INFORMATION NOTE
ODW 8.02

Forest Research
An agency of the Forestry Commission
TECHNICAL DEVELOPMENT BRANCH

THE IRON HORSE

Introduction

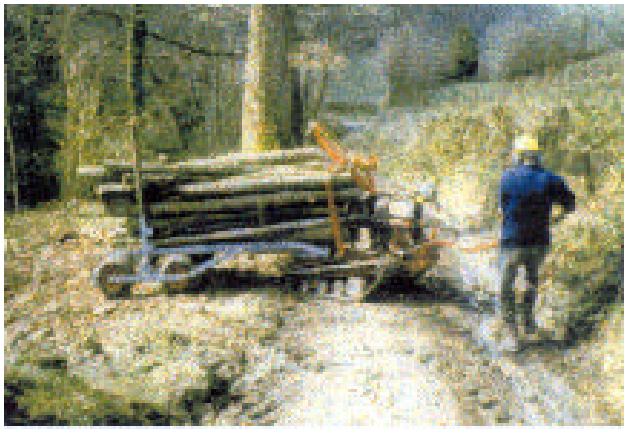
This Information Note is one of a series derived from a Technical Development Branch (TDB) Outdoor Workshop (ODW). It is produced as a guide to part of a harvesting system suitable for use in small scale broadleaved woodlands. ODWs are a TDB initiative designed to offer practical advice to practical people through presentation, demonstration and user guidance. The ODW programme will involve repeating trials and introducing new systems around Great Britain, so that a wide range of sites, systems and practitioners can be included.

Information has been gathered from equipment and method trials based at a single location. This information therefore must be taken as indicative only. Variation could be expected for other operations where factors such as terrain, crop specification, product specification, operating distances or operator efficiency differ.

The System

The Iron Horse is a pedestrian controlled tractor with tracks. It can be used as a skidder, making use of the integral winch, or as a forwarder using a trailer. The skidding and forwarding options make the Iron Horse a versatile machine suitable for working shortwood or pole length systems on most ground conditions.

The Iron Horse is a purpose built machine which is compact yet powerful enough to handle all but the largest timber. It has excellent terrain capabilities, is suitable for sensitive, steep or soft sites with minimal ground damage and is easily transportable between sites on a trailer.



Information collected during a case study (1998) on another site (Table 1) has been used in the calculation of outputs and costs.

To obtain the total system cost, the additional cost of felling is required.

The nature of the material extracted during the case study (small diameter, bent and twisted) meant that load sizes could not be optimised during skidding. Load volume would increase if larger volume and more uniform material was extracted.

Details of the machine and equipment costs are given in Table 2.

The skidder working method is illustrated in Figure 1.

Table 1

Case Study: Site and Crop Characteristics

Soil	Sandy free draining and friable loam overlying shale	Species	Oak, some ash/birch	Age	50
Vegetation	Sparse grasses, bare in places some hazel coppice	Form	Oak: Some good stems, small underdeveloped crowns. Ash: Poor form some with cankers.		
Terrain	30% slope with occasional steep snap falling to a level area adjacent to a stream. Ground gently undulating and free from major obstacles.	Average tree (m^3)	0.083 (Thinned)		
Access	Level grassy ride at top of slope. Unsurfaced farm track traversing slope at one end of the wood.	Standing volume	121 m^3/ha	Thinning volume	54 m^3/ha

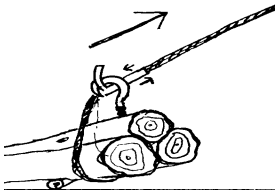
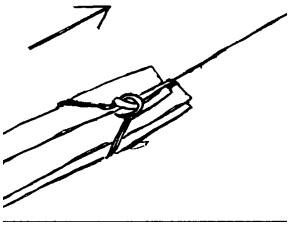
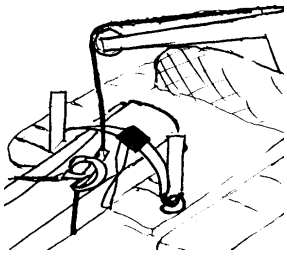
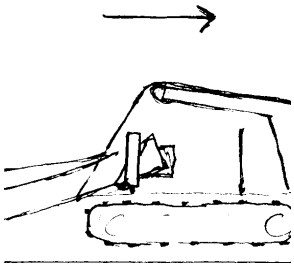
Table 2

Case Study: Machine/Equipment Description

Item	Specification	Capital Cost (£)	Hourly Cost (£)
Pedestrian controlled tractor	Partner/Jonsered, Iron Horse 129 Pro. Honda GX 270 cc 4 stroke, fan cooled petrol engine. Kevlar strengthened tracks. Maximum speed 4 mph. Load 500 kg (skidder), 1000 kg (forwarder). Winch, 1100 kg pull. 20 m of 6 mm wire rope. Loading crane.	7 150 (new)	2.62
Trailer	Partner/Jonsered. Two wheel bogie axle. 1 tonne capacity. No brakes.	1 050 (new)	0.33
Labour			8.00
	Total Hourly Cost (as skidder): £10.62 Total Hourly Cost (as forwarder): £10.95		

Figure 1

Skidder Method

			
Wire rope around tush	Haul in	Secure load	Skid out

Outputs and Costs

Estimated outputs and costs based on the case study data have been given for Skidding (Table 3) and Forwarding (Table 4) over a range of load sizes and an extraction distance of 100 m. Output per standard hour (shr) include allowances of 17% for Rest and 16% for Other Work.

Table 3

Skidder Outputs and Costs

Load size (m^3)	0.20	0.30	0.40	0.50	0.60
Output (m^3/shr)	1.00	1.21	1.35	1.39	1.47
Cost (£/m^3)	10.62	8.78	7.87	7.64	7.22

Table 4

Forwarder Outputs and Costs
(Good and Poor Access)★

Load size (m^3)		0.50	0.60	0.70	0.80
Good access	Output (m^3/shr)	1.75	1.86	2.03	2.30
	Cost (£/m^3)	6.26	5.89	5.39	4.76
Poor access	Output (m^3/shr)	1.49	1.58	1.68	1.90
	Cost (£/m^3)	7.35	6.93	6.52	5.76

★ Good access = level ride or unsurfaced rack
Poor access = in wood

Comments on Performance

Skidding: The skidding option increases manoeuvrability in crops. Skidding poor quality, bent and twisted pole length material is awkward due to the load securing system.

Forwarding: The use of the forwarding trailer is more suitable for smaller diameter timber. Occasional large material can be loaded using the winch and loading arm attachment.

Material should be presented butt first on bearers for winching. Rackways should be identified and cleared with timber sacked adjacent to them for forwarding.

Associated TDB Publications

Information from ODWs will be published by TDB. Associated publications available now are:

- Report 25/93 - The Gorge Trials - A Case Study of Small Scale Extraction Techniques
- Technical Note 25/96, Harvesting, Extraction & Processing of Low Grade Broadleaves: Case Study.
- Report 1/93, Extraction by the 'Iron Horse' in Broadleaved Woodland

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