A Comparison of the Advantages of Light and Heavy Log Trucks Used in Truck Log Hauling

by

Walter Geren

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TABLE OF CONTENTS

Chapter 1  Advantages of heavy logging trucks over light logging trucks.
Chapter 11  Advantages of light logging trucks over heavy logging trucks.
Chapter 111 Summary
Appendix

1. Figure 1  Abstract of test runs made by Grande Ronde Pine Company.
2. Figure 11  Abstract of test runs made by Lakeview Logging Company.
3. Figure 111 Table showing relative operation costs of various sized logging trucks, made by Grande Ronde Pine Co.
A Comparison of the Advantages of Light And Heavy Log Trucks Used in Truck Log Hauling

Introduction

There is some controversy among truck loggers as to the relative merits of large and small trucks in the truck logging industry. This paper is not intended to settle the problem or to make a decision one way or another, but to present both sides of the argument in such ways that a prospective operator could use it as a guide for decisions in buying logging trucks.

This paper is based upon the assumption that both the light and heavy trucks are used on private roads, as the heavy trucks would be automatically ruled out if used on public highways.

The problem, while of no great importance to the public, is of importance to the logger because the difference in hauling costs between light and heavy trucks, might, under some conditions mean the difference between profit and loss on an operation.

The only study of this subject besides the private study of each logger as he buys a logging truck has been carried on by Mr. Truman Collins, president of the Lakeview Logging Company, and by the Timberman. The best way by which this question has been settled to the owners satisfaction has been by actual experience with the various sized trucks.
The data for this paper has been drawn largely from The Timberman, West Coast Lumberman, the paper "Truck Logging Cases" by Truman Collins and from experience and observation by the writer.

The subject is developed by listing the points in favor of each sized truck, large and small, and explaining how each point will apply in the selection of the proper sized truck.

In this paper large trucks are those able to haul 7,000 or more board feet and small trucks those whose maximum load is 7,000 feet. Both loads being considered as hauled over roads suitable for the size loads hauled.
Chapter I---Advantages of large trucks over small trucks.

(a) Larger loads possible

In an operation where several large trucks or a greater number of small trucks are needed to handle the output of a side the larger loads which it is possible to haul is an important factor in keeping the road, which is usually a one way road, uncongested. With small trucks, the greater number needed to handle the output of a side would make an organized plan of dispatching almost impossible. While with larger units, hauling twice as much a plan for meeting and passing on a one way road can efficiently be carried out thus saving time which with more numerous small trucks would be lost. Another saving of time effected by the hauling of large loads is in loading and unloading. The time necessary for getting the truck ready for loading is no greater for a large truck than for a small truck and the time necessary for actual loading is hardly twice as much in the case of large trucks as the time used in loading the small trucks. The time for unloading would be the same with either size truck making a saving of time in the case of a large load.
(b) Larger trucks are faster.

It has been shown on test runs at the Lakeview Logging Companies operation at Lakeview, Oregon that the larger units, in this case Kenworth trucks hauling an average of about 15,000 board ft. made a greater mile per hour average both loaded and on return trip empty to the woods than two Macks and an International hauling about 6500 board feet. In these test cases the Kenworth truck hauled 15 M.B.F. at an average speed of 18.3 miles per hour and returned at an average speed of 24 miles per hour. The haul was over about 14.5 miles of favorable grade running from 6.6% down to .5%. (See Figure 2) Over the same road at the same time the two Macks and the International truck hauling an average load of 6500 B.F.M. averaged 15.1 miles per hour loaded and 19.1 miles per hour on the return trip.

According to these test runs it can be seen that the larger trucks are capable of higher speeds on both adverse and favorable grade. On favorable grades the larger trucks are able to descend faster because of better brakes or rather because of larger braking surfaces. On the return trip the larger trucks make more speed because of more power against the adverse grade. The test runs are shown graphically in Table I.
(c) Large trucks can be dieselized.

The larger trucks at the present time are the only ones that can be equipped with diesel motors. Diesel power is much cheaper, costing about 60% of the cost of gasoline power and giving more power.

Replacement of gasoline motors by diesel motors is often done now in larger trucks and operators of these re-powered trucks report fuel savings, more power and a cut in repair bills.

(d) Larger trucks do not need special axles and transmissions.

