigging slinger will have the turn selected and when possible, instruct the chokerman before the rigging returns.
- d. The rigging slinger along with the chokermen will keep clear until the rigging has been spotted and the chokers stop swinging.
- e. If the rigging is to be picked up out of the brush, it must be done before the crew approaches to set the turn.
- f. Stability of logs must be considered. Workers must not crawl in between or underneath logs which could slip or drop.

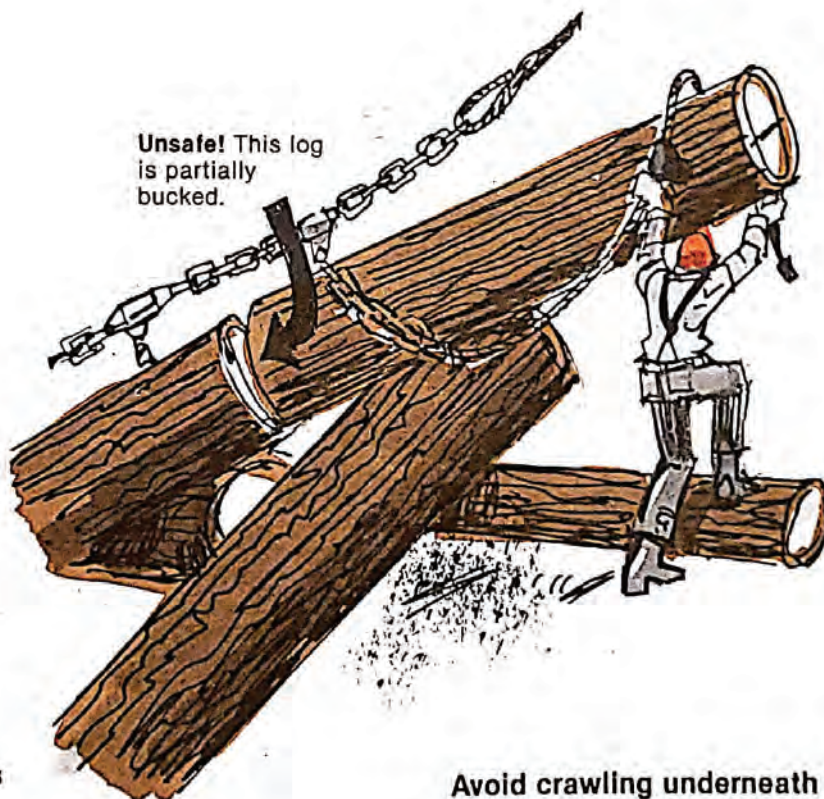


Figure 83

Avoid crawling underneath logs that could slip or drop.

- g. Heavier logs shall be hooked with the front choker.
- h. Logs shall be choked with short ends whenever possible to prevent upending or swinging. This also makes the turn easier to yard and land.



Figure 84

Heavier logs shall be hooked with front choker.

Workers should not be where they would be at risk if the radio whistle fails. Example: The whistle may fail to signal "stop" after signalling go ahead or come back slow.

Logs shall be choked with short end to prevent upending or swinging.

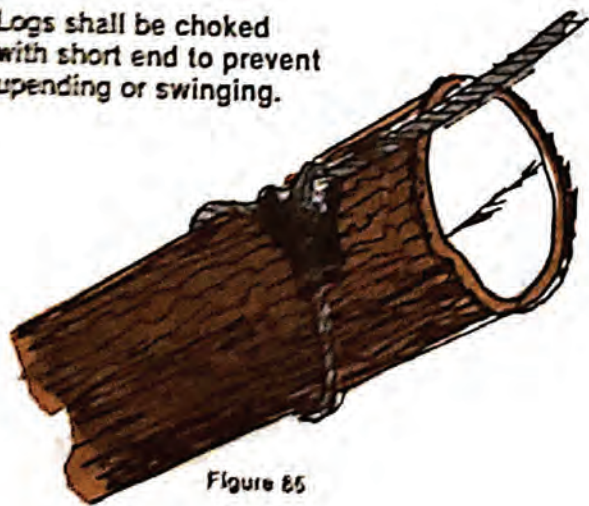


Figure 85

- j. When the turn is set, the rigging slinger shall be the last one away to the clear. He must make sure that everyone retreats in the same direction, UPPER SIDE, CLEAR OF SWINGING LOGS, IN THE LOGGED-OFF AREA BEHIND THE TURN AND OUT OF THE BIGHT, before the go-ahead signal is given.
 - k. The rigging crew must not be blocked in. They must be able to move quickly further into the clear if something unexpected happens.
 - l. The rigging slinger shall have the whistle ready to signal "stop", until the turn is yarded clear. He will signal "go ahead slow" if there is any doubt about the safety of the crew.
 - m. The crew shall watch the turn until it has been yarded clear. For other considerations when selecting and hooking up the turn, refer to Section "Selecting and Choking the Turn", page 43.
14. **Hazards Due to Butt Rigging Dropping Accidentally or Faster than Expected when being Slacked Down.**
- Reasons vary:
- a. Drum brakes can fail.
 - b. Brake bands, anchors, adjusting rods can fail, ratchets may slip off pawls, particularly on early model yarders.
 - c. If there is sudden loss of air pressure the rigging may drop some distance before the spring brake or dogs engage.
 - d. Controls may be accidentally released.
 - e. Brake may be wet or sticky.

Precautions:

- a. Never stand directly under the butt rigging.
- b. When waiting for slack, keep to the side.
- c. If it is necessary to cross beneath the lines, do so swiftly.

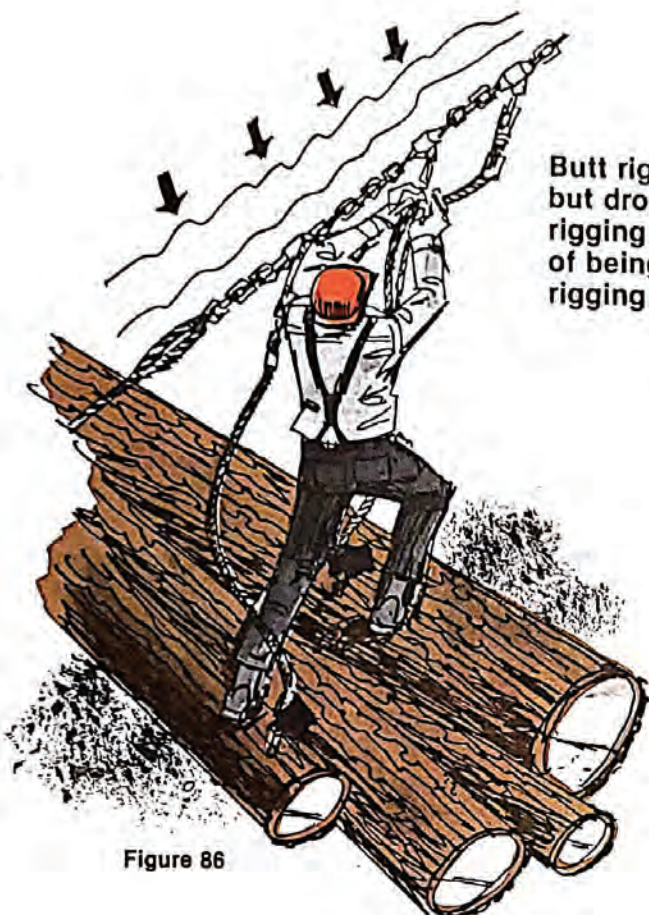


Figure 86

Butt rigging suspended but dropping. Worker under rigging runs serious risk of being struck by the rigging when it drops.

Precautions to be taken by yarder engineer to prevent butt rigging from dropping:

- a. Make sure the braking system is well maintained.
- b. Stop winch and keep frictions and brakes applied when the rigging is suspended.
- c. Ensure the safety brake or dogs are working.
- d. The operator must stay at the controls when the crew is setting a turn.

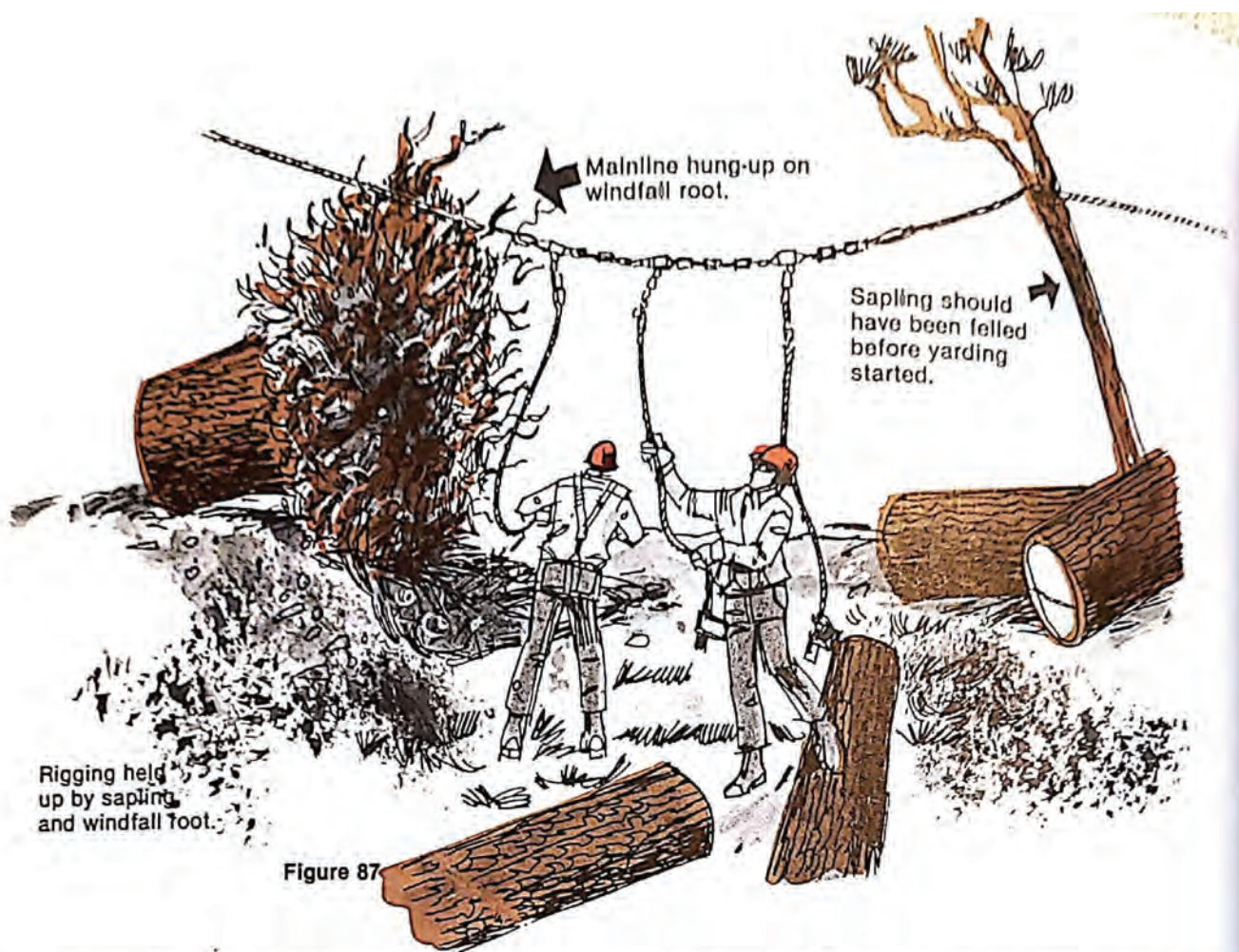
15. Hazards Due to Rigging Held up by Branches of Saplings and Other Objects

- a. When the rigging is slacked down, the haulback, mainline, or rigging can hang up on saplings or on extended windfall roots.
- b. The mainline is often slacked more than usual in efforts to break the limb or root. If this method fails, the rigging can hang up and later crash down when the chokers are being set.

Precautions:

- a. Never allow the rigging to hang on limbs or roots.

- b. If rigging hangs up overhead on limbs or roots, pick up the slack again to relieve the weight before approaching to set the turn. This will prevent the rigging from dropping if a limb or root breaks.
- c. Slack the mainline and skin the rigging back to clear lines.
- d. Skin the rigging back and pick up a light turn to clear lines.
- e. Never work under raised butt rigging.
- f. Saplings must be felled before yarding commences if they endanger the crew.



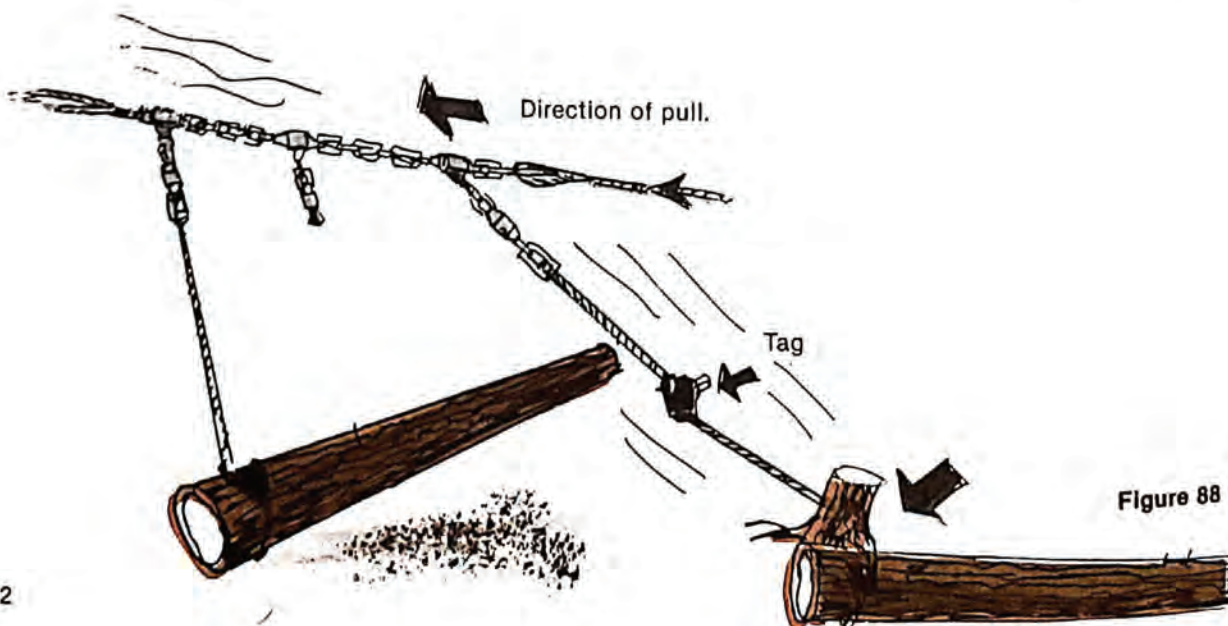
16. Hazards from Tagged Logs

- It is hazardous to leave chokers tagged as the turn is yarded and landed.
- Tagged logs are harder to control and it is more difficult to tightline clear of hangups.
- A light tagged log can upend and swing a greater distance to the side.

- Tagged logs are more difficult to land and often create hazards by jill poking other logs ahead in the pile.
- Tagged logs can foul more readily when they are being yarded near guylines.

Precaution:

Shorten the choker up before sending in the turn and whenever possible, use front choker for tagging logs.



Tagged logs are more difficult to land and often tag creates hazards by jill-poking other logs ahead on the pile.

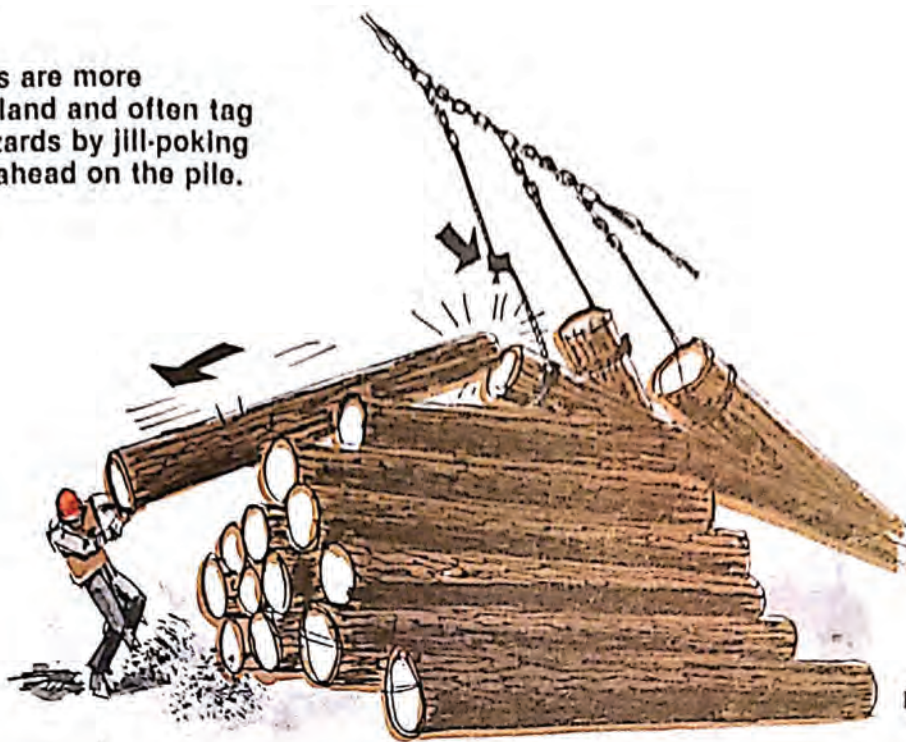


Figure 89

17. Hazards Due to Inaccurate Radio Whistle Operation

Unexpected or accidental line or log movement can be caused if a radio whistle malfunctions or is used wrongly.

Precautions:

- Radio whistles must be on the approved frequency for the operating location to prevent interference with other radio whistle units.
- If a radio whistle unit does not function properly, it must not be used until it is repaired.
- Radio units will operate more reliably if handled carefully.
- Report any deficiencies or abnormalities at once.
- Keep battery charged as required.

f. The sound of the spar whistles must be different from the log loader whistle or any other whistle within range. Whistle tones are easy to adjust.

g. The rigging crew must be able to distinctly hear the whistle signals.

h. Keep transmitter ready to signal "stop" in case of an emergency, especially:

- After "go-ahead" signal has been given, until the turn is cleared.
- When lines are being run around.
- When spotting rigging.

When an electrical whistle wire and bug are used, these precautions also apply.

18. Hazards Due to Mainline Fouled Under Roots or Other Objects

- The bight of the mainline may foul under roots or other objects when it is

Crew behind turn in the slash. They are not safe if objects are thrown by fouled lines breaking clear.

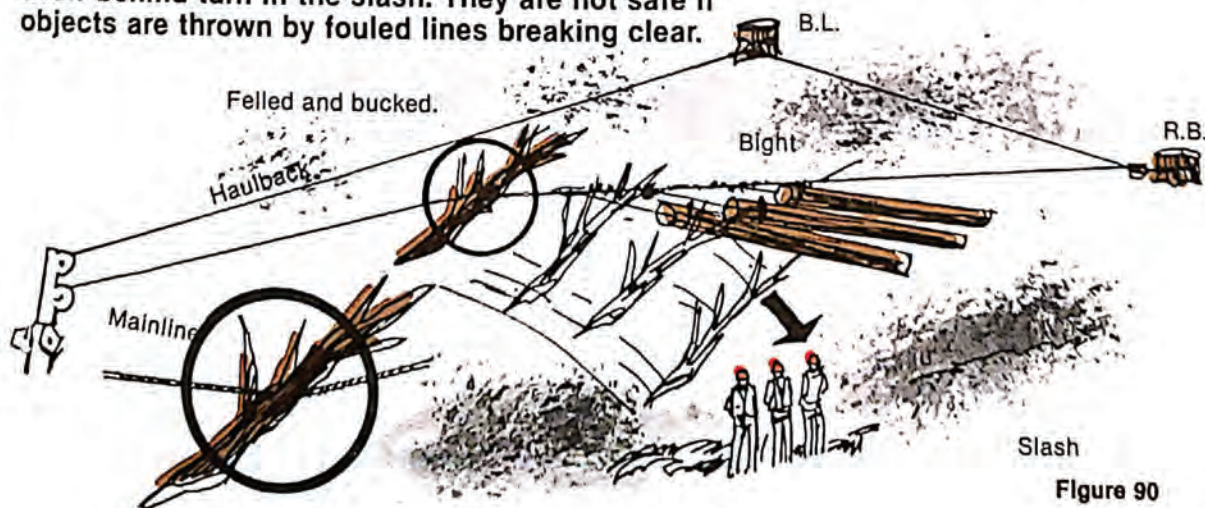


Figure 90

slacked. When the "go-ahead" signal is given and the line tightens up, it may break free and throw objects toward the crew.

Precaution:

Be cautious if the mainline does not lift. The crew should move further into the clear if necessary. Workers must watch for materials being thrown into the air and also be alert for possible hangups if the mainline fails to clear.

- b. Heavy rains can disturb the ground and this may cause the root to tip more easily.

Precautions:

- a. Be aware of the dangers of roots and do not get below or behind them.
- b. When a root appears unstable, pull it clear with the rigging. The choker must be set from the upper side.

19. Hazards Due to Windfall Roots

- a. Windfall roots will often sit back when a tree is bucked off or yarded free, particularly if it is bucked short.

Incorrect



Figure 91a

Water is eroding bank which supports the root system. Root could slide.

Correct



Figure 91b

Pull unstable roots clear with the rigging when crew is safely in the clear.



Figure 92

20. Hazards of Rocks, Roots and Other Material Dislodged by Mainline when Yarding Uphill

Rocks, roots and other material can be kicked loose or tightlined down the hill when the slacked mainline is being picked up to clear the rigging or when going ahead.

Precautions:

- Spot the rigging so that there is sufficient slack to hook up the turn before the workers approach.
- If the mainline is on the ground, do not pick up on it until all the crew are well in the clear.
- If anything is being tightlined down the mainline, slack off at once to dislodge it.

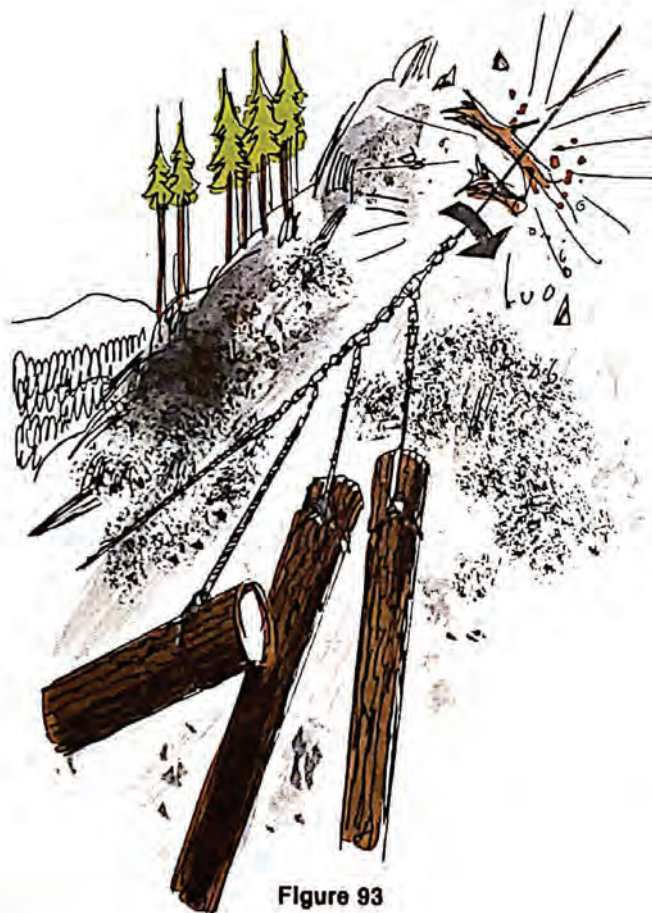


Figure 93

The uphill yarding or tight-lining can throw debris toward the crew who are otherwise in the clear.

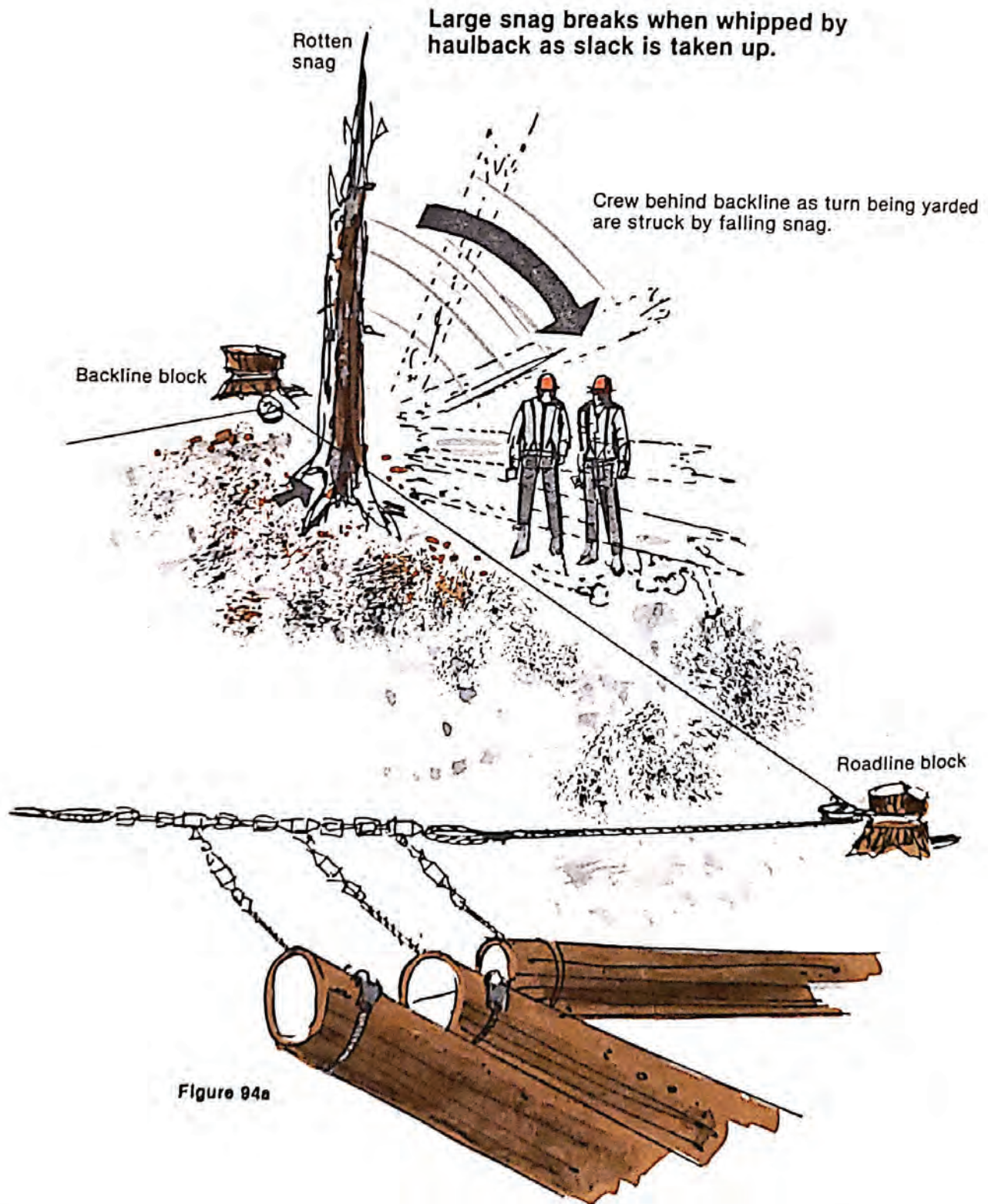


21. Hazards Resulting from Snags Left Standing in Quarters

Rigging crews sometimes yard around hazardous and cut up snags. If a line strikes a snag, it can easily fall and kill or injure crew members.

Precautions:

Be aware of snags and tell the hooktender if there are any. He will tell the supervisor, who will have the snags removed before the rigging crew starts work.



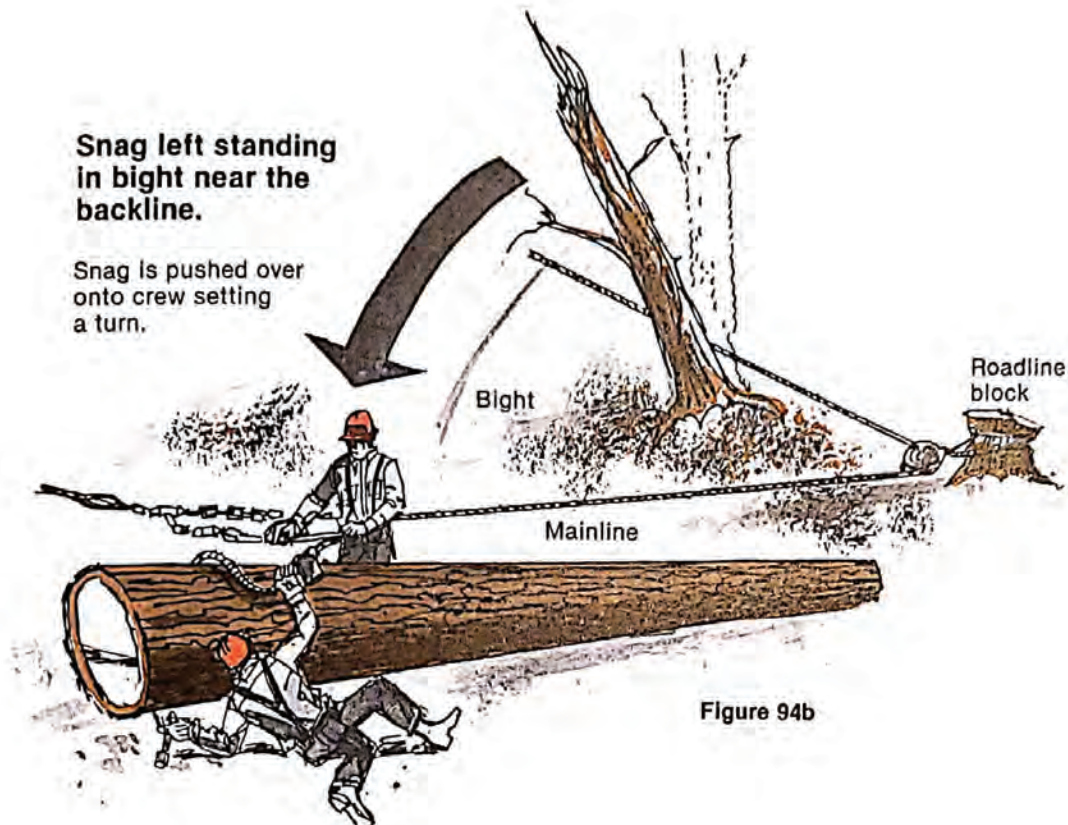


Figure 94b

22. Hazardous Snags and Loose Limbs (Widowmakers) in Trees Along the Setting Boundary

- Hazardous snags must be felled along the setting boundaries but often cannot be felled safely because they lean into the timber or are not clear of standing timber. Fallers must report these hazards and the snags shall be removed safely before the rigging crew arrives.
- There are often loose limbs in trees along the boundary face, although they can be hard to see.

Precautions:

- Be constantly on the look-out for snags along the back-end boundaries before going into the area. Hazardous snags should be reported to the hooktender who will decide on how best to remove the hazard.
- When snags and widowmakers are observed, the rigging crew must be warned to stay clear.

- Snags must not be used as anchors for tail-blocks or for tie backs.
- Always look up along the timber for loose limbs and dead tops and warn others if you see them.
- Do not hang rigging on trees with dead tops.
- Do not stand under a tree with a tail-block hanging from it or a tree used as a tieback anchor.

23. Hazard of Siwashed Lines

- If the haulback has cut into stumps, logs, saplings or other material, the rigging will not run freely when being slacked. The rigging can continue to run after the stop signal has been given. This can cause tightening-up on chokers being set or light chunks or logs already set may be pulled onto the crew.

Haulback siwashed and held tightly by line which has sawed into stump.

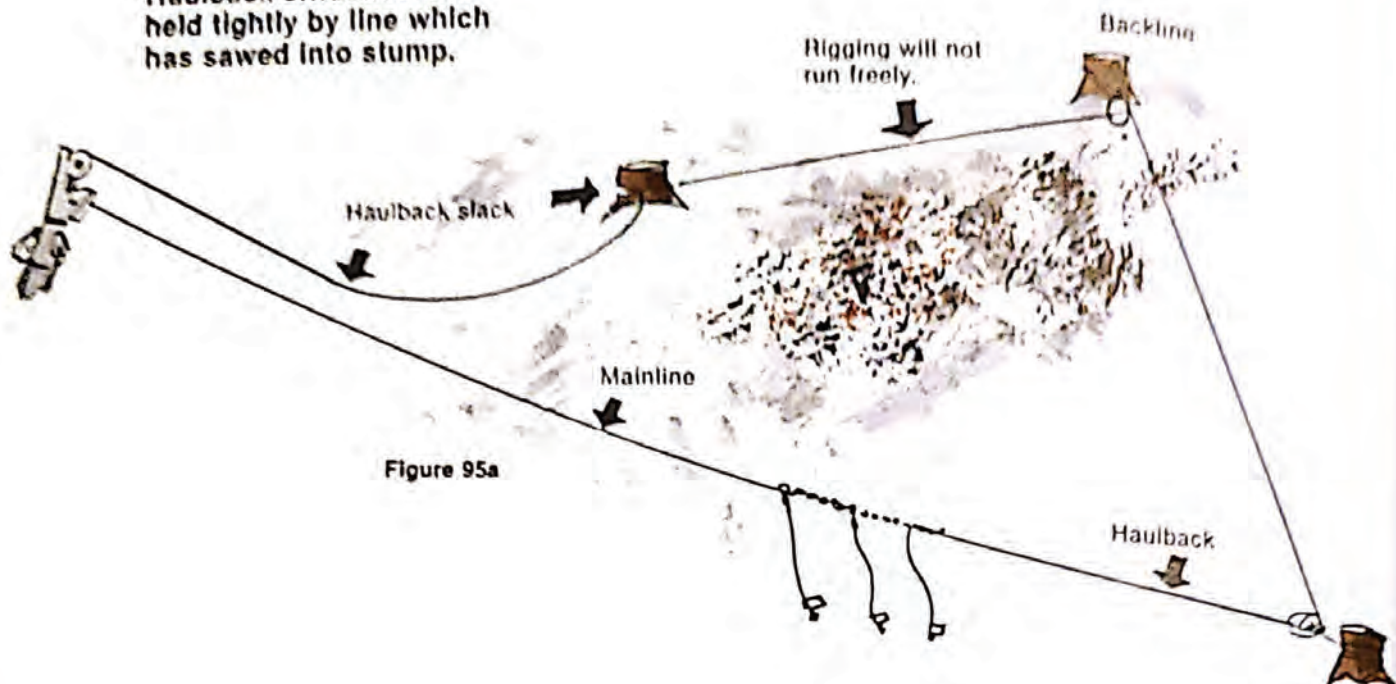


Figure 95a

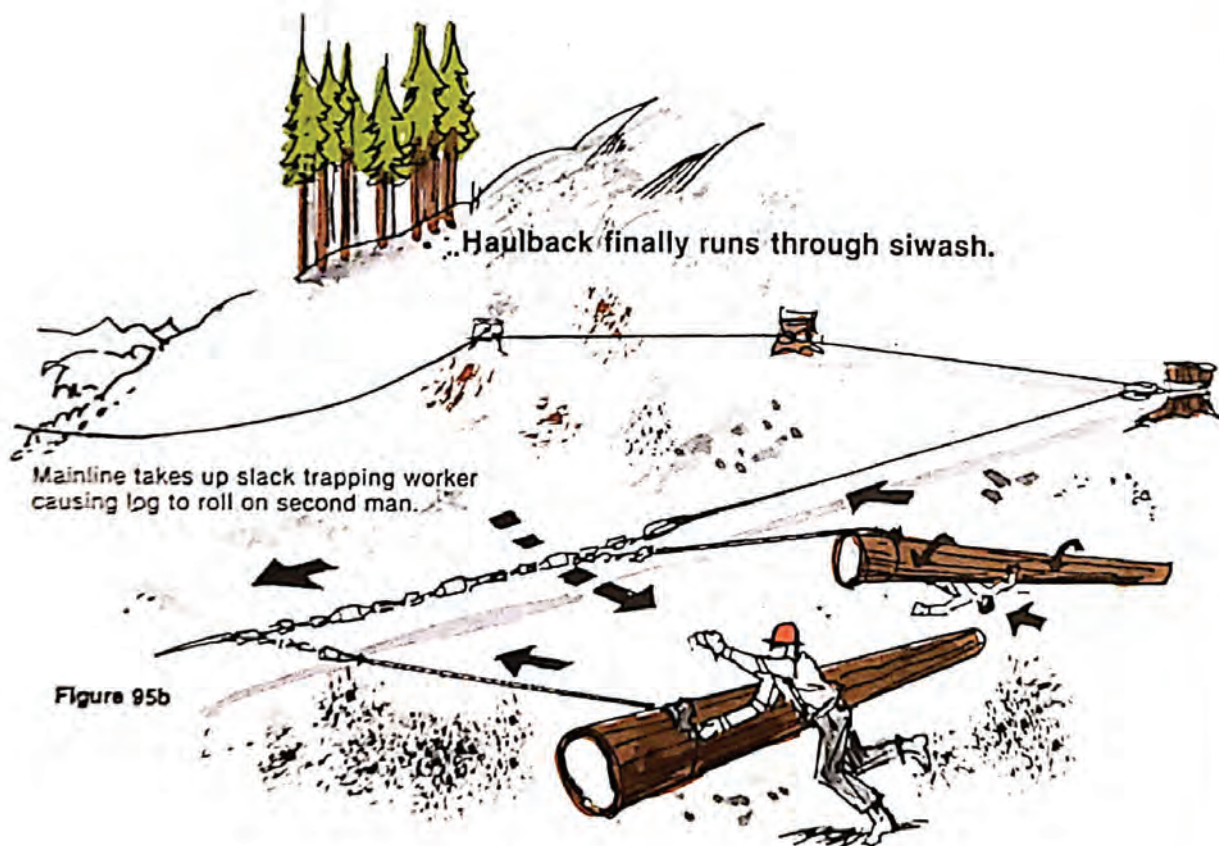
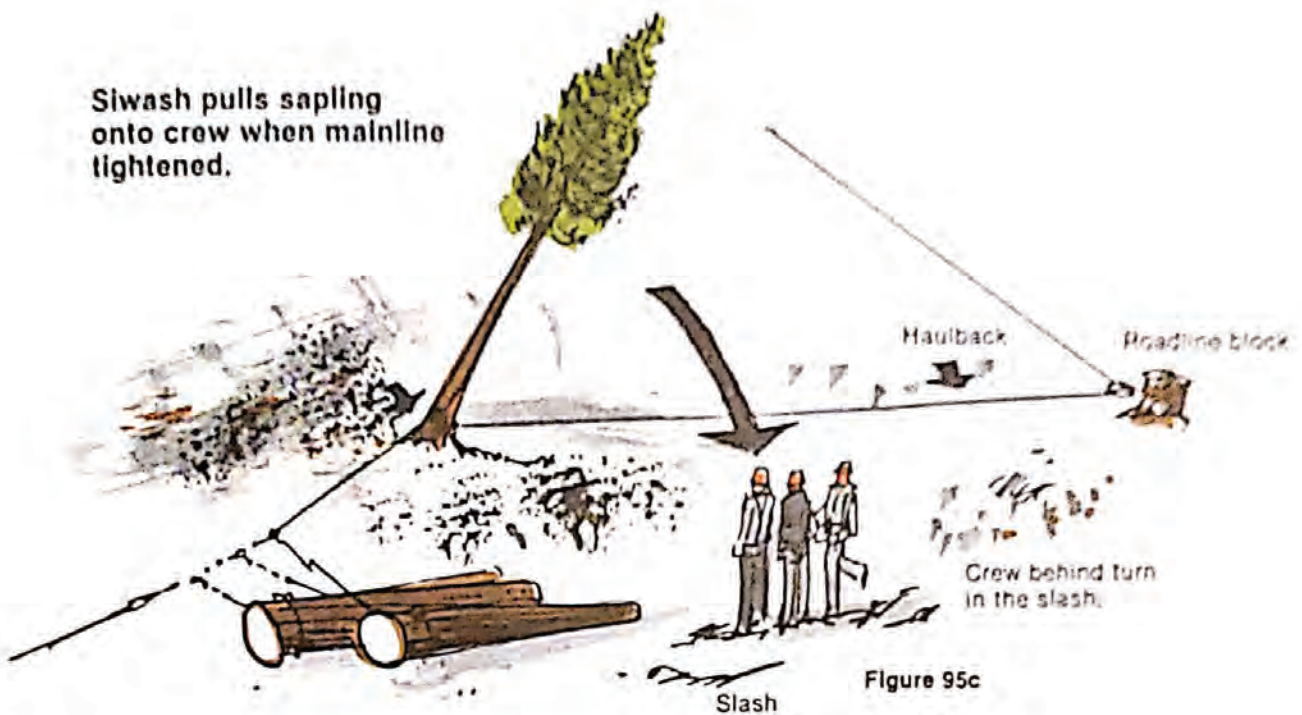


Figure 95b

b. If the haulback is siwashed on the roadline, saplings may be tightlined on-to the crew. The line or rigging may hit

the crew if the siwash frees itself or is tightlined clear, and may throw chunks or logs.

