DOWN HILL HIGHLEADING

Submitted to

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by

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Introduction

The Highlead System of yarding logs is the most commonly used cable yarding system in the Pacific Northwest. Its advantages over the other cable systems are: simplicity of rigging; its adaptability to varying conditions; and the comparatively low capital investment. It can be used for yarding to a landing or cold deck, or may be used for "swinging" though a skyline or slack system is usually preferred for the latter.

The Highlead System

Requirements for a Highlead System

Two things are essential where the highlead system of yarding is to be used. The first and most important of these essentials is that the area to be yarded must be clearcut. The reason clearcutting is necessary is that any trees left standing in the yarding circle would hang-up turns being brought in, and it would be difficult if not impossible to move tailholds when a road has been yarded.

The second essential is a large volume of timber on the area to be yarded. This is essential because the high lead yarding system is expensive to rig and move.

Description of the Highlead System

The highlead system consists of a single spar tree located at the landing, guylines to brace the spar tree, a

mainline block hung near the top of the spar tree, a haulback block hung under the mainline block, tail blocks and haulback corners, a double drum yarder with the mainline on one drum and the haulback on the other, and the butt rigging that connects the mainline to the haulback.

Landings:

Landings are usually located on tops of hills or ridges. A fairly level spot is required so logs can be decked and the yarder located and set up. If there is no level spot, one must be built.

One of the most important things involved in locating the landing is that it must be located so roads can be built straight into it. If this was not done, turns would be yarded across the roads, causing much damage.

Spar trees:

Spar trees must be fairly large, straight, and relatively free of defect. They must be located in a good place for a landing. If no trees in the immediate landing area meet these requirements, a tree may be brought in from another area and raised.

The spar tree is limbed and topped by a high climber.

Guylines:

Guylines are made of strong, flexible wire rope.

Blocks:

The mainline or bullblock is the largest block on the and is hung immediately under the guylines. Top guys?

The haulback block is smaller than the mainline block

and is hung immediately under it.

The pass line block is the smallest block on the tree and is hung above the guylines. It is the block used for rigging the tree.

Tail blocks and haulback corners:

The tail block is attached to a stump located on the outer edge of the yarding circle.

The haulback corners are similar to the tail block but are located inside the yarding circle. Their purpose is to keep the haulback line away from the mainline thus preventing tangling and foul-ups.

Highlead yarders:

The conventional highlead yarder has a mainline drum, haulback drum, and a straw line drum. The latter is used in rigging the tree. etc

The mainline drum is lowest and farthest forward on the yarder frame. The haulback drum is immediately behind and slightly above the mainline drum. The straw drum is usually on the same shaft as the haulback drum and is right beside it.

The yarder may be mounted on a log sled, a bulldozer, or a truck. It is powered with a gas or diesel engine.

Mainline and haulback line:

The mainline is a strong, flexible wire rope ranging from 5/8 to 1 5/8 inches in diameter and any length required.

The haulback line is like the mainline in every respect except diameter and length. It is somewhat smaller in dia-

meter and a little more than twice as long.

Butt rigging:

The butt rigging is a series of swivels. The chokers are attached to it. The mainline is attached to one end of the butt rigging, and the haulback line is attached to the other.

