Harvesting Systems and Equipment in British Columbia
Harvesting Systems and Equipment
Part One
EQUIPMENT SELECTION

Chart 1 to 13

The handbook does not attempt to define a single “best” system for any site. Instead, it
presumes that readers need to be aware of the key factors that influence the probability of
achieving success with any given combination of equipment and site characteristics.
Readers will then use their own judgement to evaluate the merits of the various options.
The information in the handbook should be considered only as part of an overall process
for equipment selection which will vary from company to company.
Key Factors for Primary Transport Equipment

Chart 1. Wheeled skidders.

- The ability to turn skidders safely is reduced on steep slopes. The presence of large obstacles such as boulders, depressions, or windfalls will increase the risk, especially on steep slopes, because they increase the difficulty of turning around the machine. Benches may increase the opportunity for turning safely. Obstacles also reduce the travel speed and increase the travel distance.

- Grapple skidders are best suited for use with mechanical falling and bunching equipment, which requires that the tree size be within the operating range of the falling equipment. Grapple skidders enable roadside operations, which can reduce production costs. Swing-boom grapples reduce the risk on steep ground. On wetter sites, line skidders can drop their load and move forward to more firm terrain before winching the load, thus reducing the risk of soil disturbance.
Chart 2. Crawler skidders.

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- Low travel speed makes crawler skidders more suited to short skidding distances.
Chart 3. Flex-track skidders.
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- The tracks for flex-track machines conform more closely to the ground profile than for conventional tracked skidders. This feature distributes their weight more evenly, allowing them to operate on soft ground and up adverse slopes with less soil disturbance.
Chart 4. Clambunk skidders.

- The presence of large obstacles such as boulders, depressions, or windfalls will increase the risk because they reduce the travel speed and increase the travel distance.

- The risk level increases for low volumes per trail (i.e., for “shallow” or low volume per hectare cutblocks). The clambunk will be unable to obtain a full load, making it uneconomic to operate unless the skidding pattern is altered to attain full loading.

- Clambunks are best suited for use with mechanical falling and bunching, which requires that the tree size be within the operating range of the falling equipment.
Chart 5. Forwarders.

- The risk level is very high if the mill and truck fleet are unable to accept cut-to-length logs, although these limitations are imposed by business requirements, not by the site characteristics. Timber sales to other companies and other options for transporting the logs should be considered.

- Large obstacles such as boulders, depressions, or windfalls will increase the risk because they reduce the travel speed and increase the travel distance.

- The tree size must be suitable for the feller-processor that works with the forwarder. Large trees may require falling and processing with additional equipment.

- Depending on machine size, the high degree of maneuverability between standing trees makes forwarders well suited to partial cutting operations.

- Distance for each “tier” or “chuck” will vary depending on the size of the machine, the length of the timber, and the decision to buck trees into log lengths.
- The risk level increases for wet or fine soils and for small trees.
Chart 7. Cherry pickers and super snorkels.

- Skidding with horses is enhanced on a snowpack because of reduced friction. Risk increases for slopes over 15% under frozen conditions because of the potential for logs to slide downhill and strike the horse.
- The trails where the horses walk must be cleared of debris before skidding.
Chart 9. Small-scale equipment.

- Many types of small-scale equipment are available with a wide range of capabilities and key factors. They are used in niche applications, typically where tree size is small and productivity is low. Beyond that, examine the specific type of equipment proposed to determine whether it is usable.

- Highlead yarders can continue to work even if the butt-rigging drags on the ground, although this practice may result in excessive soil disturbance and low productivity.
- Landing chance refers to the ability to build and use suitable landings. Poor landing chance may be caused by difficult terrain or by the combination of terrain, deflection, and the tower location within the landing.
- Tree size and volume per hectare must be evaluated in relation to the specific machine, with a minimum economic volume ranging from 150 to 350 m³/ha depending on machine size.
- Anchors may consist of large tree stumps, several smaller trees or stumps, or fabricated anchors such as a buried log or rock bolts.
- Cable extensions can be used to reach logs beyond the yarder's normal working distance.
Chart 11. Swing yarders - grapple.

- The risk level is increased where mobile backspars cannot be used — conventional anchors must be available in their place. Anchors may consist of large tree stumps, several smaller trees or stumps, or fabricated anchors such as a buried log or rock bolts.

- The risk level increases for small tree size because the trees are picked up individually. Mechanical falling and bunching can reduce the risk.

Risk levels
1 - Low
2 - Acceptable
3 - Caution
4 - Risky
5 - Highly risky
6 - Not recommended

See definitions in Tables 6 & 7.
Chart 12. Swing yarders - slackpulling carriage and chokers.

- Anchors may consist of large tree stumps, several smaller trees or stumps, or fabricated anchors such as a buried log or rock bolts.

- Landing chance refers to the ability to build and use suitable landings for extraction and subsequent phases. Poor landing chance may be caused by difficult terrain or by the combination of terrain, deflection, and the tower location within the landing.

- Risk level increases as the volume per hectare decreases.

- Although intermediate supports allow for yarding in areas of poor deflection, risk increases as the number of intermediate supports increases.

- Payloads can be lifted over intervening obstacles depending on the ground profile, the layout, and the equipment capability.

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- Cable extensions can be used to reach logs beyond the yarder's normal working distance.

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