


# CURRENT STATUS OF MISSISSIPPI'S LOG TRUCKING INDUSTRY



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# **Current Status of Mississippi's Log Trucking Industry**

James Shannon, Eric McConnell, John Auel,  
Shaun Tanger, Don Grebner, Robert Grala



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## ABSTRACT

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Trucking is the most expensive forest-to-market process, yet studies regarding the composition, organization, structure, and performance of this industry segment have only occurred recently. A mixed-mode survey included Mississippi log trucking firms that owned 452 trucks, had a mean fleet size of approximately four trucks, three full-time employees, and produced nearly 57 loads per week. The average age of business owners was 52 years old, and 24% were over 60 years old. Eighty-one percent of employed truck drivers were over age 40. Prevalent safety practices included scheduled safety meetings (76%), distracted driving prevention (68%), pre-trip truck inspections (67%), truck scales (64%), and

road-facing cameras (61%). Air disc brakes (47%), GPS truck tracking (40%), and speed governors (36%) were reported less often. Twenty-three percent reported utilizing technology to train drivers. Statistical group comparisons revealed eleven differences related to region of operation, operational structure, and business organization. These centered around the adoption of safety practices and technologies. Emphasizing safety within the log trucking industry and truck driving educational technologies can prevent costly lawsuits and avoidable regulations.

**Keywords:** Bootstrapping; Logger survey; Online survey; QR code survey; Timber transportation

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## INTRODUCTION AND OBJECTIVES

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The United States trucking industry faces many challenges. Rising input costs and difficulty hiring and retaining drivers are impacting all trucking sectors. In 2022, operational costs for the United States trucking industry exceeded two dollars per mile for the first time since industry-wide reports began in 2008. Fuel prices had the largest impact, with a surge of over 20%. Excluding fuel, other trucking inputs increased by 12%, with contributors including repair and maintenance, truck acquisition costs, driver salaries, and insurance premiums. A shortage of over 60,000 truck drivers was reported by the American Trucking Associations for 2023, which despite improving in the short term was expected to grow greater over the long term.

Recent studies in the southeastern United States have documented unique challenges regarding the log trucking industry's role in transporting timber from the forest to wood processing mills, including aging ownership, operation of older equipment compared to other trucking industries, disproportionate increases in insurance premiums, and limited profits. Clark documented elevated liability insurance costs from an analysis of nine log trucking firms in east-central Mississippi. The average liability insurance cost was \$14,756 per truck per year, ranging from \$6,500 to \$24,000. One east-central Mississippi firm reported a 215% increase in premiums from 2015 to 2020, attributed to insurance company financial settlements because of log truck crashes. These findings motivated larger-scale research due to a lack of current and comprehensive information

on the log trucking industry statewide in Mississippi. Additional knowledge gaps included how firms compared geographically, operationally, and organizationally.

The overall goal of this bulletin was to provide a better understanding of Mississippi's log trucking industry by collecting data regarding the status and performance of its firms using a mixed-mode survey. Specific objectives were to:

- Report the demographic characteristics of Mississippi log trucking business ownership and truck drivers, including age, race, and gender.
- Describe Mississippi log trucking companies regarding equipment age and haul distance.
- Document the frequency that Mississippi log trucking firms use safety equipment and safety procedures.
- Perform statistical categorical comparisons based on region of operation, operational structure, and business structure to provide a baseline of knowledge of the Mississippi log trucking industry.

## METHODS

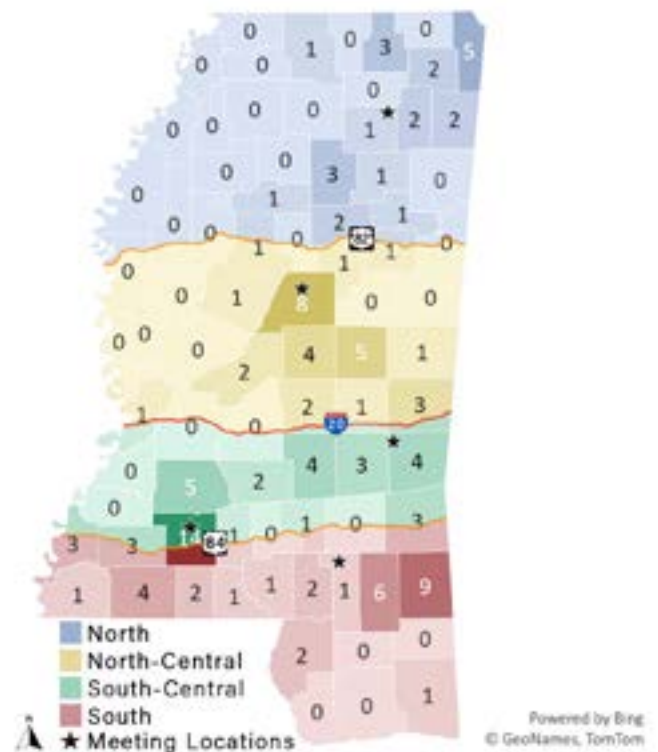
### Survey Procedures

Mississippi log trucking businesses were surveyed in late 2022 and early 2023. A questionnaire was developed that included 41 closed-ended, open-ended, short-answer, and Likert-scale questions. It was pretested and reviewed by Mississippi log trucking companies, industry trade associations, forest operations researchers, and insurance industry professionals. The Mississippi State University Human Research Protection Program and Institutional Review Board (MSU HRPP/IRB) ruled the survey and its proposed procedures qualified for an Exemption Determination. The research can be referenced using the MSU HRPP/IRB study number IRB-22-200.

