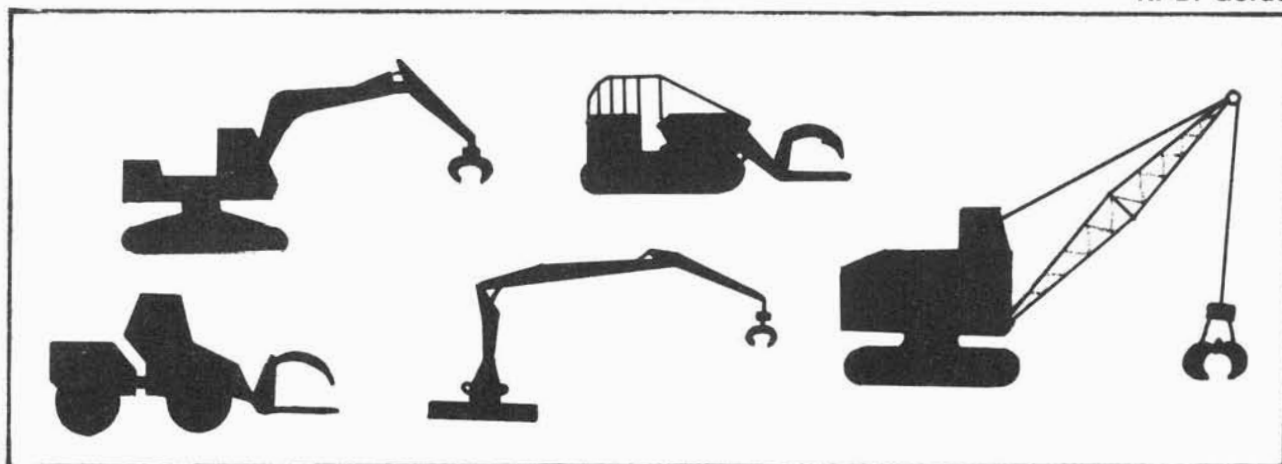


LOADER SELECTION AND APPLICATION

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Loader Types Commonly Available and Used in N.Z.

The options in selection and application of log loaders are extensive. Loading, the essential link between log extraction and transport, contributes from 10-25% towards "on truck" logging costs, thus good decisions on loader choice and use are most important.

This report presents a checklist summary of the factors that should be considered when choosing or applying a loader. It summarises a full LIRA Project Report titled "Log Loaders - Criteria for Machine Selection and Application", P.R.15, which is available to LIRA members on request.

The project was carried out in three parts. Initially current loader operations were surveyed to establish patterns of application and variations in performance. Specifications and costs of machines commonly available were then analysed to provide an indication of potential loader performance patterns, irrespective of what was achieved in practice. Finally, loader performance data from a wide range of sources was gathered and used to quantify the factors influencing loader operation. A comparison of these three sections of the study identified the more important factors influencing loader performance. It provided the basis for establishing the following guidelines for loader selection and application.

GUIDELINES FOR SELECTING A LOG LOADER

Selection of a loader should be carried out in three stages:

- a) Identify most suitable type of loader
- b) Establish size of loader necessary
- c) Select brand of loader or specific machine

Under each of these a number of factors need to be considered. Their relative importance to the selection decision will depend very much on the situation in question. Not only should the loader be chosen based on the operation it will immediately be applied in, but consideration needs to be given to future operations the machine may be used on, whether in logging or not.

In some cases type and size may already have been established and specified by a contract. However, reconsideration should not be overlooked.

IDENTIFYING MOST SUITABLE TYPE OF LOADER

The initial selection step should establish the type of loader most suited to the operation. The main options are:

- 1) A swing-crane type loader or a mobile front-end type loader.
- 2) A loader mounted on a separate rubber-tyred carrier, mounted on a separate tracked carrier, or fixed as an addition to an extraction or transport machine.

The following factors should be considered:

- landing space and shape commonly available, any restrictions on loader operating area.
- landing organisation and layout, as determined by the extraction, stockpiling, and trucking characteristics.
- ground surface conditions - firmness, roughness, and slope.
- key functions the loader will perform and proportion of time at each (clearing landed logs, sorting and stacking, loading trucks).
- loader versatility required for performing other functions, such as assisting skid workers, extraction machine, log trucks, and keeping the landing clean.
- operator skills and availability.
- ability of machine to segregate and stockpile the required number of log sorts.
- log sizes and types (lengths, diameters, form) that will be handled.
- mobility between landings (frequency, length of shifts, transport availability).