Setting up the Highlead System

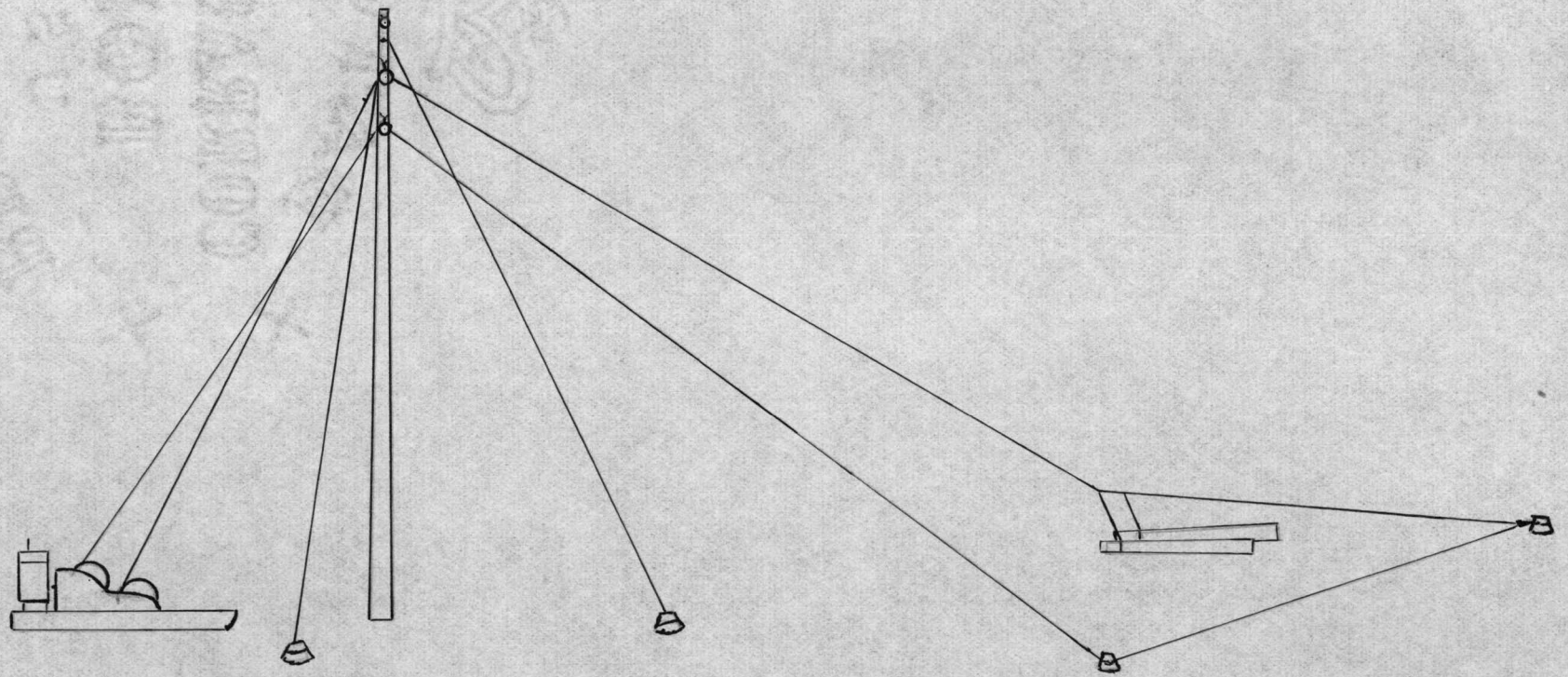
The landing is cleared and leveled, the spar tree limbed and topped, and the yarder brought up and fastened down. Yarders are fastened down with anchor cables leading from either or both ends of the sled and attached to stumps.

The rigging of the tree is started by hanging the pass line block near the top of the tree running the rigging line through it. The rigging line is spooled on the straw drum. Bark is peeled from a section of the trunk below the pass line block, and the tree plates are attached. These plates serve a number of purposes. They prevent the lines from cutting into the tree or from slipping down the tree.

The guylines are then put into place. They are first attached to the tree under the pass line block and then pulled up tight and fastened down to stumps. The bullblock is hung under the guylines, and the haulback block is hung immediately under it.

The straw line is pulled out by hand to the tailblock and then pulled back and hooked to the haulback line. The haulback line is pulled out through the tailblock by the straw drum and back to the mainline. The butt rigging attachs the haulback to the mainline.

THE HIGHLEAD SYSTEM



Uses of the Highlead System

The highlead system is used where the ground is to rough or steep for Cats, where erosion is a problem, and for yarding out of swamps.

The most economical yarding distance is about 800 feet with a maximum of 1000 feet on long corners.

Variations of the Highlead System

The system as described can be changed in many ways to meet special conditions. The spar tree can be replaced with a tower on a barge or an A-frame on a raft for yarding shore lines; or it can be the boom of a combination yarder and loader used for yarding small clear cut areas or turns in roads. The yarder can be mounted on a truck, bulldozer, barge, or raft.