The mixed-mode survey was conducted following the Tailored Design Method. A population of 1,051 Mississippi log trucking business owners listed in the Mississippi Forestry Association (MFA) Professional Logging Manager (PLM) database were invited to participate through a mailed survey pre-notice letter. Based on the population size ( $N = 1,051$ ) and a conservative estimate of response distribution (i.e., 50/50), achieving a  $\pm 10\%$  sampling error at the 95% confidence level required 89 usable surveys to adequately represent the population. The first survey phase reached participants during five in-person Mississippi Loggers Association (MLA) meetings and one forest product manufacturer's wood suppliers meeting (Figure 1). Businesses unable to attend a meeting with an e-mail address listed in the PLM database were e-mailed four invitations to participate in an online survey using Qualtrics. Companies unable to attend a meeting and without an e-mail address in the database were mailed three sequenced postcards with a quick response, or QR code. Scanning the code allowed access to the Qualtrics questionnaire using smartphones or other devices. Nonresponse bias was evaluated through wave analysis. Responses from each survey phase were compared using the Kruskal-Wallis test at  $\alpha = 0.05$  in SAS 9.4 and 95% bootstrap confidence intervals using Microsoft Excel.

Description of the survey phases and groups analyzed statistically are listed in Table 1. Mississippi was divided into four geographic regions using major highways and interstates as lines of separation to increase understanding of the unique nature of timber markets (Figure 1). Operational structure groups were formed based on the integration of

trucking from both risk management and business model perspectives (Table 1). Some firms owned both harvesting and hauling equipment. These were separated by the decision to either run the logging and trucking operations as a single unit or divide them into separate businesses. The creation of a separate trucking business is a risk management strategy to shelter assets from risks associated with potential truck accidents and lawsuits. A third group was contract hauling firms that did not harvest timber. Contract trucking businesses focused entirely on hauling and were not involved in logging operations that included cutting, skidding, and loading. Organizational structure effects were studied according to businesses identified as sole proprietorships and partnerships, C corporations, S corporations, or limited liability companies (LLC). This structural decision is based on tax, liability, and legal matters relating to each entity's unique characteristics.



**Figure 1.** Mississippi log trucking mixed-mode survey analysis regions, meeting locations, and county-level participation. Data collected during 2022-2023 ( $n=128$ ). Two respondents were not listed due to zip code data entry error that prevented county determination. Assistance with figure creation courtesy of Ms. Lara Taylor.

**Table 1.**

Independent variable groupings for a mixed-mode survey analysis of Mississippi log trucking companies conducted during 2022–2023. Groupings were evaluated using the Kruskal-Wallis test at alpha = 0.05 and 95% bootstrap confidence intervals.

| <b>Independent variable groupings</b>   |  |  |  |
|---|--|--|--|
| <b>Survey phase/mode to determine if nonresponse bias existed</b><br>1. MLA meeting survey<br>2. E-mail survey<br>3. QR code survey | <b>Region of operation</b><br>1. North (above US Highway 82)<br>2. North-Central (between US Highway 82 and Interstate 20)<br>3. South-Central (between Interstate 20 and US Highway 84)<br>4. South (below US Highway 84) | <b>Operational Structure</b><br>1. Single company including logging and trucking operations<br>2. Separate companies for logging and trucking operations<br>3. Contract trucking with no logging operation | <b>Business organization</b><br>1. C-Corporation<br>2. S-Corporation<br>3. Limited Liability Company (LLC)<br>4. Partnerships and sole proprietorships |

## **ANALYSIS**

Response data were entered into a Microsoft Excel spreadsheet where survey respondents resided along the rows, and survey questions were coded down columns. Discrete and continuous data were entered as provided by respondents, such as questions nine and 22, found in Appendix A. Ordinal data, such as question 30, were entered in their naturally ascending order. Nominal response data were recorded using ordinal encoding. This technique assigns numerical values to nominal data classifications, such as question seven, with choices of farm tags, apportioned tags, or business tags (B-Tags). In some cases, such as Yes/No questions, an order can be implied due to the positive/negative response generated by the question. Nominal data were coded beginning at a value of one in the order the categories appeared in the survey. This indirectly organized the data for quantitative analyses. As with all nominal/categorical data, the orders are interchangeable. This will subsequently impact the scores assigned to the categories, but it will not impact any conclusions drawn from hypothesis testing.

The original master file was copied to another file where clear occurrences of non-sampling error identified by the authors were removed. One example of non-sampling error was a listed owner age below five years old. Missing values occurred when respondents did not provide the

requested information. All blank entries from respondent omission or removal due to perceived non-sampling error were replaced with a period (.) as a SAS coding requirement.

Nonparametric Kruskal-Wallis test results first determined whether categorical differences existed at alpha = 0.05 using SAS version 9.4 (SAS 2020). A key advantage the Kruskal-Wallis test provided was the ability to rapidly assess the data for categorical differences. The primary disadvantage, though, was the need for post hoc tests. Bootstrap confidence intervals were constructed to clarify the between-group differences in Table 1 and to decrease the probability of committing a type I error by incorrectly rejecting a null hypothesis. In practical terms, this is called a “false positive” finding. Bootstrap confidence intervals additionally provided a robust counterweight to the reduced statistical power of the distribution-free Kruskal-Wallis test. For example, bootstrap confidence intervals accounted for data spread, which confirmed eleven significant group differences but identified eight instances of type I error.

Survey questions deemed significant by the Kruskal-Wallis test were simulated to create 1,000 bootstrap samples using the INDEX and RANDBETWEEN functions in Micro-

soft Excel. The 1,000 bootstrap sample means were sorted to determine 95% confidence intervals by selecting the lower bound rank in the 25th position and the upper bound in the 975th position. Overlapping bootstrap con-

fidence intervals indicated that statistical significance did not exist at  $\alpha = 0.05$ . Non-overlapping intervals signified differences between groups.

