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Introduction

Southern Forest Experiment Station

U. S. Forest Service

New Orleans, La.

TRUCK LOGGING OF PINE IN MISSISSIPPI AND LOUISIANA

By

R. R. Reynolds, Junior Forester.

General Notes About Logging

With a fairly level land, and the virgin or second-growth timber of good quality pine, truck logging is sure to have the highest net returns. However, some of the virgin and second-growth timber has been cut, and it is becoming increasingly difficult to obtain timber in suitable quantities for log by this method. The only necessary logging of forest has been done elsewhere and the same may obtain here some day.

Truck logging often is possible and profitable under conditions where railroad logging is impracticable and the reasons that trucks are used where suitable and complete road networks and logging skids, with little or no preparatory work, trucks are able, in dry weather at least, to go over practically any surface of low woods after a load of logs, often packed on the lower logs, without the necessity of skidding. In short, the use of the logs have to be moved that the trucks to get a load.

Perhaps the chief value of the trials, however, is that by their use woods of very low density and stands being worked selectively can be profitably logged.

* - This series of publications releases data gathered in connection with investigations being carried on at the Southern Station. The information contained in them is subject to correction or amplification following further investigation - Editor.

E. M. Reynolds, Junior Forester.

Introduction

The data presented in this report were obtained as a result of a study of a fairly large and representative number of operations being conducted in the south and central West Virginia and eastern Kentucky. These operations are of the Southern Coastal type, including operations in hardwood, hemlock, spruce, and loblolly pine and upland hardwood; in all conditions of stands from virgin to scattered second growth; and in widely varying conditions of topography. The soil type or types encountered in this logging vary from sand to a heavy clay and consequently the fire hazard over which some of the hauling is usually done also varies widely as to soil and ease of trucking in wet weather. The time available for this study was limited. Therefore, this phase of the study was confined to the logging of virgin. While the material presented is believed reliable, this report would not be considered the final work as to methods and costs of tract logging, but rather as a progress report only.

Virgin versus Tract Logging

With a fairly long haul, and in virgin or second-growth timber of good density per acre, tract logging is hard to beat for efficiency and economy. However, much of the virgin and dense second-growth timber has been cut, and it is becoming increasingly difficult to obtain timber in which it is practicable to log by this method. For this reason, logging by tract has come into existence and is being more widely used each year.

Tract logging often is possible and profitable under conditions where tract logging is unprofitable for the reason that tracts are more mobile and adaptable than tracts and logging tracts. With little or no preparatory work, tracts are able, in dry weather at least, to go into practically any portion of the woods after a load of logs, when clearing up the larger logs without the necessity of skidding. In fact, for the logs have to be moved for the tracts to get a load.

Perhaps the chief value of the tracts, however, is that by their use stands of very low density and waste being handled selectively can be profitably logged.

The fact that tract logging of pine is coming into greater use each year was forcefully brought out in the trip on which the data presented in this report were collected. Two large lumber companies were visited, each of which at one time logged all of their timber by tract, but as the price of pine has advanced the entire mill has been converted to log skidding. The mill on the main line of the railroad. These mills produce 50 and

100 M feet of logs per day. Another large company was producing approximately 25 per cent of its total mill cut of logs by truck, and a number of other large mills were producing some logs by this method.

Company versus Contract Truck Logging

Many of the companies now obtaining a portion or all of their total mill cut of logs by truck have at one time or another tried truck logging with company-owned trucks. With very few exceptions, however, all have changed to the contract method. This is due chiefly to the fact that the competition among truck owners makes it possible to get the logs to the mill considerably cheaper than could be done with the company-owned trucks.

Contract truck logging has other advantages over company truck logging. Besides being cheaper, the company knows exactly the cost at which it can get logs to the mill, thus avoiding wide fluctuations in log cost from month to month; the total cost of producing lumber at any one time can be much more easily ascertained and controlled; and trucks and trailers receive much better care and handling when driven by the men who own them than they would receive from hired drivers who often have little or no interest in the machines.

