

EVALUATION OF ROLL-OFF TRAILERS IN SMALL-DIAMETER APPLICATIONS

by

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ABSTRACT

Concern about wildfire in overstocked forests of the western U.S. has led to increased emphasis on extraction of small-diameter material. Removing this material improves forest health, reduces fuel loading, and may generate value that can be used to offset the costs of operation. However, the cost of small-diameter operations (both in-woods and secondary processing) are often prohibitive due to handling and transport. This is a particular problem with small-volume niche markets that cannot absorb the productive capacity of conventional forest products transportation systems. This project studied the performance and costs of an innovative wood transport system using roll-off pallet racks to facilitate handling of small-diameter thinning material. Elemental studies defined the transport cycles and cost analysis compared the economics of the new system with conventional transport technology.

Introduction

A recent assessment of biomass in western forests of the U.S. (USFS, 2003) estimates that about 570 million bone dry tons of material could be removed through fuel reduction treatments to address high-risk stands. While much of the volume can be processed into conventional forest products, there is also interest in promoting diverse and specialized utilization. Small-volume niche markets can increase value-added by careful selection and merchandizing of the raw material. For example, logs for carving, rustic furniture material, log home components, post-and-rail, and specialized sawlogs are higher value niche products that can be recovered from fuel thinning projects. Although these niche products will not consume large quantities of forest biomass, they may make fuel reduction projects more cost-effective in some local areas.

A key problem for small producers is finding economical methods for harvesting, handling and transport of material when daily production levels are low. Conventional logging and transport equipment operates efficiently at high volumes. A drive-to-tree feller-buncher, for example, may be able to cut and pile 50 tons per hour. A conventional grapple skidder can produce 30 tons per hour. High production is essential to reducing harvesting and transport costs. However, when the total wood flow for a small-scale producer is less than potential productivity of conventional equipment, costs increase due to under-utilized capacity.

This objective of this project was to examine transportation alternatives for a case study of a small-volume shavings factory. Total woodflow through the mill is about 30 green

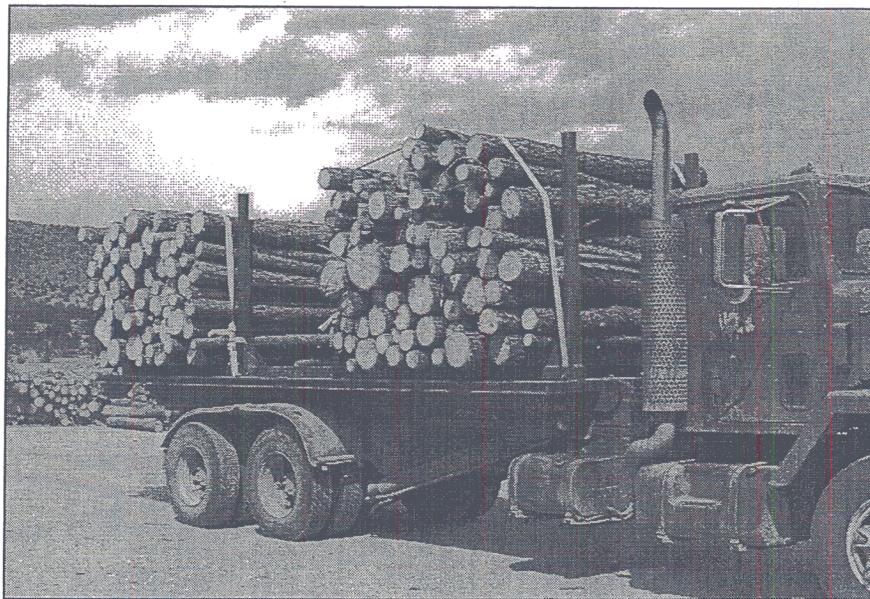


Figure 1. Roll-off wood rack for shortwood bolts.

System Evaluation

An initial elemental production study was conducted after the contractor had used the system for several months. The truck made 2 trips per day and Table 1 summarizes elemental data from 6 loads. Each load was followed to the millyard to measure average travel speeds on the various types of roadways (Table 2).

Table 1. Elemental cycle time summary for roll-off wood rack transport system.

Productive Element	Mean	Max	Min
<i>In-woods</i>			
Position to unload (min)	1.02	1.73	0.32
Unload rack (min)	3.33	4.25	2.40
Position to load (min)	4.48	7.06	2.04
Load rack (min)	3.99	5.27	2.44
Bind down load (min)	6.61	10.19	2.69
<i>Millyard</i>			
Unbind load (min)	2.15	3.31	1.65
Unload with sling loader (min)	12.98	16.45	10.12

Table 2. Average travel speeds for the roll-off truck.

Road Type	Mean Empty (mph)	Mean Loaded (mph)
Woods road	4.2	4.1
Gravel road	30.3	26.0
Paved, in-town	33.7	28.2
Paved, out-of-town	44.7	41.5
4-lane highway	50.9	45.1

two small facilities may be able to fully utilize a single conventional trucking operation reducing wood costs for both consumers. However, multiple markets must be able to have some consensus on product form and wood-handling system requirements in order to use a common trucking system.

As new utilization opportunities are developed for small-diameter wood products it is important to understand the economies of scale in wood transport. Markets that require less than 50 green tons per day will likely pay a premium in transport and handling compared to larger utilizers.

References

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