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TECHNICAL RELEASE

05-R-1

INCREASING TRUCK PAYLOADS AND PERFORMANCE

Trucks/Trucking: efficiency/productivity *February 2005*
www.forestresources.org/members/serpub/05-R-1.html

INTRODUCTION: Researchers at Auburn University, under contract with the Wood Supply Research Institute (WSRI), explored ways to improve the productivity, safety, and cost of the trucking portion of the wood fiber supply system. Means investigated to increase payload weights and improve truck performance are summarized below.

INCREASING PAYLOADS: During the trucking study, log truckers in the U.S. South were asked whether their load had been weighed in the woods. The use of some type of in-woods scaling varied greatly from state to state: Alabama, Georgia, and South Carolina, 0%; Mississippi, 39%; Louisiana and Texas, 55%; and North Carolina, 60%. Loads that were weighed in the woods generally netted more payload than those not weighed. In-woods weighing minimized the number of light loads while reducing the number of loads over each state's legal weight limits.

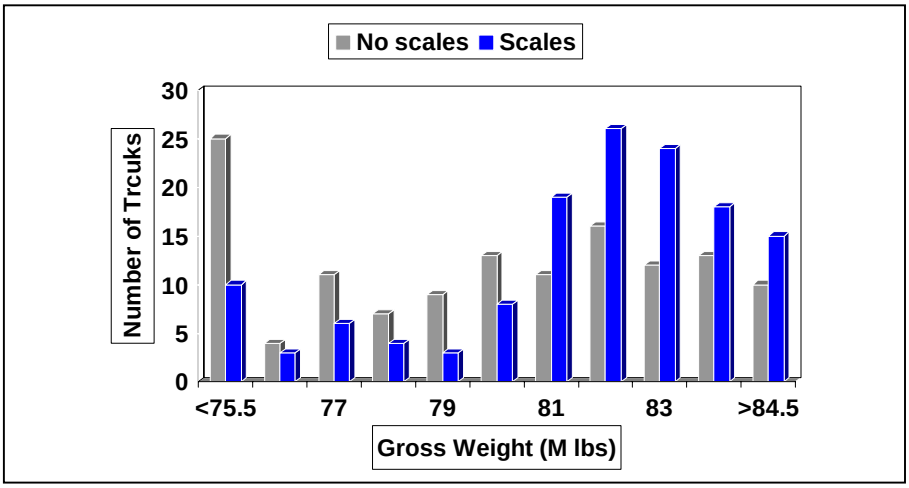

Fig. 1: *. Gross weight of trucks using scales versus trucks not using scales from locations where some in-woods scale use was observed. NOTE: Weight limit plus tolerance is 80,000 pounds in NC, SC, GA; 84,000 in MS, TX; 86,600 in LA; and 88,000 in AL.*

Benefits of In-Woods Scales: When loggers were asked why they did not use scales, most indicated they either did not see the benefit or could not integrate them into their operation. Some had tried either on-board or platform scales but did not repair them following breakdown. Some loggers used contract truckers that would not install scales. Others believed the sites they worked were too wet for platform scales. Loggers who did use scales generally reported positively about their use, although some suggested that mills had influenced their buying decision—for instance, when mills established policies of not paying for wood over a certain weight limit.

Reaching a total legal load with treelength material may be difficult in some wood types (mostly plantation thinnings) with typical loading practices. To reach the maximum legal load, other loading methods may have to be used, such as indexing (treelength material loaded mixing butts and tops) and piggyback (partial load of log material put on back bunk first before treelength

material is loaded onto the entire trailer). ***Fig. 2*** compares the average load weights observed for four ways of loading trailers at one mill location.

Loglength loads generally reach the legal limit because the loader operator can completely fill both bunks with wood. The other three methods are for hauling treelength material. The trucks hauling piggyback can increase payloads, but the few trucks sampled did not give a clear indication of this method's advantage. Indexing, however, resulted in a 1,700-pound payload increase over standard treelength loads.

