

Report No. 36

An Observed Trial to find the Operating cost of
the Power Operated RopewayOrigin

Reports Nos. 3 and 13 described a lightweight power operated ropeway which has been designed to meet the particular conditions imposed by the extraction of thinnings from inaccessible areas in British forests. The problem was to design a ropeway capable of carrying a reasonable payload and yet light enough in itself to be easily erected and dismantled. This latter point was a dominant factor in view of the small volumes of timber likely to be available on any one site (seldom more than 3,000 cu.ft.). It was hoped in the early days of this ropeway development that it would be possible to extract for a price of 9d. per cu.ft. covering the moving from stump to roadside (1/2d. including felling). Whilst, as a set piece demonstration, this can be done it was soon realised that unpractised teams working under normal forest conditions, hampered by rain and other interruptions, would find it difficult to achieve this figure.

Conditions
of the Trail

In order to establish actual costs under normal forest conditions, an observed trial was carried out on three adjacent sites at Waterloo Wood near Dolgelley. These sites provided steep slopes mainly within the range of 20° - 30° and about 500 yards long. The crop was mainly D.F. and J.L. some of the logs exceeding 35 ft. in length and 6 cu.ft. in volume. The largest individual log was 14 cu.ft. The ground offered no unusual difficulty but the situation was complicated by a main road which passed close to the bottom of the hill. In view of the danger from a possible runaway carriage if the rope came straight down the hill the abnormal expedient of changing direction on the rope was introduced. (It was not possible to run diagonally across the hillside.) This direction change was done by using a number of extra supports to bring the rope down the hill in a pronounced arc meeting the road at the bottom at about 45°. An observer was employed to record the exact number of man hours spent on the site and exactly how these man hours were used. The team normally employed was 5 men. 2 photographs of the ropeway in operation are attached to this report.

Observations

1. A summary of the figures recorded on the three sites is as follows:-

	Site 1	Site 2	Site 3
(a) Total volume extracted cu.ft.	1,774	3,170	3,591
(b) Man hours worked	260	946	851
(c) " " lost	300	497	539
(d) " " charged (b + c)	560	1,443	1,390
(e) Man hours lost due to rain included in (c) above	209	84	386
(f) Man hours lost due to mechanical breakdown included in (c) above	48	226	96
(g) Labour cost per cu.ft. based on man hours charged at 2/9d. per hour	10½d.	1/3d.	1/0¾d.
(h) 40% added to labour (g) for overheads	4d.	6d.	5d.
(i) Add 5d. felling, 1d. depreciation on ropeway and ½d. for fuel and repairs per cu.ft.	6½d.	6½d.	6½d.
(j) Add for erection on site 1 only including 40% added for overheads (Based on average erection cost on sites 2 and 3 included above at (d))	8½d.	-	-
(k) Cost added for dragging a proportion of the logs to the ropeway by horse	1¾d.	2d.	1¼d.
(l) Total cost of extraction per cu.ft.	2/7½d.	2/5½d.	2/1½d.
(m) " " " " " " if time lost due to rain is omitted	2/1¾d.	2/4¾d.	1/8¾d.

2. Examination of the figures given at Observation 1 shows that the main points revealed by the trial were:-

- (a) The enormous number of man hours which were lost. The main causes were the weather which was probably the worst on record for the July - November period and secondly mechanical breakdown of the equipment. All these lost man hours had not only to be paid for at the standard rate but they also had to carry a 40% addition for overhead charges, an overwhelming burden on the costs when it is noted that on site 1 the man hours lost substantially exceeded the number of man hours worked. On the other two sites this situation was little better. The heavy time losses due to mechanical breakdown were partly due to the age of the equipment nearly all of which had seen over two years service and the considerable complication introduced by the need to change direction on so many of the main cable supports. Most of the mechanical breakdown were due to the carriage derailing at these direction changes particularly when carrying the very long logs.
- (b) The immense value of employing men in the team who have had at least some, ropeway experience. In this trial the team was entirely new to the work and the situation was made worse by frequent replacements in the teams from day to day. Nevertheless they did improve as the trial progressed since the total cost of extraction was lowest on the third site.

3. Erection (with dismantling) costs on the two sites for which records are available were 3d. and 4d. per cu.ft. The times being 274 and 451 man hours respectively ignoring time lost due to rain. Director changes on the rope were partly responsible for these high costs but this trial has once again shown that erection and dismantling together cannot be allowed to absorb more than 160 man hours. Even at this figure on a site yielding 3,000 cu.ft. erection with dismantling costs would be nearly 2d. per cu.ft.