Provisions of Contract Truck Logging

The contract provisions in truck logging are practically uniform between the different companies that obtain some or all of their logs by the contract truck haul method. About the only variable is the price per thousand board feet. Practically all the companies own their own timber, and pay so much per thousand to have it delivered to the mill. This includes the felling and bucking, skidding or bunching, loading, road building if necessary, hauling, unloading, and supervision. The price per thousand feet delivered at the mill, of course, varies somewhat with the length of haul, the stand per acre, the kind of roads, and whether it is winter or summer logging. However, some of the lower contract prices were for the longer hauls.

The contract price as given by six representative companies for dry weather and wet weather logging, together with the data on the length of haul and the stand per acre, is given in the following table:

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The contract price as given by six representative companies for dry
weather and wet weather logging, together with the data on the length of
haul and the stand per acre, is given in the following table:

Table 1.

Company Number	Length of haul	Stand per acre thousand board feet	Contract price per thousand board feet (dry weather)	Contract price per thousand board feet (wet weather)
1	5	1-2	\$5.00-\$6.00	
2	15	2	\$4.00	\$4.00*
3	20½	1-3	\$7.50	\$7.50
4	23	4	\$4.00	\$4.00*
5	15	2-3	\$4.50	\$4.50*
6	9½	4	\$4.50	\$6.50

* - Mostly on all-weather roads.

The number of miles of different types of road encountered on each of these trucking jobs is given in Table 3. It was found, however, that the higher or lower prices paid on a particular job were not entirely due to length of haul, condition of the roads, etc. Usually they were due to the availability of trucks and the competition of truck owners and loggers. Where trucking is done in winter from any roads other than main highways, or all-weather roads, the price paid per thousand is usually considerably higher than for summer or dry-weather logging.

Density of Stand Necessary for Profitable Truck Logging

In periods of dry weather, when it is possible to run a truck to any place in the pine woods, truck logging is practicable and profitable in almost all densities of stand, provided the timber is not too small or too scattered. For instance, it would probably be unprofitable under depressed or even normal market conditions to truck log timber 14 inches d.b.h. on a fairly long haul if only that size were present. It would also probably be unprofitable to log trees below 16 inches d.b.h. if the skidding distance were too far or if the truck and teams had to move several times in order to get a load. However, with timber of good size or with timber of smaller size that occurred in patches or bunches it no doubt would be profitable to truck log timber as thin as 500 feet to the acre or even one or more trees to the forty, provided the trees were of large size.

Under contract logging in dry weather, the contractors will log very light stands for little or no extra cost over dense stands. In wet weather, however, unless the stands are adjacent to all-weather roads, it is apparently unprofitable to log, or to have logged by contract, timber of a density less than 4,000 board feet per acre.

Table 1.

Company Number	Length of haul	Stand per acre thousand board feet	Contract price per thousand board feet (dry weather)	Contract price per thousand board feet (wet weather)
1	2	1-2	\$2.00-\$6.00	\$1.00*
2	12	2	\$4.00	\$7.50
3	20 1/2	1-2	\$7.50	\$4.00*
4	22	4	\$4.00	\$4.50*
5	15	2-2	\$4.50	\$6.50
6	2	4	\$4.50	

- Mostly on all-weather roads.

The number of miles of different types of road encountered on each of these trucking jobs is given in Table 2. It was found, however, that the higher or lower prices paid on a particular job were not entirely due to length of haul, condition of the roads, etc. Usually they were due to the availability of trucks and the competition of truck owners and loggers. Trucking is done in winter from any roads other than main highways, or all-weather roads, the price paid per thousand is usually considerably higher than for summer or dry-weather logging.

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Under contract logging in dry weather, the contractor will log very light stands for little or no extra cost over bare stands. In wet weather, however, unless the stands are adjacent to all-weather roads, it is apparently unprofitable to log, or to have loaded by contract, timber of a density less than 4,000 board feet per acre.