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## RESULTS

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### Nonresponse Bias and Survey Response Rate

A total of 130 log trucking companies provided usable information for a response rate of 12.4%. Group analyses using the Kruskal-Wallis test and bootstrapping were carried out for 98 firms that completed at least 75% of the questionnaire for a usable response rate of 9.3%. Non-response bias was not significant across survey phases (waves) and group analyses ( $p > 0.05$  in all cases). Mississippi log trucking firms in the South-Central region constituted 30% of respondents, followed by the Southern region (28%), the North-Central region (22%), and the Northern region (20%) (Figure 1). The largely unforested western counties in the Mississippi Alluvial Plain lacked respondents due to the importance of row crop agriculture and the minimal size of the forest product industry in that area (Figure 1). Generalizing the results of this study across the U.S. South should be done prudently due to the number of Mississippi firms compared to the population of firms over the entire region.

### Mississippi Log Trucking Company Characteristics

The responding firms owned 452 trucks, had a mean fleet size of approximately four trucks, three full-time employees, and produced nearly 57 loads per week (Table 2). The typical log trucking business in this study had been in business for over 20 years with an owner who was nearly 52 years old (Table 2). Mississippi log trucking businesses operated trucks an average of 68,947 miles per year with a one-way haul distance of 57 miles, hauled timber for 46 weeks, and delivered three loads per truck daily (Table 2).

Sixty-six percent of logging and trucking firms used contract hauling to deliver, on average, 25% of the total timber production reported during the study (Table 2). The organizational structure of Mississippi log trucking firms included single companies with logging and trucking combined (70%), companies with logging and trucking organized in separate units (18%), and contract trucking firms (7%) (Table 3). Most log trucking firms were organized as limited liability companies (LLC) (52%), followed by S-corporations (24%), C-corporations (13%), and partnerships and sole proprietorships (11%). The business ownership was primarily male (97%) and white (89%) (Table 3). Fifty-eight percent of the owners were between 41 and 60, and 24% were over 60 years old (Table 4). Truck drivers were predominately male (97%) and between 41 to 60 years of age (60%) (Table 4).



**Table 2.**

Mississippi log trucking firm characteristics compiled from a mixed-mode survey conducted during 2022–2023.

| Factor  | Median | Mean   | Standard Deviation | Minimum | Maximum |
|---|--------|--------|--------------------|---------|---------|
| Years hauling timber (n=125)  | 18.00  | 20.43  | 13.76              | 1       | 60      |
| Company-owned trucks (n=125)  | 3.00   | 3.82   | 2.59               | 0       | 14      |
| Full-time employees (n=128)   | 3.00   | 3.34   | 2.52               | 0       | 13      |
| Owner age (n=128)   | 51.50  | 51.92  | 12.34              | 21      | 81      |
| Truck miles/year (n=104)  | 70,000 | 68,947 | 25,430             | 20,000  | 175,000 |
| Haul distance (miles) (n=118)   | 59.50  | 57.34  | 16.46              | 30      | 110     |
| Production/week (loads) (n=116)   | 50.00  | 56.84  | 37.80              | 10      | 200     |
| Percentage of logging and trucking firm production delivered by contract trucking firms (n=121) | 10.00% | 24.98% | 29.37%             | 0%      | 100%    |
| Weeks in operation/year (n=117)   | 48     | 45.91  | 6.52               | 11      | 52      |

**Table 3.**

The percentage of Mississippi log trucking firms separated by operational structure, business organization, and demographic characteristics. Data were collected using a mixed-mode survey conducted during 2022–2023. Summing may not equal to 100 due to rounding.

| Item                          | Percentage of Participating Firms          |     |
|-------------------------------|--|-----|
| Operational structure (n=130) | Single company logging and trucking        | 70% |
|                               | Separated logging and trucking             | 18% |
|                               | Contract                                   | 7%  |
|                               | Other                                      | 5%  |
| Business structure (n=126)    | LLC  | 52% |
|                               | S-Corporation                              | 24% |
|                               | C-Corporation                              | 13% |
|                               | Partnerships, sole proprietors, and others | 11% |
| Owner gender (n=125)          | Male                                       | 97% |
|                               | Female                                     | 3%  |
| Owner race (n=128)            | White                                      | 89% |
|                               | Black or African American                  | 10% |
|                               | Other/Unidentified                         | 1%  |
| Products hauled (n=119)       | Roundwood                                  | 92% |
|                               | Chips                                      | 1%  |
|                               | Both                                       | 8%  |

**Table 4.**

Age and gender percentages of Mississippi log trucking business owners and their drivers. Data were compiled from a mixed-mode survey conducted during 2022 – 2023.

| Age group | Owners n=120 | Drivers (n=472) | Gender | Owners (n=121) | Drivers (n=475) |
|-----------|--------------|-----------------|--------|----------------|-----------------|
| 21–40     | 18%          | 19%             | Male   | 97%            | 97%             |
| 41–60     | 58%          | 60%             | Female | 3%             | 3%              |
| 61–up     | 24%          | 21%             |        |                |                 |



## Mississippi Log Trucking Equipment Characteristics and Safety Practices

Seventy-two percent of the trucks used by participating firms were ten years of age or newer (Table 5). The mean age of a log truck was approximately eight years old. The majority of trailers were under ten years old (62%). Sixty-one percent of respondents used onboard truck scales, 3% used in-woods platform scales, and 36% did not use scales to monitor truck payloads (Table 5).