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Conclusions

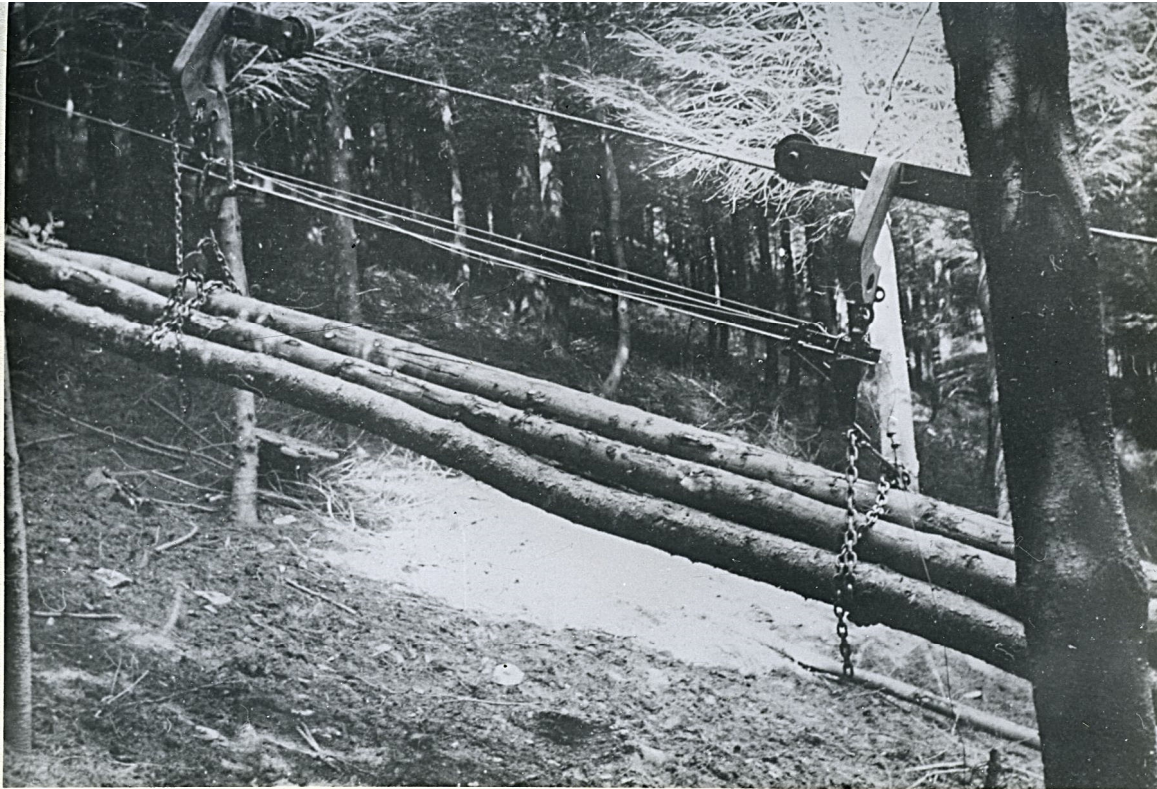
The trial has given some very useful information on extraction costs by this ropeway including detailed costs incurred in the various phases of the operation.

The outstanding features were:-

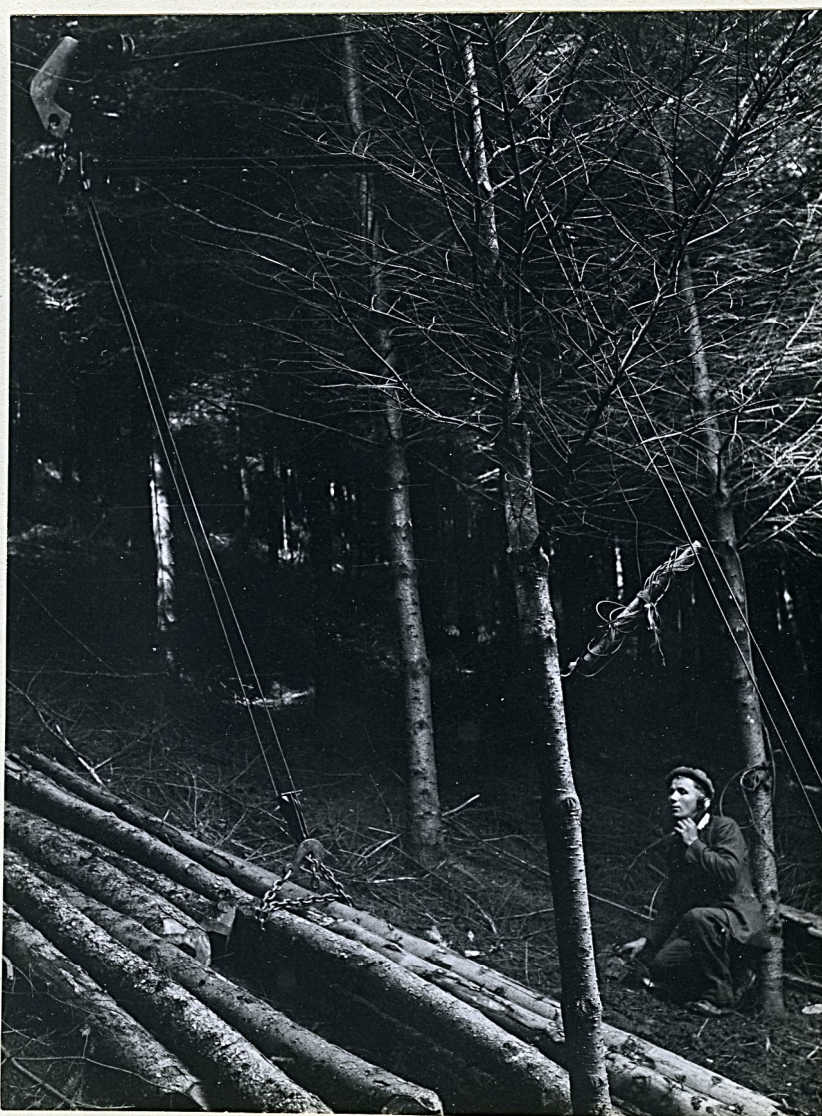
1. The very large amount of time lost through rain.
2. Delay through breakdown such as carriages coming off the rope largely due to the direction changes introduced to suit the sites of this particular trial.
3. The long periods spent on erecting the equipment. This trial again stressed the importance of a simple design for any ropeway intended for the extraction of thinnings because the volume per site is usually so small.

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March, 1955



The F.C. power operated ropeway in operation at Waterloo Wood, Dolgellley, Autumn 1954.



The load on the ground ready to be lifted mechanically up to the carriages. Note the cables coming down to the pulley blocks on the lifting hooks. The loader is seen telephoning to the winch operator telling him that he is ready for the lift.