Trucks Used

The trucks used in truck logging in Mississippi and Louisiana, where these data were obtained, all had either four or six cylinder motors with a two-wheeled drive at the rear; dual wheels in the rear; four wheel mechanical breaks; and usually no cab. The listed capacity of these trucks is from one to three tons. Most of the trucks used were of the lighter type, apparently because of the smaller original cost, the lower cost of repairs, lesser license cost, and also due to the State laws governing the weight per load that can be hauled on State highways. A large percentage of the trucks used cost approximately \$700 each when new.

Life of the Trucks: The life of the trucks depends upon the amount of the time they are in use, and perhaps more important, the care that they are given. Most operators agree that under almost constant use and with ordinary care trucks will last about 1½ years. With exceptionally good care, the life of trucks may be extended to two years. One operator said that he preferred to trade in his trucks at the end of each year. By doing this he would get a higher trade-in value and also do away with the many repair bills that are associated with old trucks.

Depreciation per Thousand Board Feet: According to one company that kept very close check upon the costs of running trucks, the amount hauled per truck per year, etc., the costs for depreciation of the trucks under their observation amounted to \$.50 per thousand board feet of logs hauled. Other operators who have figures on cost of depreciation think this figure is, on the average, about right, but if anything, a little low.

Gasoline and Oil Consumption: The gasoline consumption per day or per mile varied with the length of haul and the kind of roads hauled over. Regardless of the distance hauled, however, the trucks are usually on the move the entire day so that the consumption per day is fairly uniform. The average consumption per truck per day, of all the companies visited, was 11 gallons of gasoline and two quarts of motor oil. According to the best figures obtainable, trucks average nine miles per gallon of gas on log hauling.

Trailers Used

In the area of Louisiana and Mississippi visited all log hauling is done with a combination of trucks and trailers. No trucks are used separately without the use of trailers as the wheelbase is not of sufficient length. The trailers are practically standard in their construction. They are two-wheeled and springless, with a bunk having a block at either end, and with a wooden or iron pipe tongue for extending or shortening the trailers from or to the truck to take care of long or short logs.

The cost of trailers is uniformly \$200, including the tires, and their life is approximately the same as that of trucks.

Trucks Used

The trucks used in truck logging in Michigan and Indiana, where these data were obtained, all had either four or six cylinder motors with a two-shaft drive at the rear; dual wheels in the rear; four wheel mechanical brakes; and usually no cab. The rated capacity of these trucks is from one to three tons. Most of the trucks used were of the lighter type, apparently because of the smaller original cost, the lower cost of repairs, lower license cost, and also due to the fact that covering the weight per load that can be hauled on State highways. A large percentage of the trucks used cost approximately \$700 each when new.

Life of the Trucks: The life of the trucks depends upon the amount of the time they are in use, and perhaps more important, the care that they are given. Most operators agree that under almost constant use and with ordinary care trucks will last about 15 years. With exceptionally good care, the life of trucks may be extended to two years. One operator said that he preferred to trade in his trucks at the end of each year. By doing this he would get a higher trade-in value and also do away with the many repairs that are associated with old trucks.

Depreciation per Tractor-horse Power Year: According to one company that kept very close check upon the costs of running trucks, the average depreciation per truck per year, etc., the cost for depreciation of the trucks under their operation amounted to \$1.50 per thousand hours of use per year. Other operators who have figures on cost of depreciation under this figure is, on the average, about right, but it is probably a little low.

Gasoline and Oil Consumption: The gasoline consumption per day or per mile varied with the length of haul and the kind of road hauled over. The average of the distance hauled, however, the trucks are usually on the road the entire day so that the consumption per day is fairly uniform. The average consumption per truck per day, of all the companies visited, was 11 gallons of gasoline and two quarts of motor oil. According to the best figures obtainable, trucks average also about 11 gallons of gas on 100 hours.