Safety equipment employed by the majority were truck scales (64%) and road-facing cameras (61%) (Table 6). Relatively common examples of safety equipment included air disc brakes (47%), GPS truck tracking technology (40%), and speed governors (36%) (Table 6). Technology

implemented less often included tire pressure monitoring (9%), driver-facing cameras (7%), telematics (5%), backup cameras (2%), and external environment cameras (2%).

The majority of firms placed greater importance on regular safety meetings (76%), distracted driver prevention, cell phone use policies (68%), and driver pre-trip truck inspections (67%) (Table 7). Driver continuing education practices, including TEAM Safe Trucking (43%), safety instruction from insurance company instructors (32%), instruction using dash cameras and telematics (23%), and yearly safety reviews (23%), were a lower priority (Table 7). Safety practices that likely required more financial investment were the least likely to be used, including the employment of a safety manager (22%) and safety bonuses (17%) (Table 7).

**Table 5.**

Mississippi log trucking company equipment use percentages including truck and trailer age and truck scale use. Trucks and trailers in each age class are characterized by percentages. Data were compiled from a mixed-mode survey conducted during 2022–2023. Summing may not equal to 100 due to rounding.

| Item                      |                 | Percentage of Equipment Used by Participating Firms |
|---------------------------|-----------------|---|
| Truck age years (n=452)   | 0 to 4          | 41%   |
|                           | 5 to 10         | 31%   |
|                           | 11 to 15        | 16%   |
|                           | 16 to 20        | 7%  |
|                           | 21 and over     | 6%  |
| Trailer age years (n=656) | 0 to 4          | 24%   |
|                           | 5 to 10         | 38%   |
|                           | 11 to 15        | 20%   |
|                           | 16 to 20        | 11%   |
|                           | 21 and up       | 6%  |
| Scale Use (n=121)         | On-board scales | 61%   |
|                           | No Scales Used  | 36%   |
|                           | In-woods scales | 3%  |

**Table 6.**

Percentages of Mississippi log trucking company mixed-mode survey respondents that implemented the following safety equipment during 2022 – 2023. Summing does not equal 100 because each represents a separate safety equipment choice that firms could implement individually.

| <b>Truck Technology</b>             | <b>Percentage of Firms Confirming Use</b> |
|-------------------------------------|---|
| Truck Scales (n=121)                | 64%                                       |
| Road Facing Cameras (n=97)          | 61%                                       |
| Air disc brakes (n=97)              | 47%                                       |
| GPS (n=97)                          | 40%                                       |
| Speed Governors (n=97)              | 36%                                       |
| Tire Pressure Monitoring (n=97)     | 9%  |
| Driver Facing Cameras (n=97)        | 7%  |
| Telematics (n=97)                   | 5%  |
| Backup Cameras (n=97)               | 2%  |
| External Environment Cameras (n=97) | 2%  |

**Table 7.**

Percentage of Mississippi log trucking company mixed-mode survey respondents that confirmed implementing various accident prevention practices during 2022 – 2023. Summing does not equal 100 because each represents a separate safety practice choice that firms could implement individually.

| <b>Safety Practice</b>                                 | <b>Percentage of Firms Confirming Use</b> |
|--|---|
| Regular safety meetings (n=108)                        | 76%                                       |
| Distracted driving prevention (Cell phone use) (n=108) | 68%                                       |
| Pre-trip inspections (n=108)                           | 67%                                       |
| Driver safety education TEAM Safe Trucking* (n=108)    | 43%                                       |
| Safety instruction from insurance companies (n=108)    | 32%                                       |
| Instruction using dash camera and telematics(n=108)    | 23%                                       |
| Yearly driver safety reviews (n=108)                   | 23%                                       |
| Safety manager/consultant (n=108)                      | 22%                                       |
| Safety bonuses (n=108)                                 | 17%                                       |

\* TEAM Safe Trucking is a non-profit volunteer organization focused on preventing log trucking accidents by improving safety culture, driver training, and fleet management.

## Mississippi Log Trucking Region Analysis

Five regional differences were associated with haul distance, safety equipment, and safety practice implementation (Table 8). North Mississippi log trucking business owners used scales less often than the other three regions. Speed governor use was significantly lower for the South-Central region than the North-Central and Northern regions. Haul distances for log trucking businesses in the Southern region

were significantly shorter than their counterparts in the North and North-Central regions. South-Central Mississippi log trucking businesses used road-facing cameras more than their counterparts in the North and North-Central regions. Log trucking businesses in the South-Central region were significantly more likely to use camera and telematic data as part of driver instruction than businesses in the South region (Table 8).

**Table 8.**

Statistically significant regional Mississippi log trucking company variable means and confidence interval group comparisons. Data were compiled from a mixed-mode survey conducted during 2022-2023. The presence of regional differences were first evaluated using Kruskal-Wallis tests at alpha = 0.05. Bootstrap 95% confidence intervals were then calculated. Regional differences were identified by non-overlapping confidence intervals. Variable means not connected by the same letter indicate significant differences.

| Variable  | Log trucking Variable Means |                     |                    |                    |
|---|-----------------------------|---------------------|--------------------|--------------------|
|   | South                       | South-Central       | North-Central      | North              |
| Truck scale use <sup>1</sup>                    | 2.32 <sup>a</sup>           | 2.68 <sup>a</sup>   | 2.37 <sup>a</sup>  | 1.35 <sup>b</sup>  |
| Speed governors <sup>2</sup>                    | 1.26 <sup>ab</sup>          | 1.13 <sup>b</sup>   | 1.58 <sup>a</sup>  | 1.65 <sup>a</sup>  |
| One-way haul distance, miles                    | 48.72 <sup>b</sup>          | 56.22 <sup>ab</sup> | 63.95 <sup>a</sup> | 59.68 <sup>a</sup> |
| Road-facing cameras <sup>3</sup>                | 1.63 <sup>ab</sup>          | 1.84 <sup>a</sup>   | 1.47 <sup>b</sup>  | 1.35 <sup>b</sup>  |
| Driver training cameras/telematics <sup>4</sup> | 1.07 <sup>b</sup>           | 1.34 <sup>a</sup>   | 1.33 <sup>ab</sup> | 1.17 <sup>ab</sup> |

<sup>1</sup>Higher values revealed an increasing tendency for using scales in a region, whether in-woods platform scales or on-board truck scales. Survey responses were coded as 1=No scales are used, 2=Yes, our company uses in-woods platform scales, 3=Yes, our company uses on-board truck scales.