Highleading Downhill

Downhill highlead yarding is essentially the same as yarding uphill and on level ground. There is one exception--there is virtually no lift on the turn when it is higher than the mainline block. This lift-necessary to raise the nose of the log over hang-ups --is what makes highlead yarding the success it is. Without this lift highleading loses much of its effectiveness. This loss of effectiveness is due to many hang-ups on stumps, rocks, and down timber.

The question that comes to mind immediately is "Why highlead downhill if it is so difficult?" The following section will endeavor to answer this question.

Why Highlead Downhill?

Downhill highleading is used in places where it is impossible, impractical, or uneconomical to locate the landing on a ridge or hill top. This difficulty might stem from one of a number of things. There may not be enough flat ground for a landing, and the cost of building one would be prohibitive, the terrain might be such that an unreasonable length of road would be required to reach a landing if one was located, the cost of building the road might be prohibitive, or the road would have to wind around the hill or require many switchbacks in order to reach the landing. This last problem is especially true on government controlled timber where road building is supervised by the U.S. Forest Service. The Forest Service's grade limits many times necessitate costly switchbacks on ground where they may not be necessary.

Another application of downhill highleading is that of logging shore lines. This is mainly applied on undeveloped shorelines and small islands where there are no roads. This particular application is carried on in many parts of Southeastern Alaska and the coastal regions of northern British Columbia.

The coastal forests of northern British Columbia grow close to the shore on mountains apparently rising vertically out of the sea. The forests of Southeastern Alaska are identically the same with the addition of a group of large and small islands.

The coasts of Southeastern Alaska and northern British

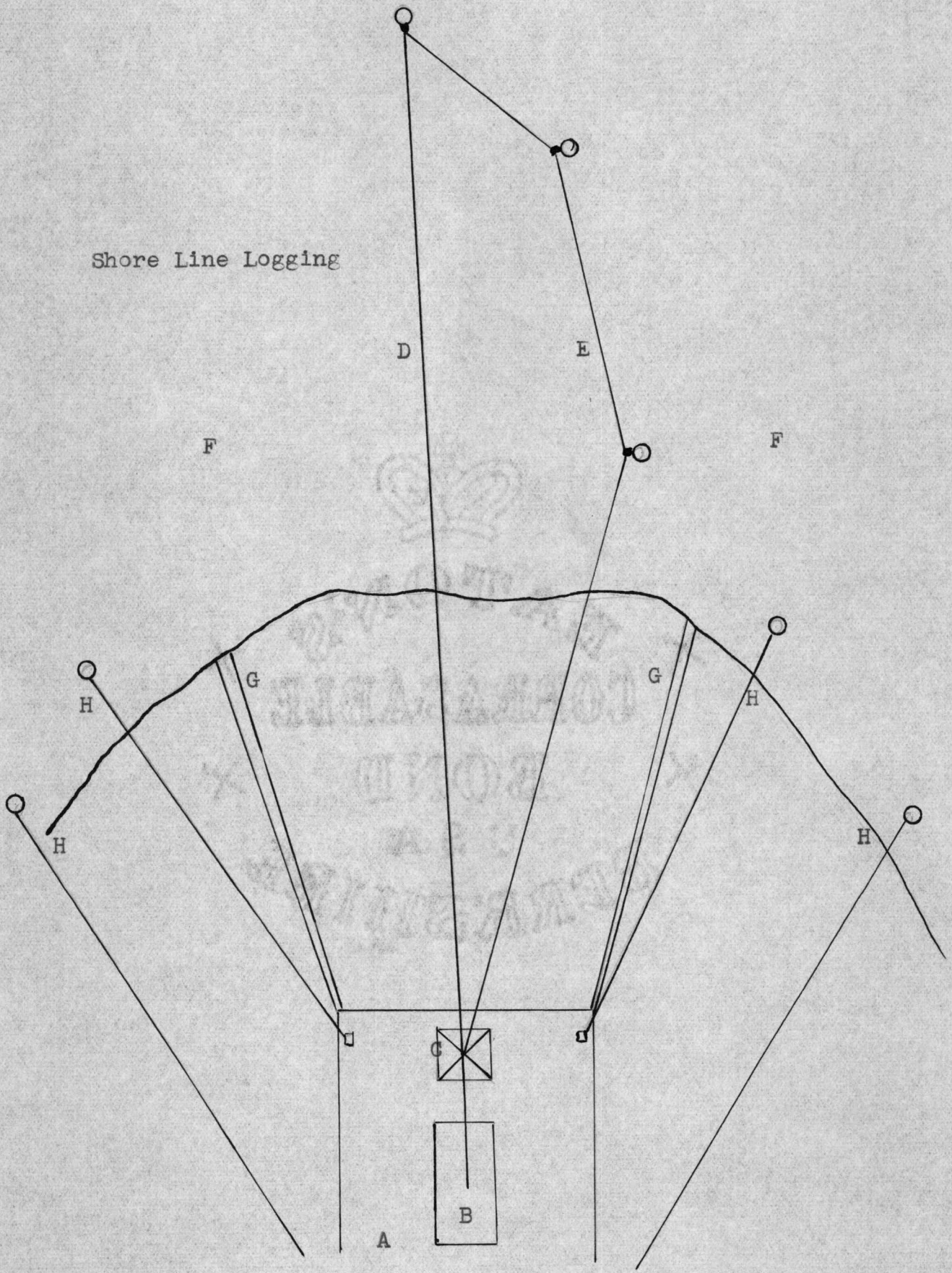
Columbia are sparsely settled and are not connected by highways. The pulp, saw, and plywood mills are located in a few widely scattered population centers, and all log transportation is by water. Water transportation, plus the fact that the waters of Southeastern Alaska are sheltered from the ocean by the large outer islands and the islands and mainland shoreline are broken by many sheltered inlets and bays, combine to make the down hill highlead system of shore line logging a very feasible operation.