Trailers Used

In the area of Michigan and Indiana visited all log hauling is done with a combination of trucks and trailers. No trucks are used separately without the use of trailers on the woodlands is not of sufficient length. The trailers are practically standard in their construction. They are two-wheeled and springless, with a tank having a floor at either end, and with a wooden or iron pipe bumper for extending or shortening the trailers from or to the truck to take care of long or short logs.

The cost of trailers is relatively low, including the tires, and their life is approximately the same as that of trucks.

Tires Used

The kind of tires used on trucks and trailers is practically the same over the region. Nearly all tires used are 32 x 6 pneumatics on both truck and trailer, with most of the trucks having dual wheels on the rear. One company claimed that by using 36 x 7 pneumatic tires on the trailer they could increase considerably the mileage obtained over that of 32 x 6 tires.

Mileage from Tires: The original cost of the 32 x 6 tires is at present approximately \$15.50 each. The mileage obtained from the tires on the truck averages about 9,000 miles, with the tires on the trailer usually lasting somewhat longer than those on the truck.

Cost or Repairs per Year

There is a wide divergence in the cost of repairs per year from one truck to another, depending not only upon the age of the truck, but also upon the type of driver, etc. On some trucks the repairs amount to only \$20 per year, while on others this figure mounts to \$150 or more. The best average figures obtainable, which include all makes and models of trucks in use at the present time, is approximately \$50 per truck per year.

The Bunching of Logs

On the average, eight months out of the year are considered as favorable for truck logging. During this favorable period the trucks can and do go to practically any place in the woods. Therefore, the distance that it is necessary to haul logs for bunching is very small, on the average probably less than 50 feet in average to fairly dense stands. Usually the trucks drive right alongside the large logs so that it is necessary to move them but little, if any. In case it is impossible to get to the larger logs, two teams are hooked in tandem to each log for skidding to the loading place.

During periods of wet weather, the distance that it is necessary to bunch logs for the trucks becomes much greater than in dry weather, varying from 100 to 600 feet or more and averaging about 200 feet.

A large number of oxen are used in the woods for bunching logs. Many of the operators claim they are much better than mules for wet weather logging, since the oxen are much surer footed and do not bog down as easily as the mules.

Method of Loading Logs

The method of loading logs on the trucks is uniformly the cross haul, with the bunching teams doing the loading. In only one case were a few logs loaded otherwise. In this case, a small proportion of the logs was loaded from a road or railroad cut or sharp rise in the ground by rolling them directly on to the truck.

The time necessary for loading of course varies, depending upon the

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Mileage from Tires: The original cost of the 32 x 6 tires is at present approximately \$25.00 each. The mileage obtained from the tires on the truck averages about 8,000 miles, with the tires on the trailer usually lasting somewhat longer than those on the truck.

Cost of Repairs per Year

There is a wide divergence in the cost of repairs per year from one truck to another, depending not only upon the age of the truck, but also upon the type of driver, etc. On some trucks the repairs amount to only \$50 per year, while on others this figure amounts to \$100 or more. The best average figure obtainable, which includes all makes and models of trucks in use at the present time, is approximately \$50 per truck per year.

The Handling of Logs

On the average, eight months out of the year are considered as favorable for truck logging. During this favorable period the woods can be cut to practically any place in the woods. Therefore, the distance that it is necessary to haul logs for unloading is very small, on the average probably less than 50 feet in average to fairly dense stands. Usually the trucks drive right alongside the large logs so that it is necessary to move them but little, if any. In case it is impossible to get to the larger logs, the logs are hooked in tandem to each log for skidding to the loading place.

During periods of wet weather, the distance that it is necessary to haul logs for the trucks becomes much greater than in dry weather, varying from 100 to 300 feet or more and averaging about 200 feet.

A large number of oxen are used in the woods for handling logs. Many of the operators claim they are much better than mules for wet weather logging, since the oxen much more readily get up and down as well as the mules.