Siwash pulls sapling onto crew when mainline tightened.



Siwashed haulback frees itself and strikes worker.



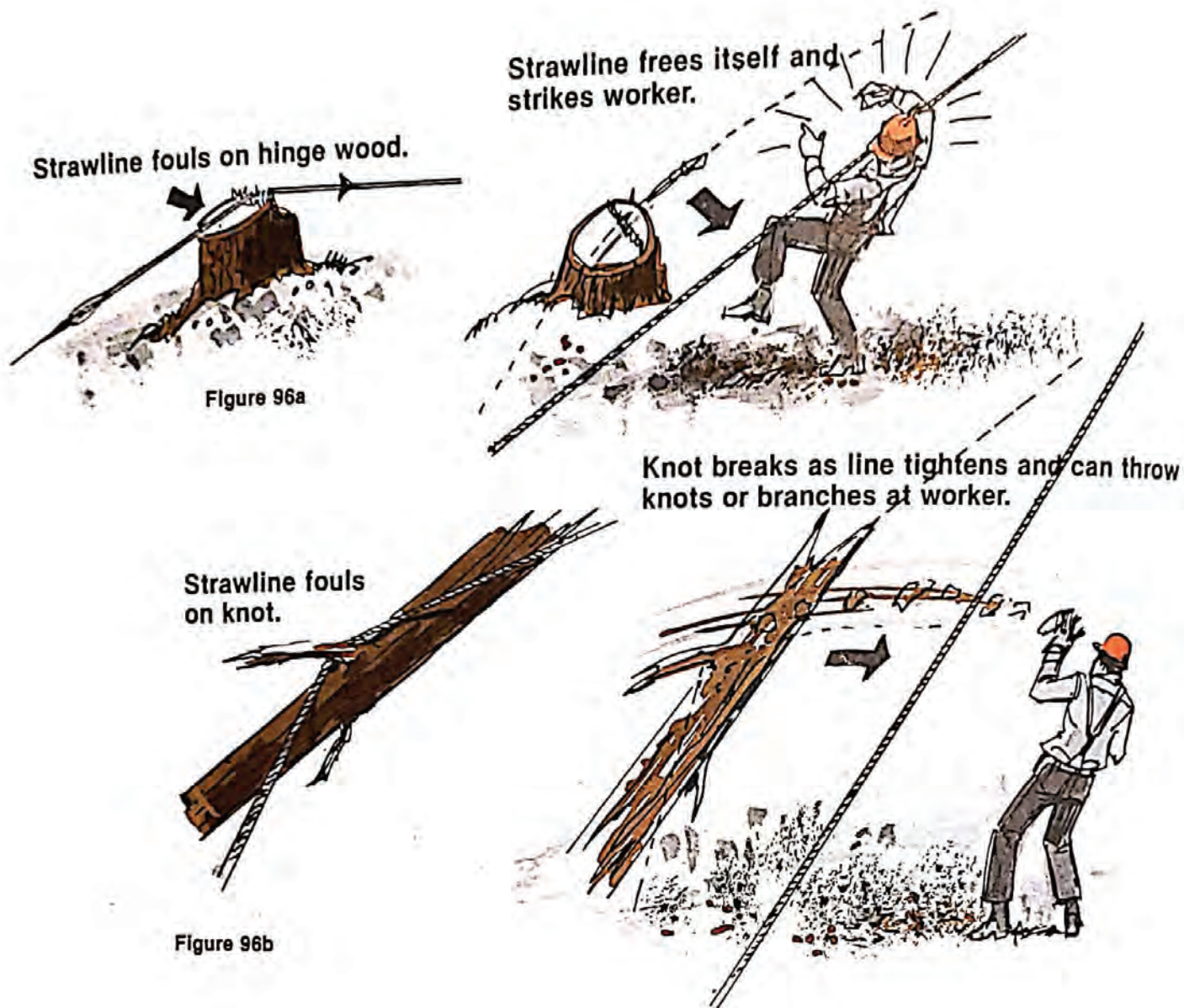
- c. Strawline siwashed — Workers often do not realize the dangers of the strawline because it is so small. Because it is small, it can catch onto knots, limbs, rocks, roots and edges of stumps more often than the larger lines. The strawline is more likely to clear itself than the larger lines because of its speed, heavy loading and twisting due to swivels or extension connections hitting the siwashes. The strawline can throw small knots and limbs as it breaks free of a siwash. Refer to Figures 96a and 96b.

Precautions:

- Keep the haulback free of siwashes.
- If the rigging does not move at once when the haulback is slacked, keep

clear and signal to pick up the slack in the haulback. Use a "go-ahead slow" signal to get the slack.

- When siwashes develop, clear them immediately.
- String lines as straight as possible.
- Be alert for siwashes and keep well out of the bight.
- Never get in the bight of a line under tension.
- Always stay clear of the strawline, whether in the woods or at the landing. Hooks and swivels often break in leads and may throw pieces. Refer to Figures 96a and 96b.



Remember:

- NEVER STEP OVER A RUNNING LINE.
- SIWASHES CREATE A FIRE HAZARD IN DRY WEATHER.
- SIWASHES DAMAGE LINES RAPIDLY.
- USE NO MORE HAULBACK IN WOODS THAN NECESSARY (MOVE RIGGING MORE OFTEN).
- USE EXTRA BLOCKS WHEN NECESSARY TO AVOID SIWASHES AND KEEP LINES OFF ROCKS.

24. Hazards from Trees or Logs Yarded out Under the Backline Between the Tall-blocks

When the log is yarded out from under the haulback, the bight can hang up on knots or limbs. This can pull saplings between corner blocks over onto the crew.

This situation puts extra strain on the roadline tall-block and anchor. It can damage the haulback or pull the anchor stump.

Precautions:

- a. Always stay in the logged-off area, out of the bight.
- b. When possible, locate the tail-blocks behind and clear of the timber to be yarded.
- c. Watch for large limbs or growths that may catch on the haulback. If the bight does hang-up, cut off the obstruction, roll the log or move the corner block.
- d. Be careful when skinning back the rigging if the bight of the haulback is pulled ahead of the block, because the log can also be yarded back by the bight of the haulback. If the haulback breaks free, chunks can fly back.

25. Hazards Caused by Slides

Precautions:

- a. Whenever working on slopes, watch for slide conditions, particularly if there are signs of slides in the area.
- b. Watch for sloping, saturated and unbroken ground with signs of stumps or trees broken loose or where there are smooth rock surfaces showing. Report these to the supervisor to investigate at once.

26. Hazards Created Due to Weather Conditions

It is most important for workers to keep warm and dry, so they stay alert and are able to move about. Workers who are wet and cold are less likely to move far enough into the clear. Appropriate clothing should be worn.

- a. Fog Conditions — If the fog is not so dense as to hide conditions or stop crews from seeing hazards in the immediate work area, work can be carried out safely, provided precautions are taken. However, when the fog is so thick on steep ground that the rigging and landing crews cannot see runaway objects, the work shall be stopped until the visibility improves.
- b. Heavy Snow Conditions
 1. High lead yarding in deep snow is not safe, practical or productive.
 2. Workers must be extremely cautious. Rigging crews cannot get into the clear as easily and cannot move away quickly enough in an emergency.

3. It is hazardous and harder to move around in brush that is snow-laden.
4. It is difficult to be sure of the length of logs hooked up in the turn.
5. Logs can slide more easily.

c. Light Snow Conditions

1. Light snow has the same hazards for the rigging crew as deep snow.
2. Logs are more likely to slide in snow.
3. Since snow sticks to leather soles of footwear, rubber-soled calk boots are best.
4. Slips and falls are more likely in snow and it takes a worker longer to get into the clear, which he should always be able to do quickly.

d. Electrical Storms

There have been injuries and damage when lightning has struck logging operations. Many trees are struck by lightning each year, so the danger is plainly there for loggers. Electrical storms near yarding operations can be very dangerous, as long lengths of cables, particularly if they are moving, may attract lightning bolts.

Precautions:

- a. Stop working.
- b. Stay away from standing timber, spars and corner blocks.
- c. Workers must remove radio whistle transmitters from their bodies.
- e. Hot Dry Conditions
 1. Be extremely careful not to start fires.
 2. Use all recognized fire prevention precautions.
 3. If a fire starts, be careful not to become trapped in the path of the flames.
 4. Follow the fire fighting procedure as instructed by the employer.
 5. Wear adequate clothing to protect you from sunburn and sun stroke.
 6. Do not drink a great deal of water.
 7. Use salt tablets as necessary.
 8. If you feel heat stress, stop working and find some shade. If the heat stress continues, get first-aid treatment immediately.

Tree bucked but
still hanging.

Figure 97a



27. Hazards of Walking in Felled and Bucked Timber

- a. Unstable logs or unbucked trees which are not secure.
- b. Loosened rocks.
- c. Limbs broken with sharp ends.
- d. Sniped off saplings.
- e. Loose bark.
- f. Broken hinge wood on stumps.
- g. Bucked windfall roots.
- h. Bypassed or cut-up snags.

- i. Widowmakers, leaning trees and snags along the face of the timber.
- j. Sinkholes.

Precautions:

- a. Be on the lookout for unstable logs or other unexpected hazards and take action to eliminate the hazard.
- b. It is not always possible to avoid the hazards in felled and bucked quarters, but workers must warn their fellow workers so that they can take extra precautions.

Loose bark can
cause serious falls.

Figure 97b



Sniped off saplings —
poor falling practice.

Windfall roots can
"sit back" crushing
worker.

Figure 97c



28. Hazard of Injury when Stringing Lines and Carrying Blocks

Many injuries are caused by workers using the wrong method of pulling strawline and carrying blocks through felled and bucked timber.

Precautions:

- a. Pull the strawline by using your arms and legs, not by bending the back.
- b. Watch for unstable logs and rocks.
- c. Be aware of windfall roots and stay away from the rear and low side.

Remember, LOGGERS HAVE BEEN BURIED BY WINDFALL ROOTS.

- d. Use your body properly when lifting blocks or other heavy objects.
- e. Carry the block on your shoulder where possible and walk on the ground or on stable logs.
- f. Try to throw the block clear as you go down if you trip or fall.

Incorrect lifting and carrying procedures.



Worker lifting with his back.



Blocks should be carried on shoulder.



Has no free hand — harder to throw the block clear.

Correct Procedures



Use proper lifting procedure when lifting heavy objects.

Figure 98

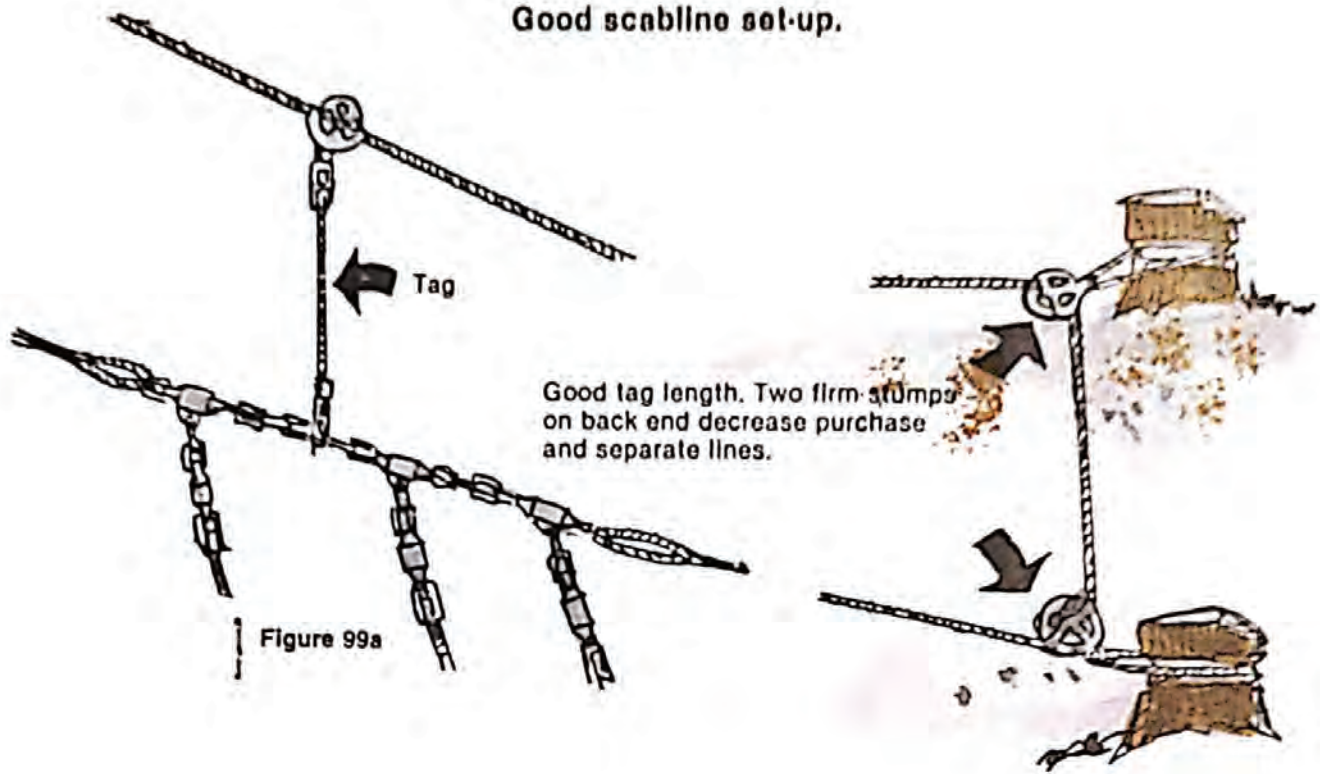


Carry the block on one shoulder and walk on the ground or stable logs.

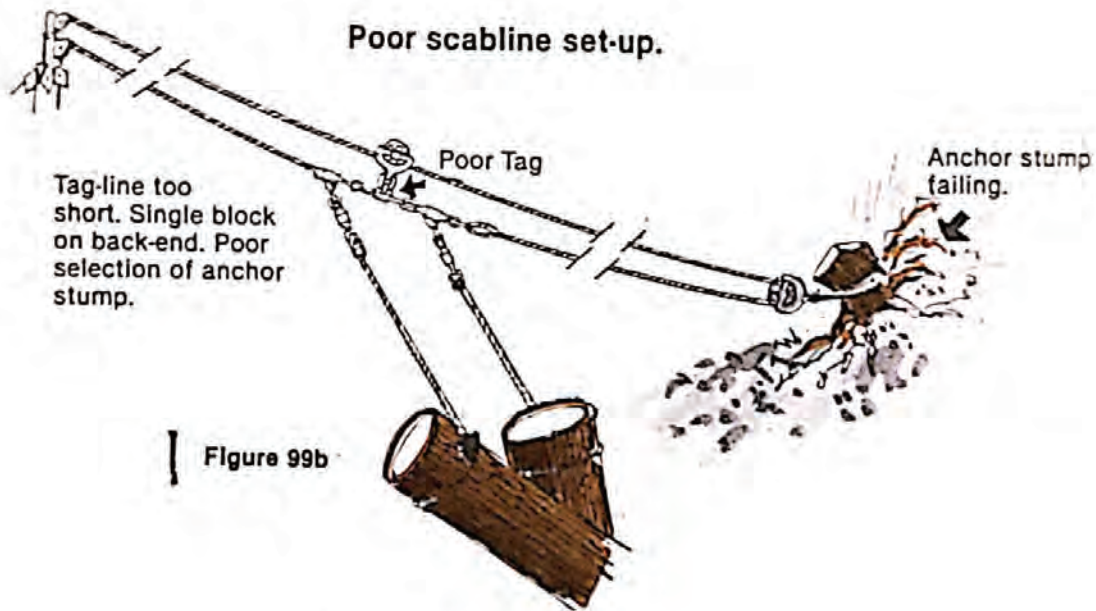


If worker falls, he should throw the block clear.

Good scabline set-up.



Poor scabline set-up.



29. Hazards when Using the Scab-line System

A scabline system provides more lift and control when the turn is being yarded.

Ground conditions must be suitable for this system, otherwise a back spar must be used to give the necessary deflection.

Hazards Created:

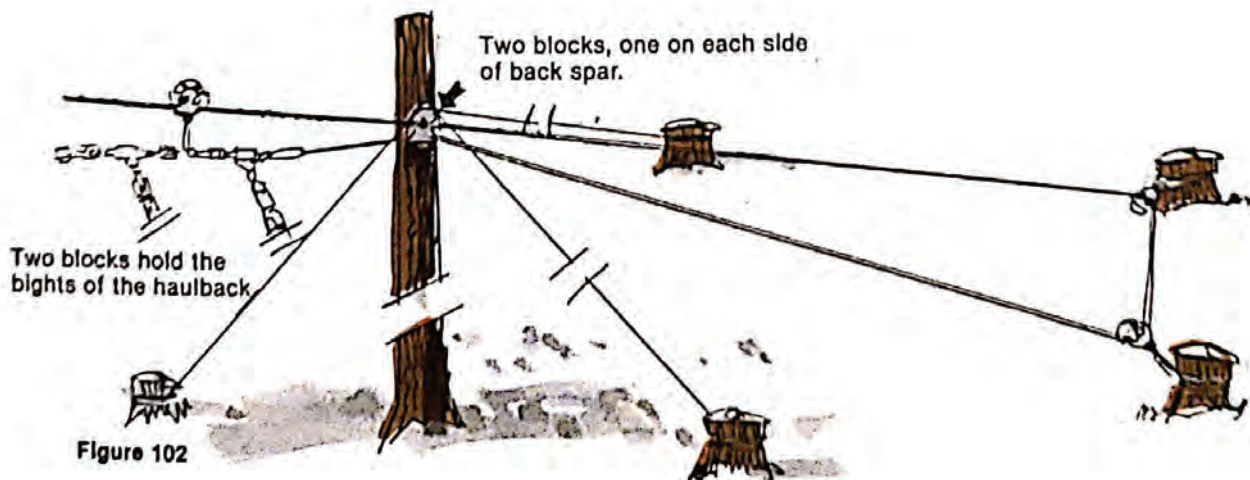
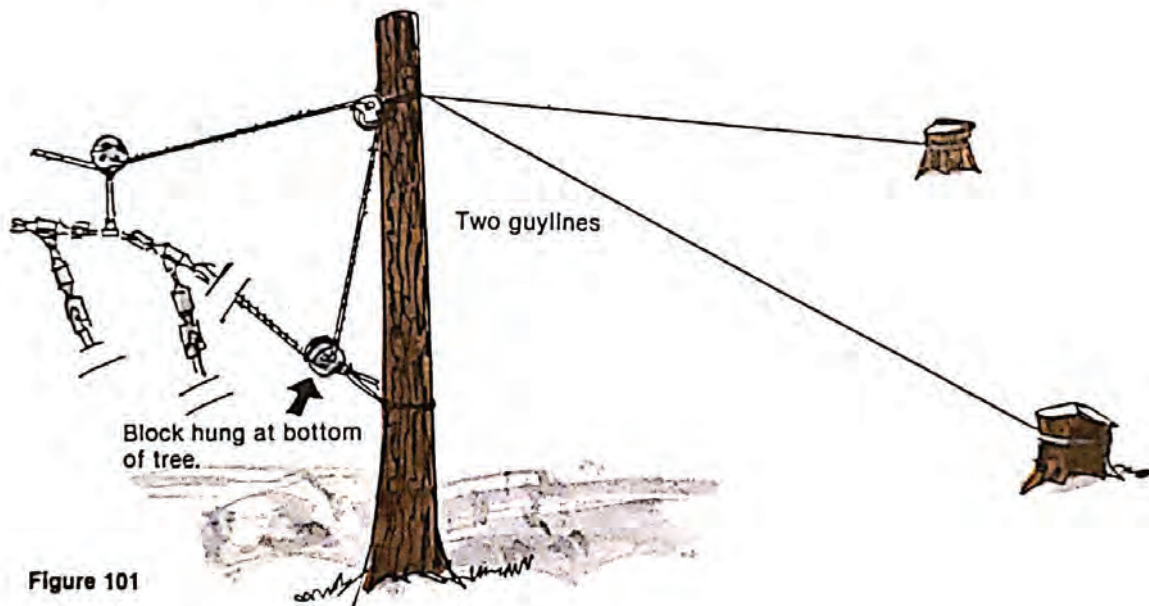
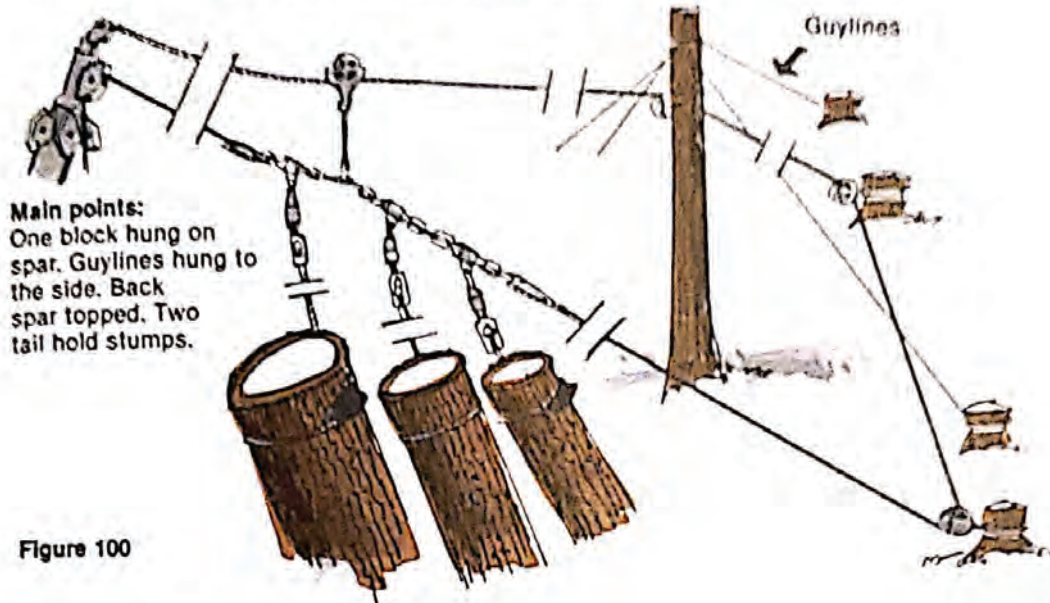
- The lines can wrap together when skinning back or yarding in the turn, burning and damaging the lines.

- As the lines are close together, there is a tendency to use only one corner block. This brings greater stresses and possible failure of the block, strap or anchor stump.

- When a back spar is used, there is a danger to workers that it may be pulled over or the top may break off during yarding.

- There is a danger that the back spar will be pulled over when attempting to slide block too far.

Scab systems with back spar.



- e. There is a danger that the rigging crew may be hit by the buttrigging when slack is given, because of the increased travel of the buttrigging with this system.
- f. If the scab block does not right itself after the line has been slacked, the haulback may be cut off or damaged.
- g. The rigging may run back when additional slack is needed to unhook the turn, endangering the chaser.

Precautions:

- a. A sufficient length of tag must be used between the scab block and the rigging.
- b. When conventional yarders are used, two corner blocks with sufficient spread must be used. This is done to prevent the lines from wrapping and burning and to avoid the additional line wear which results from the use of only one block. It will also distribute the stress over two block anchors.
- c. When the lines wrap up, the rigging shall be stopped until the lines are free.
- d. If a back spar is used, it shall be topped and rigged with sufficient guylines or used as considered safe by the supervisor, provided that workers stay out of the danger area.
- e. Side blocking shall be limited, unless the back spar is rigged with sufficient guylines to prevent the back spar from being pulled over.
- f. If it is found necessary to side block near the back end for a turn or two, and there is concern about the back spar stability, the haulback must be kept slack until the turn is yarded ahead.
- g. The rigging crew must be aware of the possible dangers from rigging movement when lines are slacked and they must stay in the clear.
- h. The scab block must be fitted with a proper line guard.
- i. A large shackle hung from the block gooseneck helps to keep the block upright.
- j. The chaser shall be aware of the possibility that the rigging may run back when the lines are slacked. He must stay in the clear.

There are a number of skyline logging systems used throughout the industry which are not mentioned in this edition.

These systems have hazards generally similar to the ones in this book, and workers should follow the safety procedures given here.

ITEMS OF SPECIAL CONCERN FOR THE HOOKTENDER TO CONTROL HAZARDS

1. Snags Left Standing in the Quarters

The hooktender must be aware of any hazardous snags throughout the work areas. He must follow up to make sure that they have been safely removed before the rigging crews arrive in the area.

2. Yarding Upper Side Above Landing

Yarding is not allowed where it may cause timber and other objects to run and endanger landing workers. However, when the spar operator is not in danger, yarding may be allowed if the other landing workers who are exposed to these hazards are moved out of the area.

3. Hazardous Terrain or Conditions

The hooktender must, whenever possible, stay with the rigging crew to identify and lessen the hazards and to make sure that the necessary precautions are taken.

4. Communication with the Crew

It is important that the hooktender discuss and involve the crew in planning and setting up safe work procedures, so that they can work more efficiently and safely.

5. Loading Trucks Alongside the Spar

Any time there is a possibility that a log or grapple can be swung into the yarder engineer's cab, loading shall be stopped and the loader shall be relocated. The hooktender will impress upon the landing crew to always tell the loader operator when the minimum two feet (61 cm) clearance between the loader and other objects is not maintained.

6. Saplings Within Reach of Landings

The hooktender must ensure that any saplings within reach of the landing are felled if they endanger landing crews.

7. Additional Considerations

- a. The hooktender must know the capability of workers under his direction and control.
- b. He must not give a worker a task if he does not think the worker can do it safely.
- c. The hooktender must know his own limitations and not try to do any duty that is beyond his capability or experience.
- d. When instructions are given, the person giving those instructions must be satisfied that the worker fully understands them and can carry out the duties safely.
- e. Work well done by the crew members should be praised. It is important that the workers know when they have done well.
- f. The rigging crew should be continually reminded to stay alert and keep their minds on the job.
- g. Safety inspections must be carried out on all equipment and rigging under the hooktender's control. He must be sure that these checks are done properly.

HAZARDS OF THE JOB AND PRECAUTIONS TO TAKE — CHASER AND OTHER LANDING WORKERS, INCLUDING TRUCK DRIVERS

1. Common Hazardous Locations in the Landing
 - a. Underneath or close by the mainline during yarding.
 - the mainline and haulback could break and drop.
 - the mainline could be slacked accidentally.
 - b. The area within reach of the turn being landed.
 - logs entering the landing can jill poke and upend or swing or can drive logs already in the landing ahead to the spar base. This is particularly likely when the logs are choked with a long end.
 - c. The area within the swing of the loader counterweight.
 - d. The area within the swing of the logs handled by the loader as logs are being loaded onto the truck or stacked.

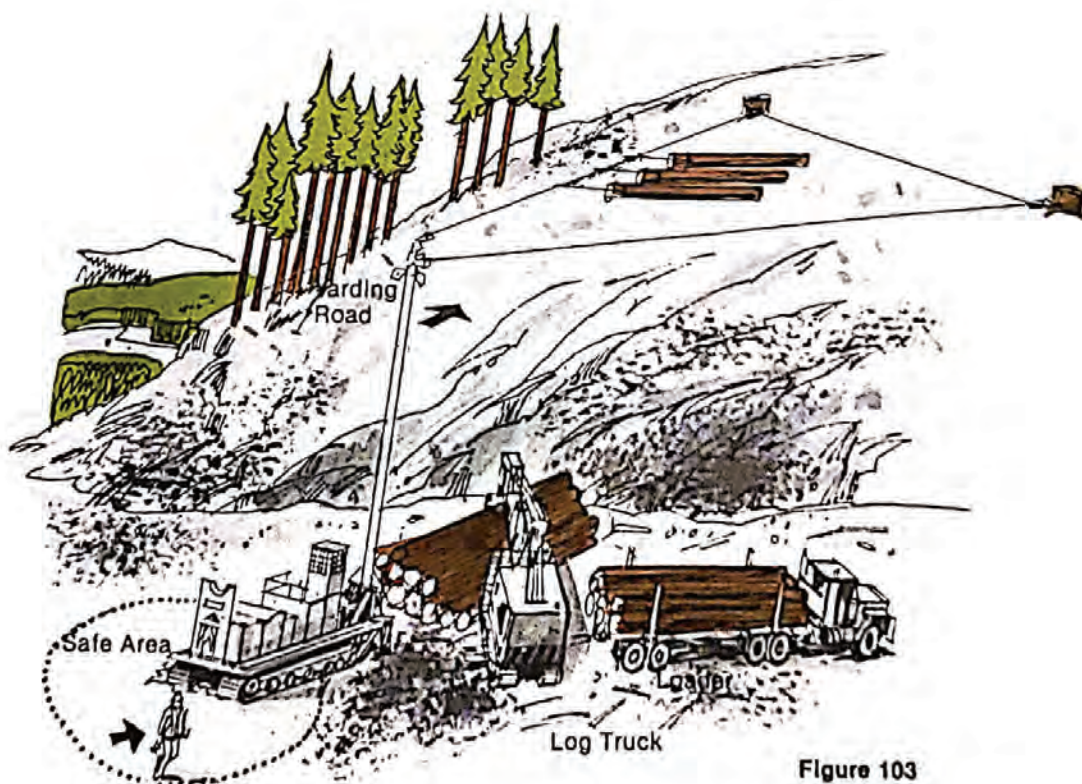


Figure 103

- e. The areas beneath the guylines opposing the pull of the turn.
- the guylines could break.
- the guylines may snap and the guylines may spring into the landing.

Precautions:

- a. Never stand between the base of the spar and the yarding direction when yarding or landing the turn.
- b. The chaser shall remain alongside or to the back of the spar whenever the yarder or loader are operating.

2. The Hazard of Working Around Moving Equipment and Logs

Chasers, landingmen, second loaders and landing buckers are in danger from moving equipment and logs because it is not easy for equipment operators to see them.

Precautions:

- a. Chasers must be easy to see.
High visibility vest or other equally effective distinguishable clothing shall be worn by all landing workers other than operators.
- b. Chasers must remain in view of the operators whenever possible.
- c. When the chaser leaves the landing for any reason, the operators must be told when he is going and when he has come back.
- d. The operators are not to handle logs in the landings unless they can see the chasers or they know that they are safe.
- e. A thorough understanding of safe landing procedures must be established with the operators, chasers and other workers who may enter the landing, including the truck driver.



Figure 104a

Correct

Chaser wears high visibility coloured vest.

Incorrect

Chaser out of view of operator, no coloured vest.

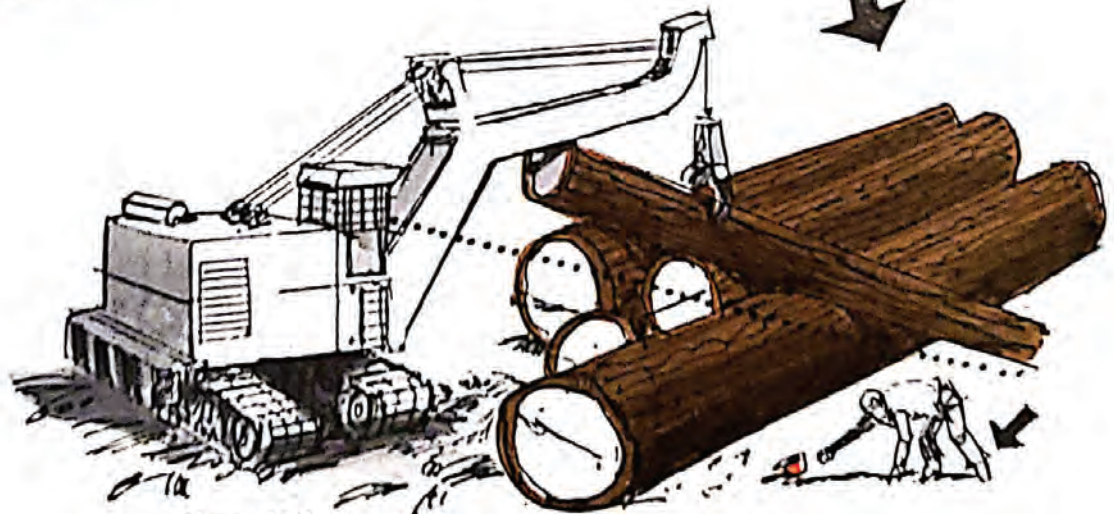


Figure 104b

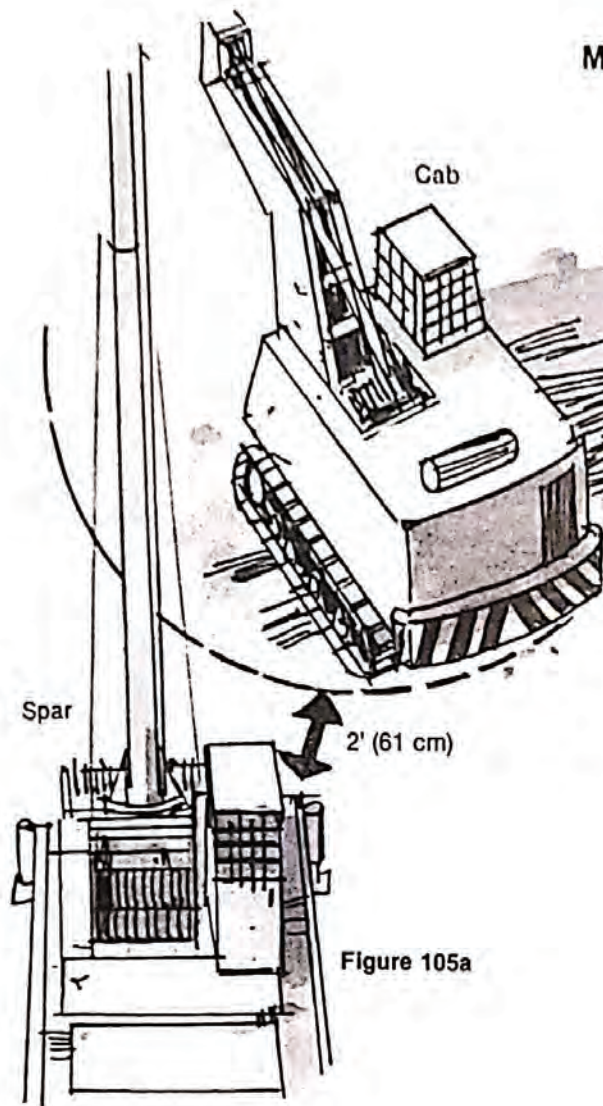


Figure 105a

Minimum clearance.

2' (61 cm)

A minimum clearance of 2' (61 cm) MUST be maintained between the counterweight of the loader and the log pile, spar, bank or any obstruction.

3. The Hazard of Being Crushed Between the Counterweight of the Loader and an Obstruction

The required minimum clearance between the counterweight of the loader and the spar, log piles or other obstructions is not always kept. The two foot (61 cm) clearance may be lost without the operator noticing as logs are kicked in or stacked up too close to the loader.

Precaution:

The minimum clearance of two feet (61 cm) must be kept at all times. When there is less than two feet of clearance tell the operator so he can move the machine or logs and keep the safe clearance.

WORKERS HAVE BEEN KILLED BY FAILURE TO KEEP ADEQUATE CLEARANCE.

Insufficient clearance between counterweight of loader and log pile, worker is crushed.