The large trucks do not need the installation of expensive special axles and transmissions to get the power necessary to haul the loads which they are able to carry. The cost of these special axles when added to the cost of the light truck brings the price of the truck to nearly twice as much as the first cost of the truck alone.

(e) Larger trucks are able to haul up steeper grades.

Because of the greater ratio of power to the size of the load in the larger trucks they are able to haul up much steeper grades than small trucks. For this reason on an operation planned for large trucks the roads can be laid out with a greater percent of grade than would be possible were small trucks to be used.
The laying out of roads on steeper grades would mean a cut in road building costs and bridge costs which in most instances would go far towards off-setting the greater initial cost of the large trucks regardless of the latter savings possible by use of large trucks.

The maximum grade a small truck without a special axle is able to negotiate loaded is from 8 to 10% according to the condition of the road. While on the same kind of road, hauling a proportionate load, the large truck can negotiate grades of 12 to 14% or even in some places as high as 15% adverse grade.

(f) Large trucks are more dependable with less likelihood of breakdown.

The larger trucks as a rule are better built than small trucks, being built heavier all-over in ratio to the load hauled than the lighter trucks. In this way there is less danger of overloading the heavier trucks than the light ones. In many cases with light trucks built to carry three or four thousand board feet there is a tendency to try and haul six or seven thousand board feet with a result of frequent breakdowns, and short truck and tire life.

If on a small truck the tires are overloaded to twice their carrying capacity the life of the tire will be shortened greatly. On the larger trucks there
is a greater ratio of tire carrying capacity to load than on the smaller trucks with a consequent longer tire and a smaller tire cost per thousand board feet. 

(g) Larger trucks are less liable to damage by dropped logs.

The larger trucks with their sturdier build are less liable to damage such as sprung frames, by heavy logs being accidently dropped on them at the landing during loading. The accidental impact load caused by a dropped log has no relation to the carrying capacity of the truck, but with a small light framed truck a log accidently dropped upon it may easily ruin it by springing the frame or the differential housing.

(h) Labor costs per thousand are less for large trucks than small.

The larger logging trucks hauling up to twice the load of a small truck and at an equal rate of speed naturally have about half the per thousand labor cost of small trucks. At present labor rates this would amount to about four or four and one half dollars per day and if the truck was hauling three loads or 45 M/day would be saving of .10/M on the basis of the amount hauled by a large truck. To state it another way the small truck might be making 3 trips a day hauling 18 M/day at a labor cost of $8/day or $.44/M while the large truck making 3 trips a day hauling 45 M/day at a labor cost of $10 or a cost of $.22/M for labor.
(i) Larger trucks easier on roads

Because of the greater ratio of tires to load possible on the larger trucks they are much easier on roads than small trucks which are much more likely to be loaded over the limits of their tires. A heavy load on a light truck will soon cut deep ruts in a road while at the same time a heavy truck hauling large loads over the same road would not break through and cut ruts in the road.

Chapter II--Advantages of light trucks over heavy trucks
(a) In buying trucks for any operation it is necessary to analyze the operation as to size and length of time necessary to remove the timber. In cases where the amount of hauling is small and the period of operation short the lighter truck has an advantage in the smaller initial investment necessary to start the operation. If the timber on an area to be logged can be removed in one or two years or during the depreciation period of a light truck, it would be foolish to invest in a large truck, and then depend upon the resale value of the large truck after the operation is finished. The lighter truck would remove the timber and be completely depreciated while a large truck would probably be only
partially depreciated and a loss realized on the partially depreciated truck, if resale is possible. If a large truck is used with a view of a resale value at the end of operations, it is necessary to make a charge per thousand board feet on an estimate of the resale value which may not be as great as expected and thus may lead to an erroneous cost per thousand board feet of hauling. Up to the present no logging concern has fully depreciated one of the new large trucks so as to be able to tell just what the period of depreciation should be; but it has been estimated at from five to eight years which is two or three years greater than the life of a lighter truck.

The excess cost of a large truck over that of a small truck will also mean the tying up of working capital at the beginning of an operation when it is probably worst needed. This, to a small outfit, where working capital is scarce, might mean the difference between success and failure or much inconvenience in raising additional capital to take the place of that tied up in the large truck.

The lighter trucks have a higher intrinsic resale or trade in value because of their size which
makes them desirable for farm use or other light light hauling. With large trucks it is necessary to completely depreciate them by log hauling as there is practically no other use for them after they have been used for that purpose.