Method of Loading Logs

The method of loading logs on the trucks is entirely the same as with the bunching teams doing the loading. In only one case were a few logs loaded otherwise. In this case, a small proportion of the logs were loaded from a road or railroad cut or sharp rise in the ground by rolling them directly on to the truck.

The time necessary for loading of courses varies, depending upon the

availability of logs. Usually, however, the teams have sufficient time between loads to bunch for the next load. Where sufficient logs for a load are bunched at one location, the loading takes about 15 minutes.

Load per Trip

The load of logs carried per trip varies in amount, depending somewhat upon the size of the timber and the length of the logs, and a great deal upon the weather and condition of the roads. On most operations the logs are cut in lengths from 12 to 20 feet and average approximately 16 feet. Most of the timber is second-growth, but the size varies considerably from one operation to another. The smallest average size was, for one operation, 50 board feet per log. The largest average size for an entire operation was 110 board feet per log. Individual logs scale as low as 30 board feet per log and as high as 400 board feet per log. The data on the average volume per log and the volume per load for wet weather and dry weather, for the same six operations, as given in Tables Nos. 1 and 3 are as follows:

Table 2.
Load per Trip - Volume of Logs

Operation	Average volume per log	Volume per load	
		Board feet, Wet weather	Doyle scale -Dry weather
1	50	400	700
2	110	600	800
3	50	450	700
4	60	600	900
5	85	450	800
6	80	600	800

Number of Trips per Day

The number of trips made by the trucks per day vary to some extent, depending upon length of haul, miles of woods roads, miles of improved roads, efficiency of operation, condition of weather, etc. However, one would assume this variation to be greater than actually exists.

On one operation having $2\frac{1}{2}$ miles of woods roads and $2\frac{1}{2}$ miles of gravel roads the trucks made an average of five round trips per day in summer and usually five round trips per day in winter when it was possible to haul over the roads. On another operation, having one mile of woods road and 14 miles of paved road, the trucks averaged four round trips per day winter and summer.

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Load per Trip

The load of logs carried per trip varies in amount, depending somewhat upon the size of the timber and the length of the load, and a great deal upon the weather and condition of the roads. On most operations the logs are cut in lengths from 12 to 20 feet and average approximately 18 feet. Most of the timber is second-growth, but the size varies considerably from one operation to another. The smallest average size was, for one operation, 10 board feet per log. The largest average size for an entire operation was 110 board feet per log. Individual logs scale as low as 10 board feet per log and as high as 400 board feet per log. The data on the average volume per log and the volume per load for wet weather and dry weather, for the same six operations, as given in Tables Nos. 1 and 2 are as follows:

Table 2.
Load per Trip - Volume of Logs

Operation	Average volume per log	Board feet, Doyle scale	Volume per load
1	55	400	700
2	110	400	800
3	55	450	700
4	60	400	300
5	85	450	300
6	80	400	300

Number of Trips per Day

The number of trips made by the trucks per day vary to some extent, depending upon length of haul, miles of woods roads, miles of improved roads, efficiency of operation, condition of weather, etc. However, one would assume this variation to be greater than actually exists.

On one operation having 2 1/2 miles of woods roads and 2 1/2 miles of gravel roads the trucks made an average of five round trips per day in summer and usually five round trips per day in winter when it was possible to haul over the roads. On another operation, having one mile of woods road and 1 1/2 miles of paved road, the trucks averaged four round trips per day winter and summer.

For means of comparison, the data on the same six operations as above will be given in the following table:

Table 3.

Number of Round Trips per Day - Log Trucks

Opera- tion	Number of miles of woods road	Number of miles improved dirt road	Number of miles of gravel road	Number of miles paved road	Topography	Number of round trips per day	
						Wet weather	Dry weather
1	2½		2½		Flat to rolling	5	5
2	1		14		Rolling	4	4
3	½	4		16	Flat	2	2
4	1	2	20		Hilly	3	4
5	1			14	Flat to rolling	3	4
6	¼	1	8		Flat to rolling	4	5

As can be seen from this table, the presence of good roads on long hauls makes possible approximately the same number of trips per day as is made on short hauls, which are usually over poorer roads.