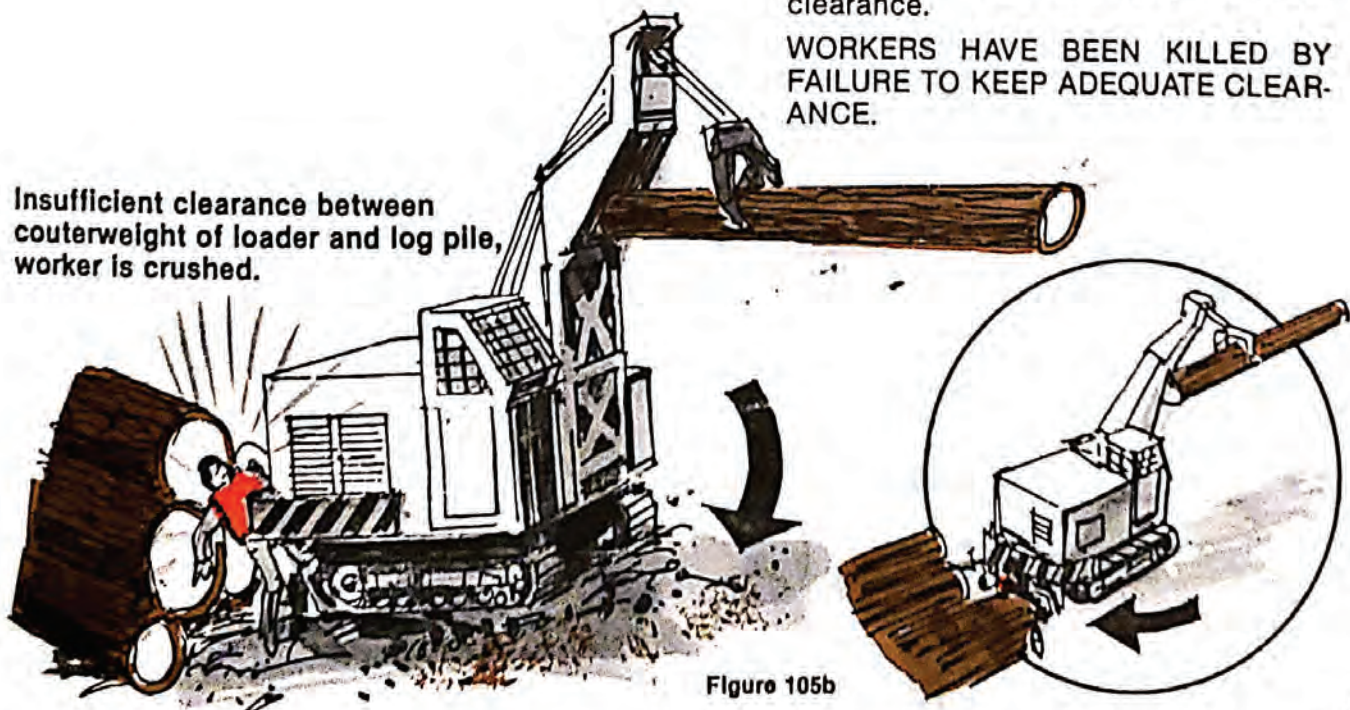


Figure 105b

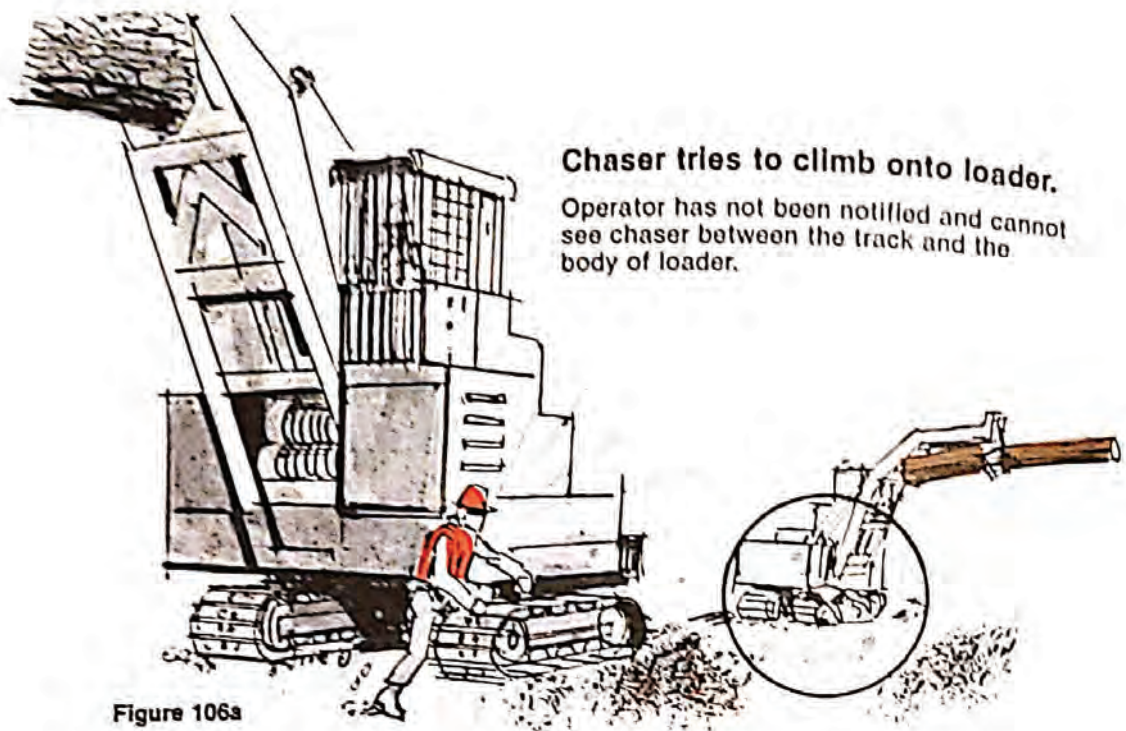


Figure 106a

4. The Hazard of Boarding the Log Loader

- Getting on the log loader without telling the operator.
- Calk-boots slipping on tracks or metal surfaces.

Precaution:

- Always notify the operator before going into his work area.
- Make sure the machine is stopped before getting on and be careful of slipping with calked boots on the steel tracks.
- The access route to the operator's cab should have a nonslip surface.

5. The Hazards of Passing Through the Loading Area

- Being struck by a log thrown over by the loader.
- A log or chunk falling off the load, onto a worker.
- Tripping and falling and not being noticed by the operator.
- Logs rolling off the pile onto workers.



Figure 106b

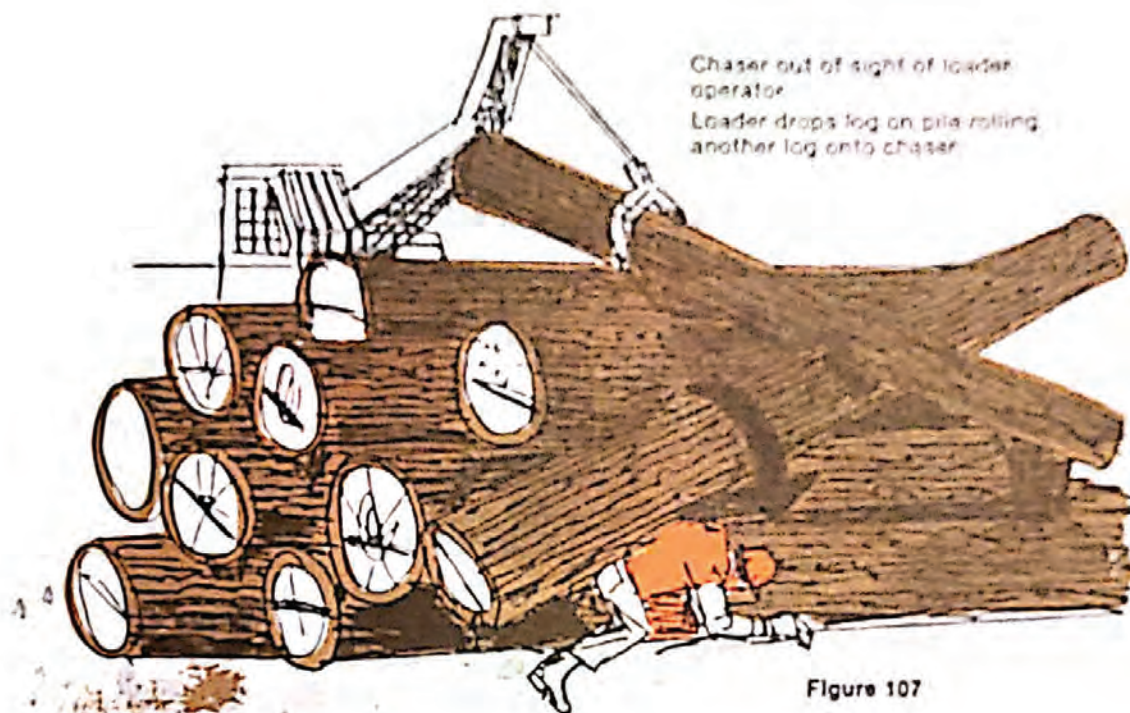


Figure 107

Precautions:

- Never pass alongside a truck being loaded without permission of the loader operator, even when the loader is swung clear. Check the load carefully for unstable logs or chunks before going ahead.
- Let the operator know when you are clear of his working area, whether you are coming or going.
- Never try to run through the loading area when the loader is turned the other way. Always tell the operator and get his clearance before going ahead.
- Be careful of logs stacked by the loader. There is little chance to get clear if they roll when you are passing through.
- Never pass alongside the truck if there is another practical route.

Always notify the operator before entering work area.

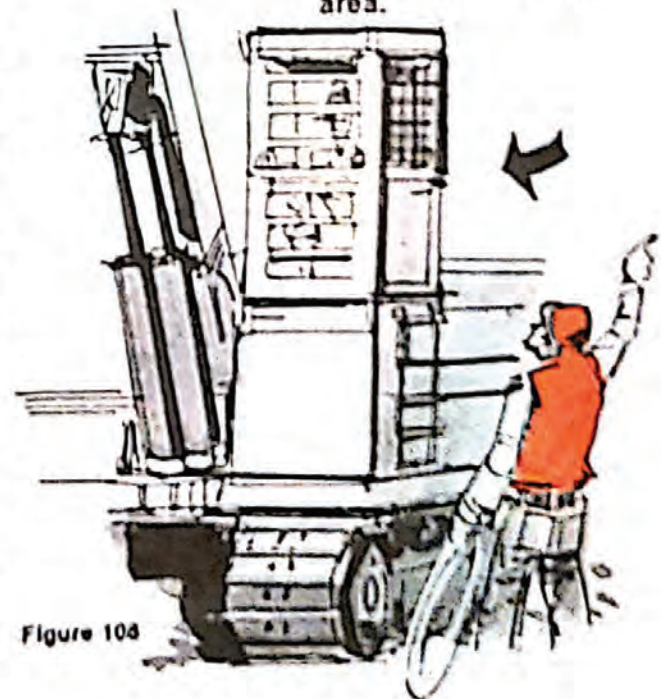


Figure 108

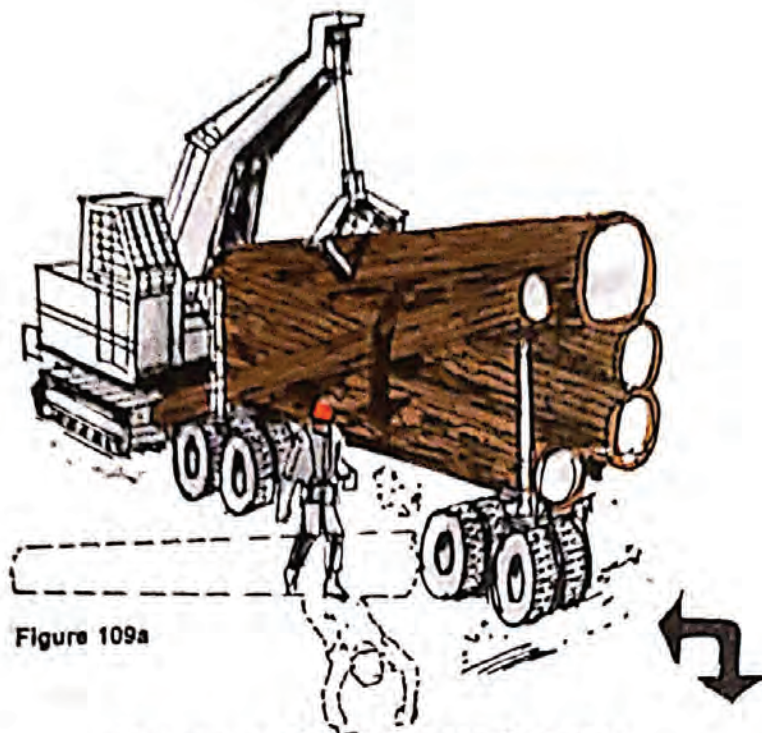


Figure 109a

Never pass through a loading area until clearance has been obtained from loader operator and loading activity has stopped. Always check load for unstable logs.



Figure 109b



Logs must be limbed or bucked in a safe area. Truck driver must signal before backing into loading area and receive reply signal from loader operator or landing man before backing up.

Figure 110

6. The Hazards Associated with Trucks Backing onto the Landing to be Loaded

Precautions:

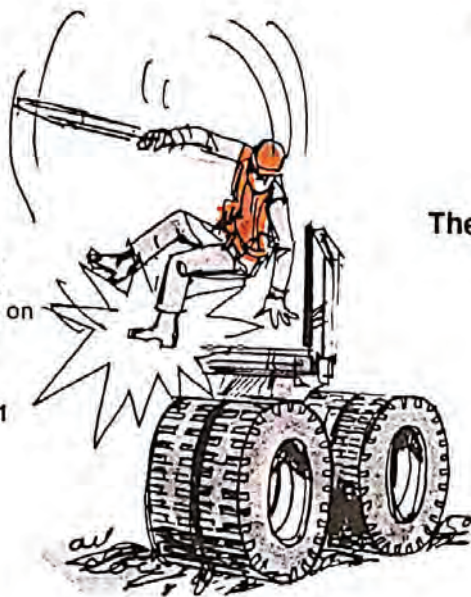
- a. Normally, the chaser is well clear of trucks backing into the landing unless this worker is waiting to help hook up the trailer or attaching the trailer lifting hook onto the grapple.
- b. If the chaser is in the loading area, he must be aware of any trucks backing into the landing.
- c. Log truck drivers are required to signal with their whistles before backing up into landing.
- d. Log trucks must stop at the approach to the landing and wait for a signal from the loader operator before backing in to have the trailer unloaded.

7. The Hazard of Hooking up the Trailer
Precautions:

- a. If a trailer lifting hook is used, the chaser shall hook this to the grapple before the truck is signalled into the loading area.
- b. The chaser will stand well in the clear until the trailer has been unloaded and set onto the grade.
- c. The truck driver will generally have the compensating hitch prepared before backing onto the reach.
- d. Provided the loader can easily handle the trailer, the lifting strap should be properly positioned on the trailer. This will make it convenient for the chaser to guide the reach end by the proper handhold, which should be provided on the reach.
- e. If the chaser is helping the driver to set up stake extensions, he must be careful not to slip on the metal surface of the log transporter.

Be careful of metal surfaces when setting up stake extension. Caulk boots slip on hard surfaces.

Figure 111



The hazard of hooking up the trailer.

Stand on left side of the reach. Keep hands away from the end of the reach. Keep feet away from under the reach.

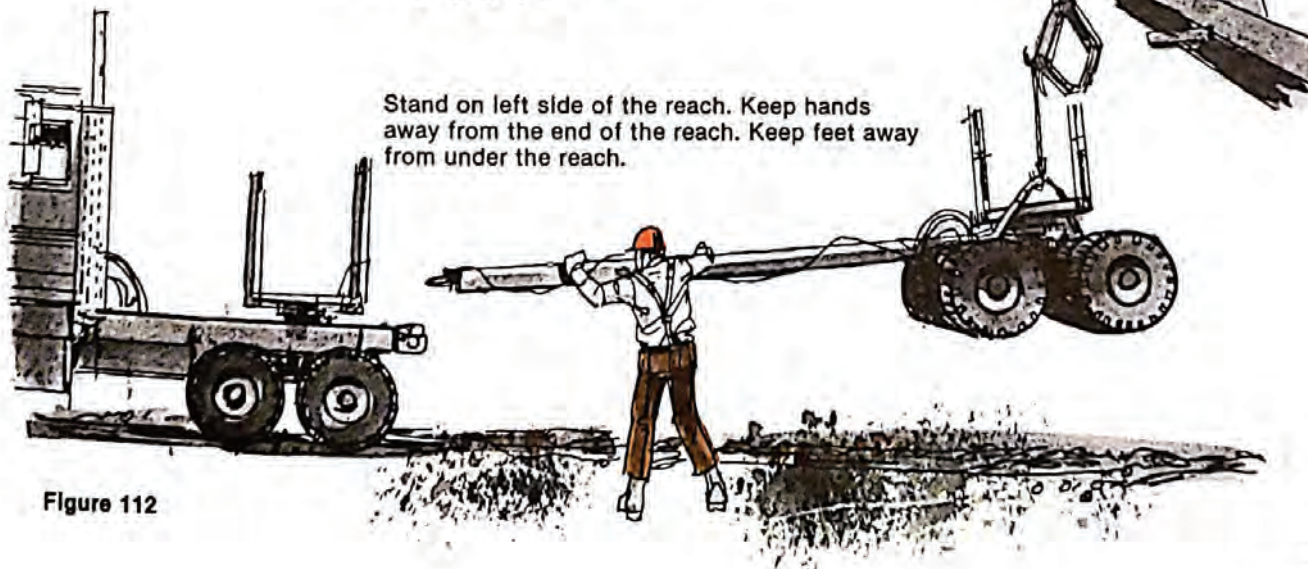


Figure 112

8. The Hazard of Stamping, Limbing and Bucking the Logs on the Load

- a. Whenever possible, logs should be stamped and painted if necessary, before they are loaded. If both ends of the logs have to be stamped or painted, it is better to do this after the load binders have been attached and the truck moved ahead out of any hazardous area.
- b. If the chaser must walk along the load, he must be alert for loose bark, knots, ice or snow and logs or chunks that may roll.

- c. Bucking and limbing should be done before the logs are loaded. The loader operator will position logs that need bucking or limbing in a safe, convenient location for the chaser.

IN ICE AND SNOW, ALL WORK SUCH AS LIMBING, TRIMMING AND STAMPING SHOULD BE DONE ON THE GROUND BEFORE LOGS ARE LOADED. HOWEVER, IF WORKERS MUST CLIMB UP ON THE LOAD, THEY SHOULD TAKE ALL SAFETY PRECAUTIONS.

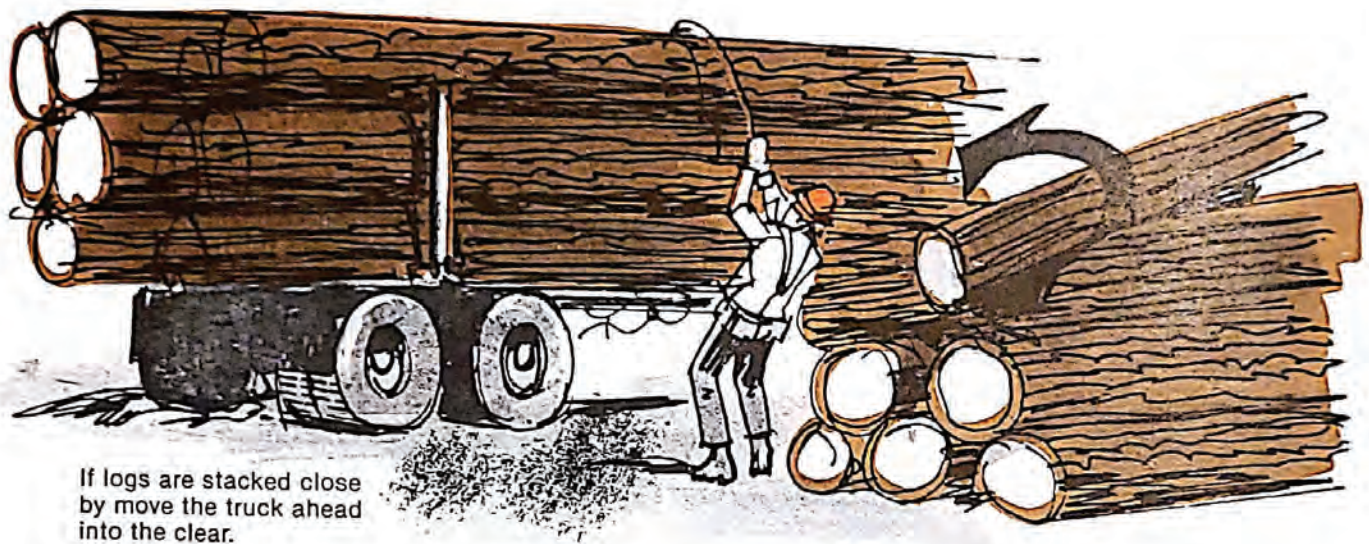


Figure 113

9. The Hazards of Installing the Load Binders and Pulling the Compensating Pin, when Done by a Landing Worker

- a. An insecure chunk or log may unexpectedly fall while binders are being installed or when the truck is moved ahead without binders.
- b. A worker may pull a log or chunk off the load while pulling on a binder which fouls while being installed.
- c. Workers may be struck by the grapple by failing to remain in the clear if binders are being lifted over the load.
- d. In wet weather, cinches may slip out of a worker's hand and quickly release, striking the worker.
- e. Logs may roll off a pile onto a worker.
- f. A worker may be run over or struck by a log if he fails to notify the truck driver when going in to pull the compensating pin.

Precautions:

- a. Workers must make sure the load is stable before binders are installed.
- b. If a binder fouls on top of the load, extreme caution must be used when jerking it free.
- c. A safe work procedure must be established and thoroughly understood by all workers involved.
- d. Workers must notify the loader and truck operators before going in to pull the compensating pin or install binders. They must remain in the clear until the grapple is swung clear or rested on the ground.
- e. I.H. & S. Regulation 60.216 states that if load binders are required, they must be installed before the truck is moved.

However, it is permissible to move the truck within the loading area without binders, providing that landing workers

are not in danger from falling logs. Moving the truck in the loading area may be necessary to avoid the hazard of stacked logs, turns being landed and other such hazards.

DO NOT ATTEMPT TO ASSIST WITH INSTALLING LOAD BINDERS OR REMOVING THE COMPENSATING PIN IF THE TRUCK IS STILL IN THE LOADING AREA AND LOGS HAVE BEEN STACKED CLOSE BY.

- f. The compensating pin or latch should be pulled before the load is completed. This is best done when the load is about halfway up the stakes. It ensures that there is adequate weight to stop the logs from sliding on the bunks if the

vehicle has to be moved during loading. The compensating pin or latch can be removed before loading starts if the truck does not have to be moved.

The chaser must be informed before loading starts if the pin is to be left in place.

10. Hazards of Unhooking the Turn

Precautions:

- a. Always stand in the clear, out of the danger zone and in view of the operator when the turn is being landed.
- b. If giving hand signals to land the turn, ensure they are clear.
- c. Be alert for small chunks which can be thrown when the turn is dropped.

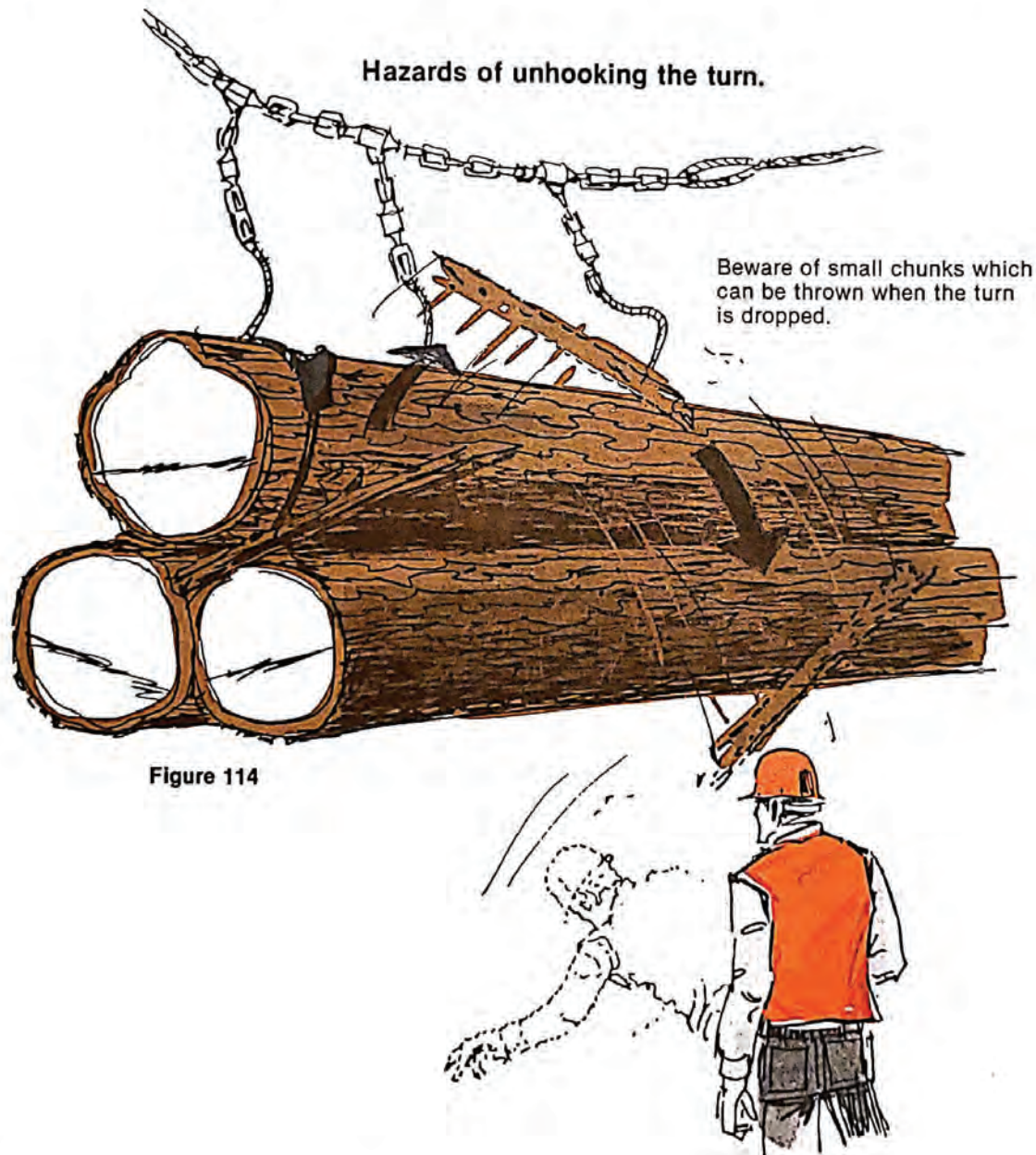
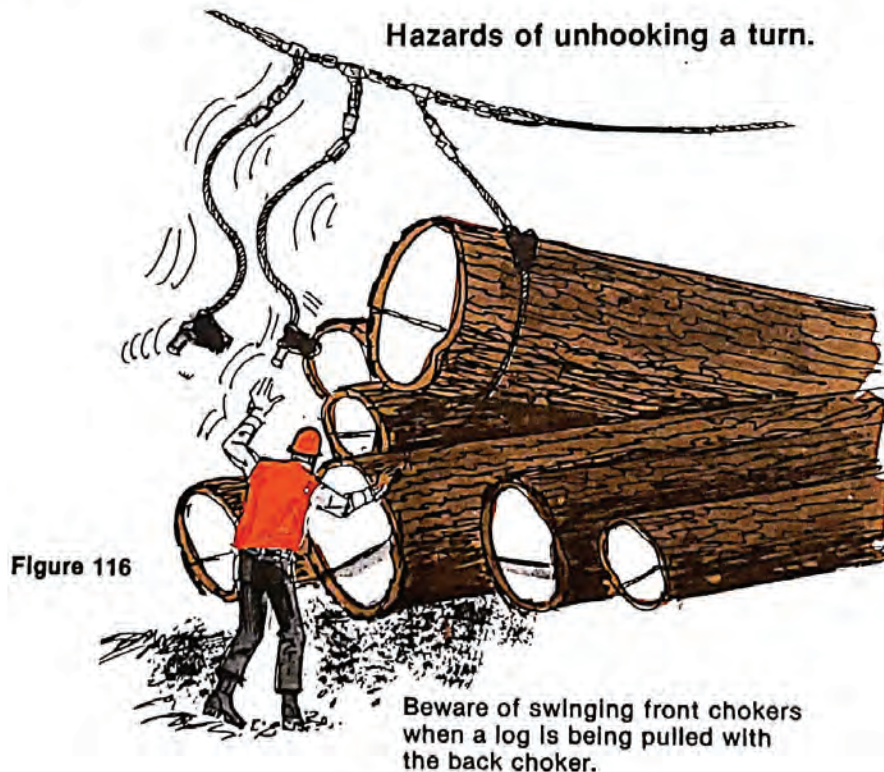
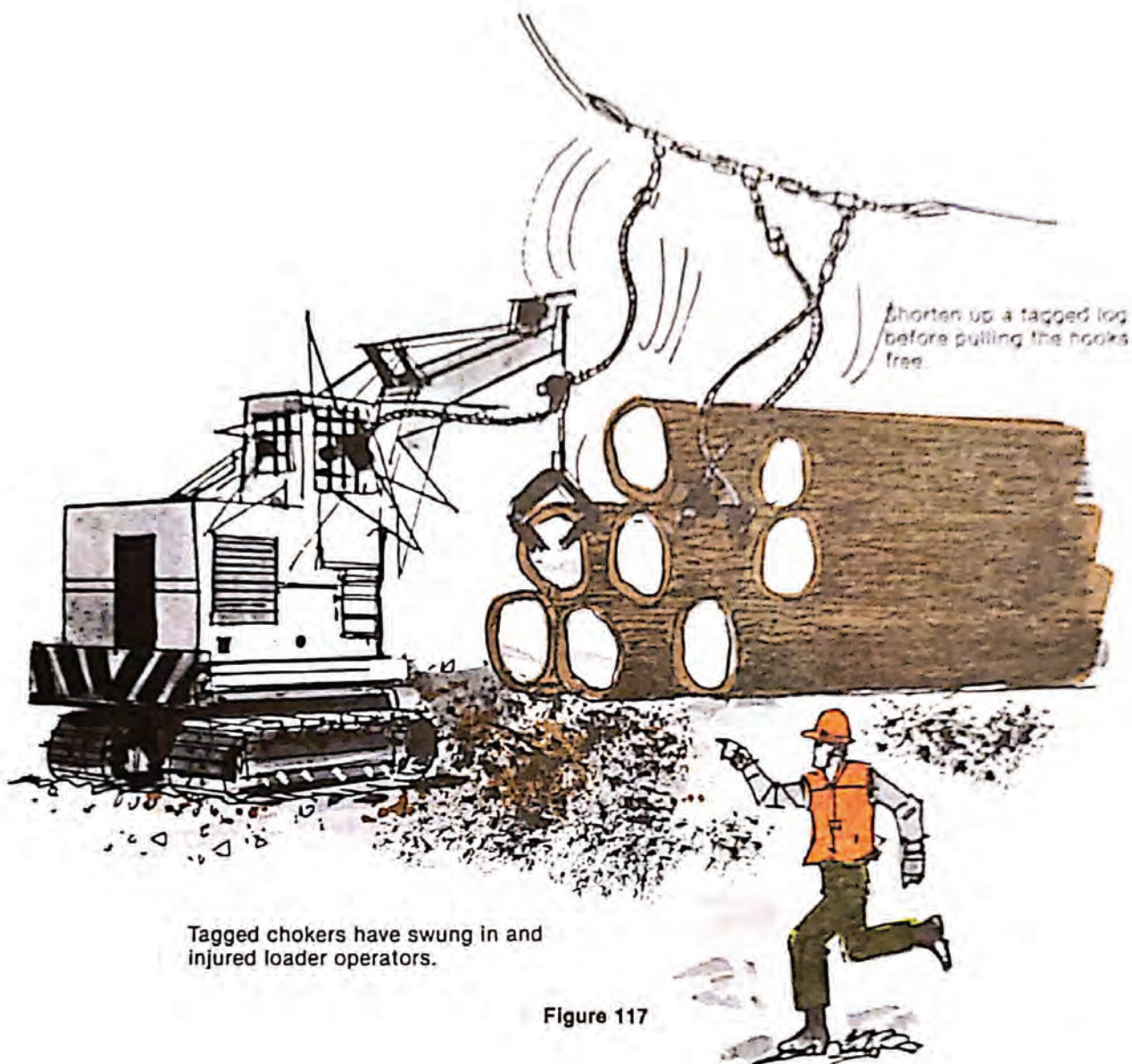




Figure 115

- d. If the logs in the turn or pile do not seem stable, signal the yarding operator to pick them up and reposition them until they are safe to unhook.
- e. Slack the rigging down before approaching the turn. Use only sufficient slack to unhook the chokers and be cautious of springing choker knobs.
- f. Be careful of rolling logs when unhooking the turn.
- g. Always unhook the bottom log first.
- h. Never reach down between unstable logs.
- i. If a log is hazardous to unhook, signal the loader or spar operator to rearrange it safely.
- j. When pulling up a log hooked in the back choker, be aware of the swinging front chokers.





k. If you must land logs close to the spar and a tagged log comes in, shorten up before landing the log.

l. If the log has to be landed tagged, shorten up before pulling the hooks free.

TAGGED CHOKERS HAVE SWUNG IN WHEN PULLED FREE AND INJURED LOADER OPERATORS.

m. Always unhook the turn from the upper side to avoid logs that may roll.

11. Tripping and Falling Hazards

a. Chunks, bucked ends, limbs, rocks, rigging and tools left in the access or work areas are all tripping hazards.

b. A chaser's work may require him to jump off logs and move swiftly while carrying a power saw. At the same time he must stay alert for moving equipment and objects and for tripping hazards.

Precautions:

- a. Communicate with the loader operator to help him keep all debris and waste materials clear of the work area.
- b. Remove small chunks, trimmed log ends and rocks from the work area before they accumulate and become a tripping hazard.
- c. All equipment, rigging and tools that are not in use should be stored out of the way.
- d. Power saws and other equipment which is used daily should be kept in a specific place, clear of access routes.
- e. Always keep the end of the strawline secured to the base of the spar and pulled up tight when not in use.

Tripping and falling hazards.



Figure 118

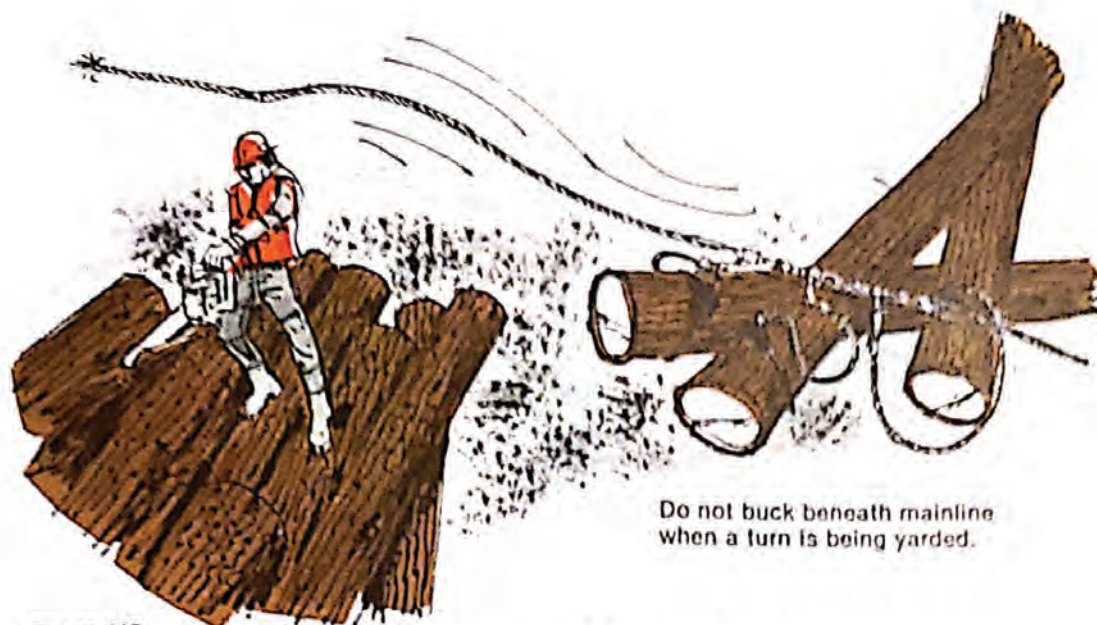


Figure 119



Figure 120

12. Hazards Involved when Bucking in Piles

- Bucking in log piles is not allowed unless the pile is spread out and all logs are stable.

DO NOT BUCK BENEATH THE MAINLINE WHEN A TURN IS BEING YARDED. REMEMBER — PROPER LEG AND HEARING PROTECTION MUST BE WORN.

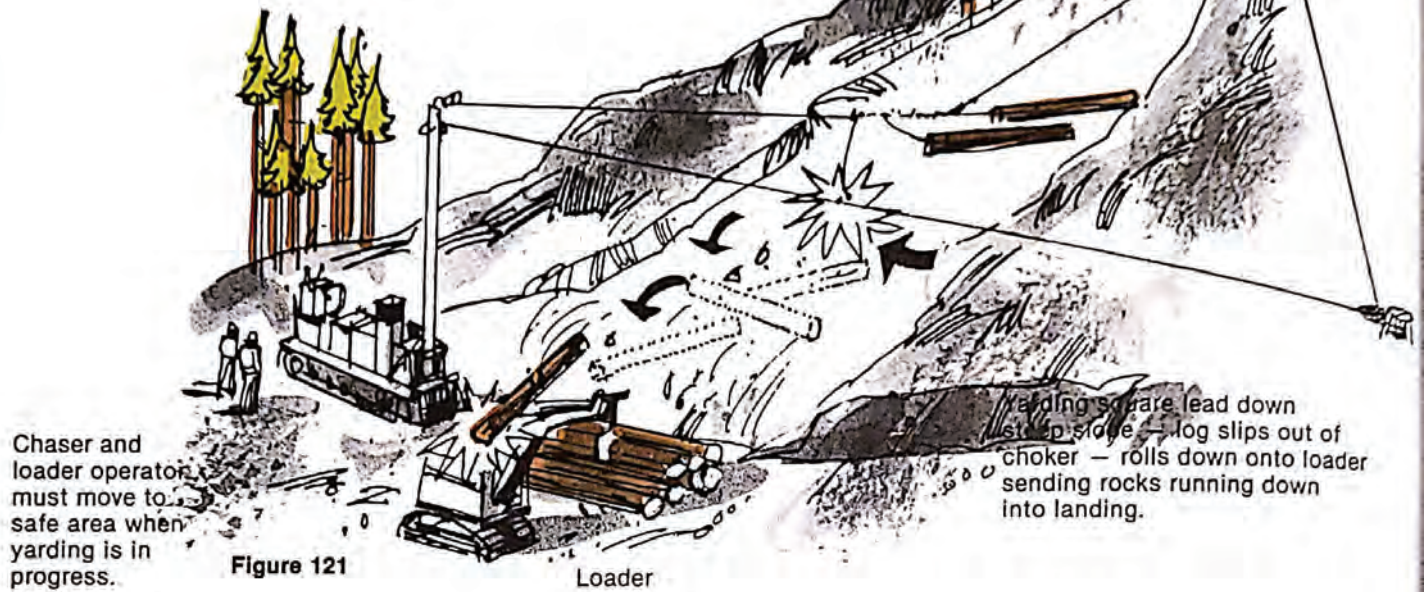
- Logs shall be laid out by the loader and bucked or limbed before loading.

- If the log is unstable, it must be moved to where it can be bucked safely.
- Always buck logs where the yarder and loader operators can see you and make sure they know what you are doing.