Because of lower cost it is possible to trade light trucks in on new trucks about every two years and thus keep up with latest improvements in truck building without taking a loss caused by obsolescence. A light truck two years old if it has been cared for will have a higher comparative trade in value than a large truck at the end of five or six years when it is unsatisfactory for log hauling, but still has some residual value.

(b) Servicing of light trucks more satisfactory.

The servicing of light trucks is more satisfactory, because they are more familiar to most mechanics and because parts can be obtained in almost any town at a low cost. With some of the larger trucks it may be necessary to send for some distance for repair parts causing a loss in working time and a consequent loss in money. In the event of a breakdown, while large trucks are not as apt to breakdown as often as small trucks, the charges accumulating against the large
truck for lost time will raise the cost of hauling materially above that of the light truck which can be repaired quicker and with less interest charges etc. piling up against it during the breakdown.

(c) Lower first cost for tires.

The first cost for tires for small trucks is much smaller for light trucks than for large trucks, and while the lower cost can not be reckoned as a smaller cost per thousand board feet, it is often a factor considering the working capital which is tied up in tires. When it is necessary to buy new tires it is much more convenient to make the smaller investment on the light truck than to invest two or three thousand dollars of working capital in tires for a large truck.

(d) Licences and fees

In a comparison of this kind the costs of licences and fees can not be considered as the operation of both sizes of trucks is over private road where no fees are required.

The difference in licence costs is a factor, however, where hauling is done over public highways. The cost for a smaller truck is under that of a large truck, but on the other hand the danger of exceeding load limits is greater with small trucks than with large trucks as the large trucks carry more rubber in ratio to their rated capacity than small trucks ordinarily carry.
Chapter III. Summary

From a table, (Fig. 3 in appendix) which was compiled at the Grande Ronde Pine Company operation, a comparison of the costs of operation of small trucks and large trucks can be drawn.

In this test run all of the trucks were equipped with dual-axle trailers and auxiliary transmissions or rear ends.

All of the trucks in the test from which the above table was compiled were over 18 months old except the Fageols which were new. For that reason estimations of repairs and tires were necessary but were based upon wide experience and should be very close to the true average.

Mr. Truman Collins, a well known truck logger of Eastern Oregon, compares the use of heavy trucks against light trucks to the railroads which were found to last longer and give cheaper service when heavier steel and equipment were used against light steel and equipment.

In the light of present day trends in the lumber business towards sustained yield and continuous logging over the same ground the heavier trucks seem to be favored because the advantages listed before are in their favor and the disadvantages of high initial cost etc. are rendered negligible by the length of the operation.
It is impossible to say that one type of truck would be superior to another without being able to see all the factors which determine the optimum sized truck. At the present time the weight of opinion of operators on long time operations seems to be with the heavier trucks, but new engineering developments may, in future, develop a light truck far beyond those in use now in economy of operation.
APPENDIX
### The Grande Ronde Pine Co. Pondosa Ore

**Abstract of Test Runs**  
**Sept. 1937**

<table>
<thead>
<tr>
<th>4</th>
<th>7</th>
<th>9</th>
<th>8</th>
<th>MPH Woods to Mill</th>
<th>9</th>
<th>17</th>
<th>23</th>
<th>To Mill Loaded</th>
<th>Time in Minutes</th>
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<tr>
<td><strong>Chevrolet</strong></td>
<td>Ave. Load 3200 ft</td>
<td>11</td>
<td>10</td>
<td>10.9 MPH</td>
<td>88</td>
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<tr>
<td>5</td>
<td>5</td>
<td>10</td>
<td>6</td>
<td>11</td>
<td>20</td>
<td>22</td>
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<tr>
<td><strong>Mack</strong></td>
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<td>11.1 &quot;</td>
<td>86</td>
<td></td>
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<tr>
<td>6</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>13</td>
<td>17</td>
<td>21</td>
<td>22</td>
<td>13.5 &quot;</td>
<td>71</td>
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<tr>
<td><strong>Federal</strong></td>
<td>Ave. Load 4800 ft</td>
<td>13</td>
<td>13</td>
<td>14</td>
<td>25</td>
<td>18.3</td>
<td>52</td>
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<tr>
<td><strong>Three Fageol Diesels</strong></td>
<td>Ave. Load 9400 ft</td>
<td>22</td>
<td>25</td>
<td>19.4</td>
<td>49</td>
<td></td>
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<tr>
<td><strong>Loading</strong></td>
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<td>4%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
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**Graph Information**