<sup>2</sup>Higher values indicated a growing prevalence of using speed governors in a region. Survey responses were coded as 1=No use of speed governors, 2=Yes, speed governors were used.

<sup>3</sup>Higher values indicated road-facing cameras were increasingly employed in a region. Survey responses were coded as 1=No use of road-facing camera, 2=Yes, road-facing camera were used.

<sup>4</sup>Higher values signified driver training cameras/telematics were more commonplace in a region. Survey responses were coded as 1=No use of driver training cameras/telematics, 2=Yes, driver training cameras/telematics were used.

## Mississippi Log Trucking Operational Structure Analysis

Operational structure analyses revealed three significant differences regarding equipment age, technology use, and regulatory violations (Table 9). Contract trucking companies had fewer trailers between zero and four years old than the

other two groups. Contract trucking firms, on average, had more trucks over 21 years old than companies with logging and trucking organized into a separate business. Contract trucking businesses had fewer overweight violations between 2019 and 2021 than the other operational structures.

**Table 9.**

Statistically significant Mississippi log trucking company variable means and confidence interval group comparisons based on operational structure. Data were compiled from a mixed-mode survey conducted during 2022-2023. The presence of operational structure differences were first evaluated using Kruskal-Wallis tests at alpha = 0.05. Bootstrap 95% confidence intervals were then calculated. Structural differences were identified by non-overlapping bootstrap confidence intervals. Variable means not connected by the same letter indicate significant differences.

| Variable                             | Log Trucking Variable Means |                    |                   |
|--------------------------------------|-----------------------------|--------------------|-------------------|
|                                      | Single Company              | Separate Companies | Contract Hauling  |
| Number of trailers age 0-4 years     | 1.27 <sup>a</sup>           | 2.76 <sup>a</sup>  | 0.14 <sup>b</sup> |
| Number of trucks age 21 years and up | 0.26 <sup>ab</sup>          | 0.06 <sup>b</sup>  | 0.71 <sup>a</sup> |
| Number of overweight violations      | 3.02 <sup>a</sup>           | 5.12 <sup>a</sup>  | 0.86 <sup>b</sup> |

## Mississippi Log Trucking Business Organization Analysis

Three significant business organizational differences were found relating to safety meeting use and business size (Table 10). Sole proprietorships and partnerships were least likely to use safety meetings compared to C-corporations, S-corporations, and LLCs. C-corporations owned more

trucks than LLCs and sole proprietorships and partnerships. C-corporations employed more truck drivers than sole proprietorships and partnerships (Table 10). S-corporations did not significantly differ from the other business structures relating to the number of company-owned trucks and truck drivers.

**Table 10.**

Statistically significant Mississippi log trucking company variable means and confidence interval group comparisons based on business organization. Data were compiled from a mixed-mode survey conducted during 2022-2023. Organizational differences were first evaluated using Kruskal-Wallis tests at alpha = 0.05. Bootstrap 95% confidence intervals were then calculated. Organizational differences were identified by non-overlapping bootstrap confidence intervals. Variable means not connected by the same letter indicate significant differences.

| Variable                       | Log Trucking Variable Means |                    |                           |                             |
|--------------------------------|-----------------------------|--------------------|---------------------------|-----------------------------|
|                                | C-Corporation               | S-Corporation      | Limited Liability Company | Sole Proprietor-Partnership |
| Safety meetings <sup>1</sup>   | 1.93 <sup>a</sup>           | 1.83 <sup>a</sup>  | 1.73 <sup>a</sup>         | 1.30 <sup>b</sup>           |
| Number of company-owned trucks | 6.23 <sup>a</sup>           | 4.43 <sup>ab</sup> | 3.40 <sup>b</sup>         | 2.56 <sup>b</sup>           |
| Number of truck drivers        | 4.71 <sup>a</sup>           | 3.63 <sup>ab</sup> | 3.30 <sup>ab</sup>        | 1.90 <sup>b</sup>           |

<sup>1</sup>Higher values signified a greater tendency of formally conducting safety meetings. Survey responses were coded as 1=Safety meetings were not formally held, 2=Yes, safety meetings were formally held.

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## DISCUSSION

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Mississippi log trucking business owners were typically middle-aged, white, and male. A decline in the number of logging business owners below the age of 40 and resulting increases in average owner age have been reported in the Lake States and in the southeastern United States. Fifty-eight percent of logging firms in the Lake States did not have a successor identified upon their retirement. Ownership transition, to some extent, is partially transferred within family groups and absorbed by expanding trucking firms, but new businesses will likely need to fill specific industry segments. Logging industry employees, including truck drivers, were also nearing the end of their careers. In Mississippi, 19% of drivers were under 40 years of age. In contrast, the Bureau of Labor Statistics stated that 47% of drivers in the United States trucking industry across all sectors were under 45 years of age in 2022. Possible factors influencing this discrepancy include the opportunity for more consistent work schedules, better wages, and improved benefit packages.

