Project Summary

Texas Department of Transportation

0-4575: Capabilities/Limitations and Recommendations for Transporting TxDOT's Heavy-Duty Off-Road Construction and Maintenance Equipment Fleet

Background

The Texas Department of Transportation (TxDOT) transports heavy-duty, off-road highway construction and maintenance equipment using various sizes and combinations of trucks and trailers. Most off-road equipment is transported on tag-a-long trailers towed by dump trucks. While typical transport methods have been working reasonably well, off-road equipment is growing larger, and this puts a strain on TxDOT's equipment transport capabilities. A concern exists that some off-road equipment may be more safely transported using different tractor/trailer combinations. To address these challenges, researchers performed a two-year study to review transport requirements for TxDOT's off-road, heavy-duty construction and maintenance equipment fleet and to assess TxDOT's current equipment transport knowledge base and practices.

What the Researchers Did

The work associated with this research was accomplished in seven tasks. Task 1 consisted of a database and literature review including contacts with public agencies, equipment haul trailer manufacturers, and a sample of other state departments of transportation. Task 2 consisted of developing survey questionnaires to collect specific equipment transport knowledge data. The researchers used web-based surveys to identify the load-trailer-truck combinations used in the districts and to forecast the types of off-road equipment to remain in TxDOT's fleet over the next five years. They submitted a survey questionnaire to a statistically representative sample of TxDOT maintenance personnel to measure equipment transport knowledge. They followed this up with interviews (Task 3) to clarify the data and to gain additional insight. More than 250 TxDOT field personnel participated in these interviews, allowing the research team to capture some 3,900 years of construction/maintenance experience and institutional knowledge. In Task 4, the results of the literature review, questionnaires, and interviews were tabulated, summarized, and synthesized. Tasks 5 and 6, completed in Year 2, addressed the communication and implementation objectives. Here the researchers completely revised and updated the curriculum for TxDOT's MNT172 training course, *Equipment Load and Tie Down*. They then conducted a full-day pilot training workshop, the goal being to finalize an effective training program. Task 7 comprised submittal of final project reports.

What They Found

Results indicate that much is good within TxDOT relative to equipment transport. Employees ascribe importance to all aspects of the equipment transport process, and their overall knowledge of equipment transport is high.

Research Performed by:

Center for Multidisciplinary Research in Transportation (TechMRT),
Texas Tech University

Research Supervisor:
William D. Lawson, TechMRT

Researcher:
Michael Leaverton, TechMRT

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In particular, knowledge and capabilities relative to equipment transport practices and procedures, trailer hitches and hitching systems, load securement, chains and tie-downs, and equipment transport safety are very strong. However, equipment transport knowledge and capabilities relative to load distribution concepts and practices, training, and compliance with laws and regulations are not as strong.

Follow-up interviews confirmed the themes identified in the questionnaires including various challenges and concerns. For example, equipment transport policy should be simplified and more widely shared. Some confusion exists about the payload capacity concept, and it was common for the researchers to observe non-valid payload values on the trailers. Further, findings indicate that the "green line" on trailers should be replaced with the "ZONE" for load distribution.

The practice of using tilt-deck trailers for hauling larger, heavier equipment should be phased out and the maintenance sections should be provided with lower, more stable trailers appropriate for transporting the larger loads. Further, maintenance personnel voiced quality concerns relative to the Texas Correctional Industries 2-axle and 3-axle fixed-deck trailers. Various load and tie-down items require attention including, among other things, the need for uniform implementation of the new cargo securement regulations, the need for more D-rings on trailers, and more tie-down points on equipment.

By far, the one thing that field personnel stated would most improve equipment transport in TxDOT was training. They want *more* training, *better* training, and *refresher* training. Second to training, respondents stated that they needed newer, better equipment trailers and trucks.

Despite the challenges, this research indicates that, as a general rule, TxDOT's equipment transport practices, procedures, and policy represent a functional system in which many things are being done well. Efforts to address equipment transport challenges amount to continuous quality improvement to a functional, working system.

What This Means

The products developed for this study can be used by TxDOT fleet managers to help make informed decisions that enhance their system of transporting TxDOT's off-road, heavy-duty construction and maintenance equipment fleet. As for implementation, the revised *Equipment Load and Tie Down* curriculum clearly delivers a "better" training program. However, a stated need exists for "more" training. This research shows that TxDOT operations personnel strongly feel that everyone responsible for equipment transport – from maintenance technicians to the section supervisor – needs to be trained in a high-quality, uniform manner. The substantial investment to achieve this level of workforce training is warranted and should be pursued with vigor.

For More Information:
Research Engineer - Duncan Stewart, TxDOT, 512-465-7403
Project Director - Don Lewis, TxDOT, 512-374-5471
Research Supervisor - William D. Lawson, TechMRT, 806-742-3521

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Texas Department of Transportation
Research and Technology Implementation Office
P.O. Box 5080
Austin, Texas 78763-5080
512-465-7403