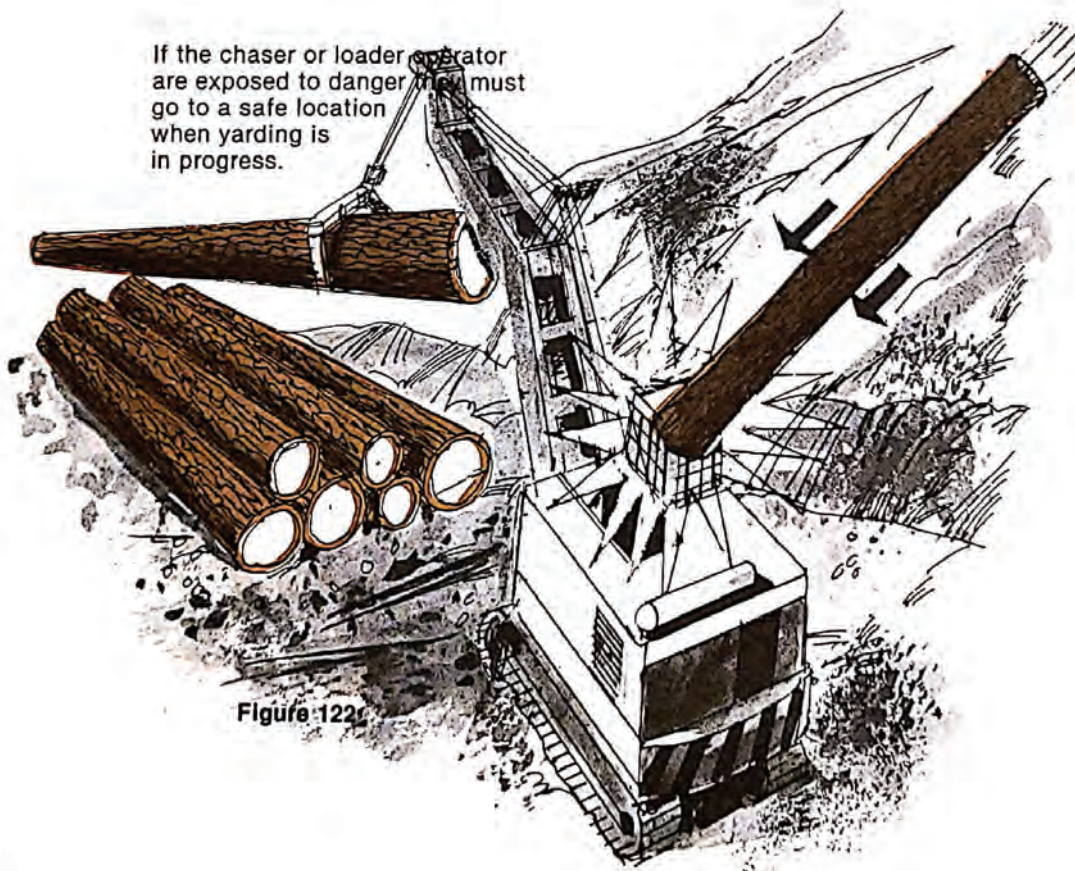
13. The Hazards of Logs, Rocks and Other Objects on Steep Sidehills Running Down Into the Landing

When yarding off steep sidehills above the landing, workers may be in danger if logs and rocks run down into or through the landing. Refer to Figure 121.

Hazards of timber, rocks and other objects on steep sidehills running down into the landing.



If the chaser or loader operator are exposed to danger they must go to a safe location when yarding is in progress.



Precautions:

- a. If the spar operator is in danger from sliding objects, yarding is not permitted.
- b. However, if only the chaser and loader operator are in danger, they must leave the landing and go to a safe location when yarding is in progress.

14. The Hazard of Roots or Chunks Caught on the Yarding Lines and Tightlined Toward the Landing

If the tail-blocks are up high when yarding down steep slopes, the haulback or mainline can pick up roots or chunks with limbs. This material can tightline or slide down the lines towards the landing. Often, chunks will be thrown off the lines before they slide too far, but they can run all the way to the landing.

Precaution:

If the rigging crew or chaser see this danger, they must signal the yarding engineer immediately to slack the lines.

15. The Hazard of Saplings Left Standing Within Reach of the Landing

- a. The chaser is in the most danger of being struck by saplings pulled over into the landing.
- b. Saplings standing at the edge of the landing may be pulled over by the incoming turn and swing sideways toward the chaser. The tops may break off and be thrown in any direction.
- c. When a log loader swings a long log, it may strike a sapling and knock it over, breaking it off or kicking the end of the log off the boom.

Precaution:

The foreman or hooktender must ensure that hazardous saplings within reach of the landing have been removed. If this has not been done, the chaser and the hooktender shall make sure that the saplings are felled before work continues, as required by WCB. I.H. & S. Regulation 60.14(1).

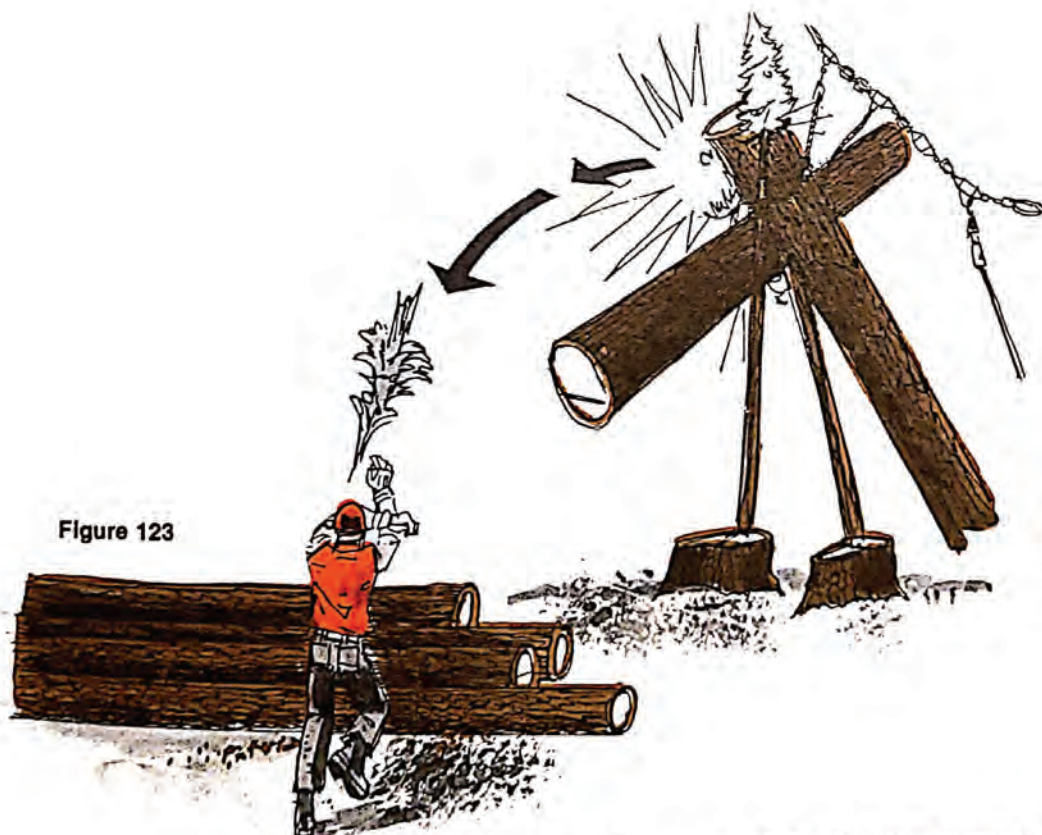


Figure 123

Saplings within reach of the landings must be felled before yarding commences.

Sapling left standing
in reach of landing.

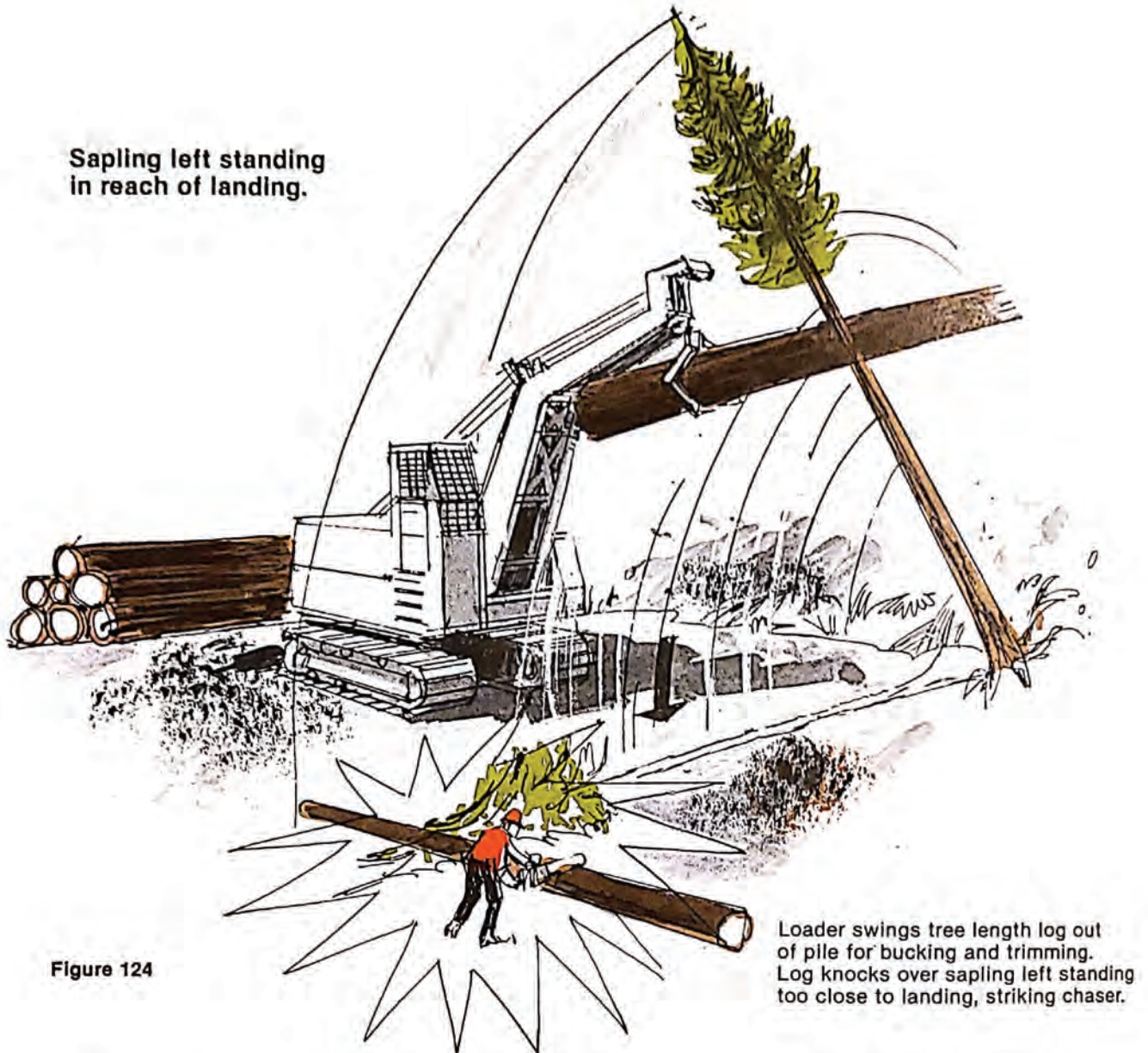


Figure 124

Loader swings tree length log out of pile for bucking and trimming. Log knocks over sapling left standing too close to landing, striking chaser.

16. The Hazard of Lines Breaking when Yarding

A worn mainline or haulback can fail at almost any point, although lines generally break in the leads. Wherever the line breaks, it will fall around the landing. Refer to Figure 125.

Precaution:

Chasers must remain far enough in the clear to avoid being struck if lines do break and fall.

17. The Hazard of Bights of the Strawline, and the Strawline Unhooking when Running In

- a. The strawline may siwash on knots or the ends of logs in the landing. It can strike the chaser if it pulls clear or it may throw limbs or knots. Refer to Figures 126a and 126b.
- b. Strawline hooks can break when the strawline is being run in tight. Extensions can come unhooked and whip the strawline around. This is particularly dangerous if the chaser is spooling the strawline.
- c. If a 'Hindu' connection on the end of an extension connection hangs up when the strawline is being run in slack, this can whip the line around when the connection is pulled free.

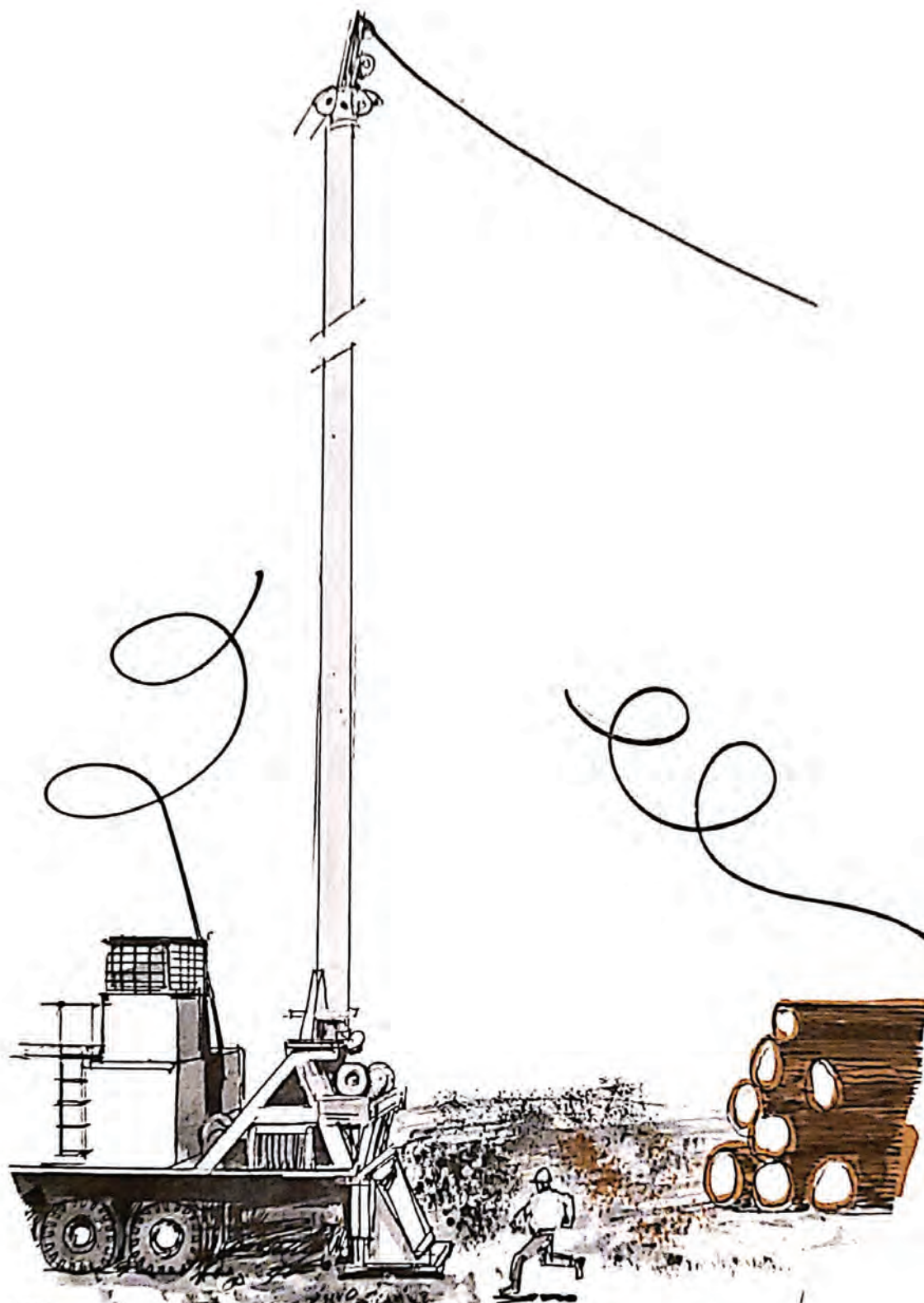


Figure 125

Precautions:

- a. Keep well clear of the strawline when it is being run-in.
- b. If the strawline is slwashed in the landing, signal the operator to stop and clear the line.
- c. If it is necessary to spool the strawline on the drum, use a proper spooling tool and run the line more slowly than normal.

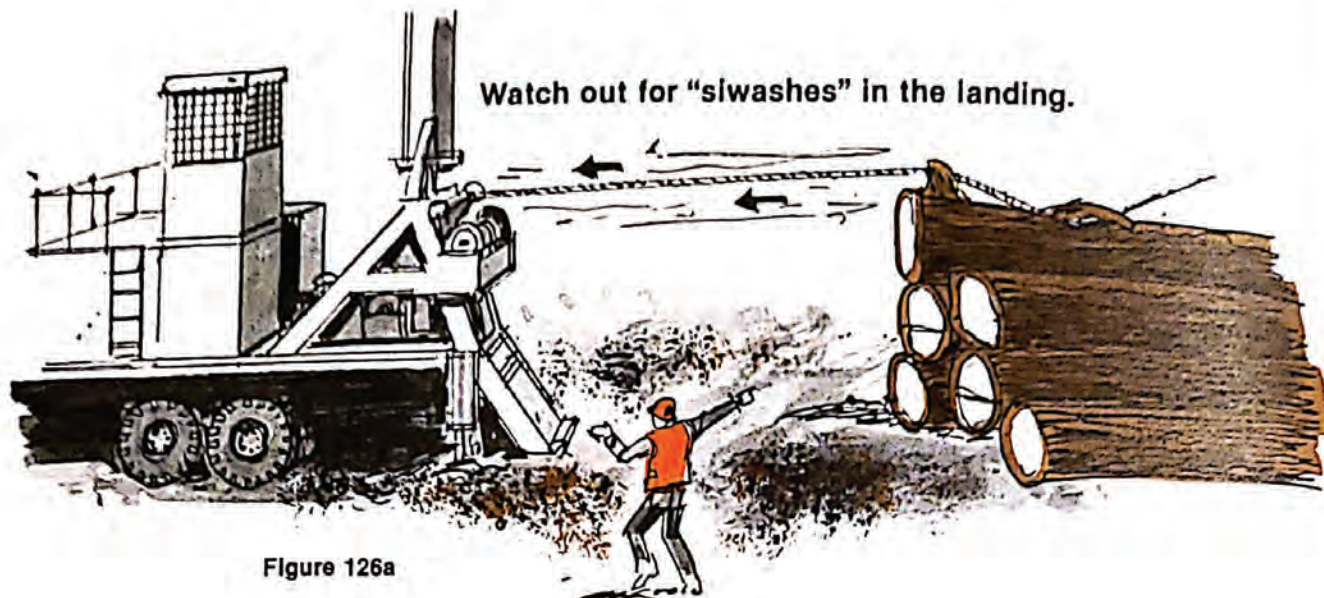


Figure 126a

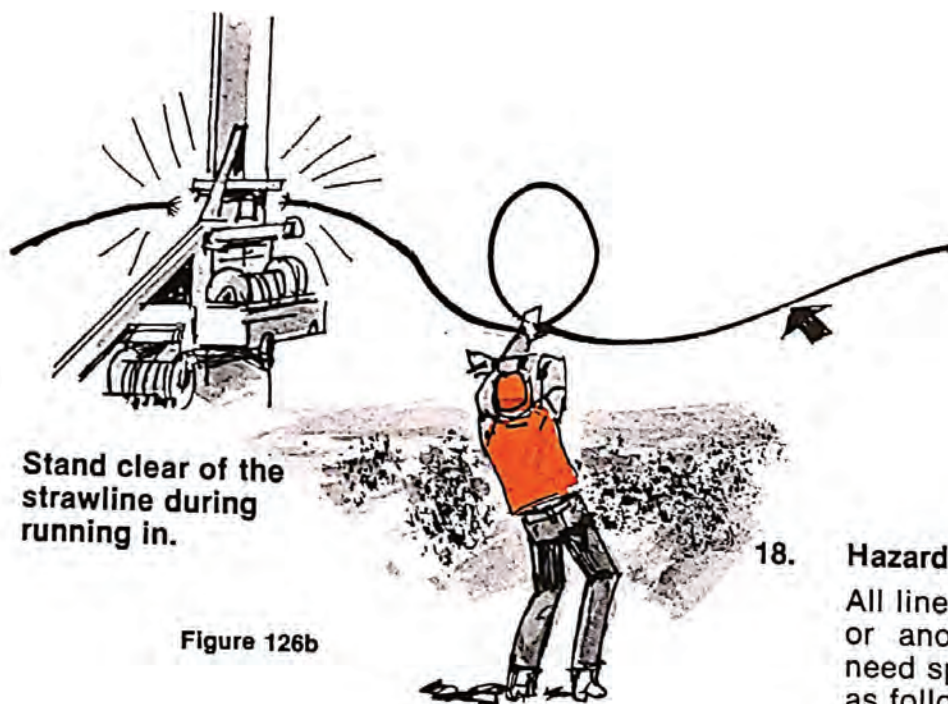
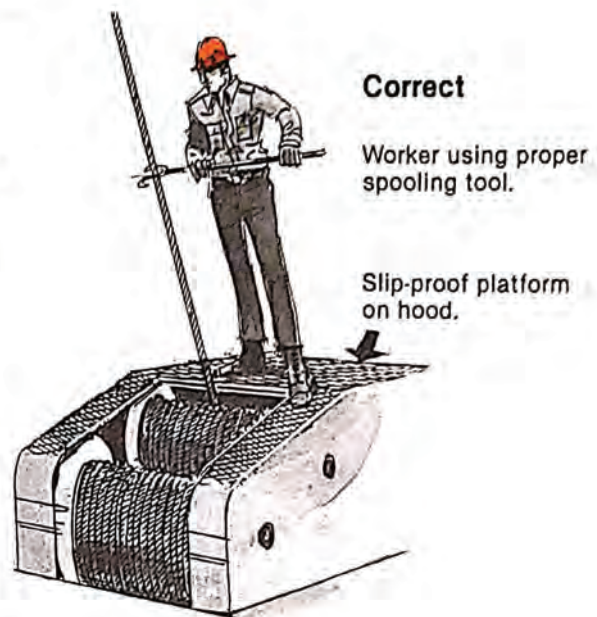
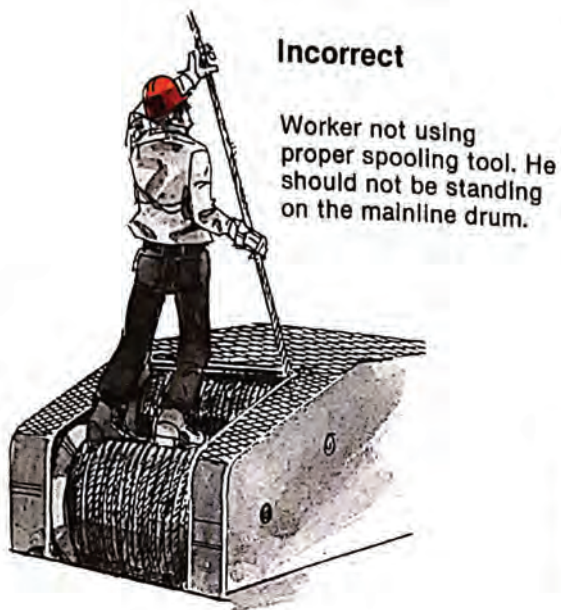


Figure 126b

18. Hazards of Spooling Lines

All lines have to be spooled some time or another. Haulbacks and guylines need spooling most often. Hazards are as follows:

- The chaser's calk boots may slip on yarder hoods, guyline drums, ladders and other metal surfaces.
- Feet may be caught between the guyline drum anchor and the assembly.
- Jaggers may catch and workers' hands may be pulled into the drum.
- Workers may slip and fall onto the haulback drum.



Hazards of spooling lines.

- (a) Always use proper spooling tools
- (b) Don't rest one foot on the drum brake housing or end of shaft

Figure 127

Anchor knobs can cause serious injuries.

Precautions:

- a. Except with guylines, always make sure the operator runs the line in slowly enough to spool properly and avoid hazards.
- b. Be cautious when walking on metal surfaces. All access routes and work platforms must be covered with non-slip material.
- c. Stand with both feet on the platform. Do not rest one foot on the drum brake housing or end shaft when spooling guylines.
- d. Always use a proper spooling iron when spooling running lines.
- e. Always stand well braced on non-slip material and ensure that the line is not reeled in too fast.

19. Hazard of Cutting Line

- a. Pieces of the wire, cutter edge and plunger may fly into the face or eyes of the workers as they cut wire rope.
THESE PIECES ARE GENERALLY HOT, WHICH MAKES EYE INJURIES MORE SERIOUS.
- b. Loose hammer heads may fly off and strike other workers.
- c. The hammer may slip out of the user's hands because the handle is wet, muddy or greasy or because the worker is using heavy, wet gloves.



Figure 128a



Figure 128b

Precautions:

- a. Eye protection must always be worn by the worker using the hammer.
- b. Workers holding the line must keep their faces turned away from the cutter.
- c. Soft headed hammers, made specially for cutting line, are the only type of hammers to be used.
- d. Only acceptable wire cutters shall be used.
- e. Ensure that the cutting blade of the guillotine cutter is over the same point on the wire for every hammer blow. This will help to prevent pieces of the line from flying off.
- f. Make sure that the hammer head is secure on the handle before using.
- g. Clean and dry the hammer handle if it is wet and greasy or covered with mud.
- h. Do not use wet, slippery gloves.
- i. When using hydraulic cutters, be aware that pieces of wire can also be thrown and wear eye protection.

20. Hazards Associated with Warm-up Fires

- a. A danger from warm-up fires exists if gasoline is used to start them or keep them going.
- b. Power saw fuel and pure gasoline are equally dangerous if used on fires.

- c. The greatest danger is if the fire burns back into the container, which will make the can explode.
- d. The vapours in a partly filled or empty container can explode and severely burn a worker.
- e. When a gas can containing fuel or vapours explodes, it will spray out and can cover a worker, burning him very seriously.
- f. Warm-up fires can also spread into the woods or damage tools and equipment. Warm-up fires must be safely located and must be properly put out at the end of the day.
- g. Wet leather boots or gloves can be quickly ruined if they are left near heat.

**POWER SAW FUEL OR GASOLINE
MUST NEVER BE USED FOR FIRES.**

Precautions:

- a. When warm-up fires are permitted, diesel fuel should be provided. If the diesel fuel is handy, workers are not likely to use power saw fuel or gasoline.
- b. A closed container should not be used, as diesel vapour can also explode in certain circumstances.
- c. If diesel fuel is being poured on an open flame, use an open container such as a used anti-freeze, oil or paint can.



Figure 129

Use only an open can when pouring diesel fuel on a fire.

- d. The open can should contain only as much diesel fuel as is needed for the fire at that particular time.
- e. If there is no flame, do not pour diesel fuel on the fire, as it can explode suddenly. Put on some kindling to get a flame, then use the diesel fuel.
- f. Keep the power saw fuel and the saw well away from the fire.
- g. Make sure warm-up fires are well away from any equipment, brush, grease, oil and other flammables. Fires must be

thoroughly put out at the end of the day.

- h. Should a worker's clothing catch fire, do not let him flail around or try to beat the flames out himself. This only feeds oxygen to the flames and increases the danger. Immediately throw the victim down and smother the flames with coats, blankets, or whatever is available. This cuts off the oxygen.
- i. Be aware of the location of the fire extinguishers.

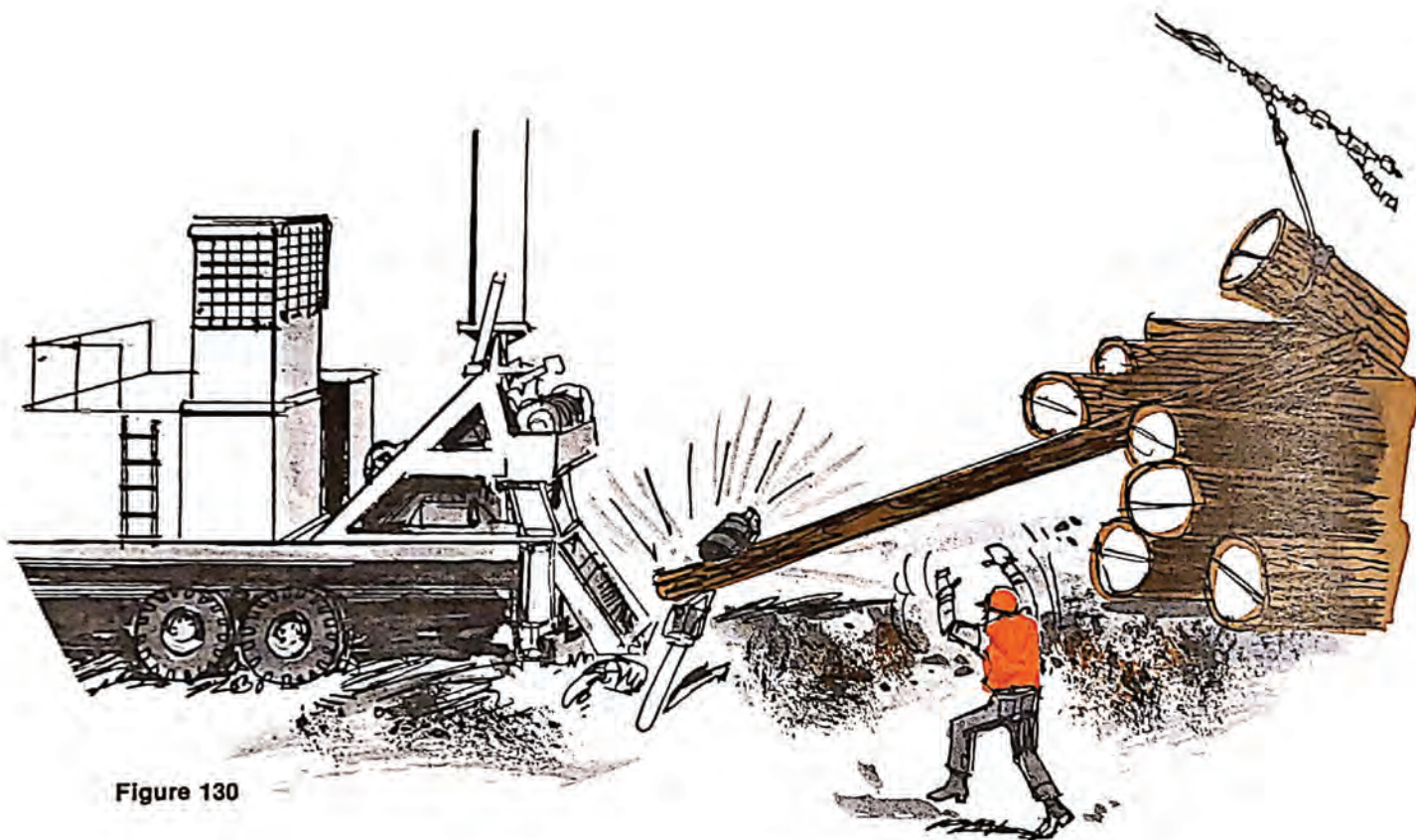


Figure 130

21. Hazards Encountered when Using Hand Signals in the Landing

If hand signals are not clear, chasers can be in danger from unexpected movement of lines, rigging, logs and equipment.

Precautions:

- a. The chaser and the operator must understand when and where hand signals are to be used.
- b. When giving hand signals, make sure you can be seen clearly by the operators.
- c. Give clear, distinct signals.
- d. Be certain that the operator has understood your signal before moving away.
- e. If a sudden change in signal has to be given, be sure that the operator has

seen and understood this overriding signal.

- f. Signalling methods such as throwing chunks of bark or sticks should only be used to get the operator's attention.

22. The Hazard of Inexperienced Workers Operating Equipment

Inexperienced workers using equipment can cause danger to other workers and damage to the equipment.

Precaution:

Before workers are allowed to operate any equipment, the supervisor must be sure that they are properly instructed and trained. A worker must not operate equipment without being authorized by the supervisor.

23. Hazards when Operating Power Saws

- a. At many operations, the chasers must use power saws continuously.
- b. To avoid injury, chasers must be trained in the handling and use of the power saw.
- c. Understanding the basics of power saw maintenance is also necessary to prevent accidents.
- d. The required leg and hearing protection must be worn.
- e. For further information on the operation of power saws, see the section on use of tools and equipment, page 158.

24. Hazards Encountered when Raising, Lowering and Moving the Spar

The chaser is exposed to certain hazards during spar raising, lowering and moving. He should know and follow the employer's work procedures as well as the hooktender's instructions.

Precautions:

- a. Stay clear of the siwashes or bights.
- b. Keep the strawline clear of siwashes around the spar.
- c. Stand well clear of the spar pad when raising or lowering it with the strawline.
- d. Stay clear of the blocking when the levelling jacks are in use.
- e. Be careful of slipping on metal surfaces when spooling guylines. Stay on the platform and non-slip surfaces.
- f. Keep your feet away from the guyline tail-holds on the drum while the line is being spooled.
- g. Only authorized and capable workers shall be allowed to operate the controls.
- h. Do not ride on the spar when it is being moved.
- i. Do not walk directly behind the spar when it is being moved up a grade.
- j. If the spar is being snubbed or towed, stay clear of the snubbing or towing line and all equipment.
- k. For more information on this subject, refer to page 36.

25. Hazards in the Landing when a Spar is Pulled Over

Workers in the landing have been killed or injured when spars have been pulled over.



Spar pulled over.

Workers have been killed or injured when spars have been pulled over. Be extremely cautious when heavy yarding is being carried out. Never run under carrier to avoid falling guylines.

Figure 131.



If the spar seems unstable, notify the hooktender.

Figure 132

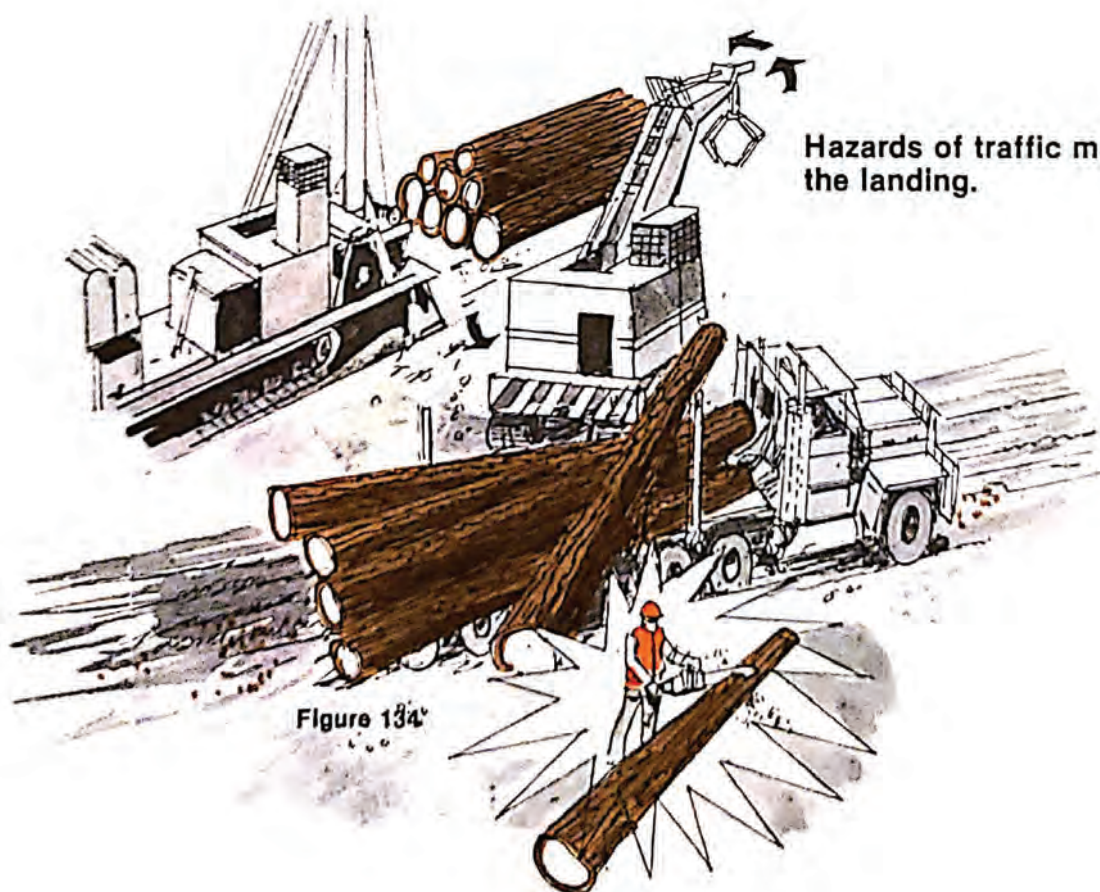


Figure 133

Precautions:

- Always be aware of the yarding direction. Try to remain on the offside and out of the way of the loader.
- Be extremely careful during heavy yarding.
- Tell the hooktender if the spar looks unstable.
- Do not seek shelter under the carrier to avoid being struck by the guylines, as the carrier may be overturned along with the spar. Refer to Figure 131.
- If there is no time to get clear of the guylines, the safest place is behind the spar.

GOOD SOLID GUYLINE STUMPS, PROPERLY PLACED WITH A MINIMUM OF THREE GUYLINES OPPOSING THE LOAD, AND WITH A LIGHT HAND ON THE THROTTLE WILL MINIMIZE THIS HAZARD.



Hazards of traffic moving through the landing.

Figure 134

26. Hazards Resulting from Other Equipment and Traffic Through the Landing

- When other logging activity is taking place beyond the landing of a yarding and loading side, there will be vehicles and equipment moving through the landing. This outside interference creates a great potential for accidents.
- Without traffic control, it is difficult for landing workers to be aware of traffic, due to the noise of yarding and loading equipment.

Precautions:

- There must be a specific procedure for all equipment and vehicle operators, to allow safe movement through active log landings. Landing workers in charge of traffic control shall be thoroughly instructed in this procedure.

- Equipment and vehicles shall stop and signal before approaching landings or other work areas. They must then wait for permission to go ahead.
- The chaser is generally the worker who signals traffic through the landing. If the chaser is too busy, another worker must be made responsible for traffic control.

27. The Hazard of Lifting Heavy Objects

- The chaser often has to lift heavy rigging, blocking and other objects.
- The chaser and every worker on the crew must learn how to lift safely and handle heavy objects to avoid back injury.

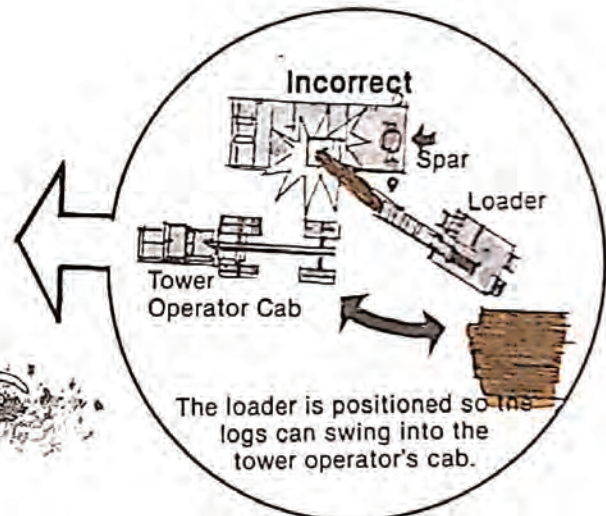
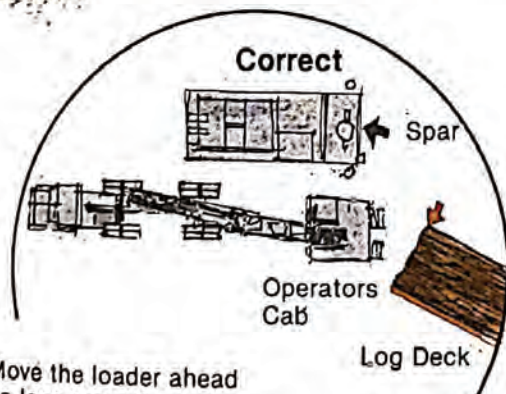


Figure 135



YARDING ENGINEER

- The Hazard of Being Struck by Logs or Grapple when Trucks are Being Loaded Alongside the Yarder Operator's Cab**

Precaution:

Ensure the truck and loader are placed so that logs being loaded cannot swing into the outward side of the spar operator's cab.

2. **The Hazard of Logs, Rocks, and Other Objects on Steep Sidehills Running Down Into the Landing**

When yarding off steep sidehills above the landing, landing workers are in danger from logs and rocks running down into the landing.