The mean age for log trucks used by Mississippi business owners was approximately eight years old. Across all trucking business types in the United States, the truck age was slightly less than six years (5.7) in 2021 and dropped below five years (4.7) in 2022. Consistent with other log trucking research, the age of trucks in Mississippi was older than other sectors in the trucking industry. The increased age of log trucks has historically been linked to a financial decision to reduce equipment costs through the purchase and operation of used trucks in response to slim profit margins.

While 41% of Mississippi trucks were under five years old, a substantial number were over 16 years old (13%). Older, poorly maintained trucks have been associated with higher incidence of crashes. Scientists found that fatal trucking accidents increased during the five-year period from 2011 through 2015. Possible contributing factors included log truck age (standing timber prices in the United States South reached a nadir at this time), rough woods roads that can increase wear and tear, and uneven loads. Georgia log trucks involved in accidents between 2006 and 2016 were typically older and had more mechanical issues than other large trucks, suggesting that a small number of old, poorly maintained trucks inordinately contributed to crashes. Factors other than the age and condition of log

trucks can contribute to crashes, including truck driver speed, rollovers, following too closely, and the actions of other motorists. Another contributor could be a lack of safety features on older trucks. Electronic stability control, for example, was mandated for tractor trucks manufactured after August 1, 2017, to reduce rollover and loss of control accidents. The implications for roadway safety increase the importance of strict preventative maintenance programs, particularly for older trucks.

Contract trucking, on average, was used to deliver 25% of the production in this study compared to 36% for firms across the southeastern United States. Some contract trucking firms, especially those with small fleets, went out of business due to higher insurance costs than other operations. The lower use of contract trucking services in this study could have been due to a lack of availability or a cost-saving strategy to avoid higher insurance costs that contract trucking firms could pass on to their customers.

Regional, operational, and business structure group comparisons among Mississippi log trucking firms found differences regarding safety equipment and practices. For example, while a combination of on-board and platform truck scales was used by 64% of the participating firms, regional implementation significantly varied for Mississippi companies. The reported truck scale use was also substantially higher than previous log trucking research conducted across the United States South (43%). These results do not necessarily imply that firms in Mississippi were more likely to use scales than others operating elsewhere. Instead, they emphasized the proportion of companies that have yet to adopt the technology. Trucks equipped with on-board scales in nine southern states, including Mississippi, were less likely to be over-weight or under-weight and gained a 4% cost savings. Log trucking companies using scales would be less likely to haul underweight loads that lower profitability and overweight loads that impact equipment, roads, and safety and can result in costly citations.

Safety technology adoption, including speed governors and road-facing cameras, also differed based on region. Log trucking business owners can manage the risk of accidents by improving safety culture through strict truck maintenance and repair schedules, installing safety



equipment on trucks, and continual driver safety training. A study that included interviews with trial attorneys and insurance industry representatives found that employing proactive safety measures beyond Federal Motor Carrier Safety Administration regulations is essential to avoid accidents and mitigate lawsuits.

Continuing education, including driver skill measurement, instruction repetition, situational awareness, and program evaluation, has improved companies' safety records. Less than half of the responding firms used driver training techniques, including TEAM Safe Trucking. An explanation for low investment in driver training can be related to financial expenditures, time costs, and lack of instantaneous benefits. The use of dash cameras and telematic data in driver instruction differed among Mississippi regions. Sixty-one percent of the firms used road-facing cameras, but only

23% reported using the data as a training tool. Reaching desired outcomes from driver training requires evaluation, observation, and coaching. This can be accomplished by using road-facing camera footage to reinforce good driving habits, review close calls, and determine the factors that lead to crashes.

A limiting factor in this study was its low response rate. However, nonresponse bias was not discovered among Mississippi log trucking firms responding to the survey. The overall and usable response rates were within the ranges of other comparable logging industry surveys. For example, response rates for logging contractor studies in Georgia and South Carolina ranged from 15% to 41%. A West Virginia logger survey had an overall response rate of 10.2 %, with 6.2% providing usable data.

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## CONCLUSIONS

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A statewide mixed-mode survey was implemented to assess the status of the Mississippi log trucking industry and perform categorical comparisons to identify distinguishing challenges. A small percentage of Mississippi log trucking business owners and truck drivers were under 41 years of age, 18% and 19%, respectively. Ninety-seven percent of the owners and drivers were male. Forty-one percent of Mississippi trucks were under five years old, but 13% were over 16 years old. Strict preventative maintenance programs, particularly for older trucks, have positive implications for roadway safety.

Eleven differences were found based on region of operation, operational structure, and business organization. Key findings centered around the adoption of safety practices and technologies. Approximately one-third of responding businesses did not implement safety practices, including cell phone use policies, pre-trip inspections, truck scales, and road-facing cameras. More than 50 percent stated

that driver education was not regularly implemented. Log trucking business owners should strive to instill a culture of safety, implement comprehensive truck maintenance programs, conduct regular driver safety training, and install safety equipment on trucks. Programs related to road-facing cameras would be beneficial in the Northern and North-Central Mississippi regions. The promotion of truck scale use could be strategically applied in the North Mississippi region. Meetings about using speed governors and integrating driver training with camera technology would be constructive in the South-Central and South regions, respectively. Sole proprietorships and partnerships would benefit from programs emphasizing the importance of internal safety meetings. Contract trucking firms operated older trucks and trailers, indicating a need for programs that address the benefits of safety equipment and preventative maintenance programs. The log trucking industry adds significant value to standing timber, but only when firms are productive, efficient, and safe.