While the number of trips per day during wet weather is not much different from the number of trips during dry weather, it must be remembered that it is possible to haul less than half the time during wet weather and also that the amount per load is only from 1/2 to 3/5 of the dry weather loads.

Labor Requirements

The labor necessary for a given trucking job differs, depending upon the amount of timber per acre, the length of haul, and character of the logging chance. In general, on any length of haul up to 10 miles one swamper and two teams and teamsters are required for every three trucks. For a haul of over 10 miles one swamper is generally used to every four trucks and one team and teamster is required for every two trucks. The number of teams required per given number of trucks is usually greater during winter logging than in summer due to the greater distance that it is necessary to bunch the logs and to the necessity of helping the trucks through bad places in the road. In practically all cases, the teams that do the bunching also load the trucks.

A few of the truck drivers are provided with helpers that stay right with the truck and help load and unload. However, this is not the general practice on large trucking operations.

For name of corporation, the date on the date of operations as above will be given in the following table:

Table W.

Number of Round Trips per Day - Log Trucks

Number of round trips per day	Number of miles of dirt road	Number of miles of improved gravel road	Number of miles of dirt road	Topography	Weather	Number of round trips per day
1	2 1/2		2 1/2	flat to rolling	dry	2
2	1		14	rolling	dry	4
3	1 1/2	4	16	flat	dry	2
4	1	2	20	hilly	dry	4
5	1		14	flat to rolling	dry	4
6	1 1/2	1	8	flat to rolling	dry	2

As can be seen from this table, the presence of good roads on land hauls makes possible approximately the same number of trips per day as is made on short hauls, which are usually over poorer roads.

While the number of trips per day during wet weather is not much different from the number of trips during dry weather, it must be remembered that it is possible to haul less than half the time during wet weather and also that the amount per load is only from 1/2 to 2/3 of the dry weather loads.

Labor Requirements

The labor necessary for a given trucking job differs, depending upon the amount of timber per acre, the length of haul, and character of the logging chance. In general, on any length of haul up to 10 miles one sweeper and two teams and teamsters are required for every three trucks. For a haul of over 10 miles one sweeper is generally used to every four trucks and one team and teamster is required for every two trucks. The number of teams required per given number of trucks is usually greater during winter logging than in summer due to the greater distance that it is necessary to reach the logs and to the necessity of helping the trucks through bad places in the road. In practically all cases, the teams that do the hauling also load the trucks.

A few of the truck drivers are provided with helpers that stay right with the truck and help load and unload. However, this is not the general practice on large trucking operations.

Practically all the labor used in the trucking operation is paid on the per "day basis." The wage scale for the truck drivers varied from \$1 per day on one operation to \$1.60 on another. The average was approximately \$1.35. The truck helpers were paid \$1 per day. The swampers' pay varied from \$1 to \$1.40, and averaged about \$1.05. The teamsters were paid from \$.90 to \$1.40 per day, with an average of about \$1.05.

On small operations the man who has the contract for delivering the logs to the mill usually supervises all the work. On larger trucking operations a man for supervising all the woods work is generally required. He is paid, on the average, \$2 per day.

Period of Year Favorable for Truck Logging

During periods of poor or even normal prices of lumber, logging by truck is essentially a dry weather proposition, unless, of course, the timber is adjacent to gravel, pavement, or other all-weather roads. During years of average rainfall, truck logging practically comes to a standstill from about December 15th to April 15th, unless over all-weather or specially constructed roads. (Specially constructed roads will be discussed later.)

Many of the contractors and companies attempt to do some logging over woods and graded dirt roads during this four-month period, but due to the condition of the roads only an average of about two to possibly three days can be worked each week. Even on all-weather and specially constructed roads, it is impossible to haul in the rain.