- **Running time to Mill**
- **Woods Trailers Loaded**

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<th>12</th>
<th>21</th>
<th>23</th>
<th>11</th>
<th>14</th>
<th>25</th>
<th>18.3</th>
<th>52</th>
</tr>
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<tbody>
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<td><strong>Chevrolet</strong></td>
<td>MPH Mill to Woods</td>
<td>11</td>
<td>12</td>
<td>22</td>
<td>23</td>
<td>10</td>
<td>17</td>
<td>28</td>
<td>19.4</td>
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<td>18</td>
<td>19</td>
<td>8</td>
<td>11</td>
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<tr>
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<td>22</td>
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<td>17</td>
<td>28</td>
<td>19.4</td>
<td>49</td>
</tr>
<tr>
<td><strong>Fageol Diesels</strong></td>
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<td>20</td>
<td>22</td>
<td>12</td>
<td>16</td>
<td>26</td>
<td>18.4</td>
<td>52</td>
</tr>
<tr>
<td>Miles Per Hour</td>
<td>Woods to Mill</td>
<td>Ave Load</td>
<td>MPH Minutes</td>
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</tr>
<tr>
<td>11.2</td>
<td>18.2</td>
<td>15.6</td>
<td>22.2</td>
<td>13.3 47</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12.7</td>
<td>17.2</td>
<td>14.9</td>
<td>20.5</td>
<td>16.1 46</td>
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<td>15.0 59</td>
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<td>8.8</td>
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<td>10.7</td>
<td>19.9</td>
<td>15.2 58</td>
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<tr>
<td>8.8</td>
<td>14.6</td>
<td>11.9</td>
<td>17.8</td>
<td>15.5 58</td>
<td></td>
<td></td>
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</table>

**Gravelled Road**

**Fig 2**
## GRANDE RONDE PINE CO.

**Truck Costs July, Aug, Sept 1937**

<table>
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<tr>
<th></th>
<th>Chevrolet</th>
<th>Mack &amp; Federal</th>
<th>Fageol Diesel80</th>
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</thead>
<tbody>
<tr>
<td><strong>Ave. Distance to Mill</strong></td>
<td>16 miles</td>
<td>16 miles</td>
<td>16 miles</td>
</tr>
<tr>
<td><strong>Average Load</strong></td>
<td>3,080 bf.</td>
<td>5,140 bf.</td>
<td>8,700 bf.</td>
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<tr>
<td><strong>Gross Weight</strong></td>
<td>35,940#</td>
<td>58,620#</td>
<td>98,000#</td>
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<tr>
<td><strong>Approx. Ave. Tire Mileage</strong></td>
<td>10,000</td>
<td>14,000</td>
<td>14,000</td>
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<tr>
<td><strong>Operating Labor</strong></td>
<td>.672 Per M</td>
<td>.665 Per M</td>
<td>.535 Per M</td>
</tr>
<tr>
<td><strong>Repairs (Labor)</strong></td>
<td>.195 Per M</td>
<td>.190 Per M</td>
<td>.140 Per M</td>
</tr>
<tr>
<td><strong>Repairs (Parts)</strong></td>
<td>.214 Per M</td>
<td>.260 Per M</td>
<td>.180 Per M</td>
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<tr>
<td><strong>Gas &amp; Oil</strong></td>
<td>.349 Per M</td>
<td>.034 Per M</td>
<td>.444 Per M</td>
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<tr>
<td><strong>Tires</strong></td>
<td>.369 Per M</td>
<td>.039 Per M</td>
<td>.390 Per M</td>
</tr>
<tr>
<td><strong>Depreciation Truck</strong></td>
<td>.260 Per M</td>
<td>.025 Per M</td>
<td>.315 Per M</td>
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<tr>
<td><strong>&quot; &quot; &quot; Trailer</strong></td>
<td>.135 Per M</td>
<td>.013 Per M</td>
<td>.125 Per M</td>
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<tr>
<td><strong>Average Interest @ 6%</strong></td>
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<td>.004 Per M</td>
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<tr>
<td><strong>Total</strong></td>
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