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**2022 – 2023**

**MISSISSIPPI LOG  
TRUCKING BUSINESS  
OWNER SURVEY**

## Costs and challenges in the Mississippi Log Trucking Industry



### This survey addresses the following questions:

1. What is the current status of Mississippi's log trucking industry? This discussion will include descriptions of equipment used, business structure, the use of contract trucking operations, and employee demographics.
2. What levels are the current operating cost levels for a Mississippi log truck and trailer?
3. How do insurance rates differ across Mississippi log trucking companies?
4. Do hiring and retaining truck drivers differ for Mississippi log trucking companies depending on company size, equipment configuration, region of operation, and business structure?
5. What are the present and future obstacles for Mississippi's log trucking industry?



## Introduction and Informed Consent Statement

The log trucking sector is a concern in the logging industry. I am seeking to answer questions regarding the current status, structure, capacity, and performance of Mississippi log trucking companies. This research study will partially fulfill requirements of a PhD in Forest Resources from Mississippi State University. The study will increase understanding of the challenges facing the log trucking industry, including workforce recruitment and retention, insurance rates, and others. The research also seeks to discover how these factors differ according to operation size, region of operation, and business structure (including the use of contract trucking). Results will seek to improve the industry's economic well-being by enhancing outreach efforts performed by the Mississippi State University College of Forest Resources, the Mississippi Loggers Association, and the Mississippi Professional Logging Manger Program.

The Mississippi State University Human Research Protection Program and situational Review Board (MSU HRPP/IRB) ruled that this study qualifies for an Exemption Determination. The MSU Office of Research Compliance can be contacted by emailing [irb@research.msstate.edu](mailto:irb@research.msstate.edu) or calling 662.325.5520. This research can be referenced by using the MSU HRPP/IRB study number: IRB-22-200.

As a Mississippi log trucking business owner (or a person most involved with the business management decisions), I am asking for your participation. This involves answering an anonymous survey that will take approximately 15 to 20 minutes of your time.

**This survey is for research purposes only. Your completion of this survey is voluntary, and you may stop at any time. The information will remain confidential. Personal names, company names, or specific company financial information will be scrubbed from all analyses. Data from this survey will be kept locked in my Mississippi State University office.**

Sincerely,



James Shannon  
Graduate Student  
Mississippi State University  
College of Forest Resources  
[james.shannon@msstate.edu](mailto:james.shannon@msstate.edu)  
662.769.0547



Mississippi State University College of Forest Resources  
Log Trucking Study

**Log Trucking Company Characteristics**

1. In what zip code is your company located? \_\_\_\_\_
2. Which of the following best describes your trucking business?
  - Single company – logging and trucking
  - Separate companies for logging and trucking
  - Contract log trucking company (does not harvest timber)
  - If “Other” please provide a description \_\_\_\_\_
3. If you are a logging and trucking company, what percentage of your timber is hauled by contract trucking companies? \_\_\_\_\_
4. How many years has your company been hauling timber? \_\_\_\_\_
5. Please indicate the business structure of your trucking company.
  - C-Corporation
  - S-Corporation
  - LLC
  - Partnership
  - Sole Proprietorship
  - Other
6. How many trucks are owned by your company? \_\_\_\_\_
7. What type of truck license (tags) are used by your company?
  - Farm tags
  - Apportioned tags
  - B-Tags
8. Are harvest permits used when hauling timber?
  - Yes
  - No
9. List the number of full-time truck drivers that are employed: \_\_\_\_\_
10. List the number of part-time truck drivers that are employed: \_\_\_\_\_
11. List the number of truck drivers that have a commercial driver’s license (CDL):\_\_\_\_\_
12. Do you regularly drive any of the log trucks owned by your company?
  - Yes, I drive full time
  - Yes, I drive part of the time
  - No, I do not drive my company’s trucks



**Log Trucking Company Ownership Characteristics**

- 13. What is the age of the log trucking business owner? \_\_\_\_\_
- 14. What is the gender of the log trucking business owner?
  - Male
  - Female
- 15. What is the ethnicity/race of the log trucking business owner?
  - Hispanic
  - American Indian or Alaska native
  - Asian
  - White
  - Black or African American
  - Native Hawaiian or other Pacific Islander
  - Other/Unidentified

**Log Truck Driver Characteristics**

16. Please document the age of log truck drivers.

| Age                  | Number of Drivers |
|----------------------|-------------------|
| 21 – 40 years        |                   |
| 41 – 60 years        |                   |
| 61 – years and older |                   |

17. Please provide the gender breakdown of log truck drivers

| Gender | Number of drivers |
|--------|-------------------|
| Male   |                   |
| Female |                   |

**Log Trucking Company Operational Characteristics**

18. Please document the age of your log trucks.

| Age of truck         | Number of trucks |
|----------------------|------------------|
| 0 – 4 years          |                  |
| 5 – 10 years         |                  |
| 11 – 15 years        |                  |
| 16 – 20 years        |                  |
| 21 – years and older |                  |

19. Please document the age of your log truck trailers.

| Age of log trailers  | Number of trailers |
|----------------------|--------------------|
| 0 – 4 years          |                    |
| 5 – 10 years         |                    |
| 11 – 15 years        |                    |
| 16 – 20 years        |                    |
| 21 – years and older |                    |

20. Please indicate if scales are used to determine truck weight before wood delivery. If scales are used mark which type.
- No scales are used
  - Yes, our company uses in-woods platform scales
  - Yes, our company uses on-board truck scales
21. What is the average number of miles that one of your log trucks travel per year? \_\_\_\_\_
22. What is your average haul distance? (From the log landing to the mill) \_\_\_\_\_
23. What is the typical number of loads hauled by your company per week? (All trucks) \_\_\_\_\_
24. How many weeks per year do you operate on average? \_\_\_\_\_
25. What products do you haul?
- Roundwood
  - Chips
26. What is the average miles per gallon of fuel used by your trucks? \_\_\_\_\_