Precautions:

- a. If the yarding engineer is in danger from sliding objects, yarding shall not be allowed.
- b. If, however, only the chaser and loader operator are in danger, they must leave the landing and go to a safe place during yarding.

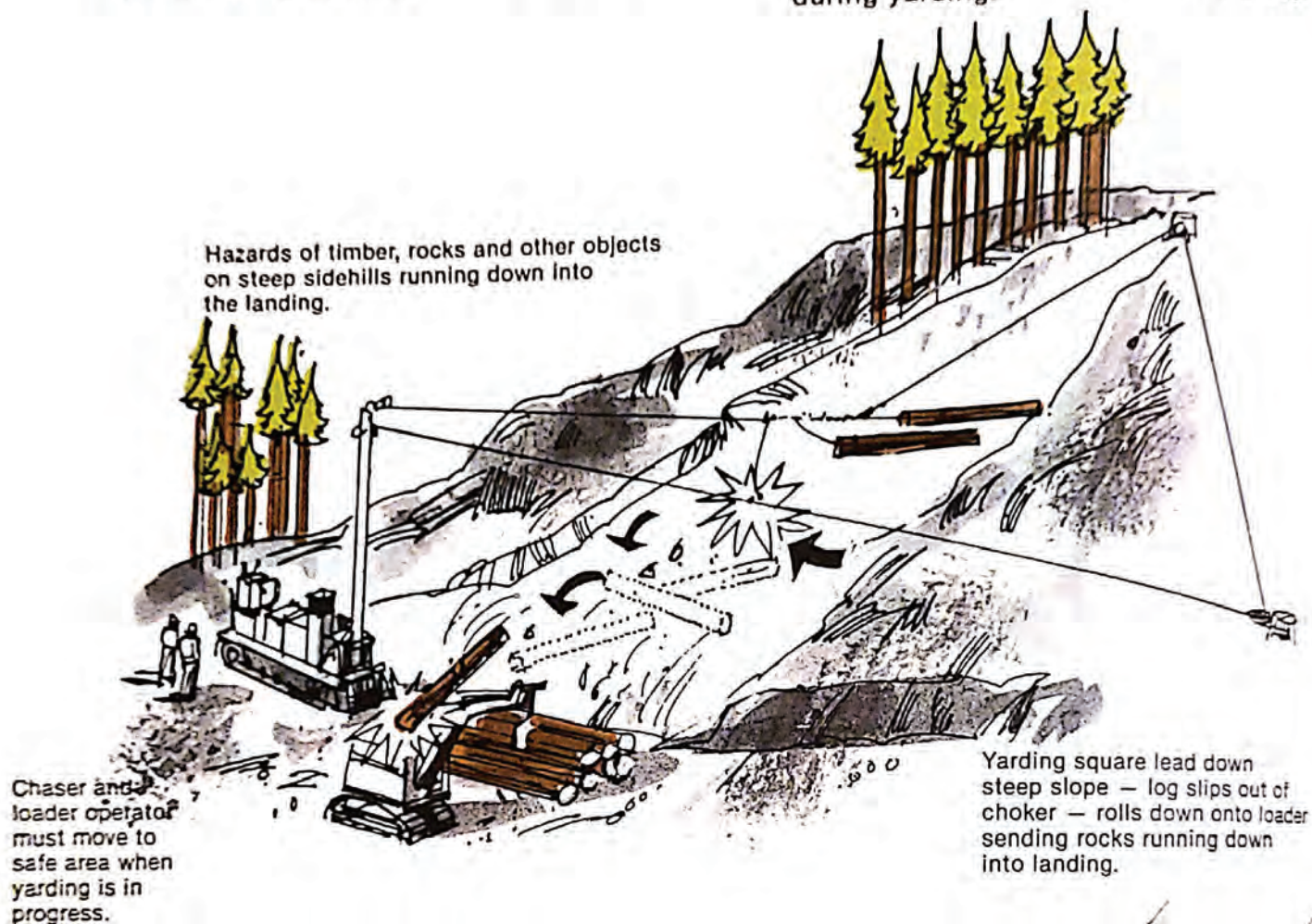


Figure 136



Figure 137

3. **The Hazards Encountered when Landing the Turn**

- a. Normally the yarding engineer is not in direct danger from the turn being landed unless yarding over a bank or steep slope. Yarding is not permitted when the engineer cannot fully control the turn being landed.
- b. If the mainline friction should fall to disengage when it is released, the turn could be yarded into the spar or could kick other logs ahead into the spar base.
- c. If large logs are dropped onto small logs or chunks, small chunks or pieces can be broken off and thrown at workers in the landing.
- d. Logs may be kicked ahead into the spar or loader if the haulback is not sufficiently snubbed when landing the turn.
- e. Logs are not to be landed or decked in a crisscross manner or in unstable piles, as this puts the chaser in danger when he is unhooking the turn or bucking logs.

Precautions:

- a. The engineer must slow the turn before it approaches the landing and be sure the haulback is adequately snubbed to properly land the turn.
- b. The turn shall not be landed if the yarding engineer cannot see the chaser or be certain that he is in a safe place. If the engineer can see the entire area, he can arrange with the chaser to land the turn without using signals.
- c. After yarding in a heavy turn, the turn should be stopped before it reaches the landing and the friction released and applied again with only sufficient pressure to land the turn.
- d. When landing a turn, the logs should be lowered and not dropped onto other logs or chunks. It is sometimes necessary to purposely drop a turn to stabilize a pile and in these cases, the chaser must be well in the clear.

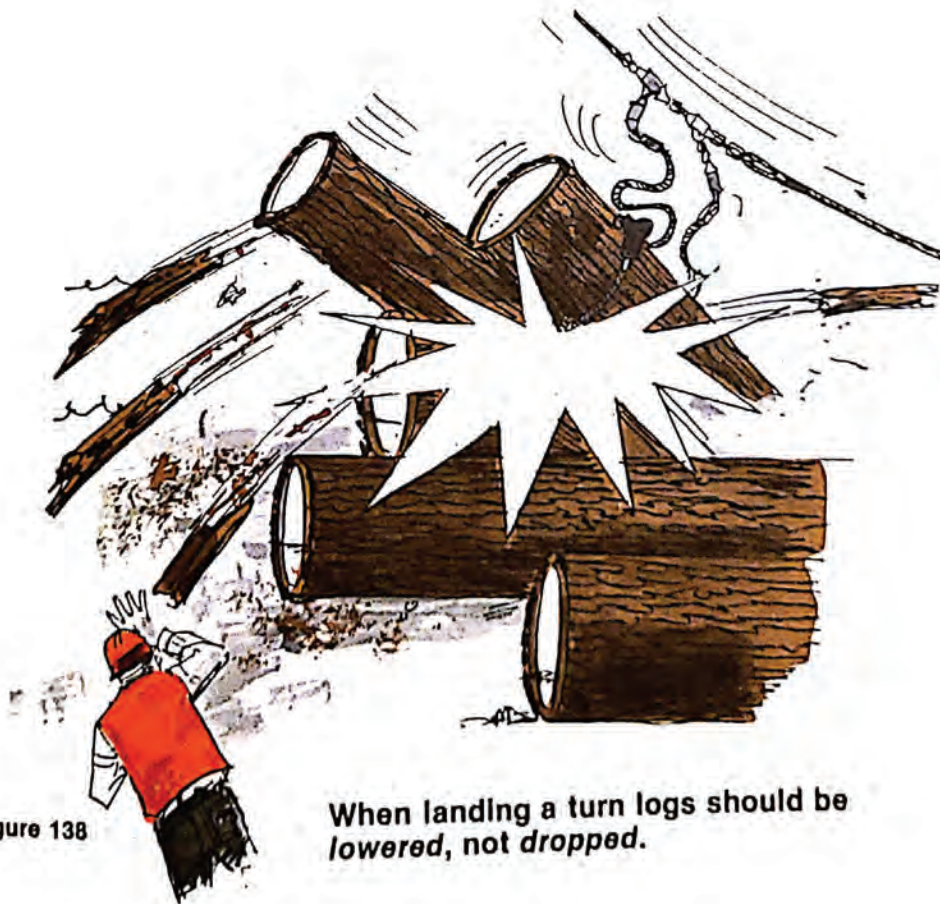


Figure 138

When landing a turn logs should be lowered, not dropped.

Hazards of landing the turn.



Care must be taken to avoid driving decked logs into landing.

Figure 139

- e. When yarding in heavy turns or when there is little lift to tightline the ends of the logs clear of decked logs, be careful not to hit the ends of the decked logs and drive them into the spar, loader or landing.
- f. Communication between the engineer and the chaser is vital so that the logs are landed and decked without endangering the chaser.
4. **The Hazard of Runaway Equipment when Moving the Mobile Steel Spar Yarder**

When moving the yarding equipment, the engineer must make sure that the equipment is in safe operating condi-

tion. Special care must be given to the braking and steering systems.

The mobile yarder shall be towed or snubbed when necessary to prevent a runaway.

The equipment must be driven in the center of the grade, particularly across fills, culverts and bridges.

5. **The Hazard of Excessive Reefing**

Excessive reefing at full power puts added stress and strain on the rigging and equipment. This can cause worn or weakened parts to fail and create extra hazards for the yarding and loading crews from breaking lines and spar collapse.

Precautions:

- a. Operators should know how much line pull can be developed by operating the yarding equipment at maximum capacity, so they can avoid damaging the equipment and pulling stump anchors, which can lead to the steel spar falling over.
 - b. The line pull developed must be used in moderation, considering the ground conditions and the timber being yarded.
- 6. The Hazards of Not Completely Seating the Dogs in the Guyline Drums During Yarding Operations**
- a. This practice puts excessive strain on the guyline drum mechanisms and may lead to drum shaft failure.
 - b. It may also lead to collapse of the spar under certain conditions.

Precaution:

Dogs must be positioned and the guyline drums gently set back onto the dogs before yarding operations commence.

Guyline drum shaft failure.

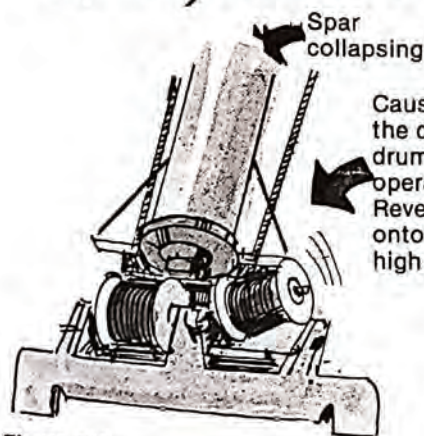


Figure 140

7. Hazards Resulting from Lack of Equipment Guarding and Missing or Inoperable Alternate Means of Escape from Cab

- a. The yarder engineer is in danger from broken lines, chunks or logs if the operator's cab windows are not properly guarded.
- b. Operators may be trapped inside the cab if an alternate means of escape is not available or functional.
- c. Operators or other workers may be caught in gears, belt and chain drives if guards are not kept in place.
- d. All doors on the operator's cab shall be kept closed during yarding operations.

Precautions:

- a. Make sure all guards are adequate and properly maintained.
- b. Report all guard defects.
- c. Ensure the alternate means of escape is functional and unobstructed.

SAFE OPERATING PROCEDURES FOR THE YARDING ENGINEER TO AVOID ACCIDENTS TO OTHERS.

- 1. Going ahead or slackening a line without a signal.**

Precautions:

Except when the operator can see all the action and other procedures have

Safe operating procedures to avoid accidents to others.

All line movement must be by a signal. If hand signals are used the chaser and operator must have clear unobstructed vision of each other.

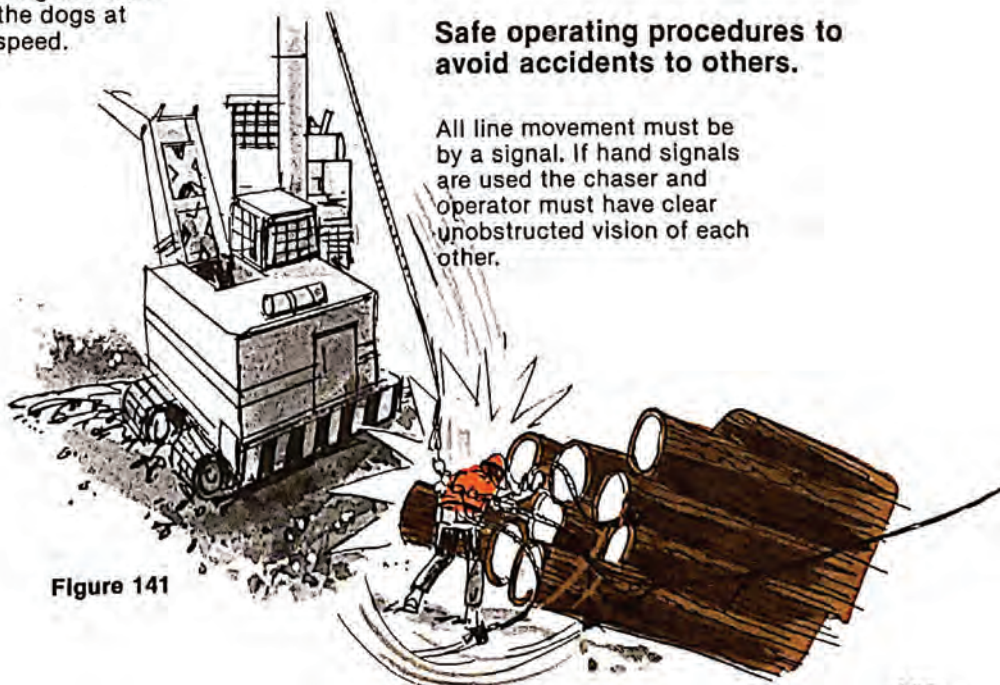


Figure 141

been agreed on by the workers concerned, these procedures shall be followed.

- a. All line movement must be directed by a signal. Audible signals must be given by the rigging crew before any action is taken by the operator when the rigging is in the quarter.
- b. If hand signals are used, the chaser and operator must be able to see each other clearly.
- c. If a signal is not clearly understood, the operator must not take action until he gives a signal and it is confirmed.

2. Spooling Lines

- a. Running lines should be spooled and tightened properly onto the drums when they are first installed and be kept properly spooled for the life of the line.
- b. Improper spooling of guylines and running lines causes crushing and cutting of the lines, increases wear and makes lines break more easily.
- c. Poorly spooled guylines can cause uneven slack during heavy loading.
- d. Delays in upending the mainline and haulback cause excessive wear and lessen the life of the lines.
- e. If the carrier is not level from side to side, transversally, the spar must be perpendicular to the carrier so that the lines can lead properly.
- f. When workers are spooling lines, they must follow these rules:
 1. Workers wearing calked boots are not allowed to stand on metal covers or hoods while they spool lines unless the metal is covered with non-slip material.
 2. Haulbacks or mainlines should be run in at moderate speed when being hand spooled.
 3. Workers must use proper spooling irons when spooling the haulback and mainline so they are not caught by any jagers on the lines.
- g. Running lines should be upended regularly to avoid rapid wear and possible failure caused by stretched and worn sections.

Spooling lines.



Figure 142

3. Factors which can Cause Butt Rigging to Drop on the Crew when they are Setting the Turn

The rigging may suddenly drop and injure the rigging crew if the brake system fails or if the brake controls are released by accident. This applies especially to equipment that is not fitted with spring brakes or dogging mechanisms.

The most common causes of failure are:

1. Brake bands, anchors and adjusting rods.
2. Ratchets may slip off pawls, particularly on older yarders.

3. Sudden loss of air pressure can cause rigging to drop before the spring brake or dogs engage.
4. Brakes may be wet or sticky.
5. Brake pedals or operator's boots may be wet or oily.

When turns are being set, the yarding engineer shall stop the winch, set the brakes and frictions securely.

4. **Yarding with Unstable or Wrongly Placed Guyline Anchors**

When yarding, the spar operator must always be aware of the correct arrangement of the guylines and make sure that at least three guylines oppose the yarding stress. He should also be alert for any unusual movement of the spar due to stump lift or lead change. He must report any movement to the hooktender, for correction.

5. **Yarding Engineer Leaving the Controls when the Turn is Being Set**

The spar operator must remain at the controls to prevent any accidental line movement when the crew is working around the rigging.

6. **Requirements for Safe Equipment Operation**

- a. The operator must maintain and operate the equipment as specified by the manufacturer.
- b. Special care must be given to the travel and yarding brake systems. Air lines, valves, brake flanges, bands, adjusting bolts, dogs, pawls and ratchets, parking or emergency systems must all be carefully serviced.
- c. Make sure that remote throttle control systems can be isolated as required, to prevent simultaneous operation.
- d. The operator must know the proper procedures for raising and lowering the spar and ensure that no unauthorized person operates the equipment.
- e. The operator is often in a position to notice dangers that the crews cannot see while they rig-up. He must make sure they are told of these hazards.
- f. Personal radios, magazines and other distracting material should not be allowed in operators' cabs. They must have their minds on their work at all times.

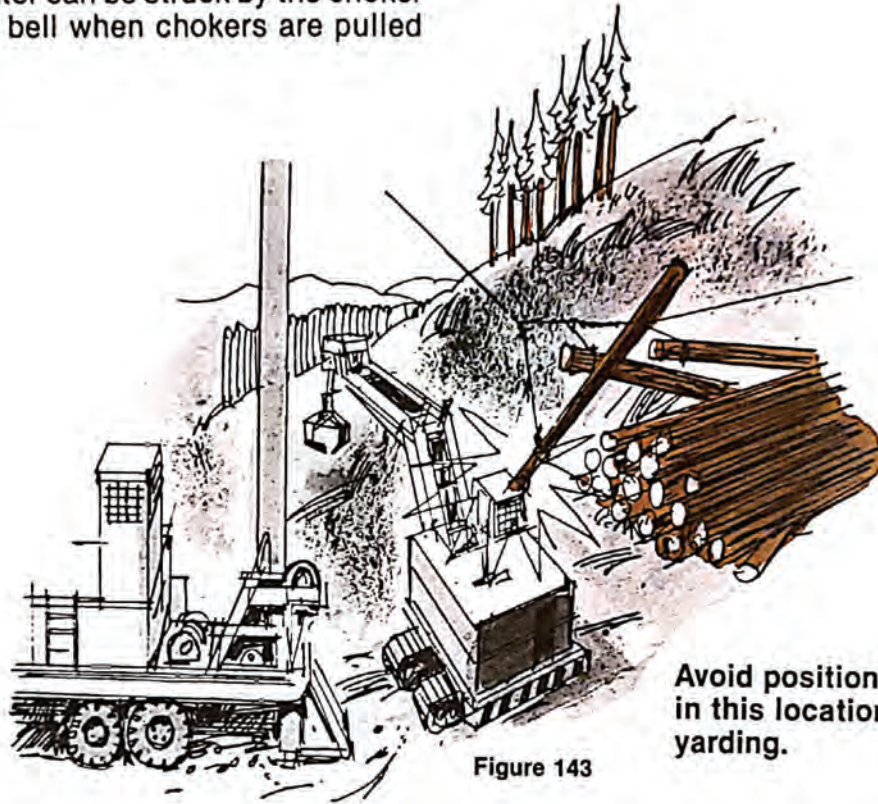
- g. Good housekeeping and proper storage of materials prevents tripping and falling accidents and increases efficiency.
- h. The operator must make sure that material carried on the yarder such as first-aid equipment, fire extinguishers, and radio signalling and communication equipment is properly maintained.
- i. The power unit must be shut down before servicing or maintenance.
- j. Report all equipment deficiencies promptly.
- k. The operator must use the necessary personal protective equipment and wear a hard hat when he leaves the cab.
- l. For information on raising and lowering the spar, refer to pages 36, 37 and 50.

**HAZARDS OF THE JOB
AND PRECAUTIONS TO TAKE
TO AVOID ACCIDENTS —
LOADER OPERATOR**

**1. The Hazards of Improper Positioning
of the Loader in the Landing**

- a. The loader operator can be hit by the incoming turn if the yarder operator's vision is obstructed.
- b. The operator can be struck by the choker knob and bell when chokers are pulled free.

- c. The boom and snorkel may hit the yarding lines and cause injury to the rigging crew.
- d. A loader on the edge of the grade or on unstable fill material may tip over when lifting heavy logs.



Avoid positioning the loader in this location when yarding.

Figure 143

**The hazard of improper positioning
of the loader in the landing.**

The operator can be struck by the choker knob bell when chokers are pulled free.

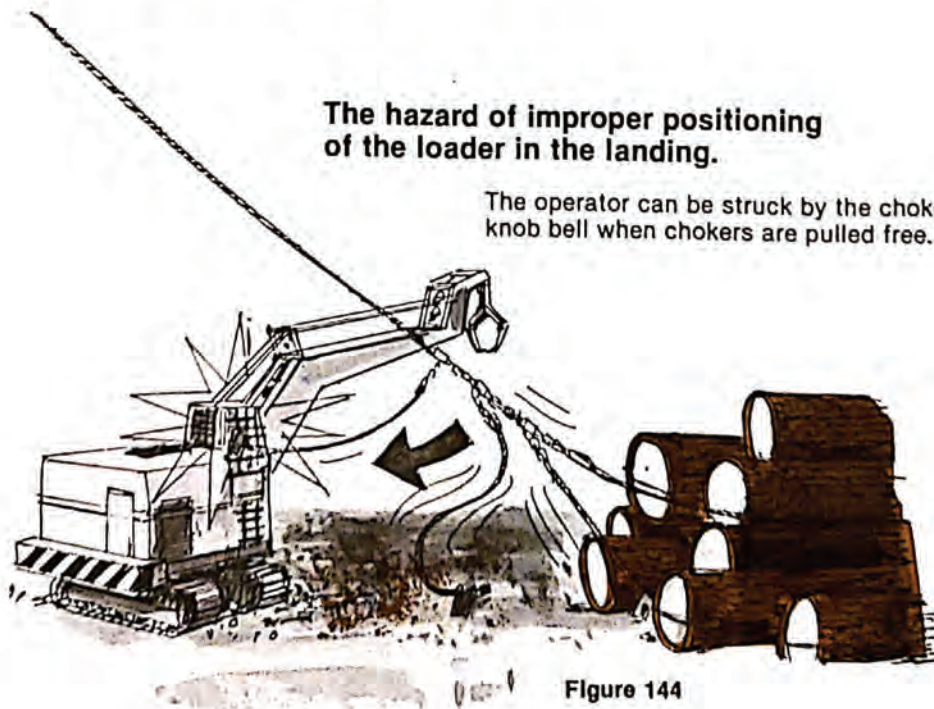
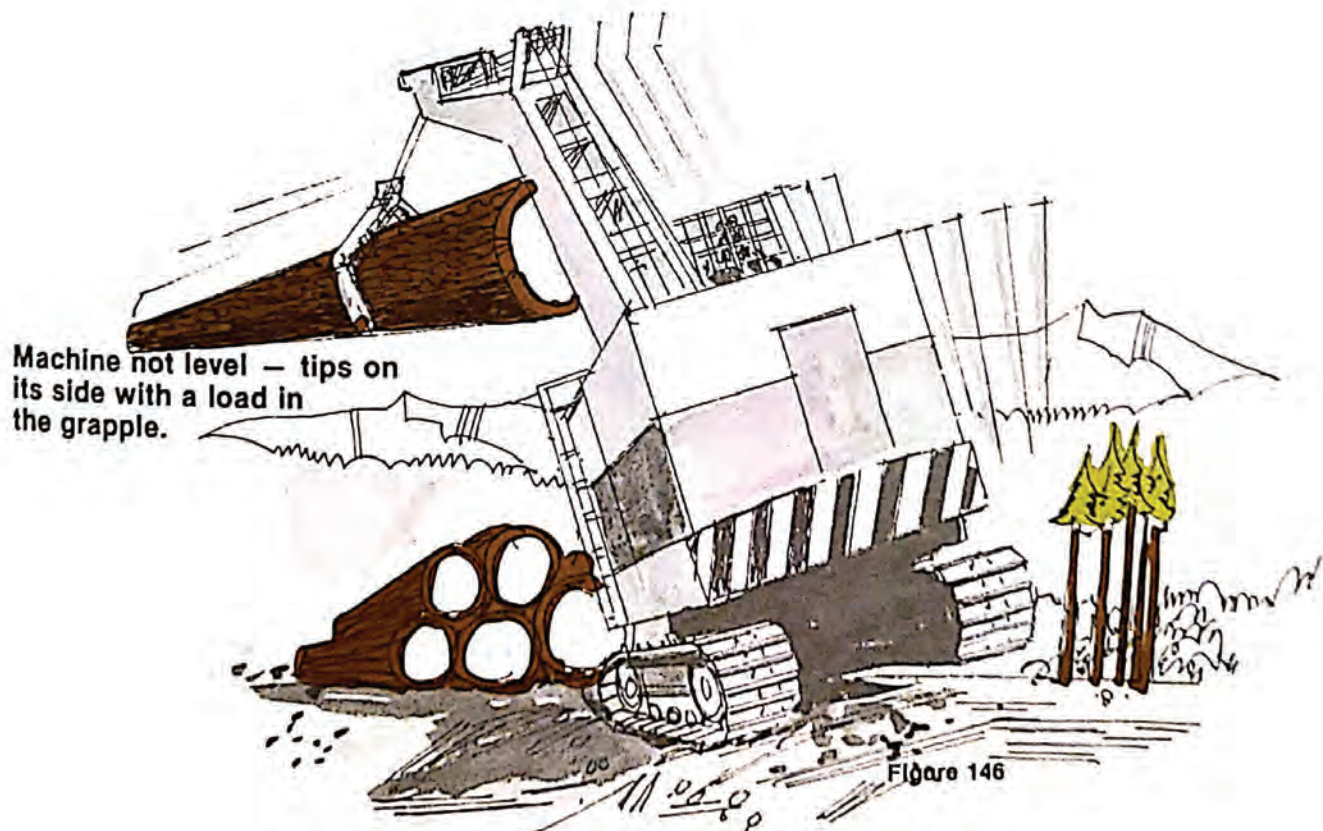
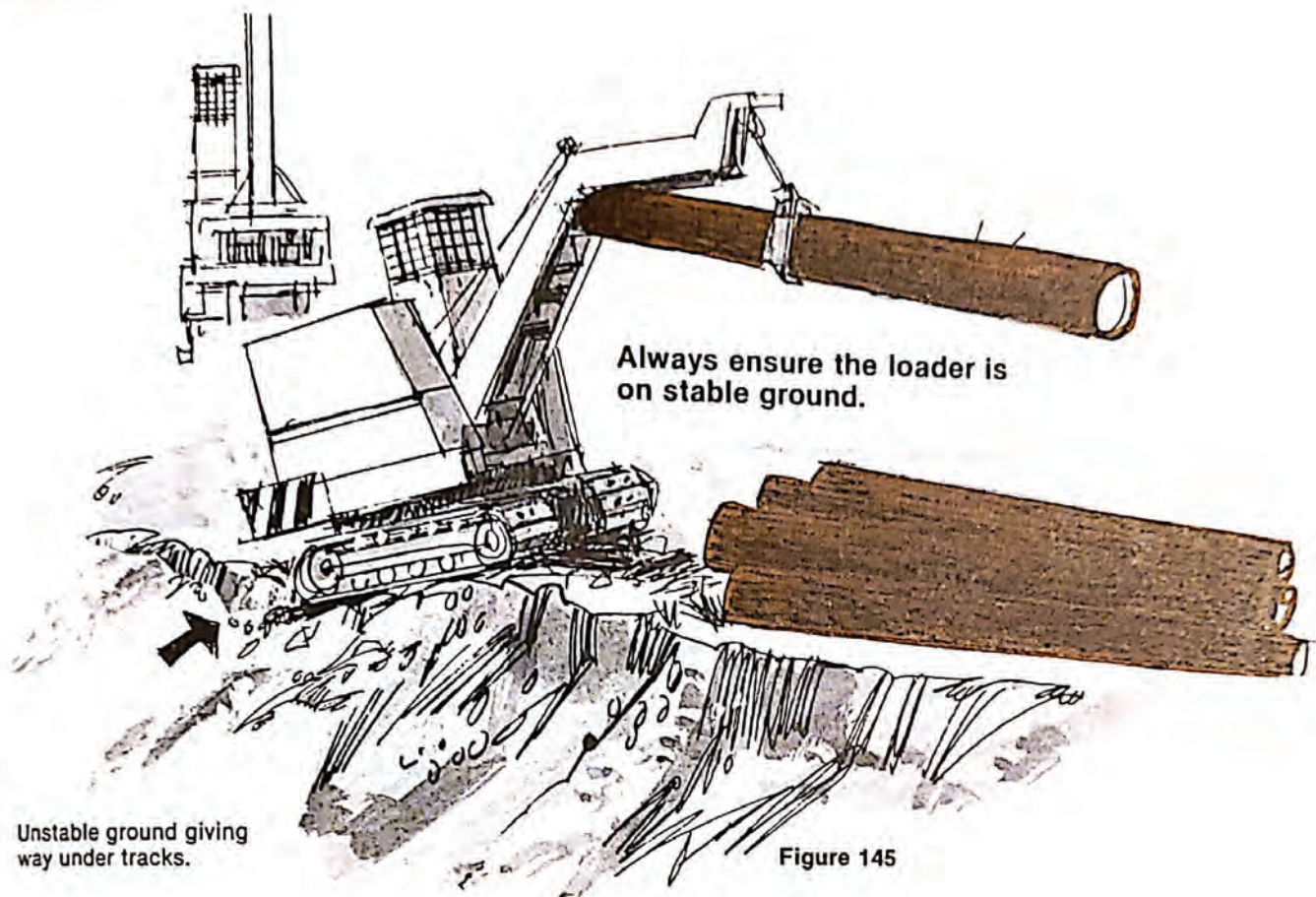


Figure 144



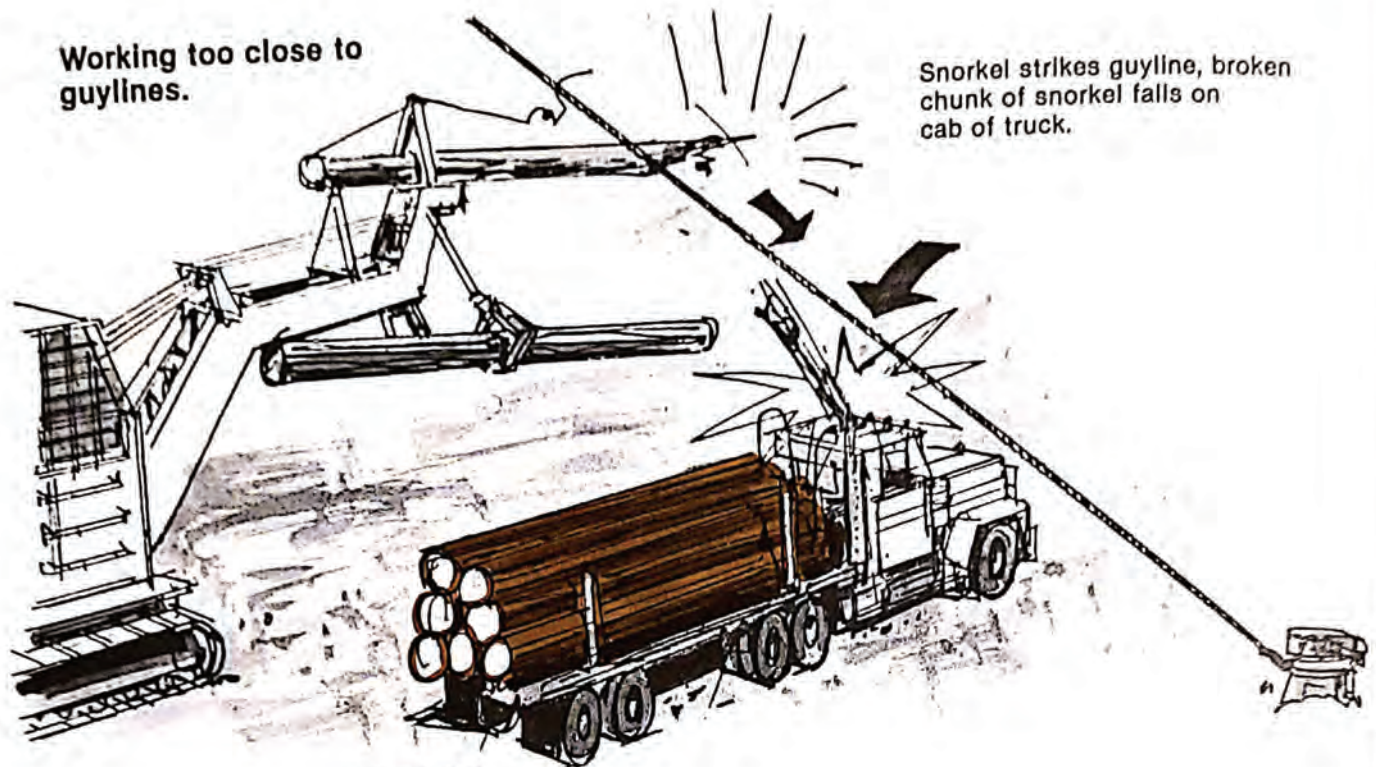


Figure 147

- e. Loader placed too close to the guylines can lead to the boom or snorkel striking a guyline and causing damage to the loader, other equipment and possibly injuring landing workers.

Precautions:

- a. Avoid positioning the machine in line with incoming turns. If the machine must be in this danger area, the operator of the loader must move out of the hazard area while turns are being landed and chokers pulled free.
- b. Locate the loader on firm, solid ground, clear of incoming turns and guylines.

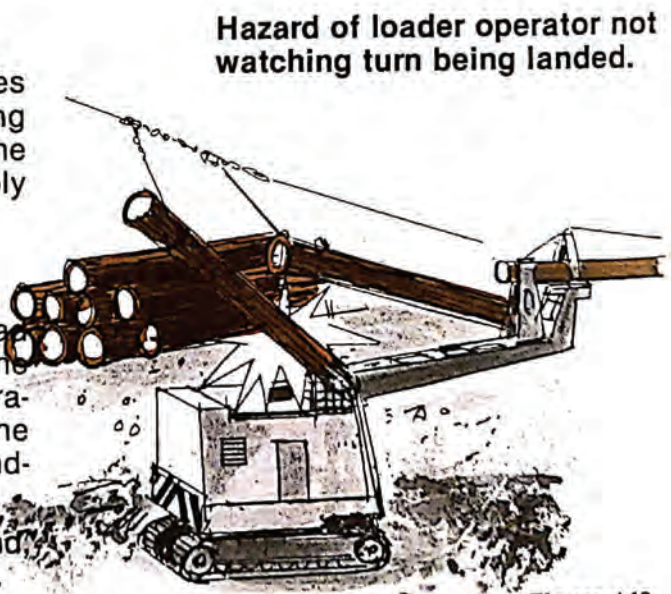


Figure 148

2. Hazards Resulting from the Turn Being Landed

- a. Logs may strike operator's cab when being landed.
- b. Logs can jillpoke into operator's cab from incoming turn.
- c. Logs may hang-up in pile and upend onto the loader.

- d. Tagged logs may swing in and strike loader.
- e. Swinging chokers may hit the operator's cab after turn is unhooked.

Precautions:

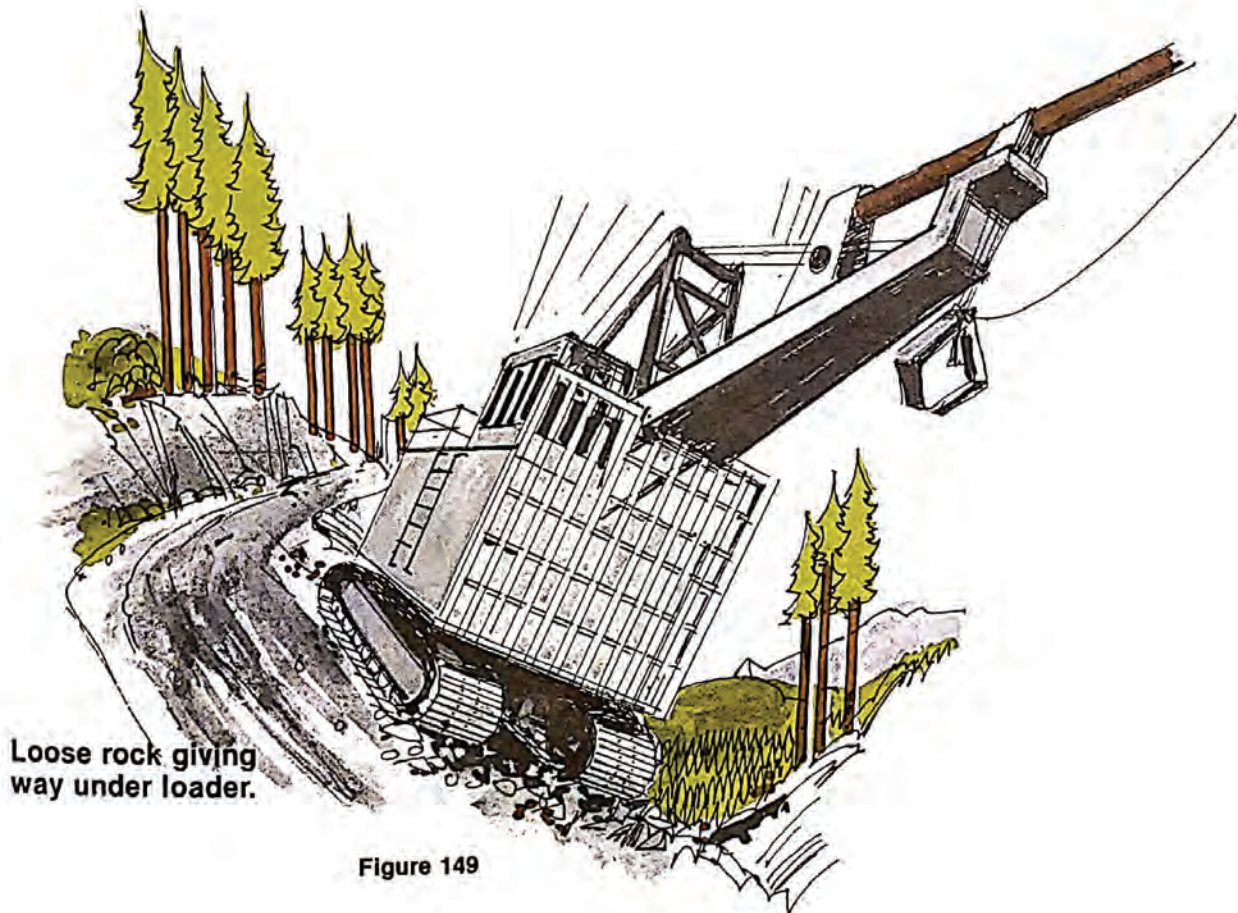
- a. The loader operator must watch for any unexpected log movement while the turn is being landed.
 - b. The operator should always swing the loader so that the entrance side of the cab is not exposed to the turn being landed.
 - c. Entrance doors on the operator's cab must be closed during yarding.
3. **The Hazards of Moving the Loader on Steep Grade**

Refer to the manufacturer's operator's manual for guidance on the steepness

of grade the machine is designed to negotiate.

Precautions:

- a. Snub or tow the machine on all grades that are too steep for the loader.
- b. Ice, mud, rock and grade surfaces must be considered before the machine is moved.
- c. Keep the loader on the center of the grade, clear of the soft shoulders.
- d. Make sure that culverts and bridges will carry the loader.



Loose rock giving way under loader.