Because of the condition of the roads during wet weather, it is necessary to cut down the amount of the loads to approximately one-half of dry weather loads. Add to this the extra cost of increased bunching distance and road building costs and it is apparent that only under conditions of very favorable prices for lumber and only in stands of good density can truck logging be made to pay when hauling over ordinary woods and dirt roads during the wet periods.

When the timber is near all-weather roads or when the timber is of sufficient volume per acre to make it profitable to build roads, truck logging can be carried on profitably throughout the wet seasons. One operator claims that in periods of favorable prices for lumber the timber must run at least 4 M or more per acre to make truck logging profitable during the wet season.

Road Improvement - Wet Weather

Only two companies of all those visited have done any road construction by which it is possible to get a large volume of logs out during the winter or wet season. The number of trucks hauling for these companies varied from 6 to 15. Both of these companies agree that the stand of timber had to contain at least 4,000 board feet per acre to warrant the construction of these special roads.

Practically all the labor used in the trucking operation is paid on the "day basis". The rates for the truck drivers varied from \$1.40 per day to \$1.50 per day. The average was approximately \$1.35. The truck helpers were paid \$1 per day. The average day varied from \$1 to \$1.40, and averaged about \$1.00. The teamsters were paid from \$1.00 to \$1.40 per day, with an average of about \$1.00.

On small operations the man who has the contract for delivering the logs to the mill usually supervises all the work. On larger trucking operations a man for supervising all the woods work is generally required. He is paid, on the average, \$2 per day.

Period of Year Favorable for Truck Loading

During periods of poor or even normal prices of lumber, loading by truck is essentially a dry weather proposition, unless, of course, the timber is adjacent to gravel, pavement, or other all-weather roads. During years of average rainfall, truck logging practically ceases to a substantial extent about December 15th to April 15th, unless over all-weather or especially constructed roads. (Specially constructed roads will be discussed later.)

Many of the contractors and companies attempt to do some logging over woods and graded dirt roads during this four-month period, but due to the condition of the roads only an average of about two to possibly three days can be worked each week, even on all-weather and specially constructed roads, it is impossible to haul in the rain.

Because of the condition of the roads during wet weather, it is necessary to cut down the amount of the loads to approximately one-half of dry weather loads. Add to this the extra cost of increased burning distances and road building costs and it is apparent that only under conditions of very favorable prices for lumber and only in stands of good quality can truck logging be made to pay when hauling over ordinary woods and dirt roads during the wet periods.

When the timber is near all-weather roads or when the timber is of sufficient volume per acre to make it profitable to build roads, truck logging can be carried on profitably throughout the wet season. One operator claims that in periods of favorable prices for lumber the timber must run at least \$4 M or more per acre to make truck logging profitable during the wet season.

Road Improvement - Wet Weather

Only two companies of all those visited have done any road construction by which it is possible to get a large volume of logs out during the winter or wet season. The number of trucks hauling for these companies varied from 5 to 15. Both of these companies agree that the stand of timber had to contain at least 4,000 board feet per acre to warrant the construction of these special roads.

Special Road Type No. 1: One company sells to the contractors poor grade oak (2 x 4's, 2 x 6's, 2 x 10's, and 2 x 12's) for road construction in wet weather. The company sells this material at a very low price and the contractors haul this material to the woods and build all their roads at their own expense.

During wet weather these planks are laid end to end, the width of the wheels apart, and the ends are nailed to cross pieces of 2 x 4's or 2 x 6's. In case the ground is very soggy, poles are laid crossways under the planks to add additional support; usually this is not necessary, however.

These plank roads are built one to the forty and all skidding is done to these roads. The roads are built at right angles to the main highway or other all-weather roads and run back into the woods usually about one-half of a forty, but sometimes up to the entire length of the forty. In using these roads, the trucks usually turn on the main highway and back in to the place of loading.

The planks are used over and over again; therefore, it is difficult to give the cost of this type of road per 100 feet or per mile.

