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Log Truck Weights Common to the Central Hardwood Region of Kentucky

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Abstract

The forest industry in Kentucky is a significant contributor to the state's economy, larger than any individual agricultural commodity. Logging is critical to provide the raw material for more than 50 percent of the billions of dollars contributed to Kentucky by the forestry sector. Logging also provides landowners the ability to economically benefit from their timber. This opportunity provides hundreds of millions of dollars annually to private landowners, including farmers in Kentucky. Trucking, of course, is required to move logs from woodlands to mills, and cost-effective transport is critical for the industry. Cost-effective transport also ensures maximum timber revenue for landowners. To better understand truck weights, which are often a concern for communities as it relates to wear on county roads, the University of Kentucky Forestry Extension conducted a log truck weight study. The study was completed in Western Kentucky and involved weighing trucks with a range of different axle configurations hauling saw logs.

Methods

Weight data was collected on a variety of truck types including tractor-trailers and single, tandem, and tri-axle hauling hardwood sawlogs of a variety of species (n=17). All truck weights were recorded at an industry scale facility in Western Kentucky, in July 2017. Weights were recorded and video was captured of trucks (both loaded and unloaded) as they passed over the scales. We were able to determine the range of tare weights for each axle configuration as well as total and load weights. All trucks were loaded within legal height and length limits and consisted of both single species and mixed species loads. Four cameras were installed at the scale house to capture:

- the back-side of the trailer showing the end of the logs
- the driver side of the log truck showing length of trailer, logs, and stack height
- the passenger side of the log truck
- the scale readout display

All four vantage points provided comprehensive information on the truck and trailer including the length and species of the logs on the load, the configuration of the load, and the weight of the truck.

Results

All loads conformed to height and configuration standards for motor carrier safety. Table 1 shows the average tare (empty) weights for each truck/trailer configuration.

Table 1. Average Tare Weight by Truck Type

Single Axle	12,240 lb
Two Axle	10,720 lb
Three Axle	18,160 lb
Semi-Trailer	24,031 lb

Loggers attempt, and are encouraged to, maximize the capacity of trucks to provide for cost-effective transport, which helps in reducing overall logging costs. The aim is to maximize the volume/value of the load while maintaining legal load configurations and weight. The logs are stacked in rows up to the legal height limit and/or heights dictated by safety regulations requiring stable log configurations based on side support height. The log length is

dictated by mill requirements, value, and legal overhang limits. Load weights are a function of the total number/volume of logs, species, and moisture content. The latter is based largely on the season. Winter, spring, and early summer typically have higher weights than late summer and fall. This study was conducted in July during a period where average moisture content would be expected. Table 2 provides the average number of rows, logs, and board volume for each truck configuration. Table 3 provides high, low, and average total truck weights and load weights for each configuration. Load weights were determined by subtracting the tare weight from the total weight. Load weights ranged from 1,400 pounds to 68,268 pounds. Single axle trucks varied from 1,400 to 11,440 pounds having the highest variability of any of the configurations. Two axle trucks ranged from 9,201 to 26,040 pounds. Tri-axles ranged from 13,480 to 40,610 pounds. Tractor-trailers ranged from 33,288 to 68,268 pounds. Loads consisted of white oak, red oak, and yellow-poplar as single species loads and as mixtures. A small amount of other mixed hardwood species occurred as mixed species loads.

Table 2. Average Number of Logs per Load and the Number of Logs in a Vertical Stack (Rows)

	(1 axle)	(2 axle)	(3 axle)	(4 axle/ Semi)
Logs	17	20	28	47
Rows	4-5	5	5-6	7-8
BdFt[1]	1,229	1,380	1,519	3,401

[1]board feet in Doyle scale

Table 3. Load and Total Weights (lb)

	(Single axle)		(Dual axle)	
	Load	**Total**	**Load**	**Total**
High	14,110	25,718	26,040	37,120
Low	1,400	11,440	9,201	20,319
Average	10,854	**22,270**	19,912	**30,007**

	(Tri axle)		(Tractor-trailer)	
	Load	**Total**	**Load**	**Total**
High	40,610	54,760	68,268	88,320
Low	13,480	31,640	33,288	52,202
Average	23,467	**41,489**	54,789	**77,043**

Conclusion

The trucks available for sampling included all axle configurations common to logging in the region. All loads were also found to be in compliance with transportation requirements for height and stack configuration. Finally, a range of species and load weights were sampled. As a result of all of these factors, the data provided a good estimate of the range of total weights that can be expected from all truck configurations common to logging in the region. We believe that the information provided from this study will be useful in local and state discussions on log truck impacts across the central hardwood region. To further assist discussions these data were used in the development of "Hauling Timber on County Roads" FORFS 18-05, which provides contextual assessment of log trucks relative to road and safety issues.

[1] See University of Kentucky, Department of Forestry and Natural Resources, Extension website for specific economic data for the forestry sector at www.ukforestry.org.

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