Figure 149

The hazards of moving the loader on steep grades.

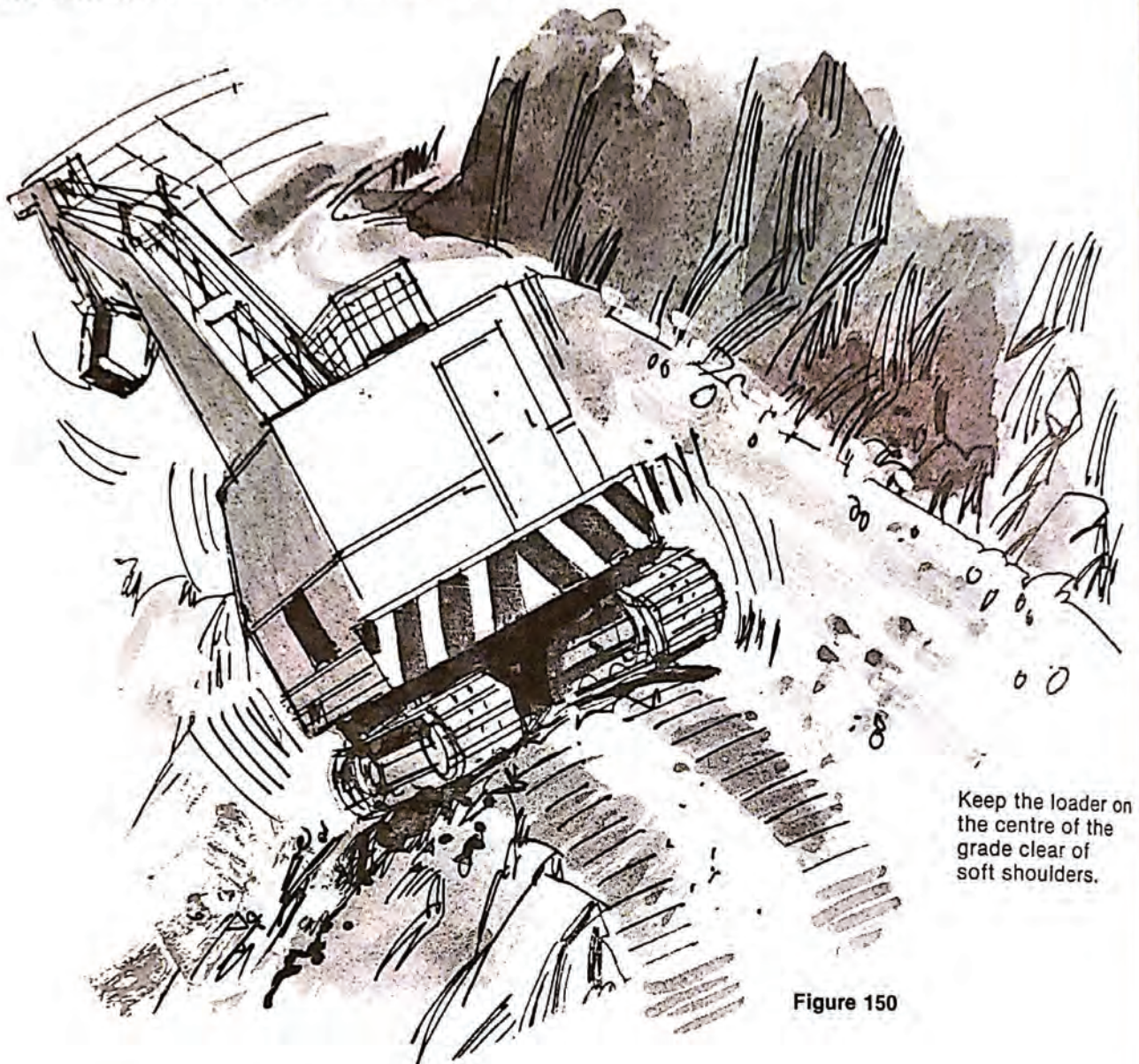


Figure 150

4. Hazards Encountered if Greasing and Servicing the Loader in an Active Landing

Workers are in danger from moving logs, lines, chokers and other objects if servicing is undertaken while logs are being yarded into the landing.

Precaution:

Move the loader into the clear if necessary or only do maintenance work when the yarder is idle.

5. Mechanical Considerations

In addition to having the necessary operating skills, the loader operator should understand the mechanics of the equipment so that it can be maintained in safe operating condition.

Particular attention should be given to:

- Brakes (carrier and winch) and dogs
- Steering system
- Gantry and boom supports
- Boom hoist lines and pendant straps
- Air systems
- Frictions and clutches
- Hoisting line

Make sure that all inspections of the loader are done in accordance with Industrial Health and Safety Regulations 56.06 and 56.08(1) and (2).

SAFE OPERATING PROCEDURES TO AVOID ACCIDENTS TO OTHERS

1. Clearance Between Loader and Other Objects

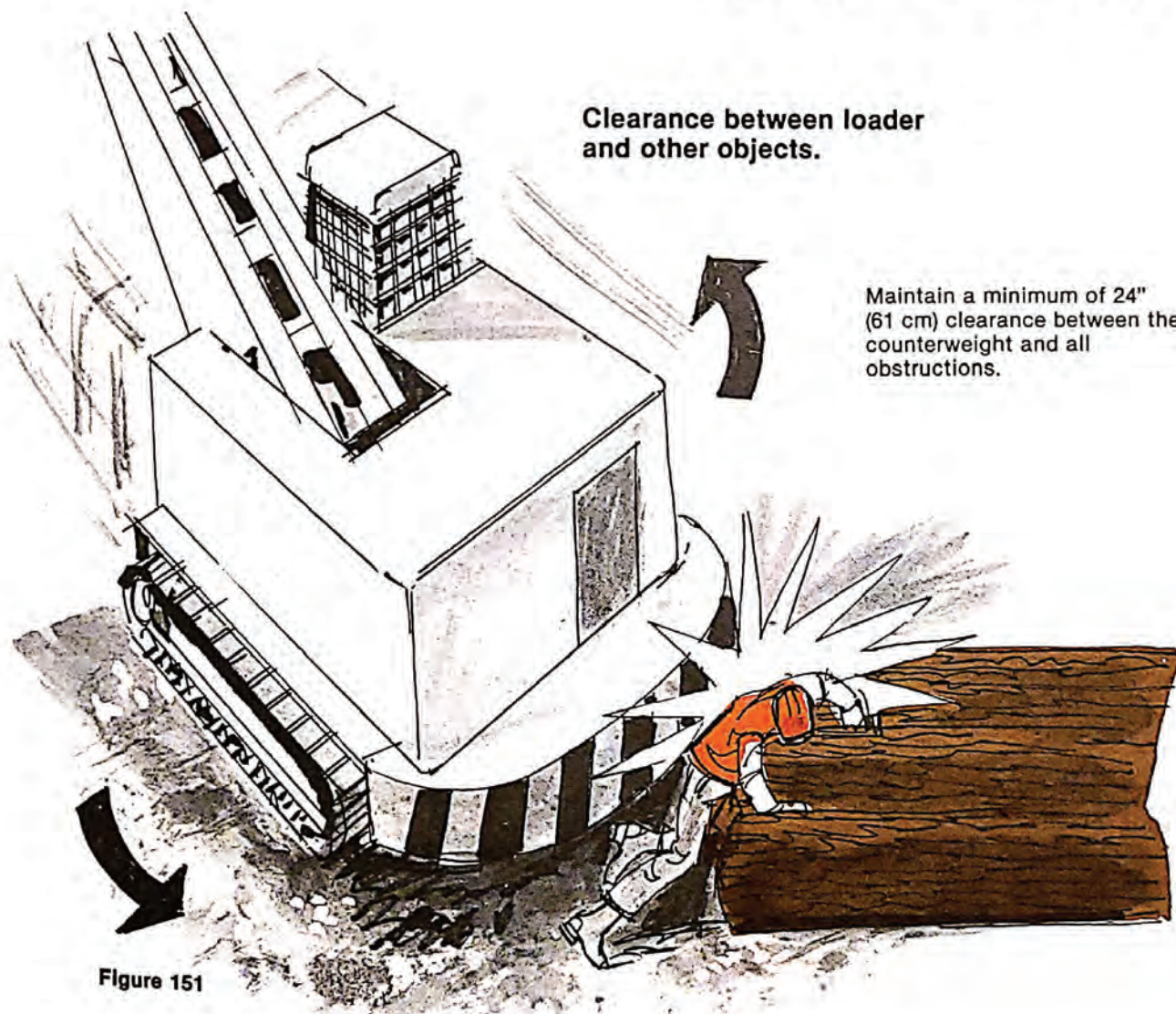
To ensure that the landing workers are not crushed,

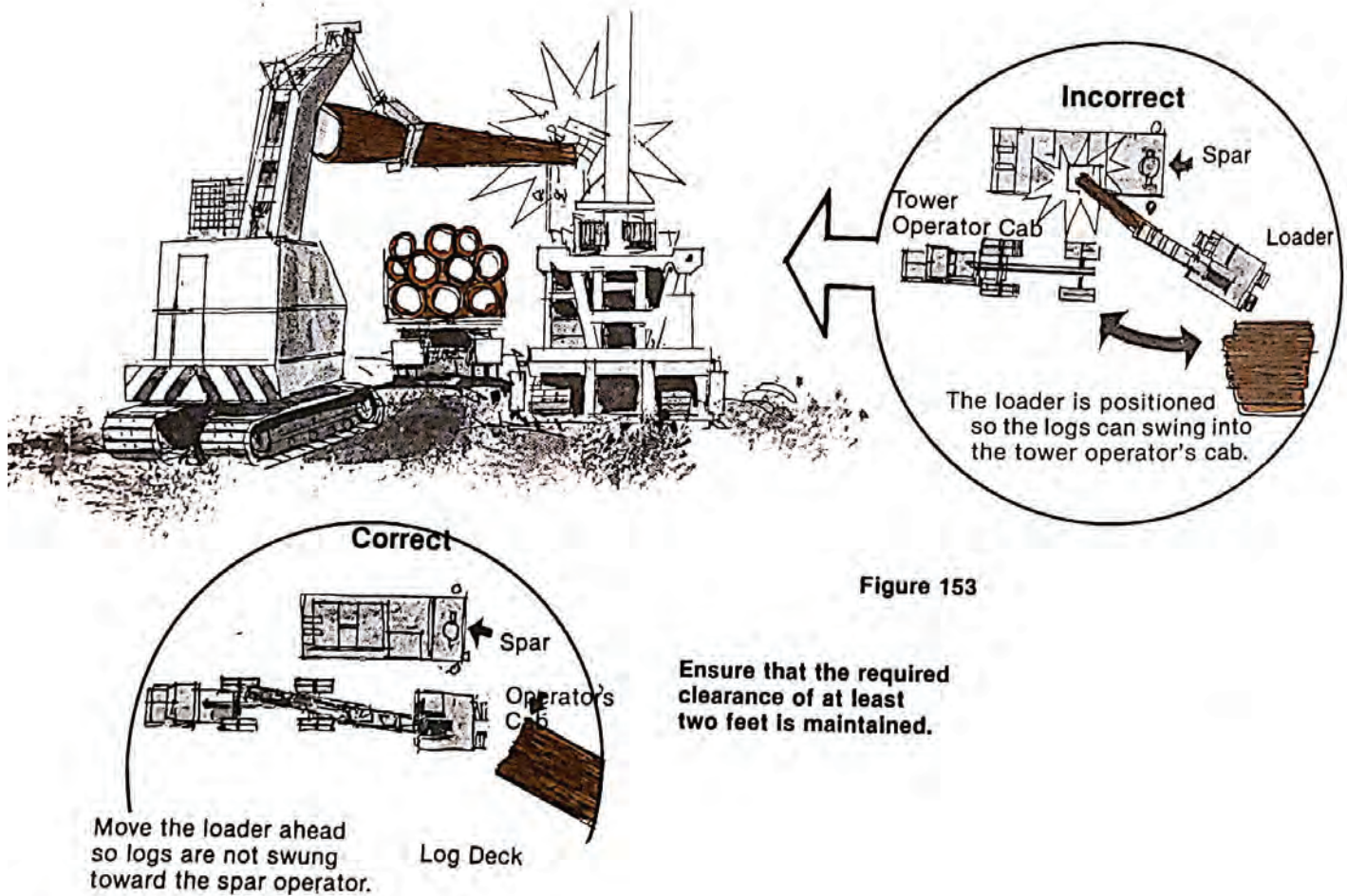
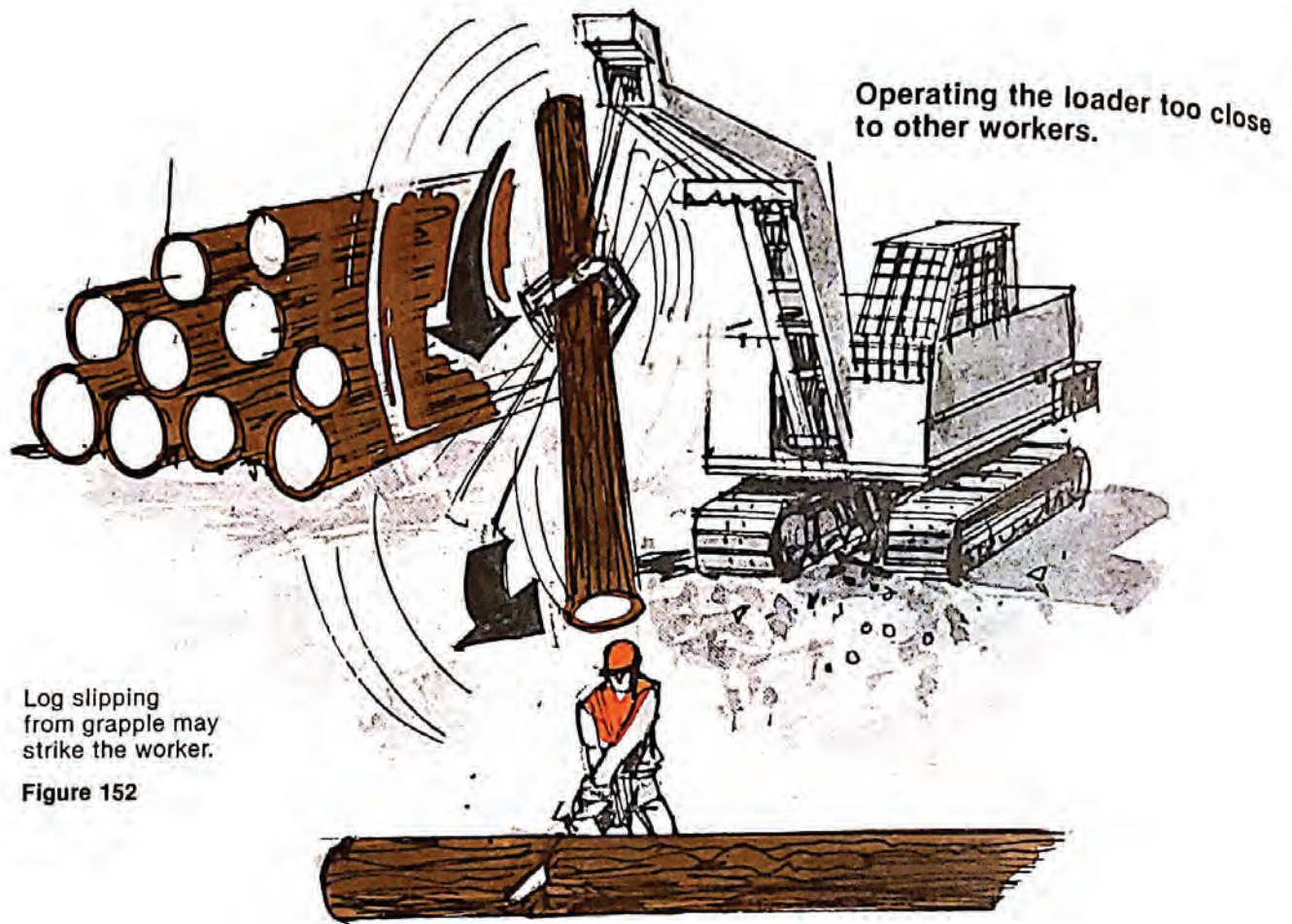
- a. Keep a minimum of 24" (61 cm.) clearance between the counterweight of the loader and all obstructions. The loader operator shall always be alert for logs that may be kicked within this 24" clearance.
- b. If the minimum clearance is not maintained, workers must notify the loader operator immediately.

- c. Workers must always notify the operator when they are approaching the loader and get his permission to enter the work area.

2. Operating the Loader Close to Other Workers

- a. Never swing the grapple or log over workers.
- b. Always lower the grapple or load to the ground before leaving the controls.
- c. Safe work areas shall be allocated for bucking and limbing.
- d. Before using the loader, the operator must be able to see or know the whereabouts of log truck drivers as well as the landing workers. He must be sure that they are out of the danger area.





3. **Loading Trucks Alongside the Yarder**
Make sure that the truck and loader are positioned so that logs will not be swung toward the yarder engineer's cab.
4. **Operating Loader Directly Above Rigging Crew**
 - a. When the rigging crew is working below the landing, the operator must be care-

ful not to dislodge or throw material such as unstable rocks, logs and chunks, which may roll down onto the crew.

- b. The loader operator must avoid striking the yarding lines, since this can move the butt rigging and endanger the rigging crew below.

Operating loader directly above rigging crew.



Figure 154

Unloading the trailer.



Landing worker should stand well clear of the equipment.

Figure 155

5. Unloading the Trailer

- The loader must be positioned so that it will not overbalance when lifting the trailer from the truck.
- Handling trailers must be done smoothly and steadily to protect workers who may have to hook-up the trailer to the hitch.
- The loader operator should make sure trailer lifting strap is strong enough.

Loading the truck. Binders must be put on before the truck leaves the landing. If truck must be moved before binders are put on, workers must stay in the clear while the truck is in motion.

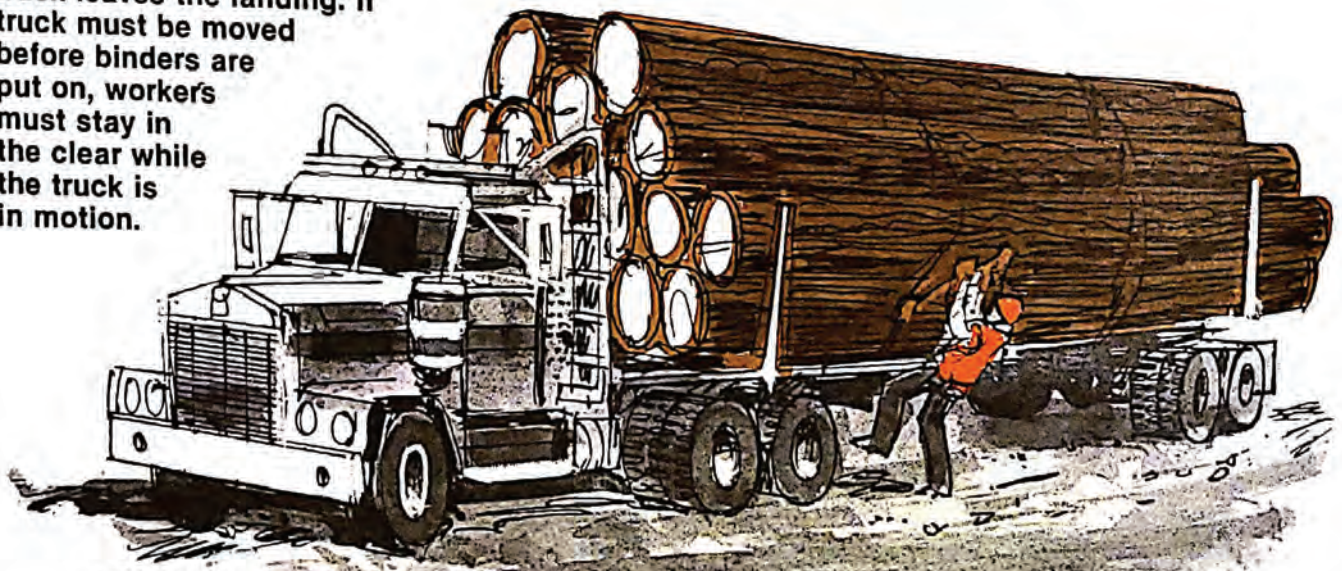


Figure 156

- Always make sure the truck and trailer are well spotted before lifting.
- When a trailer is not properly balanced, lower it to the ground and reset the grapple before the landing worker approaches the reach.
- Ensure the landing worker remains well in the clear before lowering the trailer to the ground.

6. Loading the Truck

- Bunk and stake logs must be firm, substantial and extend far enough beyond the bunks and stakes so that they will not slip off during transit.
- Sufficient turning clearance between the bulkhead or watertank and the load must be maintained at all times.
- The load must be properly balanced.
- Limbs must not be able to foul airlines or tires. Limbs that stick out must be removed before the truck leaves.
- The top logs must be firmly set. Chunks should not be put on top of the load, as they are difficult to restrain with binders and can be dangerous to unload at the dump or dry land log sort.
- Side logs should never be placed on top of the stakes.

CLOTHING AND PERSONAL PROTECTIVE EQUIPMENT



CLOTHING AND PERSONAL PROTECTIVE EQUIPMENT

Proper clothing for loggers.

KEY POINTS:

- Wear proper clothing
- Good calk boots
- Good gloves
- Stag pants
- Keep your calks in good condition
- Keep your safety headgear in good condition — renew liner when necessary

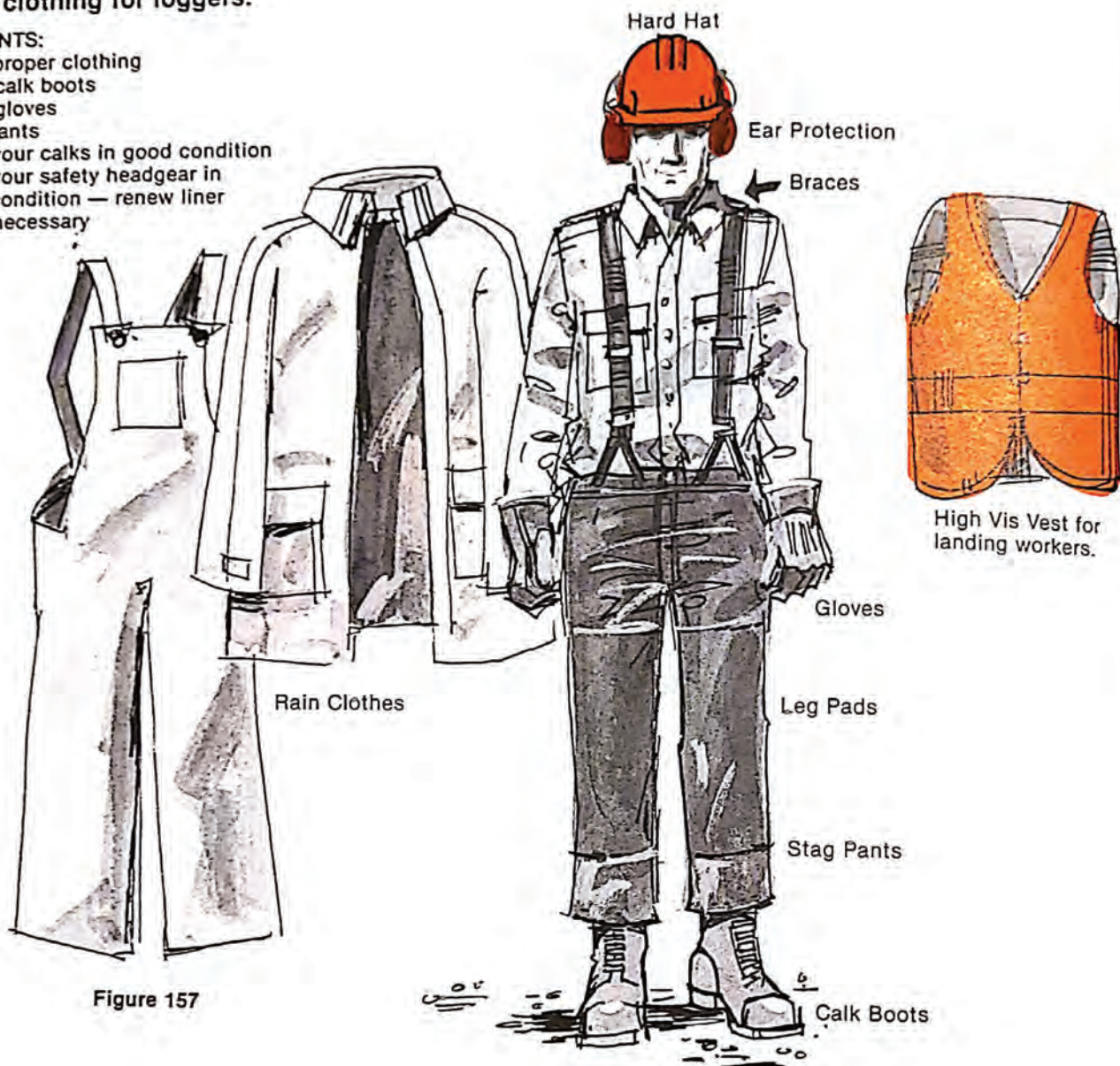


Figure 157

1. Clothing

The type and condition of clothing worn by yarding and loading crews is important in the prevention of accidents and injury.

Clothing should fit fairly close about the body of the worker. It should be loose enough for the worker to move freely but not enough that it can be caught up on moving machinery, lines, bushes, broken limbs, roots and other similar debris.

Trousers should be "staggered-off" to prevent hang-ups and the waistband and legs should be reasonably loose.

Suspenders will hold trousers at a comfortable position even if they get rain-soaked.

Clothing must be strong and durable and must keep the worker warm and dry in weather conditions such as snow, rain, sleet and wind. Workers do not function nearly as well when they are cold as when they are warm and dry. Wet, uncomfortable workers are more likely to have accidents and less able to scramble out of the way of danger.

Good wool underwear and raingear are necessary along the B.C. Coast during the cool, rainy period from autumn to spring.

2. Safety Headgear

All yarding and loading workers must wear safety headgear for protection from falling, flying or thrown objects. The headgear must be in good condition, in accordance with Industrial Health and Safety Regulations 14.12 (1) and 14.28. The only exception to this rule is for yarding engineers and loader operators while they are inside their cabs.

The brim-type is preferred because it deflects rain, and gives side protection from branches, lines and flying wood debris. The head harness or suspension inside the safety headgear can be adjusted for proper fit. There must be a minimum of one and one quarter inches (3.1 cm) between the suspension and the crown of the hat shell. In high winds or other conditions which might dislodge headgear, chin straps or other effective means shall be used to make sure they stay on. Safety headgear shall be a high-visibility colour as required by Industrial Health and Safety Regulation 60.10 and shall meet the requirements of the CSA and other standards acceptable to the Board.

3. Calk-Soled Footwear

All rigging and landing crew workers who must walk on logs shall wear calked footwear, in accordance with Industrial Health and Safety Regulation 14.10. Footing problems for yarding and loading workers are aggravated by bad weather, difficult terrain and awkward work positions. Yarding and loading workers often have slipping and falling injuries and must be careful of where and how they stand or walk.

Different types of calked footwear are available. Rubber or composition soles with screw type calks are made for snow conditions and leather soles with drive-type calks are best for dry weather. Worn calks are not effective and should be replaced.

4. Hand Protection

Workers handling chokers, wire rope cable and other equipment which is liable to cut, scrape or irritate the hands shall wear effective hand protection as required by Industrial Health and Safety Regulation 14.16.

5. Leg Protection

Chasers, landing buckers and other workers on yarding and loading crews who operate power saws shall wear leg protective devices. This will protect them from cuts from saw kickbacks in accordance with Industrial Health and Safety Regulation 14.04 (2). A ballistic nylon pad can be sewn or fastened into the trousers. This should cover the area from at least 12

inches (30 cm) above the knee to 5 inches (12.8 cm) below the knee. Recent improvements in leg protectors have encouraged power saw users to wear them and there have been far fewer kickback injuries. Leg protective devices shall conform to WCB Personal Protective Equipment Standard 14.1 or other standards acceptable to the Board.

6. Eye Protection

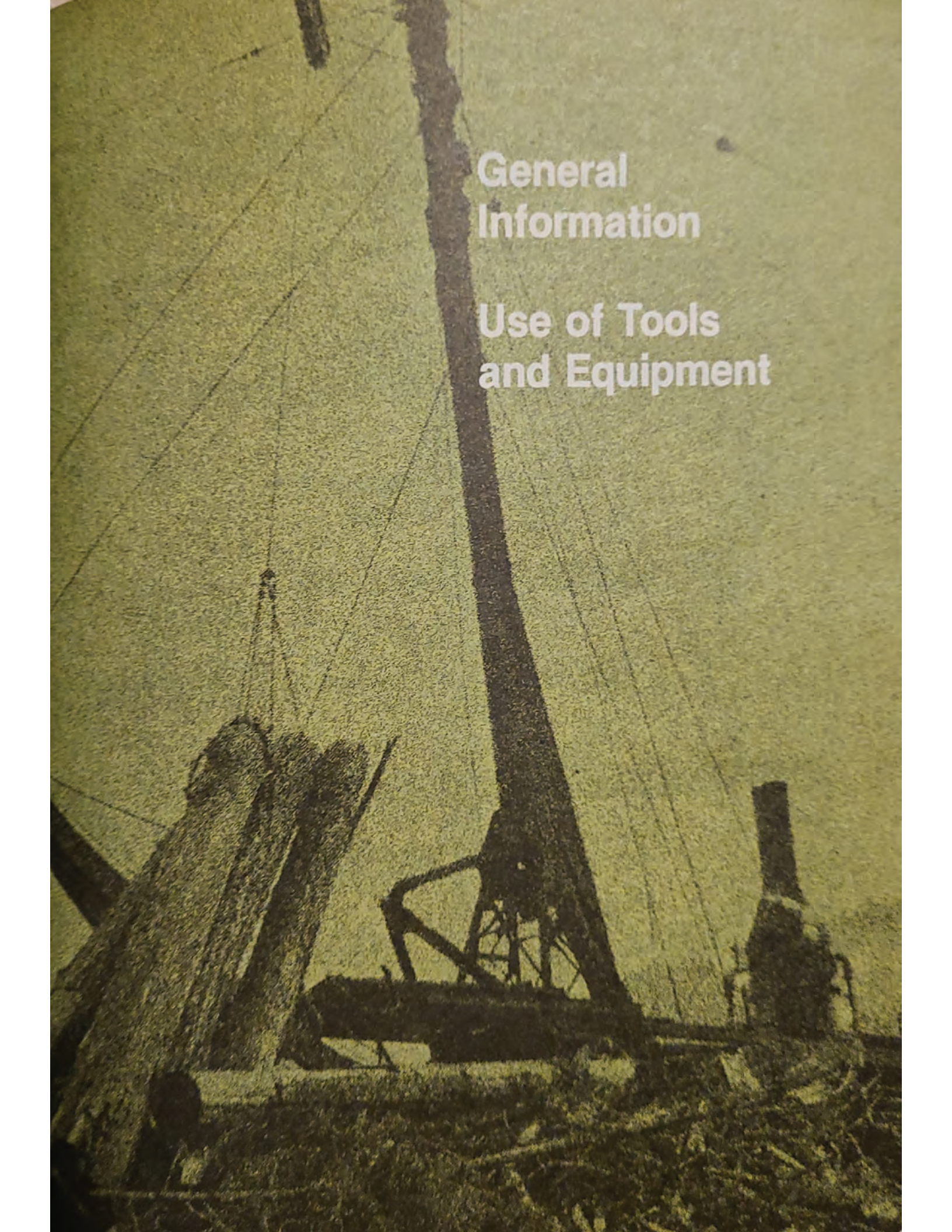
Workers who cut wire rope and operators of power saws shall wear eye protection whenever they are in danger of eye injury, as required by Industrial Health and Safety Regulations 14.21 and 60.124. Face shields, properly fitting goggles or other effective eye protective equipment will prevent injury from thrown sawdust and chips or pieces of wire and cutting tools.

7. Hearing Protection

Yarding and loading workers who are exposed to loud noise shall wear hearing protection as required by Industrial Health and Safety Regulations 13.21 and 14.27. Hearing protectors are usually of the muff type or insert plugs. Both types protect workers from harmful noise and will not prevent them from hearing what they need to on the job. Warning signals and speech in noisy areas often can be heard better by a worker wearing hearing protectors. Generally, yarding and loading equipment noise levels are not over 100 dBA and operators can obtain the desired protection by using earplugs. Landing buckers, chasers and other workers who operate power saws need Class "A" muff type hearing protectors.

8. Protection from Moving Vehicles and Equipment

Landing workers such as chasers, second loaders and buckers must wear high visibility fluorescent red vests so they can be seen by equipment operators. The vests must be in accordance with Industrial Health and Safety Regulations 14.06 and 60.246.

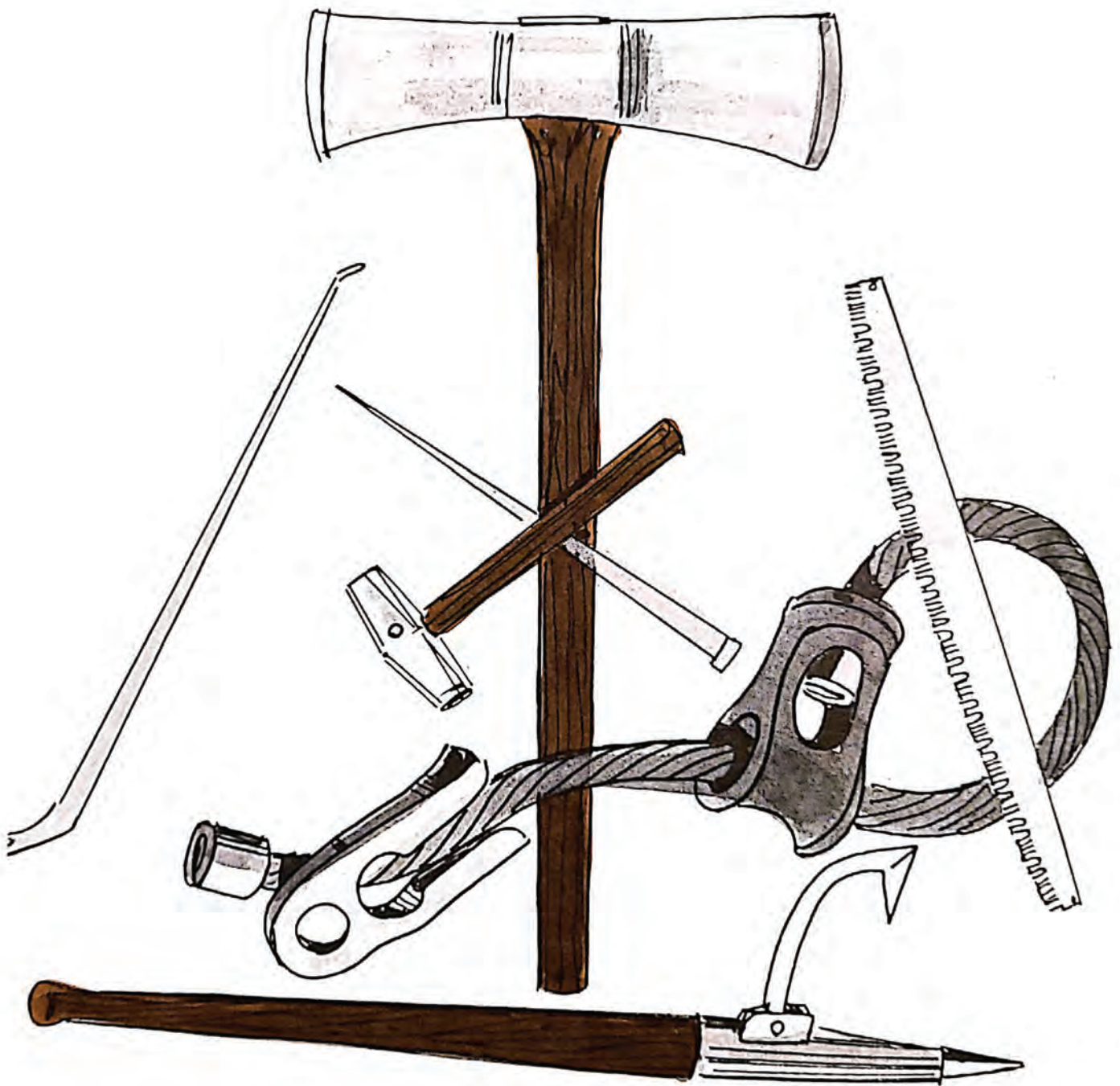


**General
Information**

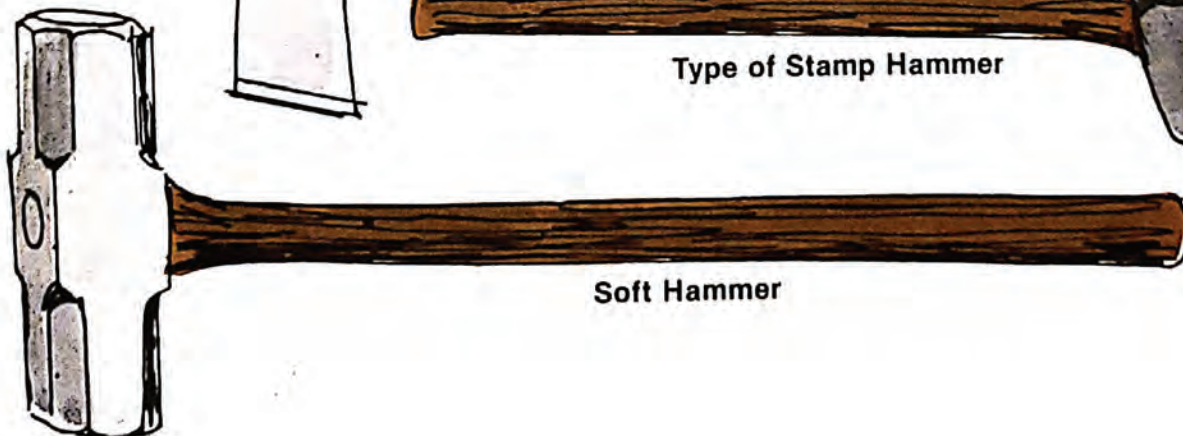
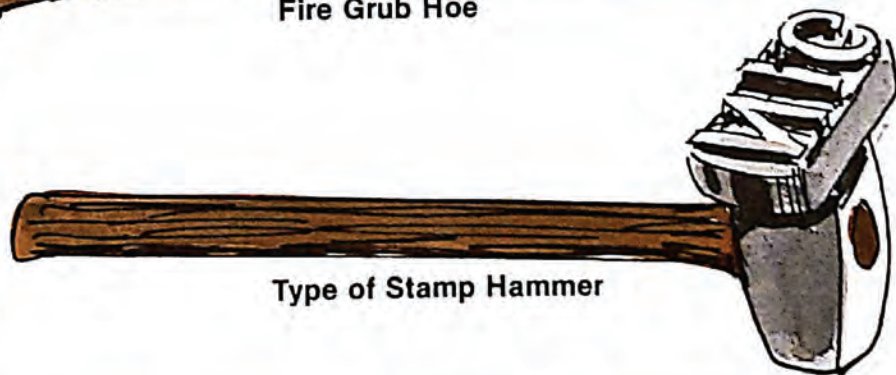
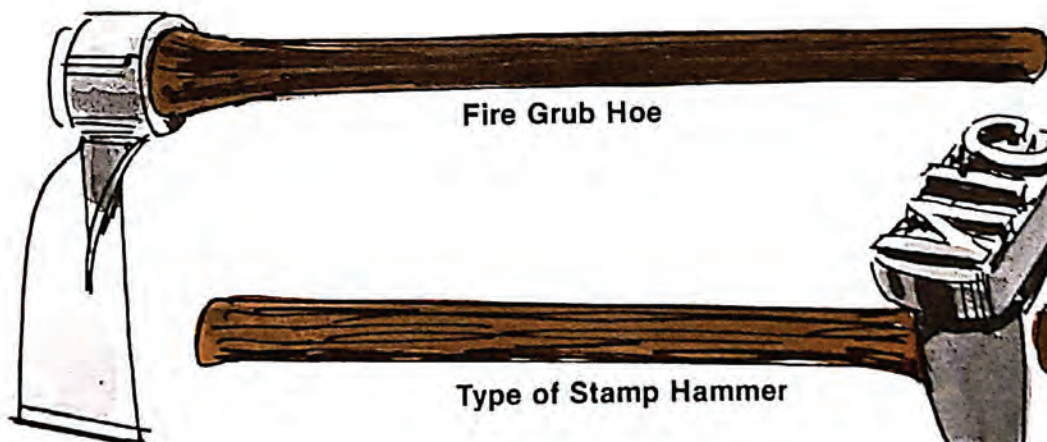
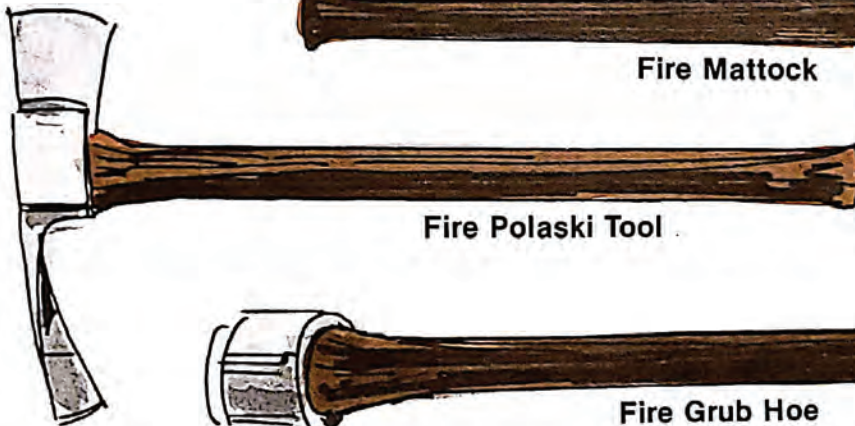
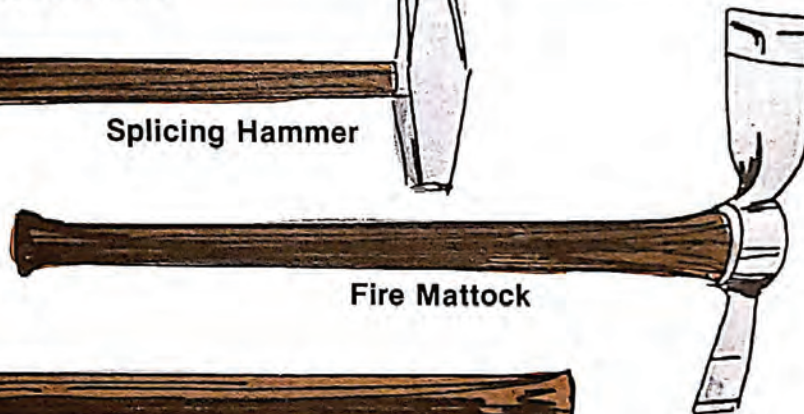
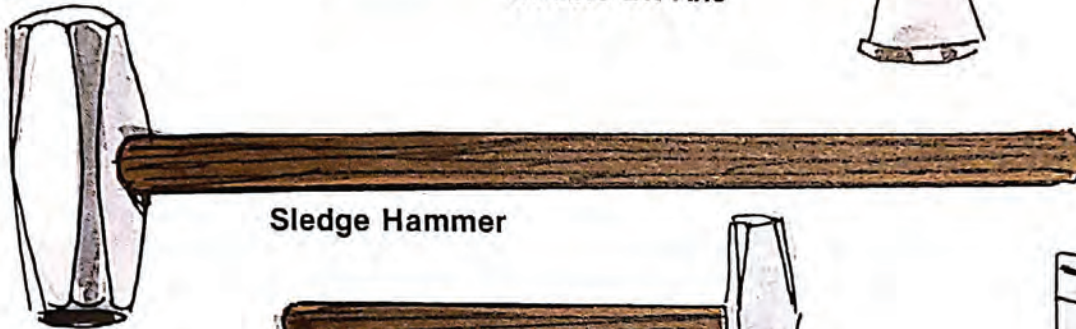
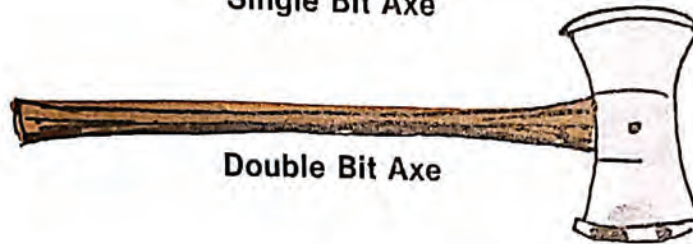
**Use of Tools
and Equipment**