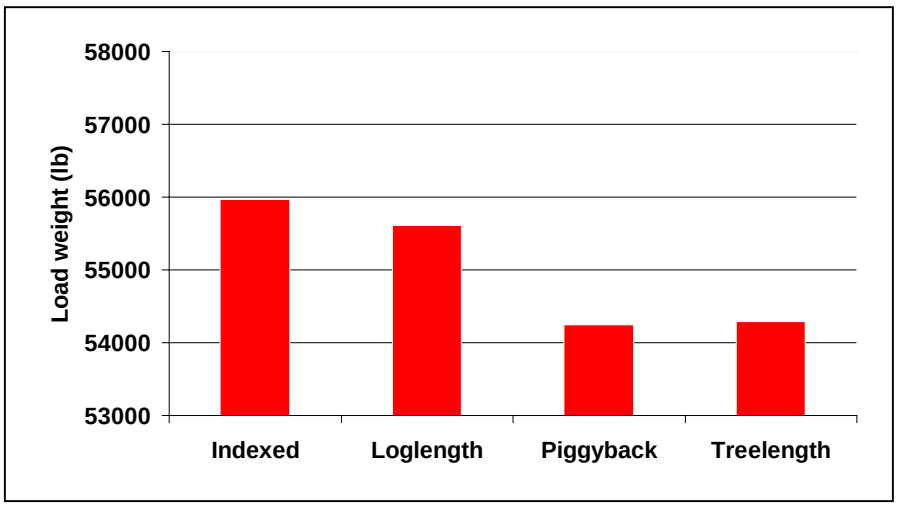

Fig. 2: Net weight per truck for different methods of loading pulpwood.

Several methods for reducing truck and trailer weights by using lightweight components are discussed Technical Release 05-R-8, *Trucks and Trailers in the South* (www.forestresources.org/members/serpub/05-r-8.html). Using a fold-up pole trailer can reduce weight, lower trailer tire costs, and improve unloaded fuel efficiency beyond that achieved by modified double-bunk trailers.

INCREASING PERFORMANCE: Truck specifications (engine, transmission, rear axle, etc.) will affect performance and fuel consumption for the life of the truck. Therefore, it is important to understand the factors that affect performance and to select components to optimize performance and fuel efficiency.

Truck manufacturers have developed simulation programs to help customers determine the proper specifications for particular applications based on the Society of Automotive Engineers Standards. FERIC (Forest Engineering Research Institute of Canada) has conducted extensive studies on transporting forest products, the results of which have been incorporated into OTTO 2000, a training simulator that can simulate the performance of current and potential vehicles on roads and can compare the effects of different component choices, driving styles, and road layouts on vehicle performance. See http://www.feric.ca/en/ed/html/otto_2000.htm.

Road surface conditions have a significant effect on power requirements and fuel consumption. A 1985 paper by Ljubic reported a 24% increase in power requirements and an 18% increase in fuel consumption between an asphalt road in poor condition and a stabilized, crushed-gravel road for a truck traveling at 39 miles per hour. Dry dirt roads require twice the power of paved roads, and as dirt roads become muddy or sandy, the rolling resistance (that reduces traction) can double or triple; therefore, loggers should haul material over the longest woods roads during dry weather for maximum efficiency.

Road speed also affects fuel consumption. The test truck in Ljubic's report consumed 40% less fuel traveling loaded when speed was reduced from 45 mph to 34 mph on a gravel road and 33% less on asphalt. Teaching truck drivers to operate at the most efficient engine RPM can reduce

fuel consumption by 10% or more. Other fuel reductions tips include: switch to super-wide singles instead of dual tires on trailers; maintain proper tire inflation pressures; and pick routes that have fewer stop lights and signs (if possible), since fuel usage is at maximum during acceleration.

MORE INFORMATION: For more information, please consult the following two reports: "Let's Talk Trucking: Weights and Loading Methods" and "Let's Talk Trucking: Truck Performance and Fuel Consumption," both available free to FRA members as Technical Papers at www.forestresources.org/MEMBERS/tech-papers/techpapers.htm.

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