Special Road Type No. 2: Another company constructs wet weather or winter roads by plowing two furrows, the width of the truck wheels apart, with a large plow. These furrows are then filled with gravel and the road is ready for use. These roads are also built one to the forty and usually run but a forty deep from the highway. Some of these roads have been constructed and used over much greater distances than this, however.

Where gravel is readily available, these roads cost only about \$100 per mile to build, and are claimed to be very efficient.

Other companies build plank and corduroy roads for short distances over bad spots in the existing roads, but the above are the only two instances found where roads were actually constructed into the woods in order to get the logs out during the wet weather.

Storage of Logs

Companies producing all or a portion of their logs by truck that have difficulty in getting logs to the mill during the winter, or during wet seasons, have two possibilities of maintaining a supply of lumber necessary for the trade during this period. One is to cut heavily during the dry season and thus build up a sufficient stock in the yards to maintain them, with the aid of a small amount of sawmill operation, during this period. The second, and perhaps more feasible method, is log storage. By cutting heavily, starting about the latter part of October, and storing or banking along the railroad right-of-way or on all-weather roads the surplus logs not needed at the mill, sufficient logs can be produced before the wet season sets in to last the mill until spring.

Special Road Type No. 1: The company sells to the contractor two grades of 2 x 4's, 2 x 6's, 2 x 8's, and 2 x 10's for road construction. The company sells this material at a very low price and the contractor hauls this material to the woods and builds all their roads at their own expense.

During wet weather these planks are laid end to end, the sides of the wheels apart, and the ends are nailed to cross pieces of 2 x 4's or 2 x 6's. In case the ground is very rocky, poles are laid crosswise under the planks to add additional support; usually this is not necessary, however.

These plank roads are built one to the forty and all skidding is done to these roads. The roads are built at right angles to the main highway or other all-weather roads and run back into the woods usually about one-half of a forty, not sometimes up to the entire length of the forty. In some cases, the trucks usually turn on the main highway and back in to the place of loading.

The planks are used over and over again; therefore, it is difficult to give the cost of this type of road per 100 feet or per mile.

Special Road Type No. 2: Another company constructs wet weather or winter roads by clearing two furrows, the width of the truck wheels apart, with a large saw. These furrows are then filled with gravel and the road is ready for use. These roads are also built one to the forty and usually run but a forty feet from the highway. Some of these roads have been constructed and used over such greater distances than this, however.

There gravel is readily available, these roads cost only about \$300 per mile to build, and are claimed to be very efficient.

Other companies build plank and concrete roads for short distances over bad spots in the existing roads, but the spots are the only two in places found where roads were actually constructed into the woods in order to get the logs out during the wet weather.

Season of Year

Operations producing all on a portion of their logs by truck that have difficulty in getting logs to the mill during the winter, or during wet seasons, have two possibilities of maintaining a supply of lumber necessary for the trade during this period. One is to cut heavily during the dry season and then build up a sufficient stock in the yards to maintain them with the aid of a small amount of small operations during this period. The second, and perhaps more feasible method, is log storage. By cutting heavily, starting about the latter part of October, and ceasing to landing along the railroad right-of-way or on all-weather roads the surplus logs not needed at the mill, sufficient logs can be produced before the wet season sets in to last the mill spring.

According to two companies that are practicing this latter method, if the logs are placed up off the ground on poles and with pole stringers between each tier, there is little or no danger of blue-stain from the latter part of October to the middle of March.

December, 1942

Two-foot
of pine seedlings

SOUTHERN FOREST EXPERIMENT STATION
U. S. Service
New Orleans, La.

ORIGIN OF THE BROWN-SPOT NEMATODE DISEASE OF PINE TREES

By

Paul V. Siggers,
Associate Pathologist.

Batch: MALBY_00319



of publications released have gathered in connection with
being carried on at the Southern Station. The information
contained in this is subject to correction or amendment following
further investigation. - Editor