Shore Line Highleading

There are many ways to log a shore line by highleading. A yarder may be mounted on a raft with a tower and run up against the beach, a yarder may be mounted on a barge or war surplus landing craft with a tower and run up against the beach, or one of these above mentioned rigs may be held away from the beach in some way so the logs can be dropped directly into the water doing away with handling logs again as they would have to be if the yarding was done by the first two methods mentioned. A way of setting up a rig like this is shown in Figure 2.

A is a barge or raft, B is the yarder, C is the tower, D is the mainline, E is the haulback, F is the shore, G and G are long, strong logs, and H,H,H, and H are tie-up lines. One end of the logs are butted against the barge or raft, and the other ends are butted up against the shore, The logs hold the barge out from the shore and form a pocket to hold logs brought in from the yarding circle. The lines (H,H,H, and H) hold the barge in place. This method is effective

Shore Line Logging



only if the shore line is rocky as sand would let the ends of the logs (G and G) slide. If there is a sandy beach, anchors can be sunk offshore to hold the barge in place.

Equipment and Procedure

Down hill highleading, as has been mentioned, differs from uphill and level ground highleading in that there is no lift given the turn when it is above the bullblock. This lack of lift causes many hang-ups. Hang-ups can be minimized by tightlining over particularly rough spots. Tightlining is done by holding back on the haulback while the turn is being brought in. Holding back on the haulback gives a slight lift to the nose of the turn. Hang-ups may be freed by yarding back up the hill with the haulback.

Tightlining puts added strain on yarders, lines, and tailholds. Larger yarders, mainlines, haulback lines, and blocks, than would normally be required for uphill or level ground highleading in this size timber, should be used. Tailholds should be strong so as to withstand the strains of tightlining and yarding back up the hill.

Another way to minimize hang-ups is to cut the stumps as low as possible.

Conclusion

Downhill highleading is used in preference to slack line and skyline systems because it does not require the rigging of a tail tree and the roads can be changed more quickly. Slackline and skyline systems are best used for swing, across

canyons and rivers, and in areas where the timber is very large and has a high volume per acre.

While downhill highleading presents many problems and is inefficient in many ways it definitely has a place in the woods, especially in these days when timber is getting more and more inaccessible.