

Fuel Tax and Road Use

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Abstract

Loaded log trucks are commonly seen on Alabama's state and county highways. In fact, 1.648 million truck loads of roundwood were harvested in Alabama in 2015. Many gallons of diesel fuel are used in transporting Alabama's unprocessed forest products, but the majority of the diesel fuel taxes collected aren't used to support and maintain the roads that loaded log trucks use. Two routes were examined to compare and contrast the impact of time, mileage, and weight restrictions. One route included interstate highway travel and the other avoided the interstate. Safety considerations were also explored.

Keywords: Diesel fuel tax, payloads, haul costs

Introduction

A large percentage of the delivered cost of wood can be attributed to transportation. The distance to a delivery location, trucking availability, landing logistics, and equipment maintenance are just a few of the variables that can impact forest product transport. Two additional variables, diesel fuel price and route selection, are examined because they are closely tied, but for an unusual reason: taxes.

In an effort to control diesel prices, logging contractors in the southeastern states have joined in a cooperative that, among other benefits, provides fueling stations for members. Fueling stations are strategically located to be advantageous to cooperative members. The prices are kept low due to the cooperative's buying power. One thing that the cooperative cannot adjust is the fuel tax rate.

Route selection is often dictated by allowable weight limits. The gross vehicle weight (GVW) on most federal highways is 80,000 pounds with the exception of those states (Vermont and Maine) involved in pilot projects. A bridge formula establishes the maximum weight any set of axles on a motor vehicle may carry on the interstate highway system. Weight limits and length limitations vary by state for state roads and highways. Many southern states allow additional weight on their state roads and highways. As a consequence, log truck routing choices gravitate to state and county roads where payloads can be maximized.

Log truck routes avoid interstates due to the GVW (and axle) limitations, but support those federal roads through diesel fuel taxes. Instead, log trucks put increased pressure on secondary roads. This paper uses Alabama's roadway funding and weight limits to examine the impacts of diesel fuel taxes, route selection, and the potential safety considerations that may result from routing choices.

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Diesel Tax

Taxes paid at the pump are typically a combination of federal, state, and other taxes. The national average for diesel taxes (federal, state, and local) is \$0.5352/gal. The federal excise tax rate for on-road diesel is \$0.244/gal (API, 2016). State motor fuels excise tax rates vary across the southern states. In addition, some counties add additional taxes and fees. The impact of federal taxes from each gallon of on-road diesel varies across the 13 southern states (exclusive of local and county taxes) and are displayed in Table 1. Federal taxes account for more than half of the diesel fuel tax in a majority of the southern states.

Table 1. Diesel Taxes in 13 Southeastern States

State	State Taxes (cents/gal)	Total State and Federal Excise Taxes (cents/gal)	Federal Excise Tax Burden of Total Tax (%)
Alabama	21.85	46.25	52.76
Arkansas	22.8	47.2	51.69
Florida	33.77	58.17	41.95
Georgia	34.66	59.06	41.31
Kentucky	23	47.4	51.48
Louisiana	20.01	44.41	54.94
Mississippi	18.4	42.8	57.01
North Carolina	35.25	59.65	40.91
Oklahoma	14	38.4	63.54
South Carolina	16.75	41.15	59.30
Tennessee	18.4	42.8	57.01
Texas	20	44.4	54.95
Virginia	26.03	50.43	48.38

Source: API, 2016

In Alabama, 53% of the diesel fuel taxes paid at the pump are deposited into the Federal Highway Trust Fund for interstate infrastructure support, yet the GVW limitation restricts the use of interstates for hauling unprocessed forest products. Currently, Alabama pays \$0.2185/gal in state taxes. These state taxes are used to fund state roads through the Alabama Department of Transportation. None of this state diesel tax income is shared with counties for rural roads and bridges.

In 2015, timber harvest removals in Alabama totaled 41.2 million tons (AFC, 2016). Softwood harvest accounted for 30.6 million tons and hardwood removals were 10.6 million tons. This annual volume equates to approximately 1.648 million truck loads (using 25 tons/load). The federal highway system benefits from the diesel taxes paid to transport this staggering number of trucks. However, loaded log trucks are pressured to use the state highways and rural routes because these roads allow heavier payloads. Alabama state roads and highways allow an additional 10% tolerance above the federal weight limit, effectively adding 8,000 pounds to the federal weight limit (88,000 pounds total).