Rubber-tyred front-end loader: needs larger landings with good surfaces. Has good versatility and mobility and is effective for working large numbers of sorts. Is a very common type of machine and is available in a large range of sizes.

These are the major factors to consider in selecting machine type, however other factors may also influence choice:

- operator visibility.
- environmental considerations - soil, water, and forest values.
- standardisation of equipment types and components where adding to a fleet.
- lift height and reach requirements in the operations.
- purchase cost and finance availability limitations.
- loader life expected.

- expected loader resale value.
- expected operating cost.
- trailer off-loading requirements.
- truck damage considerations when loading.
- operator comforts.

ESTABLISHING SIZE OF LOADER NECESSARY

Once the type of loader has been established it is important to select the most appropriate size of machine for the operation. Machine sizes available vary widely although in some types, (e.g. rope cranes) the size range offered is limited.

The following factors are the most important to consider:

- log handling rate (tonnes per hour) at key functions (clearing landed logs, sorting and stacking, loading trucks).
- log sizes and types to handle (weight per piece and dimensions).



Rope Crane Loader: available in limited size range, not suited to large numbers of log sorts, and requires highly skilled operators. Effective on small landings, poor surfaces, and at trailer off-loading. Has good lift height and long machine life.

- loader maintenance considerations and machine life expected.
- lift height ability and reach requirements of the operation.
- trailer off-loading requirements ; trailer weights and types.

Other factors that can also influence machine size selection but that are not as important in most operations, include:

- truck damage considerations during loading logs or off-loading trailers.
- loader purchase cost.
- expected loader operating cost.
- standardisation of equipment and components where adding to a fleet.

SELECTING BRAND OF LOADER OR SPECIFIC MACHINE

With the type of loader and the best size established, the remaining decision is that of choosing the specific machine. The two main options are:

- 1) A new machine or a used machine.
- 2) The particular machine manufacturer or brand preferred.

The choice should be based on the following factors:

- service back-up and parts availability for the loader in the locality in which it will be used.
- maintenance considerations and machine life based on knowledge and past experience relating to the specific machine.
- availability of machine at time of purchase.
- purchase cost of machine and overall deal offered by the seller, (trade-in allowance, warranty, finance charges, etc.).
- resale value expected.
- expected operating cost of loader (knowledge and past experience).
- equipment standardisation where adding to a fleet.
- operator comforts available.
- operator visibility requirements for the operation.

GUIDELINES FOR APPLYING A LOG LOADER

The objective in any loader application is to get the required job done in a way that results in minimum over-all cost to the logging system.

Efficient loader application depends on the ability to manipulate operating conditions in relation to the machine (type,size,brand). These may be:

LANDING LAYOUT: are the relative positions of stock-piles, processing area, log landing, and truck loading areas the best for efficient loader cycles, while still meeting the overall operational requirements?

FUNCTIONS PERFORMED BY LOADER: is the loader being used as much as practical on productive or necessary system functions? Are there some non-productive functions being performed that need not be done or which interfere with efficiency?

OPERATOR TECHNIQUE USED: is the operator adequately trained and aware of the factors influencing operational and cost performance? Examples are minimising travel and maximising volume handled per grab in each cycle, minimising unnecessary running, carrying out appropriate preventative maintenance and servicing, etc.).

LOG SORTS BEING HANDLED: has the number of different log sorts been minimised as far as possible? Can different log sorts be stockpiled, loaded and transported together?

LOADER LIFT CAPACITY AND REACH: is the loader lift capacity maximised as far as desirable without over stressing the machine? Hydro-inflated tyres or counterweights can be used and lift height for truck loading can be improved by stepped landings.

LOG GRAPPLE SUITABILITY: is the log grapple suited to effectively handle the log sizes? Is it matched to the loader lift capacity?

EXTRACTION MACHINE OPERATION: can this be altered in any way (drag size, cycle time) to assist loader efficiency without adversely affecting overall system performance?

LOG TRUCKING OPERATION: can this be altered in any way (arrival times, load type required) to assist loader efficiency without adversely affecting overall system performance?

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