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Headquarters Mechanical Development Committee

Report No. 9 on

Mechanical Loading - The Hiab Hoist

M.R. 1/44

Origin

Thinnings now being extracted from the plantations of the Commission have, in some cases, already reached a size where loading is beyond the capacity of hand labour. To meet this situation several Mechanical loading devices have been investigated and the most suitable has proved to be the Hiab Hoist which is a Swedish design, the makers being represented in the United Kingdom by Tullos Ltd., of Aberdeen.

Description

A general view of the Hiab Hoist fitted to a Bedford 5 ton vehicle is given at Photograph 1 attached to this report. The device consists of a horizontal jib mounted on a ram which rises and falls in a vertical hydraulic cylinder mounted immediately behind the drivers cab. The jib is also traversed by hydraulic rams mounted horizontally behind the main cylinder.

The whole of this structure is mounted on the main frame of the vehicle. The lifting cable passes round triple pulley blocks on the stationary and moving components to increase the travel of the cable.

Hydraulic power is supplied by a pump driven from the power take off on the vehicle gearbox. Hand controls for both lifting and traversing are provided on each side of the drivers cab.

Two men are required to operate the equipment which will lift loads up to 10 cwts. A hydraulic by pass provides protection against overloading.

Price of the equipment is £155.

Observations

1. The hoist has now been in use in the field for over 9 months and the users regard it as a great advance in loading technique. Whilst the primary object is for loading heavy poles it is also useful for picking up other loads in depots.
2. When loading poles averaging 2.8 cu. ft. two men using the Hiab can easily effect the loading whereas four men are required to load these poles by hand and they can do so only with considerable physical effort.
3. The most suitable loading technique is for one man to operate the controls whilst the other fastens the cable round one or more poles and then stands by to guide the load and pull out the cable as soon as the load has been deposited on the lorry. Some practice is required in order to judge the point of balance of the load when attaching the cable. Photographs of loading in progress are attached to this report.
4. In a trial to determine the economics of hand v. mechanical loading of poles averaging 2.8 cu. ft the results show:-

How many minutes?
See Appx.

(a)	Cost of loading by hand	=	0.36d. per cu.ft.
(b)	Cost of loading by Hiab (labour only)	=	0.22d. " " "
(c)	Cost of loading by Hiab (including overheads)	=	0.35d. " " "

Details of these calculations are given at Appendix A attached to this report.

Whilst the present costs of mechanical loading with the Hiab show no great overall saving it must be appreciated that the weight of individual loads is rapidly increasing with the attendant risk of injuries when hand loading. For some of the loads the Hiab is already essential.

or something else

5. No trouble has been experienced with the equipment the only replacements being the cable which shows signs of wear after about 3 months regular use.

How did we work 1939-46?

Conclusions

The Hiab Hoist provides a satisfactory method of mechanical loading for heavy poles and is of increasing value as the size of thinnings progresses.

Machinery Research Officer.

September, 1951.

APPENDIX A

The comparative costs of hand and machine loading

In a field trial to show the labour cost of both methods of loading 81 poles of an average size of 2.8 cu. ft. the following figures were obtained:-

By hand - 4 men took 34 minutes
By Hiab - 2 men took 42 minutes

The same poles were loaded under identical conditions in each case.

From the above figures taking labour costs at 3/- per hour the costs are:-

By hand

- (i) 4 men for 34 minutes = 136 man mins. = 2.27 man hours.
- (ii) 2.27 hours at 3/- per hour = 81.72d.
- (iii) 81 poles of 2.8 cu. ft. each = 227 cu. ft.

$$\therefore \text{Cost} = \frac{81.72}{227} = \underline{0.36d. \text{ per cu. ft.}}$$

By Hiab

- (1) 2 men for 42 minutes = 84 man mins. = 1.4 man hours
- (ii) 1.4 man hours at 3/- per hour = 50.4 d.
- (iii) 81 poles of 2.8 cu. ft. each = 227 cu. ft.

$$\therefore \text{Labour cost} = \frac{50.4}{227} = \underline{0.22d. \text{ per cu. ft.}}$$

Depreciation at £40 per annum and loading 4,000 tons.

$$\text{Depreciation} = \frac{40 \times 240}{4,000 \times 30} \text{ pence per cu. ft.}$$

$$= \underline{0.08d. \text{ per cu. ft.}}$$

Fuel at 9d. per load of 6 tons = 0.05d. per cu. ft.

$$\begin{aligned} \therefore \text{Total cost} &= 0.22 \\ &0.08 \\ &0.05 \\ &\underline{0.35d. \text{ per cu. ft.}} \end{aligned}$$