Low weight bridges are another road-related problem in many areas. There are 8,650 county bridges in Alabama, and 1,302 of them have been designated as structurally deficient (ACEA, 2011). Over 1,000 county bridges in Alabama are functionally obsolete because they are not wide enough. Log trucks are routed over one-lane, low weight bridges when other routing options are not available. Some of these bridges are used in haul routing because the bridges are short enough that the axle weight limits can be met. In other cases, trucking firms must incur costs to take longer routes to their destination in order to avoid these deficient bridges.

Counties are under no obligation to give maintenance priority to low weight, or structurally deficient, bridges. Each county in Alabama can manage their road and bridge funds as they choose. Some counties prioritize funding of road and bridge projects within their own voting districts. One county, Lee County, has recently changed to a method of prioritizing road and bridge maintenance across the entire county based on need, not by voting districts. This change pools the funds and helps assure that costly maintenance and repair activities can be addressed, regardless of location in the county.

Route Selection

A large mill in Prattville, AL procures wood from a wide area of central Alabama, including the easternmost areas of the state. Google maps was used to determine the travel distance and time for driving from a forested area in Lee County to the Prattville mill. The shortest and fastest route was one that used the interstate highway system. The shortest and fastest non-interstate route selected for comparison is one commonly travelled by loaded log trucks. The two routes are displayed in Figure1.

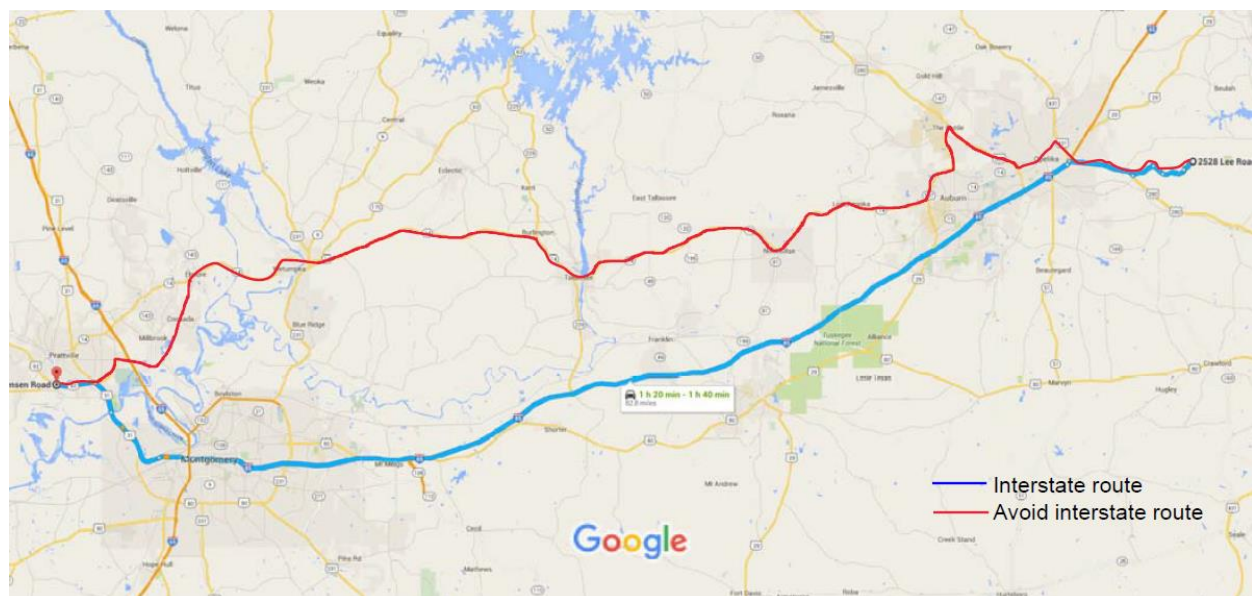


Figure 1. Route comparison map

A route comparison was made using the following assumptions:

- Return travel is unloaded, no backhauls are available
- Return travel follows the interstate route.
- 20 minute mill turnaround time is independent of the travel route
- Truck drivers work 10 hours/day
- An average payload is 25 tons for a GVW limit of 88,000 lbs.
- Axle weights are within legal limits.
- Trucking haul rates (\$/loaded ton-mile) are a flat rate.

The interstate route is 82.8 miles (one-way) and typically takes 1 hour 30 minutes to complete, depending on the time of day. Alternatively, the one-way route that avoids the interstate is 88.3 miles and typically takes 2 hours and 20 minutes to complete (Table 2). The travel time in google is based on their proprietary algorithms from information mainly gathered from smart phones (NCTA, 2013). The one-way difference in travel time is 50 minutes.