TOOL AND LIGHT RIGGING SECTION

PROPER CARE AND STORAGE MAKES
EASIER AND SAFER WORK



**EQUIPMENT MOST COMMONLY USED
BY YARDING AND LOADING CREWS
HAMMERS & OTHER HAND TOOLS**



Axes, Sledge Hammers, Splicing Hammers, Stamping Hammers, Fire Tools

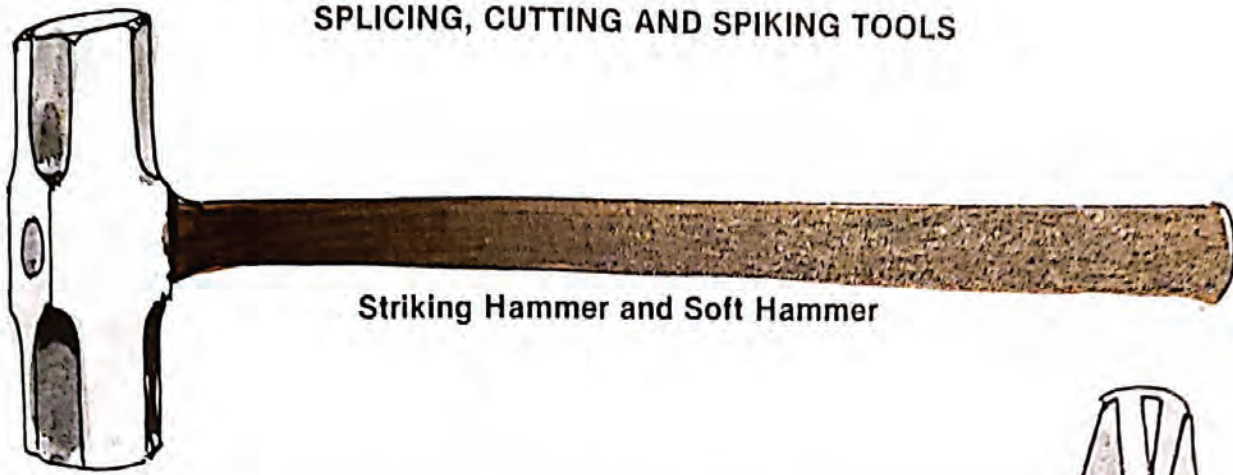
1. The heads must be tightly hung and axe heads pinned.
2. Handles must be free of breaks or splits.
3. Do not use long handles on splicing and stamp hammers.
4. Do not use extra long handled hammers for spiking or line cutting.
5. Soft headed hammers must be used for line cutting.
6. The use of double bit axes should be discouraged around the landings.
7. Do not leave axes, polaski tools, or mattocks driven into logs, etc.
8. Always set mattock and grub hoe head by striking end of the handle before using.
9. Do not rely on putting hard hammer heads into a fire to soften; this does not always work, particularly if the head is not cooled slowly.

Splicing, Cutting and Spiking Tools

1. When spiking guylines or driving spikes into any hard wood, be certain that the spike is driven in securely before striking hard with the hammer.
2. Do not use a burled or round headed hammer for driving spikes.
3. Remember to remove all spikes when the job is finished.
4. Crooked, twisted track spikes that cannot be straightened easily should not be used.
5. Be cautious when attempting to straighten bent spikes.
6. Always wear eye protection when cutting line.
7. If holding line for another worker to cut, do not look directly at the wire cutter.
8. To avoid cutter bouncing around and cutting wire in several places, do not set guillotine type cutters on hard surfaces such as rocks. Use stumps when possible.
9. When starting a cut, be sure to keep the cutting blade in the same position on the line, to avoid flying pieces.
10. Use a heavy hammer when cutting line.
11. Repair or discard any badly burled hammers, claw bars, or cutter pistons.

12. Do not strike hard with hammer when the line is nearly severed, this will damage the cutter or cutting blades.
13. When using a piston or guillotine type cutter, stand on the closed side.
14. Remember, even a hydraulic cutter can throw line slivers.

SPLICING, CUTTING AND SPIKING TOOLS



Striking Hammer and Soft Hammer



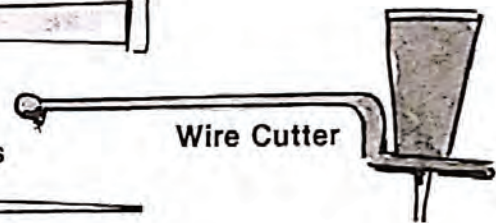
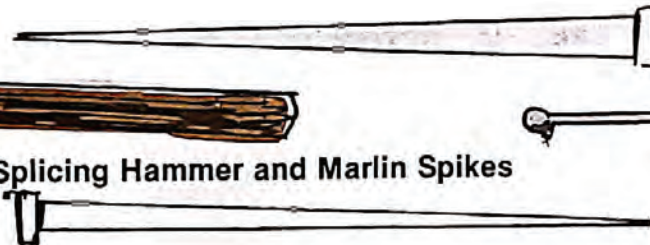
Sledge Hammer



Claw Bar (Spike Bar)



Soft Splicing Hammer and Marlin Spikes

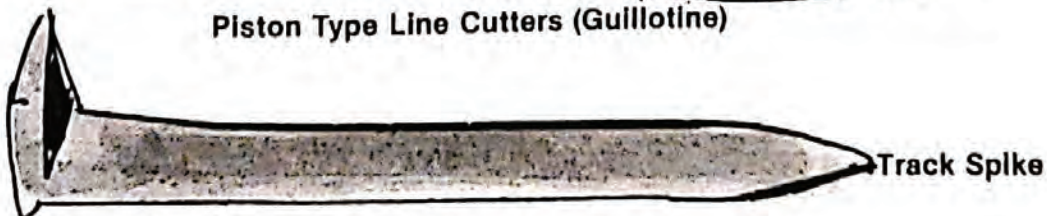


Wire Cutter



Eye Protection Goggles

Piston Type Line Cutters (Guillotine)



Track Spike



Two Types of Strawline Hooks

1. Inspect hooks for damage, wear and springing open.
2. Ensure that the hooks are the correct size for the line used.



Strawline Swivel

If strawline swivels are used, they must be inspected frequently as they generally wear rapidly.

Double End

Strawline Extension End Connection

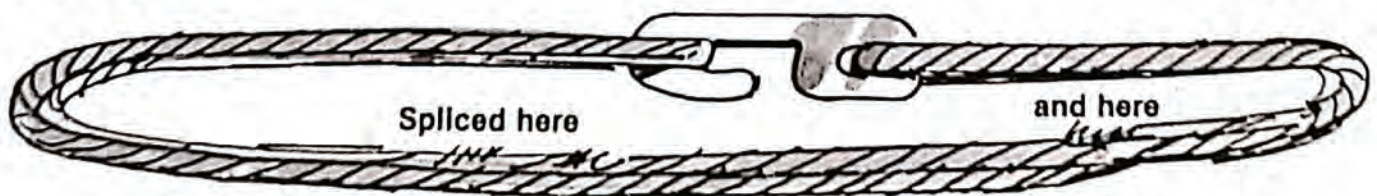


1. When tying the knot, be careful to attach the strawline hook so that the hook will be in the desired position to ensure that the connection is secure.

Double End

Hindu Strawline Connector

Double End



2. The eyes in Hindus and extension ends should be spliced large enough so that the line is double.

COMMON RIGGING OR PASS CHAIN

1. Generally 1.5 meters in length.
2. Manufactured with 1.1 cm ($\frac{7}{16}$ ") or larger diameter, high quality coil chain.
3. The large end ring (preferably elongated) must be made of larger diameter steel than the chain links.



Stretched Chain



Chain Worn Inside Links

Check chain for damaged, worn or stretched links.



Good Chain



Cold Shot Link



Swing Link



Missing Link



Lap Link

1. If chain has been spliced with connectors, ensure that the connectors are the correct size and installed properly.

2. Only temporarily and in an emergency should a Molly Hogan be used to join a broken chain.

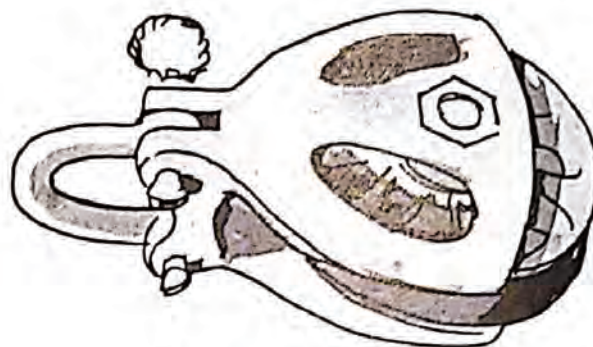
BLOCKS

1. When carrying, keep Mollies away from neck or face.
2. Do not lift by the sheave. Hold by the gooseneck and swing onto the shoulder.
3. If you trip when carrying, throw the block clear.
4. Do not deliberately throw blocks down rock bluffs — it can cause damage that will be hard to see.



Tommy Moore Block

Tommy Moore block — very light, about 12 kg. (28 lbs.) generally roller bearings designed for extensive use, wide throat for running extensions, eye splices, etc. through.



Typical Haulback Block

5. Weight generally averages from 22 to 45 kg. (50 to 100 lbs.).
6. Ensure block is designed for the size of line running through it.

NEVER BE POSITIONED IN THE BIGHT OF ANY BLOCK.



Passline Block

Passline or similar block — very light, about 11 kg. (25 lbs.) and generally too narrow to run Hindus or strawline extension through. Normally not designed for continuous running.

Moving or Dutchman Blocks

1. Not that common on mobile spars, but may be on hand for heavy loadings, snubbing, towing, or when a Dutchman is used.
2. Weight — generally averages from 68 to 192 kg. (150 to 425 lbs.). Get help when moving, use the strawline.



Moving Block with Dutchman Guard

All Blocks

1. Check goosenecks for wear, tightness of sheave and shells.
2. Use proper pins — not bolts unless high grade.
3. Grease regularly.
4. Use proper size Mollies when used in pin holes.



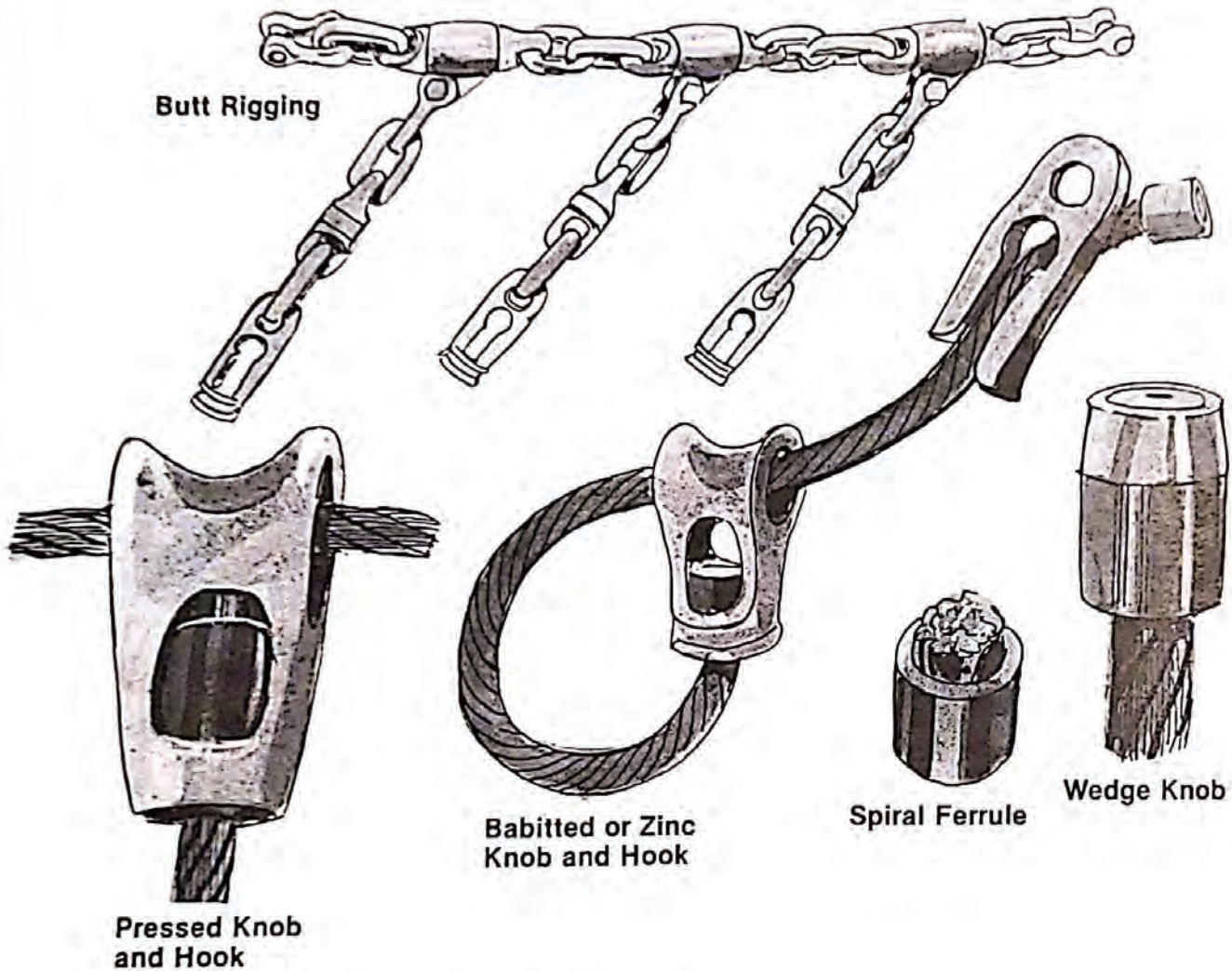
Moving Block

STRAPS

1. Coil straps up for carrying and be careful of eye splice strand ends.
2. Always use strap that is adequate for the size of the line running through the block.
3. Use a strap long enough to let the block align, and place both eyes in the gooseneck or shackle.
4. Used line shall not be used for haulback straps.
5. Spliced eyes in straps shall have not less than three full tucks and the strands must be trimmed short.
6. Straps made with pressed or swaged eyes must meet the requirements of I.H. & S. Regulation 54.18.
7. When straps are used for snubbing and towing equipment, be aware that the strap can cut on metal edges; use a heavier strap or double when necessary.
8. Always notch stumps so the strap will not lift off.
9. Do not use lang lay line for straps, if possible.

BUTT RIGGING AND CHOKERS

Can weigh up to 453 kg. (1000 lbs.)



Pressed Knob and Hook

1. Check buttrigging at frequent intervals for loose shackle pins and worn parts.
2. Be cautious of jagers when handling chokers.
3. Ensure that the choker hook is the correct size for line used.
4. When chokers are made on the job-site, be certain correct size spiral or wedge knobs are used and fitted properly.
5. Stay clear of swinging chokers and don't stand under the buttrigging.
6. Discard badly worn or jaggered chokers.

SHACKLES

1. Shackles must be inspected regularly for damage and wear.
2. Screw shackle pins must be tightened securely and not used in any standing or overhead rigging.
3. Shackles with pins using securing nuts with Mollies or Mollies alone shall be used on standing or overhead rigging.
4. Ensure that shackle pin Mollies are rolled sufficiently and fit the pin hole fully, especially on pins without securing nuts.
5. Ensure that shackles and other rigging are not used for purposes for which they were not designed.

SHACKLES AND OTHER CONNECTORS



Mainline and haulback screw pin straight and bell shackles.



Guyline bell and straight shackles with Mollies only



Guyline anchor shackle with nut and Molly



Guyline anchor shackle with Molly only



Guyline connecting bell shackle with nut and Molly



Light bullcock shackle



Bell type knock-out shackle with Molly only



Guyline knob connector

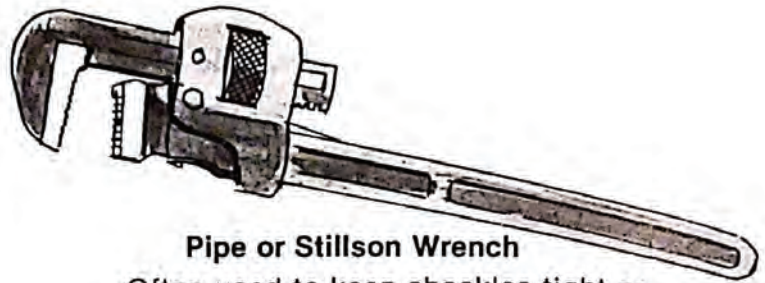


Heavy rigging shackle



Guyline anchor screw hook

OTHER LIGHT EQUIPMENT



Pipe or Stillson Wrench

Often used to keep shackles tight or undo butt rigging.



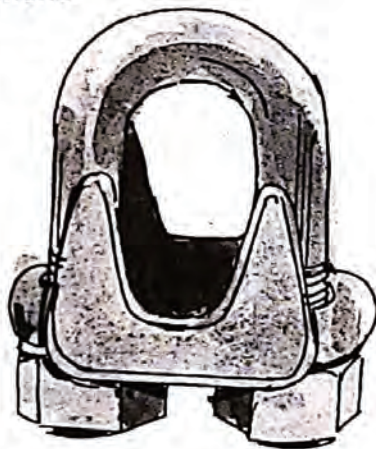
Finger or Pelican Type Links

Sometimes used on steep settings at the back-end on both conventional and skyline operations.



Safety Gasoline Container

1. Always use proper gasoline containers.
2. Store clear of heat or flames.
3. Do not use gasoline for lighting fires.

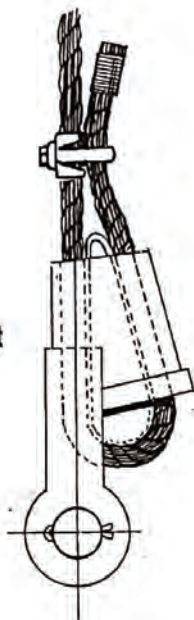


Line Clamp or Clip

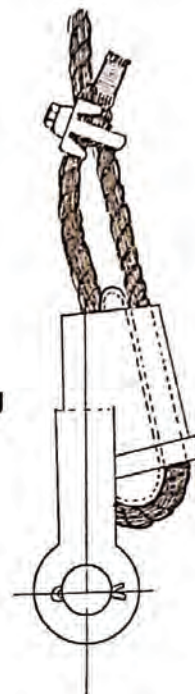
1. The most common clamp used around spars.
2. Install properly as required by I.H. & S. Regulation 54.12. When installing, remember, "Never put a saddle on a dead horse."

**How to properly install wedge sockets.
Used on boom holst lines on
various log loaders**

Correct



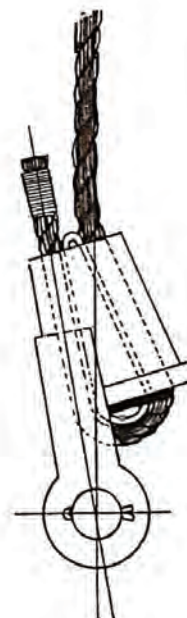
Wrong

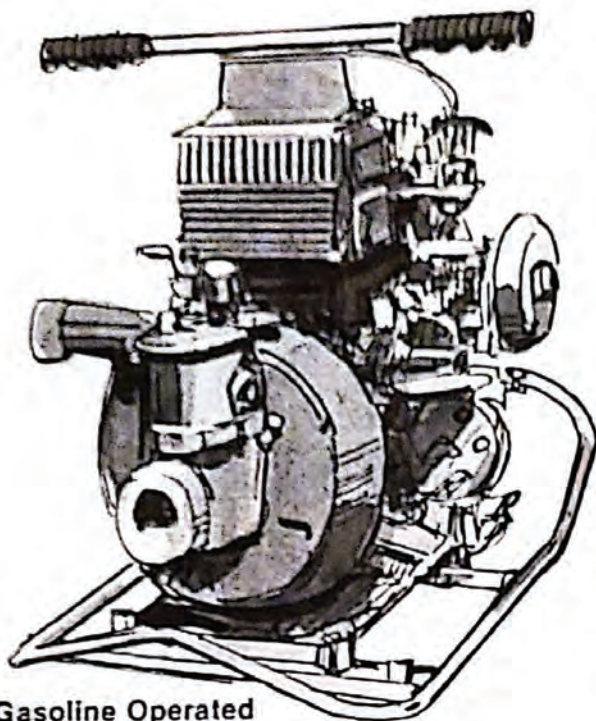


Correct

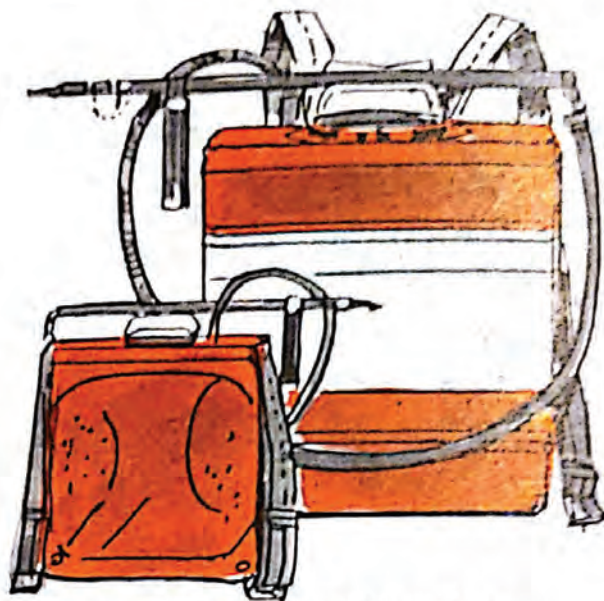


Wrong





**Gasoline Operated
Fire Pumps**
Learn how to
carry and operate.



Back Pack Water Pump Cans

1. Use both straps when carrying loaded with water.
2. Not recommended for use with fuel oil for slash burning.



Dry Chemical

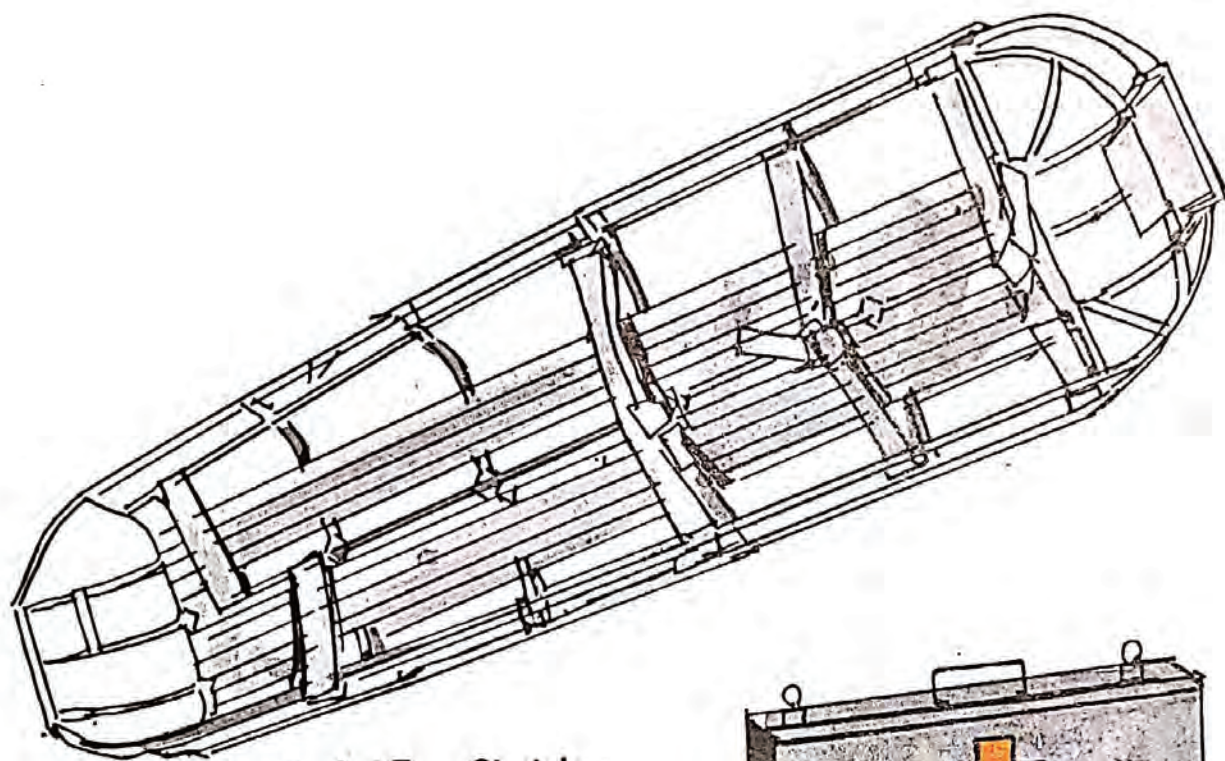


**Carbon Dioxide
Fire Extinguishers**



Dry Chemical





Basket Type Stretcher



First Aid Kits

OTHER LIGHT EQUIPMENT

Know their location and learn how to use.

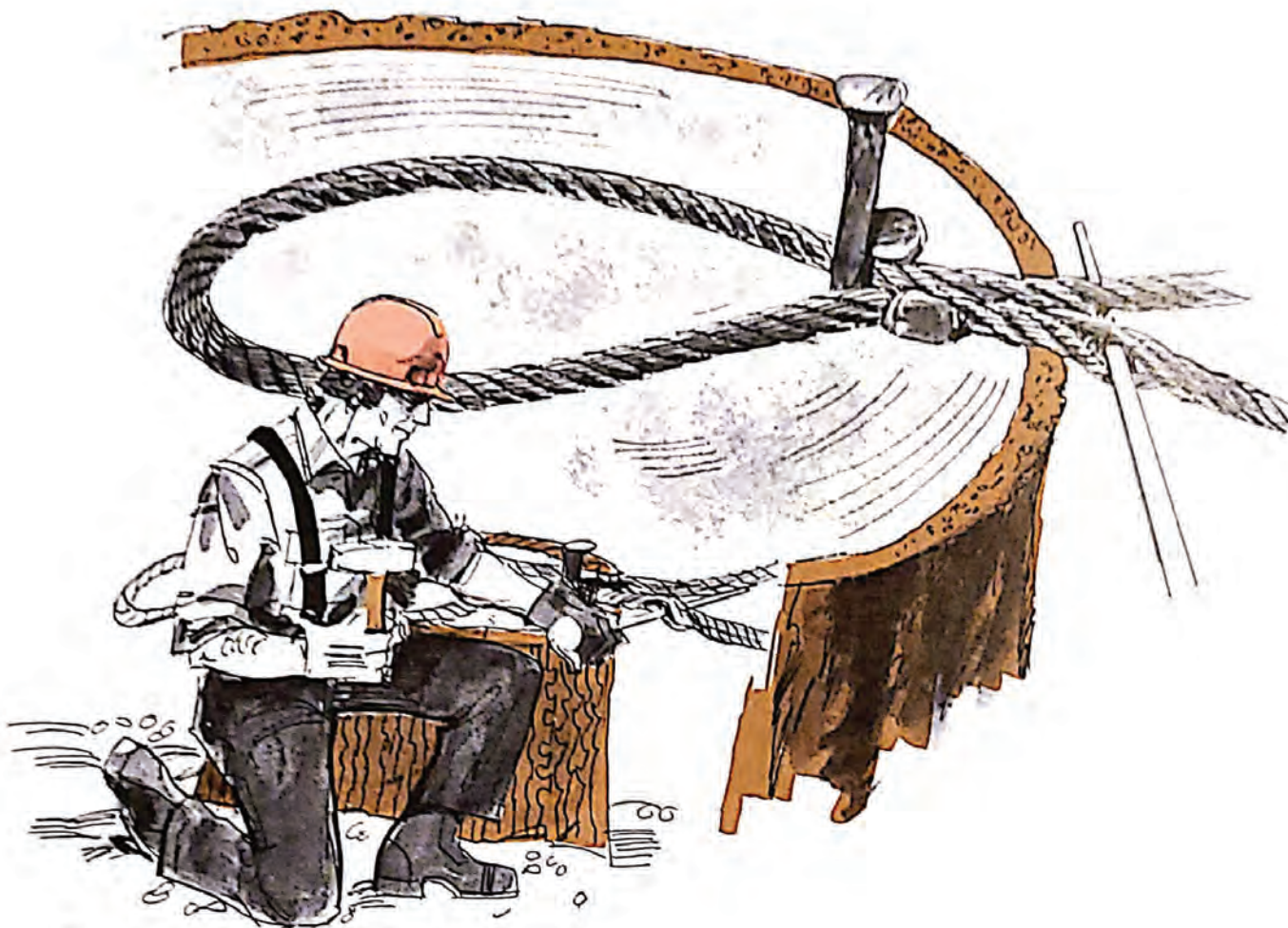


Figure 158

LOGGERS SPLICING MANUAL

As splicing is so important in the daily logging routine the WCB has published an illustrated Logger's Splicing Manual showing how to make the following types of splices:—

- Logger's Eye Splice
- Rolled Eye Splice
- Marine Type Splice
- Long Splice
- Short Long Splice
- Short Splice

Also illustrated are useful variations of other splices such as:—

- Molly Hogans
- Cats Paw
- Farmer's Eye
- etc.

The Logger's Splicing Manual is available from:—

Workers' Compensation Board
Films and Posters Section
5255 Heather Street
Vancouver, B.C.
V5Z 3L8



Regular lay

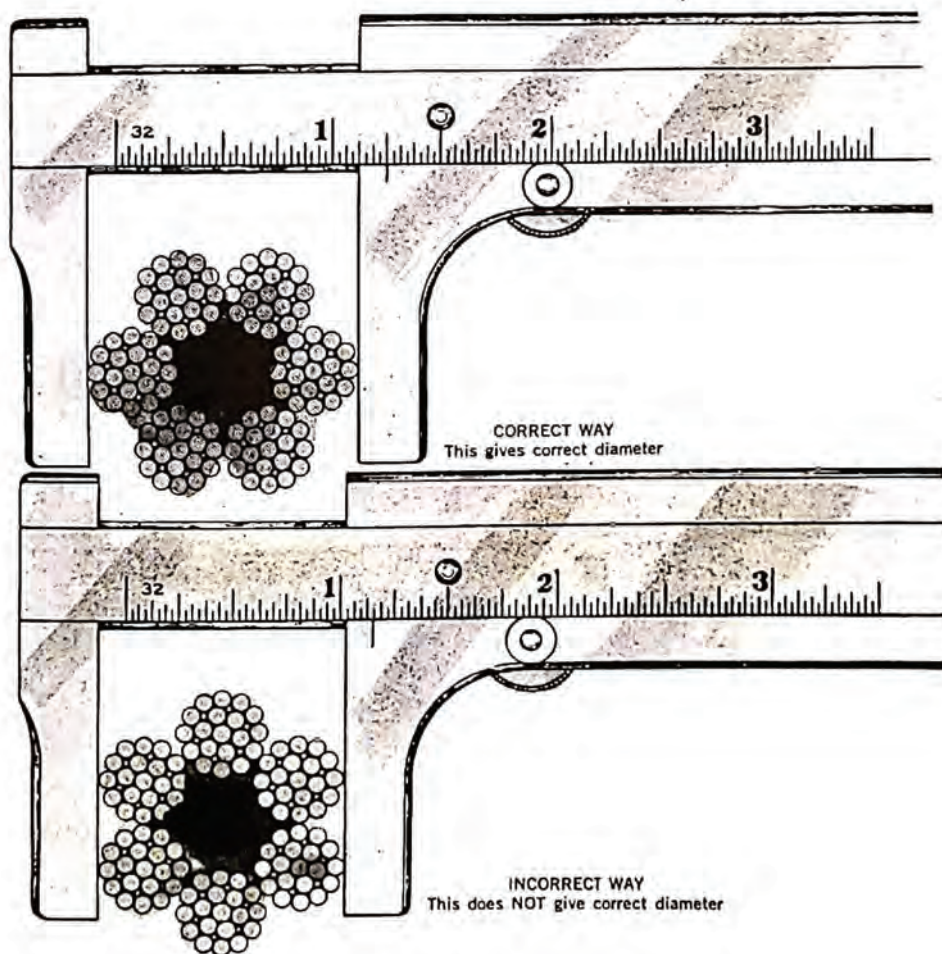


Lang lay

TWO TYPES OF LINE USED AROUND YARDING AND LOADING SIDES

Learn to recognize the two differently constructed lines. Lang lay line is generally used only on line grapple log loader. Lang lay is not recommended for straps, as it is not suitable for the common logger's splice.

Measurement of Line Diameters



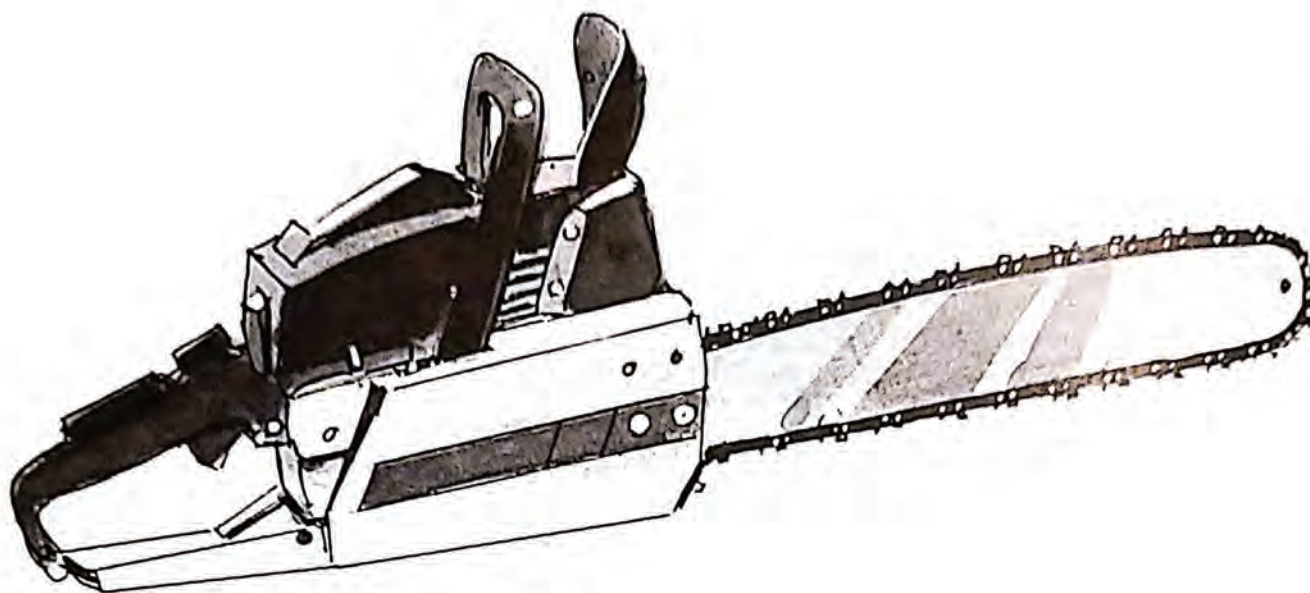


Figure 159

CHAIN SAW

Do not use a chain saw unless adequately instructed, trained or experienced.