**Business Costs**

27. List the method of payment and average wage for company employed drivers (i.e. Dollars/ton mile). \_\_\_\_\_
28. List the method of payment and average wage for contract haulers (i.e. Dollars/ton mile). \_\_\_\_\_
29. What was the liability insurance cost (\$) per truck for the following years?
- 2019 \_\_\_\_\_
- 2020 \_\_\_\_\_
- 2021 \_\_\_\_\_
30. What is your log truck liability insurance policy limit? The policy limit is the highest amount that your insurance carrier will pay per claim.
- Less than \$1 million
  - \$1 million
  - \$1 million with an umbrella policy for claims over \$1 million
  - \$2 million
  - Other please list \_\_\_\_\_

31. Indicate which of the following benefits are provided for truck drivers.
- Health Insurance
  - Disability Insurance
  - Retirement plan/IRA
  - Vacation
  - Holiday Bonuses
  - No benefits offered
  - Other \_\_\_\_\_
32. What is the typical log hauling rate received during each of the following years? Please list the unit you were paid by (i.e. Dollars per ton mile).
- 2019 \_\_\_\_\_  
 2020 \_\_\_\_\_  
 2021 \_\_\_\_\_
33. List the number of violations from safety inspections and overweight tickets during 2019, 2020, and 2021.
- Safety inspection violations \_\_\_\_\_  
 Out of service violations \_\_\_\_\_  
 Overweight violations \_\_\_\_\_
34. List the number of crashes your log trucks were involved in during 2019, 2020, and 2021 that required insurance claims.
- Crashes resulting in injury or death \_\_\_\_\_  
 Crashes resulting only in property damage \_\_\_\_\_

**Challenges facing the log trucking industry.**

35. Compare the profitability associated with the log trucking company in 2021 to 2019 using the following 5-point scale.

|   | Profits were worse in 2021 | Profits were slightly worse in 2021 | Profits were the same in 2021 | Profits were slightly better in 2021 | Profits were better in 2021 |
|---|----------------------------|-------------------------------------|-------------------------------|--------------------------------------|-----------------------------|
| Trucking company profits in 2021 vs. 2019 | 1                          | 2                                   | 3                             | 4                                    | 5                           |

36. Compare the availability of log truck drivers in 2021 to 2019 using the following 5-point scale.

|   | More difficult in 2021 | Slightly more difficult in 2021 | The same | Slightly Easier in 2021 | Easier in 2021 |
|---|------------------------|---------------------------------|----------|-------------------------|----------------|
| Hiring available log truck drivers in 2021 vs. 2019 | 1                      | 2                               | 3        | 4                       | 5              |

37. Rate the factors that could make it harder for a log trucking company to hire qualified drivers.

| Factors                             | Not Important | Of Little Importance | Moderately Important | Important | Very Important |
|-------------------------------------|---------------|----------------------|----------------------|-----------|----------------|
| Lack of qualified available drivers | 1             | 2                    | 3                    | 4         | 5              |
| Lack of competitive pay             | 1             | 2                    | 3                    | 4         | 5              |
| Lack of employee benefits           | 1             | 2                    | 3                    | 4         | 5              |
| Failed drug tests                   | 1             | 2                    | 3                    | 4         | 5              |

Other please explain \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

38. Rate the following operational challenges based on their potential to affect business profits.

| Factors                                      | Not Important | Of Little Importance | Moderately Important | Important | Very Important |
|--|---------------|----------------------|----------------------|-----------|----------------|
| Hiring and retaining qualified truck drivers | 1             | 2                    | 3                    | 4         | 5              |
| Fuel prices                                  | 1             | 2                    | 3                    | 4         | 5              |
| Trucking rates                               | 1             | 2                    | 3                    | 4         | 5              |
| Liability insurance rates                    | 1             | 2                    | 3                    | 4         | 5              |
| Road weight limits                           | 1             | 2                    | 3                    | 4         | 5              |
| Mill turnaround times                        | 1             | 2                    | 3                    | 4         | 5              |
| In woods turnaround times                    | 1             | 2                    | 3                    | 4         | 5              |
| Increasing driver pay                        | 1             | 2                    | 3                    | 4         | 5              |
| Hauling distance                             | 1             | 2                    | 3                    | 4         | 5              |
| Lawsuits from accidents                      | 1             | 2                    | 3                    | 4         | 5              |

Other please explain \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

39. Which of the following technologies does your trucking company use? (Select all that are used)

- Air disc brakes
- GPS truck tracking
- Road facing cameras
- Driver facing cameras
- Speed governors
- Back-up cameras or sensors
- Tire pressure monitoring
- External environment cameras
- Telematics
- Other (Please indicate) \_\_\_\_\_

40. Which of the following safety practices does your trucking company apply?  
(List all that are used)

- Driver Safety education (ex. TEAM Safe Trucking)
- Safety meetings weekly or monthly
- Safety instruction provided by insurance carriers
- Safety manager/consultant
- Driver pre-trip inspections
- Cell phone use rules (Distracted driving prevention)
- Safety bonuses
- Driver instruction/coaching using technology (dash cameras/telematics)
- Yearly driver safety reviews
- Other (please list) - \_\_\_\_\_

41. What future challenges and potential successes do you anticipate your company confronting in the next 3-years?

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Thank you very much for the time and effort used to complete this survey.



**MISSISSIPPI STATE**  
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FOREST AND WILDLIFE RESEARCH CENTER

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