Table 2. Impact of travel time by route type

	Avoid Interstate Route	Interstate Route
Contract truck driver work hours	10	10
Round trip time		
Travel loaded (mins)	140	90
Mill turnaround time (mins)	20	20
Travel empty (mins)	90	90
Total time/load (mins)	250	200
Total trips/day/truck	2	3
Round trip miles/trip	171.1	165.6
Round trip miles/day	177	248

If truck drivers work 10 hours (600 minutes), the interstate route has the potential of achieving an additional load each day for each truck. If the operation is using 3 trucks, there would be 3 additional loads delivered each day. However, the interstate loads are limited to 80,000 lbs. GVW (Table 3).

Table 3. Impact of weight limits by route type

	Avoid Interstate Route	Interstate Route
Gross vehicle weight (lbs.)	88,000	80,000
Payload (lbs.)	50,000	42,000
Loads/day	2	3
Wood delivered/truck/day (tons)	50	63
Loaded miles/day	258	177
Haul rate for one load (\$0.13/ton-mile)	\$226	\$287

In this example, the interstate route could potentially haul 13 more tons/day/truck as compared to the route that avoids interstates. Over the course of a 5-day work week, the interstate route could increase deliveries by 65 tons/truck.

Insufficient trucking capacity can lead to bottlenecks on landings. Skidder delays occur when there isn't enough room on the landing for more wood. Additionally, once the landing is full, the loader can no longer process wood. Increasing truck frequency to a job site may help alleviate bottlenecks by clearing the landing area more frequently. The ability to move an additional 13 tons/truck/day or 65 tons/truck/week could have the potential to improve logging efficiency, especially when hauling from small landing areas.

Contract truck drivers are often paid at a \$/ton-mile rate, or \$/loaded mile. In this example, the \$/ton-mile for hauling was assumed to be constant. The shorter interstate route saved 5.5 loaded miles. The payload and mileage dissimilarities between the routes results in a haul cost difference of \$61 (Table 3). In reality, the cost to haul smaller payloads may result in different, potentially higher, haul rates. Fuel efficiency may be better when travelling on interstates as compared to stop-and-go traffic associated with county and state roads. However, the tonnage based rate may need to be adjusted based to account for the lower interstate payload restriction.

Safety Considerations

In 2014, 61% of all fatality crashes involving large trucks occurred in rural areas of the United States (USDOT, 2016). Interstates in rural areas accounted for 12.8% of these crashes. The remaining fatality crashes were on rural non-federal roadways. Roadways classified as other rural arterial principle were reported to have the most fatality crashes involving large trucks than any other individual rural or urban roadway classification. Moving loaded log trucks to interstates with limited access points may improve public safety.

Interstate travel may offer other potential public safety benefits. Many communities do not want the noise and other aspects of truck traffic that passes through with little benefit to the locality (USDOT, 2016). The route that avoids the interstate travels through several congested areas. Along this example route are two busy shopping areas, several miles of 2 lane city streets, narrow intersections, school zones, and various communities with scattered churches and businesses. Mixing big, heavy trucks and small, nimble cars can make for a 'toxic mix' (McAdory, 2016).

Four-way intersections have the highest incidence (fatalities, injury and property damage) of large truck accidents. Use of secondary roads for log truck routing increases the exposure to four-way intersections. One safety consideration for log trucks in intersections is the presence of trees overhanging the rear of the trailer. Typical logging trailer lengths in the southeastern US are 45' long plus approximately 14' for the tractor. Log overhang limits vary by state and add to the difficulty of navigating loaded trucks in urban areas.

Summary

Diesel taxes help support the maintenance and repair of federal and state roads. In Alabama, those tax funds are not distributed to counties for use in maintaining and repairing county roads and bridges that are heavily used by the logging industry.

Interstates are an alternative route for hauling unprocessed forest products, but limit the GVW to 80,000 pounds. State and county roads and highway often allow higher weights, but may increase the time and miles for a round trip. In some instances, it may be advantageous to haul a lower payload on an interstate than a higher payload on a state road. Individual situations would need evaluation.

There may be some safety advantages for avoiding state and county roads. Rural roads have more fatality crashes involving large trucks than interstates. Four-way intersections also have a high incidence of large truck accidents. Interstate travel of unprocessed forest products could reduce congestion and noise on non-federal roadways.

The routing example displayed in this paper provides some insight into the advantages and disadvantages of routing trucks on federal interstates, given the current weight restrictions. Decision models may be developed to aid logging contractors in selecting interstate or non-interstate routes based on individual tract location (miles by road type) and local road condition information.

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