A chain saw properly handled and well maintained, helps a worker do his job quickly and safely.

Common causes of injuries are:

1. Working in an awkward position, off balance or with poor footing.
2. The chain tip touching branches, obstructions or other materials.
3. The saw has mechanical problems, such as an improperly filed chain, loose handle bars, clutch drag or improperly adjusted idle speed.
4. The saw chain binding in the cut.
5. The end of the bar striking uncut wood in the cut.

Injuries from saw kick-backs are usually severe, as the chain makes a wide ragged cut. This can mean permanent disabilities for workers. Sometimes an entire leg or arm has been severed when a worker has lost control of the saw.

SAFETY GUIDELINES

1. Adjust the carburetor so that the chain stops when the saw is idling.

2. Make sure that the chain is properly adjusted for tension.
3. When carrying the saw, keep the bar at the rear, so you will not fall on the chain if you trip or stumble.
4. Shut off the engine when carrying the saw any distance.
5. Be careful of the chain and hot exhaust when servicing or filing.
6. When making a boring cut, hold the saw firmly against the body to reduce impact from kick-backs.
7. When sawing limbs, remember that the end of the bar causes most kick-backs.
8. Learn to use the saw equally well, right or left handed, so you will not have to work in awkward positions.
9. Never stand directly behind or straddle the saw. Work to one side to minimize injury from kick-back.
10. After refueling, make sure that the gas cap is tight so fuel will not leak onto clothing. Repair or replace fuel caps which have leaky vents.

Chain saws have very few mechanical safeguards. If the chain is to cut at all, it cannot be guarded. So it is for the worker to learn to use the saw safely.

The following fire prevention rules are included for guidance:



1. Use proper grade of gas and the oil mixture recommended by manufacturer.



5. Move saw at least 10 feet (3 m) from spot of refueling before starting.



9. Keep chainsaw clean of sawdust and oil.



2. Permit hot saw to cool two or three minutes before refueling.



6. Clean carbon from muffler periodically and check muffler once a week.



10. Check fuel lines, fuel cap and connections for gas leaks.



3. Refuel saw only on a spot cleared to bare ground.



7. Set saw on stump or bare ground should saw require mechanical adjustment.



11. Check saw for broken castings.



4. Clean spilled gas from motor before starting.



8. Don't operate saw if it is backfiring.



12. Store fuel in approved container.

NO SMOKING AT ANY FUELING POINTS

Storage Around the Landing

1. When deciding where to store power saws, choose an area around or under the spar which workers can get to easily. The storage area must give protection from incoming turns, moving logs and equipment.
2. Provide protection from weather and keep saws covered.
3. Find a safe place to store the fuel, chain oil and tools.
4. Keep a limb or slab under the saw to protect the chain.

Most operators have power saw servicing facilities for major maintenance and only a few parts and tools need to be kept handy, such as:

Files, bar and spark plug wrench, spare starting rope, chain, fuel filter and fire extinguisher.

Filing the Chains

Workers have been seriously injured when unguarded file tangs in their pockets were punched into their backs. Always keep file tangs guarded.

Many workers have injured their hands when filing saw chains. Choose a file handle which will provide a good grip and prevent the hands from being cut by a chain or file tang.

Find a safe clear location to file chains or "monkey wrench" saws.

Points to Remember when Operating the Saw

1. Operator must be qualified.
2. Wear adequate personal protective equipment:
 - a. Safety headgear.
 - b. Safety goggles or screen (recommended).
 - c. Leg protective devices.
 - d. Gloves.
 - e. Hearing protection.
3. Coordinate bucking and limbing activities with the loader and yarder operators.
4. Do not work under running lines.
5. Avoid bucking and limbing on truck loads. If you must work on the load, use extra care.
6. Hold the saw securely with the thumb tightly tucked around the handle bar.

7. Do not attempt to buck or limb if the log is in a hazardous position. Have the log moved to a safe location.
8. If the saw requires filing, adjusting, etc., it should be done at the earliest convenient opportunity to avoid a sharpening which could cause delays and disruptions to the work pattern.
9. Remove rocks, mud, etc. from logs before bucking to avoid dulling the chain.
10. Avoid touching limbs or other objects with the tip of the bar. This will reduce the danger of kick-backs or having the chain fly off.
11. Carefully check limbs under tension. When cut up, these could cause a log to roll or the limb to spring back and hit the buckler.
12. Use caution when cutting small brush and saplings. Slender material may cause the chain to come off or pull the worker off balance.

GENERAL

1. Power saws and fuel shall not be carried in the crew compartment of vehicles. They must be isolated from the passengers. I.H. & S. Regulation 28.04(1).
2. No materials, tools or equipment shall be kept in crew compartments, unless they are secured so they cannot injure workers.

RADIO WHISTLES – VARIOUS TYPES

1. A great deal depends on proper use and care of radio whistles.
2. Handle with care at all times.
3. Keep properly charged as required.
4. Do not use if not working properly.
5. Make sure that the radio whistle operator fully understands how to use it.

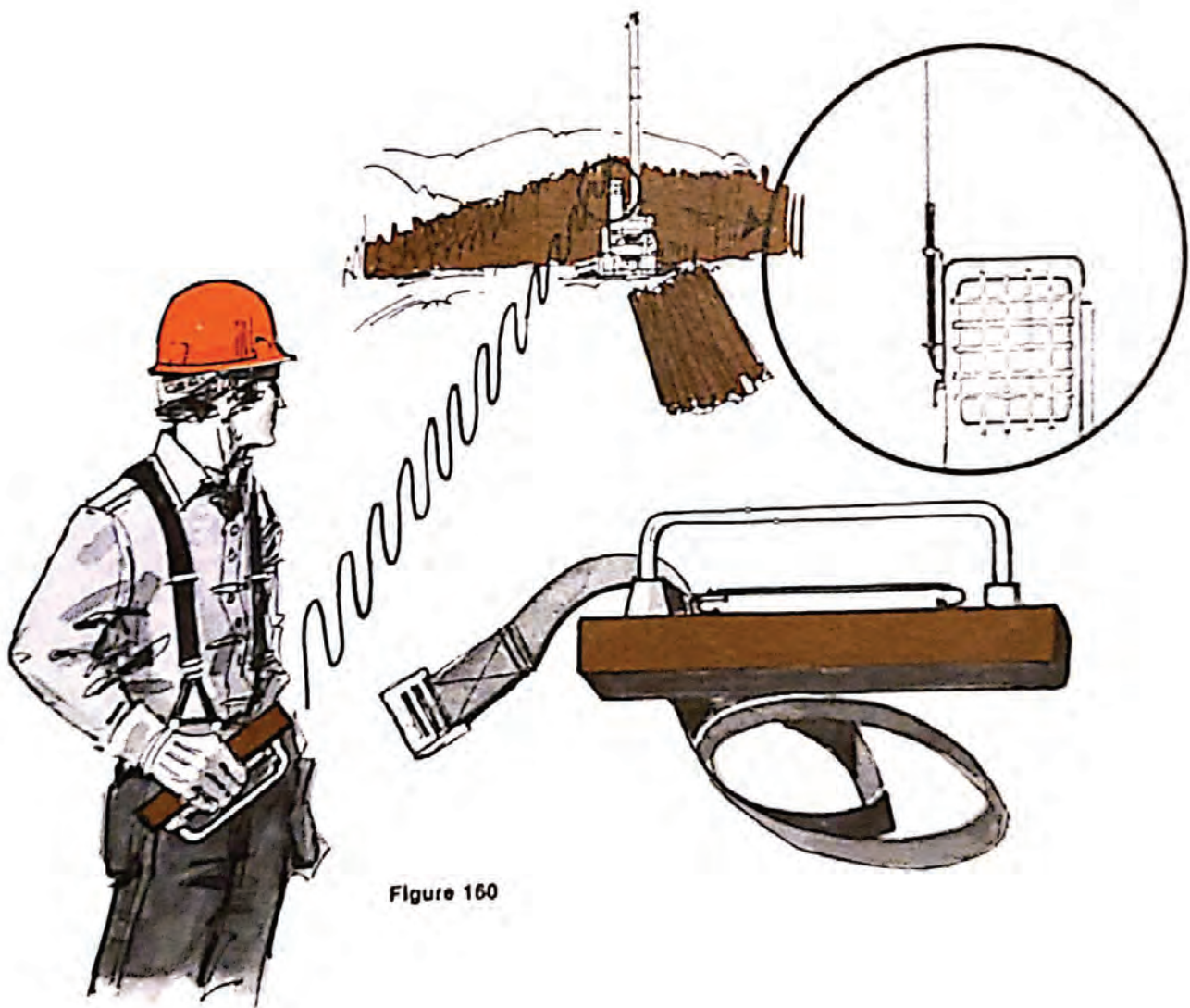


Figure 160



Appendix "A"

Audible and Hand Signals Used In Yarding and Loading

Audible Signals for Logging Operations

Call Signals

| | |
|--|---|
| ACCIDENT..... | Seven long whistles. |
| EMERGENCY HAZARD CONDITION..... | One long whistle, continued until emergent condition has ceased to exist. |
| FIRE..... | One long—several short whistles, repeated. |
| STARTING WHISTLE..... | One long whistle (*also used by the equipment operator to indicate a delay and shall also be given before the equipment is again operated). |
| CALLING FOREMAN..... | Four long whistles. |
| CALLING HOOKER..... | Three long whistles. |
| CALLING HOOKING CREW..... | Three long—several short whistles. |
| CALLING SECOND RIGGER..... | Two long—one short whistle. |
| CALLING SECOND RIGGER AND BACK RIGGERS..... | Two long—several short whistles. |
| CALLING FOR WATER BAG..... | One short—one long whistle. |
| *When an operating delay has occurred and the equipment is ready to re-operate, the signal immediately following the “one long” re-start signal, shall be the repeat instruction signal. | |

Vehicle Operations

| | |
|---------------|-----------------|
| BACK UP..... | Two whistles. |
| GO AHEAD..... | Three whistles. |
| STOP..... | One whistle. |

Operational Signals for High Lead Logging

| | |
|---|---|
| AHEAD*..... | Three short whistles. |
| AHEAD ON STRAWLINE*..... | Three short—pause—one short whistle. |
| BACK*..... | Two short—pause—two short whistles. |
| SLACK HAULBACK..... | Two short—pause—series of short whistles. |
| SLACK MAINLINE..... | Series of short whistles. |
| SLOW..... | One long whistle (precedes any signal for slow operation). |
| STOP ALL LINES..... | One short whistle. |
| TIGHTEN LINES..... | Three short—pause—two short whistles. |
| WHEN BUTT RIGGING AT TREE SEND OUT STRAWLINE..... | Three short—one long whistle. |

WHEN BUTT RIGGING

IS AT TREE.....Two short—followed by a number of long whistles indicates the number of chokers required.

*"AHEAD" means haulage line moves toward machine.

"BACK" means haulage line moves away from machine.

Operational Signals for Slackline Logging

Regular signals

AHEAD ON SKYLINE.....One short—pause—two short.

AHEAD ON SKIDDING
LINE.....Three short.

COME BACK ON
HAULBACK.....Two short—pause—two short.

AHEAD ON STRAWLINE.....Three short—pause—one short.

TIGHT LINE.....Three short—pause—two short.

STOP.....One short.

SLACK SKYLINE.....Several short.

SLACK SKIDDING LINE.....Three short—pause—several short.

SLACK HAULBACK.....Two short—pause—two short—pause—several short.

Slow signals

Any regular signal preceded by a long whistle is a slow signal.
Any signal that the Engineer is not sure of is a "STOP" signal.

Miscellaneous signals

| | | |
|--------------|-----------------------------|---|
| THREE SHORT— | When carriage is going back | Hold skidding line tight and keep on coming back until "STOP" signal is received. |
|--------------|-----------------------------|---|

| | | |
|-------------|-----------------------------|--|
| TWO SHORT — | When carriage is going back | Hold skidding line tight, start lowering skyline, keep on coming back. |
|-------------|-----------------------------|--|

| | | |
|--------------------------|--|-----------------------|
| A REPEAT—TWO SHORT | | Slack skyline faster. |
|--------------------------|--|-----------------------|

| | | |
|-------------------|--|--|
| TWO SHORT — | When carriage is going ahead | Pick up on skyline. |
| TIGHT LINE SIGNAL | (Three short pause—two short) when carriage is going ahead | Skidding line is wrapped around skyline. |

When carriage is going back and "STOP" signal (one short) comes in—Engineer stops carriage and starts lowering skyline. If a slack skidding line signal (three short - pause - several short) comes in while he is lowering skyline, it means slack skidding and skyline at same time so that chokers come straight down.

Signals to Chaser When Carriage is at Head Spar

| | |
|---|---|
| THREE SHORT—pause— one short..... | Send back strawline on haulback. |
| THREE SHORT—pause—one short followed by a number of evenly spaced shorts..... | Send back that number of coils of strawline. |
| THREE SHORT..... | Inspect butt rigging. |
| THREE SHORT—pause— one short—pause— two short..... | Send back end of strawline hooked into chocker bell. |

Operational Signals for Yarder-Loaders and Snorkel-Equipped Yarders

Operation

| | |
|----------------------|---|
| TAKE OUT TONGS..... | Two short—pause—two short whistles. |
| DROP TONGS..... | A series of short whistles. |
| BRING IN TONGS..... | Three short whistles. |
| EXTEND SNORKEL..... | Two long—pause—two short whistles. |
| RETRACT SNORKEL..... | Two long—pause—three short whistles. |

HAND SIGNALS FOR TRACTOR LOGGING



Ahead on mainline.



To slack mainline to unhook choker — wave hand extended, palm down.



Stop any moving line and hold.



To stop tractor — hold one hand out with palm down.



Go ahead on tractor.

HAND SIGNALS FOR TRACTOR LOGGING



To back up the tractor — rotate the hand.

When hooker wants tractor to back in he slaps his butt.
If tractor is to head in he puts finger on top of his head.



Tractor hooker's signal to tractor driver as to where he wants chokers dropped. Hooker faces in direction he wants tractor to stop and stands where he wants chokers dropped. He indicates what is to be done by swinging both hands in front of him, hands open with thumbs up.



To use upper winch, pat back of wrist with palm of other hand. Follow by standard signals.

HAND SIGNALS FOR HIGHLEAD LOGGING



Mainline ahead, normal.
Raise one arm.



Mainline ahead, fast. One
arm raised, hand
'fluttering'.



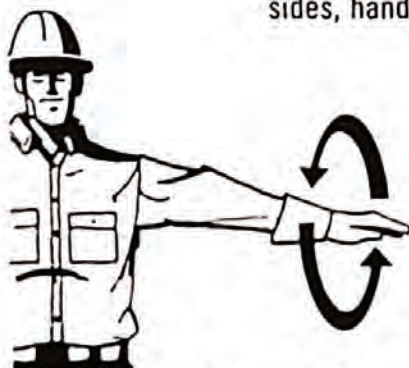
Mainline ahead, slow.
Both arms raised.



Stop any moving line and hold.



Slack the mainline, easy. Both hands extended at
sides, hands fluttering.



Ahead on haulback, normal speed.
One arm extended, rotating.



Haulback ahead, slow. Both
arms extended, rotating.

HAND SIGNALS FOR HIGHLEAD LOGGING



Slack the haulback. Hands in front of body using chopping motion.



Tightline. Hands overhead, fingertips touching.



Slack the strawline. Pat back of hand with other hand.



Hold dog drum or lock brake lever. Clasp one hand with the other.



Ahead on strawline. Touch hand to bent elbow.



and then



Ahead on strawline, slow.



Slack mainline all off. Arm extended at side, flipping wrist.

HAND SIGNALS FOR LOADING LOGS



Place log on left side of truck or car.



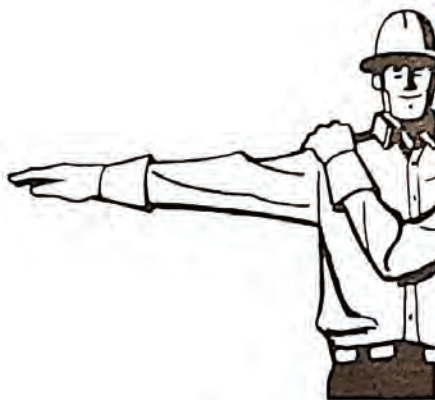
Place log on right side of truck or car.



Place log in center of load.



Hit log into lay.



Long log.



Place peak log on load.



Roll log into lay on load.



Pick tong up in the clear.



Load finished.



Appendix “B”

First Aid for Survival

APPENDIX "B"

FIRST AID FOR SURVIVAL

SURVIVAL FIRST AID

First Aid for Survival aims to keep an injured worker alive until medical help arrives.

Of course, the most important thing for any worker is to prevent accidents in the first place. But if an accident does happen, especially in a remote area, it is important that somebody handy has at least a basic knowledge of first aid. The nearest industrial first aid attendant may be miles away and the nearest hospital may be hours distant by road.

As many workers as possible should know how to keep an injured worker breathing and how to control bleeding. Then, if an accident does happen, they can give their fellow-worker the best chance of surviving — and knowing what to do can help them to save their own lives if they are hurt.

The first rule in giving first aid is to check out the situation. Sometimes there is more danger in treating a worker where he is than in getting him to safety. So, have a look at the situation and decide whether you must move the injured worker.

If it is not necessary to move the worker, keep him warm and comfortable where he is.

The main threats to life are:

1. Breathing
2. Bleeding
3. Unconsciousness

Breathing: Perform mouth-to-mouth:

- a. Check to make sure that the mouth and throat are clear of any obstruction. If not clear, clean out the obstruction (vomit, blood, lower dentures, etc.) with your finger.
- b. Put the person on his back.
- c. Tilt his head back.
- d. Raise his chin, to straighten his air passages.
- e. Pinch his nose and take a deep breath.
- f. Seal your mouth to the patient's and blow.
- g. Watch to see that his chest rises when you blow. If not, check his mouth for obstruction again.
- h. Wait five seconds.
- i. Pinch the victim's nose and blow directly into his mouth again.
- j. Keep repeating this rhythm and be prepared to continue for a long time.
- k. When the person begins to breathe, assist his first breaths with yours and continue if he is having difficulty.

Bleeding

Put pressure on the wound immediately with finger, thumb or hand and replace with a dressing and bandage as soon as possible. Raise the bleeding part to slow bleeding. If the wound is large or the patient feels faint, have him sit or lie down so he is comfortable.

Unconsciousness

Unconscious persons cannot help themselves, so they are in constant danger of choking on vomit, blood or their own tongues. Put an unconscious man on his side, injured side down, with his cheek on the ground. Make sure that his chin is off his chest, to straighten the air passage. Check to make sure that the mouth and throat are clear of any obstruction. If not, clean out the obstruction with your finger. Place something behind the patient to prevent him from rolling over onto his back.

Protect patient from the weather and get trained help.



Appendix "C"

Glossary of Yarding and Loading Terms

APPENDIX "C"

GLOSSARY OF YARDING AND LOADING TERMS

A-frame An A-shaped framework of logs used for yarding logs or for dumping logs.

Anchor log A log buried in the earth to hold a guyline firmly — also called a deadman.

Back corner An angle where a tail block turns the haulback line around a corner.

Back end At the back of a setting.

Back guy The guyline which is back of the spar, opposite to the lead of the mainline or skyline; it takes most of the pull in yarding logs.

Back line That part of the haulback line from the spar to the road line corner block.

Back spar A tree rigged up at the back end of a setting to provide lift for yarding logs.

Bald-headed Buttrigging sent back to the woods without chokers.

Barrel swivel A swivelling device used in the buttrigging.

Beads Chokers.

Bell The socket which slides back and forth on the choker cables between the two knobs. The knob is hooked into the bell to choke the log.

Belly The middle of anything, also, a slack in the cable, also, sag in a guyline.

Bight Hazardous zone created by running lines under tension. Any section of a line between the ends.

Blinder A wire rope, connected by a cinch, placed around logs on a truck to prevent any of the load from spilling. Also called wrapper.

Block A metal case (shell) enclosing one or more pulley sheaves, provided with a hook, swivel or gooseneck by which the unit may be attached to an object and used to change the direction of motion of a line. Blocks are described according to their use, such as guyline, corner, tail, moving, etc.

Block purchase To use one or more blocks for mechanical advantage.

Blowdown A tree or stand of timber blown down by the wind.

Bridle A method of choking a large log using two chokers. Also a method of tailholding a guyline using two stumps.

Brush Any kind of undergrowth.

Brush out To clear an area.

Buck To cut trees into log lengths; to make any bucking cut on logs.

Buckle To bend under strain, as with a mobile spar.

Bug A signal device carried on a belt used to transmit signals.

Bulkhead A heavy barrier at the back of the cab to protect the driver of a log truck.

Bull block A high lead block used on wooden trees for the mainline.

Bull choker A large choker.

Bull gang A rig-up crew.

Bundle strap A length of wire rope with clamp, used for bundling log loads for transport in the water.

Bunk The heavy steel frame or cradle assembly on logging trucks on which logs are placed.

Bunk log Any log resting on the bunk; the bottom layer in loading a log truck.

Burr Rough edge or mushroom effect on the striking surface of a hammer or wedge.

Butt The bottom of a tree. Also, the large end of a log.

Butt hook — (Bull hook) The heavy hook on the buttrigging to which chokers are attached.

Butt plate A steel plate used in some buttrigging.

Buttrigging A system of swivels, shackles, links and tags which connect the haulback and mainlines and to which chokers are fastened.

Cable cutter A hydraulically, mechanically or physically operated tool for cutting wire ropes.

Cable logging A yarding system employing winches, blocks and cables.

Calks Short spikes driven, or screwed into the soles and heels of boots to give sure footing while walking on wood or logs.

Cat's paw A simple non-slipping knot used on rope or steel cable. Also, a line run through an eye and looped back on itself to make a quick join.

Chain saw A gas operated power saw.

Change ends To reverse a wire rope to equalize areas of heavy wear. Also, to swing a log around in the air, end for end, when loading, to get a better lay on the log truck.

Change road To move rigging in order to progressively yard logs from the next unlogged area in the felled and bucked timber.

Chase Unhook logs at the landing.

Chaser Worker who performs chasing duties at the landing.

Choke To pass a line or choker around a log or other object and pull it tight.

Choker The wire rope used to choke logs.

Choker hook A sliding attachment — "bell" — on the bight of a choker.

Chokerman A rigging crew member who sets chokers, sometimes called a choker setter.

Chunk out To remove log chunks, branches, and debris from a landing or other work area.

Clamp A U-bolt cable connector.

Climbing irons (Spurs) Irons with sharp spurs, strapped to the leg at the ankle and below the knee. Used by riggers to climb trees for topping and rigging.

Closing line A line used to close a grapple on a loading or yarding machine.

Cold deck A pile of logs yarded and left for transportation later.

Core The center strand of a wire rope. May be hemp for flexibility, or wire for strength.

Corner The point at which the haulback line is turned sharply.

Corner blocks The haulback blocks at the back end of the setting which change the direction of the haulback line.

Cull A log of less quality than the lowest merchantable grade. Also, to reject a log, or throw away unwanted material.

Crummy A vehicle used to transport workers to and from the woods work areas.

Cutting bar The bar which carries the cutting chain on a power saw.

Deck A stack of logs. Also, to pile up logs.

Deflection Technically, the amount of sag at mid-point below a straight line drawn between the two ends where the rope is anchored or supported. The greater the deflection, the greater the load which can be carried without overstraining the rope. Often "deflection" is applied to the sag in the ground profile which permits

deflection. Deflection is frequently expressed as a percentage of the horizontal span length.

Diamond lead Yarding past square lead, in the back quarter.

Dog To secure a machine winch or other equipment. A locking device.

Dog cock When a log breaks or slides out of the choker, the noose cinches up tight to the bell and puts a bad kink in the end of the choker.

Dog it To stop movement — set the dog on the drum.

Dog leg To angle away from a straight line — crooked.

Donkey A yarding machine.

Donkey puncher A yarding operator.

Dutchman A block arrangement used to pull a bight in a line to help land the logs (to hang a Dutchman).

Extension A line added to another line to make it longer. A 250 foot piece of strawline. A line added to a guyline to make it longer.

Eye A loop spliced into the end of a wire rope.

Eye splice A wire rope turned back on itself with strands interwoven to make an eye.

Fair lead Rollers or pulleys arranged to permit spooling in a cable from any direction. Also, the area between the two front quarter guylines.

Farmer's eye An eye splice formed by stranding a cable and rerolling it to form an eye; a fast temporary splice.

Felled and bucked Down timber bucked up for yarding.

Ferrule A metal sleeve or collar babbitted to the ends of a section of wire rope to make a choker. Also called a knob.

Ferrule butt-hook The socket on the butt-rigging into which the choker knob is fitted.

Flight hang ups To change or reset the chokers to clear the turn being yarded when it gets hung up behind a stump or boulders.

Fire watch The worker left after the day's work is done on a logging site to watch for fires.

Fleet angle The angle measured between a line from the center of the mainline block sheave to the center of the main drum and a line from the center of that sheave to the rim of the drum.

Flying chokers The number of chokers attached to the buttrigging. e.g. Fly two chokers.

Footing A base for a pad or outrigger.

Friction blocks The mechanical means by which the drums on a yarder are engaged.

Front end At the spar tree, by the machine.

Gooseneck The yoke of a block.

Gooseneck boom The boom on a shovel log loader constructed in an arc to heel logs.

Grab the snotty end Take the end of a line or the worst part of a job.

Grade The quality of a log. **Also**, a completed base for truck haul road. **Also**, a hill.

Green timber The uncut forest.

Ground The kind of terrain on which a logging operation is being carried on — cat ground, high lead ground, poor ground, etc.

Ground lead When there is no lift for yarding logs.

Handyman A man skilled at various jobs around a logging operation.

Hang a block To place a block in position when rigging up.

Hang an axe To put a handle in an axe head.

Hang-up Logs stuck behind a stump or other obstacle when yarding, **also**, rigging fouled in some manner so as to prevent logging, **also**, any kind of failure on an operation.

Hanging the rigging Rigging up a spar tree.

Haulback block A block through which the haulback line runs.

Haulback drum The drum on a yarder which holds the haulback line.

Haulback fairlead The sheave at the top of the spar designed to lead the haulback line.

Haulback line The line which takes the mainline and buttrigging back to the woods in yarding.

Haywire Anything below normal standard; anything unserviceable or no good; another term for strawline.

High lead A cable logging system in which running line lead blocks are placed at the top of the spar to provide lift to the logs during yarding.

Jackpot Unstable logs crisscrossed or difficult to break free; a potentially hazardous situation.

Jagger A broken strand on worn or damaged cable; wires that stick out and tear hands or clothes.

Jill poke To push against or make contact with. A protruding log, such as a log on a pile pushed ahead when struck by the incoming turn.

Kink A sharp bend in a wire rope.

Knob A choker ferrule attached to each end of a choker by babbit or wedges.

Land To bring logs into a landing.

Landing Area where the yarder and/or loader are placed and the logs are landed.

Landing buckler Worker employed at log buckling in the landing.

Landing man Worker who bucks, limbs and trims, unhook turns and hooks up trailers.

Lay The method by which a wire rope is woven. In regular lay, the single wires go to the left and the strands to the right. Left hand lay is the opposite. With lang lay, the wires and strands twist in the same direction, either right or left; this makes a more flexible rope than the other types. **Also**, the position of a log in a pile or load.

Layout A logging plan, including the settings and road systems.

Lead The direction in which the lines run out from the yarder. **Also**, the angle the line will spool on the drums.

Lead block A block used to change the direction of a line pull.

Leave strip A stand of timber uncut between two clear cut areas, usually a fire break.

Lily pad A flat disk of wood sawed off the end of a log.

Limb To cut branches off trees or logs.

Line Wire rope, a survey line, boundary. It is shouted when there is enough line.

Line changing Changing the rigging from one yarding road to another.

Load To load logs, a load of logs, the stress placed on a cable or piece of equipment, to place dynamite in a hole ready to blast.

Loader Any kind of machine used for loading logs.

Logs The cut sections of felled timber, bucked into lengths.

Log stamp A branding hammer used to identify logs.

Long butt A cull chunk cut off the bottom log of a tree because of rot or other defect. **Also**, to cut off a long butt.

Long splice The best splice to use if a line strands or breaks. It may be up to 60 feet or longer, carefully rolled into the lay of the other line. A good splice passes through blocks almost as easily as the original line.

- Mainline** The line used to yard the logs. It has a larger diameter than the haulback line. Also, the main road in a logging operation road system.
- Mainline fairlead** The sheave at the top of the spar designed to lead the mainline.
- Marlin spike** A steel spike-shaped tool that tapers to a flat point, used in splicing wire rope.
- Marking gun** A squirt gun used in applying marking paint for end-marking of logs for identification prior to transportation to the mill.
- Mat** Short lengths of logs for the pad of spar tree to rest on. Also, a portable set of logs bolted or lashed together for a grade shovel to rest on when making roads.
- Molly Hogan** A single strand of wire rope rolled into a circle with six wraps. It can be used as a temporary method of connecting the eye splices of two lines. Also, a Molly is used in most pin shackles in place of a cotter key.
- Monkey wrench** To repair a machine or piece of equipment.
- Mud 'em in** To drag the logs when there is not enough lift from the spar tree.
- Mutt and Jeff** A flat hook and a round hook facing in opposite directions and joined by a link or Molly Hogan.
- Necktie** A choker.
- Notch** A notch is cut in a stump to prevent the guyline or haulback strap lifting off. The notch should lead to the top of the spar.
- Off-highway Truck** A logging truck with 12, 14 or 16 foot bunks. (A highway truck has only eight foot bunks).
- Old growth** Virgin timber.
- On the fly** Doing any kind of work while equipment or logs are moving.
- Opening line** A line used to open a yarding grapple.
- Oregon block** A stump used instead of a block to change the direction of line pull.
- Out of lead** When the line does not spool properly on the drum.
- Pad** Same as mat.
- Parbuckle** A method of setting a choker when fighting a hang-up.
- Pass block** A light block at the top of a spar tree (wooden) used to pull rigging up the tree.
- Pass chain** A chain used to make sort of a bosun's chair for a climber to ride in as he goes up a tree. Also, used to grasp the bight of a line.
- Patch logging** Staggered settings on a claim, for fire prevention and reforestation.
- Pay out** To unreel line from a drum.
- Peaker** The top log on a load.
- Pecker pole** A small tree or log.
- Peeler** A log suitable for plywood.
- Peewee** A small merchantable log.
- Pile** A pile of logs.
- Pitch** Sticky resin found in most coniferous trees, sap. Also, the steepness of a road on a hill.
- Powder** Explosives used in blasting; dynamite.
- Power saw** A chain saw; a motor-operated saw for falling and bucking.
- Pull rigging** The work done by a rigging slinger.
- Pump can** A five gallon water can with a built-in pump used in putting out small fires.
- Purchase** To obtain additional pull by the use of lines and blocks.
- Purchase block** A block used in rigging to obtain greater pull on a line.
- Push** Any foreman or boss.
- Quarter** An area within the setting, eg: front right quarter, back left quarter, yarding quarter, front quarter guylines, etc.
- Radio whistle** A transmitter (bug) and receiver that operates the audible signal system.
- Raise a tree** To set up a spar tree.
- Raising guy** Usually the front quarter guys for the final raising of certain portable spars.
- Raising line** The cable used for the initial raising of certain portable spars.
- Ram** A hydraulically operated device for the initial raising of certain types of steel spars.
- Reef** To pull hard, with the yarder throttle wide open.
- Reeve** To thread a line through a block or carriage.
- Re-log** To log again because the area was not logged clean enough the first time.
- Rig up** To set up a spar tree for logging.
- Rigging** Lines, blocks, hooks, chokers, etc., all the gear used in cable logging systems. Also, working on rigging jobs.
- Rigging crew** The crew which handles the rigging in a yarding operation — the rigging slinger and the chokerman.

Rigging man A logger working on the rigging crew.

Rigging slinger The man in charge of the chokermen who spots the rigging and picks out the turn. He is responsible for the safety of the chokermen.

Road The road along which logs are yarded to the landing. **Also**, short for skidroad. **Also**, the truck haul road.

Roll A choker hold on a log which causes it to roll in a desired direction when the line is tightened.

Roll splice A type of splice in which the strands are rolled in, instead of being tucked.

Root wad The torn up mass of dirt and rocks caught in the root system when a tree is uprooted.

Running line A moving cable in logging operations.

Saddle The support that the portable spar rests in when it is lowered.

Safety strap Strap attached to the guyline blocks at the top of the spar. Prevents the blocks from falling into the landing if the crown ring or shackles fail.

School marm A log or tree with two main stems instead of a single stem.

Scrub Poor, unmerchantable timber.

Second growth Young timber — the timber that grows after the mature timber is removed.

Second loader Worker who assists in the loading of a log truck.

Set beads To set chokers.

Setting The area logged by one spar tree or cat.

Shackle A clevis or heavy iron device used to hook rigging and/or lines together. May be a screw pin, Molly Hogan pin, or a knockout pin.

Sheave The wheel of a block grooved for the line.

Shell The outer framework of a block.

Shovel loader With the bucket and dipper stick removed and replaced with a log loading boom, a power shovel makes a good portable log loader.

Show A logging operation (high lead show, winter show, summer show, etc.).

Shutdown A work stoppage for various reasons; road washouts, equipment breakdown, labour trouble, fire hazard, etc.

Slide A logging unit; the men and equipment needed to log an area (setting) of an operation.

Slide push The man in charge of an area of a logging operation.

Signals Audible or hand signals used to direct the movement of logs in yarding or loading operations. Refer to Appendix A.

Slwash A line not running in a straight line but bent around trees, logs.

Skin 'er back Go ahead on the haulback, take the butttrigging back to the woods.

Slash Debris left on the ground after logging. **Also**, a logged off area.

Slash burn A fire set in logging slash, generally in the fall, to get rid of dangerous fuels before the next season.

Snag Any dead or dying tree ten feet high or over.

Snatch block A block that can be opened on one side to receive the bight of a rope.

Snubbing line A line used for lowering a machine down an incline.

Soft hammer A hammer used in cutting wire rope.

Spar The tree or mast on which rigging is hung for any one of the many high lead cable logging systems.

Spike bar A clawbar used to pull the railroad spikes.

Spike 'er To stop anything.

Spike top A tree with dead top, usually without branches.

Splice To join ends of ropes or cables by interweaving strands. **Also**, to join wire rope in various ways, as eye splice, long splice, etc.

Split a quarter To start the first road on a setting halfway between fair lead and square lead.

Spool A drum to hold cable. **Also**, to wind cable smoothly on a drum.

Spooling iron A metal hook used to spool line on a drum.

Spreader The short length of wire rope or chain links between the butt plates or barrel swivels on the butttrigging.

Square lead Right angles to the yarding machine.

Squaw hitch A method of choking a log.

Stagged pants Work pants cut short to get rid of dangerous cuffs which can catch and trip a worker.

Stand An area of timber.

Stillson A pipe wrench.

Strap A short length cable with an eye in each end.

Strand a cable To unwind the strands of a cable, preparing to make a splice. To break one or more strands.

Strawline A light cable used in rigging up, or in moving other cables or blocks. The smallest line on the yarder (mainline — haulback line — strawline).

Strawline drum A small drum on yarders; handles the strawline.

Strawline fairlead A fairlead used to guide the strawline on the drum.

Strip a tree To take all the rigging off a spar tree.

Stub A guyline extension.

Swamp out To clean out a place, as a landing.

Swell butted A tree with a large flaring base.

Swivel A universal joint used in rigging to prevent lines from twisting.

Tag A short chain link device with a swivel and a bull hook attached to the butt rigging — to join two or more chokers for an extended reach.

Tagline A short piece of line added to anything. Also, a line used to position a loading grapple.

Tailblock A block used to guide the haulback line at the back corner of the yarding area.

Tailhold A point of anchor for the dead end of a purchase line or rigging assembly. Also, refers to the stumps the back line blocks are hung on.

Thimble A ring of thin metal formed with a grooved outer edge so as to fit within an eye splice and protect the rope from chafing.

Thread To reeve a line through blocks or a carriage.

Tightlining To hold a line tight by braking or interlocking the lines. Used to increase the lift to clear the butt rigging or turn.

Timber hitch A type of knot.

Tommy Moore A small block with a wide throat usually used with the strawline as a lead block.

Tongs Scissor-like hooks used to load logs.

Track side Where the yarder is located. Term left over from days of railroad logging where the spar and donkeys were set up alongside the railroad.

Turn One or more logs that are yarded to the landing at one time.

Twister If a tailhold stump does not appear to be strong enough, it should be tied back to another stump, or stumps, by use of a length of line and a twister pole.

Up-end a line To swap ends of a line to equalize the wear.

Up-end a log To change ends of a log in order to position it for loading or piling. Also, to cause a log to up-end in yarding by coming in contact with an obstruction.

Whistle A signal device for the yarding of logs, nowadays usually transmitted by a radio signal.

Widowmaker A loose limb, top, piece of bark, or anything loose in a tree that may fall on a logger.

Winch A machine having one or more drums on which to spool a line for hauling or hoisting.

Windfall A blown down tree.

Wrap A turn of line around a drum, stump, etc.

Wrapper A line used to secure the logs on the log truck.

Yarder A machine that yards logs.

Yarding Pulling logs to the landing.

LOGGING TERMINOLOGY

FIRE PREVENTION

Burn A burned over area.

Closure Shut down for fire season.

Early shift A shift that is worked in the summertime when the fire hazard is high.

Fire hazard The condition of the fuel in the woods.

Fire break A stand of timber left between settings to slow down or stop forest fires.

Fire guard A cleared trail around a fire made by machine.

Fire season Usually from May 1st to October 31st or as long as the fire hazard is high.

Fire watch A man left after work to watch for possible fires.

Humidity The amount of moisture in the air.

Mattock A heavy digging tool with a hoe blade on one side and an axe blade on the other, used for fire fighting.

Muck stick A hand shovel.

Polaski A light fire tool shaped like an axe.

Slash A logged off area, tops, broken branches, trees, etc., left on the ground after logging.

Slash burn A fire set in the slash usually in the fall to get rid of the debris for reforestation and fire protection.

Spark arrester A screen fitted over the exhaust to prevent sparks escaping.

Spark chaser Sparky — a fire watchman.

Siamese A "Y" coupling for a fire hose — giving two outlets.

Spot fire A small fire ahead of the main fire.

NOTES: