Improving Truck Safety in Florida:

An evaluation of exclusive highway facilities as a countermeasure

The movement of freight by truck has grown tremendously in the United States. A recent federal study predicted that domestic freight traffic will increase by 85% through 2020. In the future, trucks will handle almost 70% of all tonnage moved in the US, representing over 80% of the value of all freight transported. Although the large volume of truck traffic contributes to economic development and job creation, it also has an effect on highway safety, congestion, and air quality.

When it comes to traffic crashes, large trucks are no match for passenger vehicles and their drivers. Overall, large trucks account for 3% of the national vehicle fleet and 7% of the total miles traveled, but they are involved in 22% of all passenger vehicle occupant deaths. Out of the nearly 4,700 fatalities resulting from two-vehicle crashes involving large trucks and passenger vehicles, an overwhelming majority (98%) were passenger vehicle occupants. Clearly, the combination of large trucks and automobiles on the highway is a hazardous recipe.

Exclusive highway facilities for trucks (EFTs) are often identified as a countermeasure to enhance safety, reduce congestion, and improve the flow of freight. Transportation policy-makers in Florida have increasingly sought methods to improve highway safety while facilitating freight movement throughout the State. Specifically, the Florida Freight Stakeholders Taskforce recently expressed the need to investigate the environmental and safety impacts of heavy trucks sharing the roadway with automobile and pedestrian traffic. The Florida Department of Transportation (FDOT) contracted with the Center for Urban Transportation Research (CUTR) to evaluate the potential for reserved truck lanes and truckways in Florida.

The overall goal of the project was to develop a methodology for use by public policy-makers, such as state and local governments and metropolitan planning organizations, when considering roadway improvements. Officials could plug in their own unique statistics to determine whether or not exclusive facilities for trucks would be a feasible solution to relieve traffic safety and congestion problems in their area. This project specifically examined the current and future potential for reserved truck lanes and truckways on Florida's State Highway System (SHS).

Throughout the project period, close coordination with state- and district-level transportation officials, including statisticians, planners, safety engineers, and motor carrier compliance officers, was essential. CUTR examined previously completed scholarly research, as well as prior and ongoing applied projects, and instances where EFTs were considered but not implemented. Researchers identified national case studies and visited sites where special treatments had been implemented to increase truck-related roadway safety.

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truck-related roadway safety.

Literature Review and National Case Studies

The review of relevant studies found that few truly exclusive facilities for trucks and/or heavy vehicles exist. Researchers examined truck volumes, the percent of trucks in the traffic stream, peak and non-peak hour volumes, roadway geometrics, and pavement conditions to determine the feasibility. In most instances, truckways were not warranted because of limited truck volumes and/or high cost. Nonetheless, exclusive facilities for trucks may have positive impacts on the environment, such as lowering air and noise pollution levels, and reducing fuel consumption.

Although the literature review revealed no long-range, truck-only highways, a few short-range, special-use facilities were found. Although state and local agencies may have recognized a corridor congestion problem involving trucks, most have not taken action, except for site-specific cases in need of improvement. Through site visits, CUTR documented conditions at existing limited access facilities in Boston, New Orleans, New Jersey, and Laredo, Texas. These truck-only facilities can be classified as short-range, special-use facilities. The only facility resembling a long haul facility is a 30-plus mile section of the New Jersey Turnpike that excludes trucks from separated lanes for non-commercial traffic. The practical effect of the exclusion, however, is truck lanes.

The special-use facilities were site-specific and usually served a limited portion of traffic, such as port-related freight movement or international border crossings. However, in most cases, implementation of the special-use facilities has had a significant impact on local truck traffic. Several factors have steered local and state agencies away from implementing exclusive truck facilities; however, the most common issue was the high construction costs. Cost estimates ranged from $4 to $8 million per mile. High costs were attributed to right of way acquisition, the heavy-duty construction that is required, and the type of design (with elevated structures costing the most). In addition, public acceptance of truck-related countermeasures has been mixed.

Although public interest groups are generally in favor of making highways safer by removing trucks, they are usually reluctant to fund such projects with tax dollars. The trucking industry has been skeptical of the benefits of reserved truck lanes, often pointing to a reluctance to pay tolls and the potential for unfavorable public opinion. Most agree that it is difficult to estimate the trucking industry's level of compliance if a special facility was in place.

Methodology

CUTR proceeded to develop a methodology to select sites that warranted further consideration for exclusive truck facilities. Specifically, researchers constructed several GIS suitability models to identify "hot spots" based on truck-related crashes; truck

About CUTR

CUTR was established by the Florida Legislature, the Florida Board of Regents, and the University of South Florida in 1988 and has become recognized nationally and serves as an important resource for policymakers, transportation professionals, the education system, and the public. With emphasis on developing innovative solutions to transportation problems, CUTR provides high quality, objective transportation expertise in the form of technical support, policy analysis, and research support that translates directly into benefits for its project sponsors.

CUTR conducts nearly $5 million in research annually for a variety of public and private sector sponsors in Florida and the United States. Areas of research include public transportation, transportation planning, intelligent transportation systems, transportation demand management (TDM), transportation economics and finance, geographic information systems, access management, and transportation safety, among others.

volume; percent of trucks; highway level of service; proximity to airports; proximity to seaports; and, proximity to other intermodal facilities. The process of creating and selecting the appropriate suitability model was iterative. Each of the variables was individually considered, and multiple combinations of the models were run. A review of each of the variables and models is included in the report along with a description of the process of creating a suitability model.

A typical research approach is to test for conditions that have contributed to a known result. Since there were no conditions under which a long haul truckway has been constructed, the suitability model creation was both iterative and collaborative with FDOT systems planning staff.

By using various combinations and weightings of factors, three models were developed and run for the State Highway System in order to identify the most suitable highways for exclusive truck facilities serving the following trip types: “Between Cities,” “Within Cities,” and “Regional Facilities.”

The objective of the Between Cities Model was to identify highway corridors that may be deemed suitable for an exclusive facility to move truck traffic from one city to another. Important factors in identifying these types of corridors are the percentage of trucks of total traffic, segments that have high volume of trucks and truck crashes, level of service and percent of trucks. It was determined that a highway’s proximity to a specific local truck traffic generator was far less important than the absolute demand for the movement of freight at a system level. This model attempts to identify the most basic movements of trucks in the state. Truck volume is highly weighted in this model with 75% of the model being attributed to truck volume. Level of service has the second highest weighting with 15%. Percent trucks and truck crash rate were both given a weight of 5%.

Based on the Between Cities Model, six potential corridors emerge. These corridors were selected based on a their high scores and where high scoring segments were generally contiguous.

1. Miami to Titusville
2. Daytona to Jacksonville
3. Naples to Ft. Myers
4. Tampa to Orlando to Daytona
5. Venice to Valdosta, Georgia
6. Lake City to Jacksonville

The design of the Within Cities Model attempts to identify those areas where additional truck capacity may be required in urban areas. These areas are sometimes characterized as those links needed in order to move freight the “last mile” to an intermodal facility or distribution center. In this model, proximity to airports with high levels of air cargo activity and seaports are highly valued. Truck mix is becomes more important than the absolute number of trucks as a measure of need.

The Within Cities Model identifies highway segments based on level of service, truck volume, percent trucks, truck crash rates, distance to truck terminals and transfer facilities, airports and seaports. In selecting the areas for further review derived from this model, routes were excluded if they were being addressed in the Between Cities Model.

The project team focused on access to local intermodal facilities. Priority was given to those local corridors that connected major intermodal facilities with an emphasis on connectivity to the Interstate System. Three sites emerged for additional examination:

1. Miami: Port of Miami to the Area of Miami Intermodal Center
2. Tampa: Port of Tampa to Interstate Route 4/275
3. Jacksonville: North Interstate Route 295 at Interstate Route 95

In an attempt to determine if the first two models would fail to capture facilities or needs of a regional nature, a third model was constructed. This Regional Model is a hybrid of the previous two models discussed. It builds off of the Within Cities Model, but gives higher values to some of the factors that are significant in the Between Cities Model; consequently, some of the variables from the Within Cities Model are given less weight. The results of the Regional Model identified no additional highway segments beyond those in the Within Cities Model. Although the scoring of specific highway segments varied, no new roadways emerged.

Most of Florida's Interstate System emerged as the most suitable highways for consideration of exclusive truck facilities. The most obvious opportunities to create a truck exclusive facility are where the need seems apparent and the right of way exists to create new lanes for a facility as opposed to "taking" a lane from existing users.

An ideal separated facility would provide for ease of passing and adequate shoulders for disabled trucks. This kind of a facility, if it were to be constructed in the median, would most appropriately be situated in areas where interchanges are far enough apart to avoid the long weave sections that would be required for entering and exiting trucks and require approximately 60-feet of right of way. This "separate facility" type seems to fit only the Interstate 10 corridor west of Interstate 295. Although the interchange spacing seems appropriate on Interstate 75 north of Tampa, long sections of the northern part of the corridor have insufficient median.

As mentioned in the national case studies, although many agencies have and are studying exclusive roadways for trucks, the only facility close to a true truckway is the 33.5-mile, "dual-dual" section of the New Jersey Turnpike. Although there are sections of Florida's Interstate System that rival the highest traffic sections of the Turnpike, the percent of trucks in these areas is lower than the 15 percent on average that New Jersey reports; however, with the continued growth in all traffic, and the demand for

truck movement not appearing to cease any time soon, the traffic profiles will approach those of New Jersey. From public policy and public perception standpoints, it may more advisable to create traffic separation by excluding trucks from "express lanes." The precedent for truck lane restrictions is already set. This approach also advantages both constituencies, while avoiding the perception that heavy public investment is being made only for one industry.

A system-wide approach to looking at this issue may present some additional opportunities not specifically addressed in the methodology employed in this study. Without the benefit of detailed origin and destination information for commercial traffic, it is difficult to understand how much of the demand for truck capacity on a particular route is a function of the fact that an interstate exists to facilitate movement. The most efficient way to serve the distribution of traffic, or most commodities requiring a fixed infrastructure, is by way of a grid. It may be prudent to give consideration to creating a system of "truck-friendly" highways to make any desired movement more efficient. The system could rely on existing state highways and minimize the need for new construction on new location.

Future improvements to all of these facilities could be made with major truck movements in mind. The "truck grid" or backbone could evolve over time within the context of a plan to provide maximum connectivity and alternatives to the congested urban sections of the Interstate System.

Recommendations

- The results of this study should be immediately shared with those working on the Interstate 10 National Freight Study as input.
- A briefing should be provided to those involved with the detailed work of the FDOT Strategic Intermodal System (SIS) to see if there is any value to be gained by incorporating these results.
- If the FDOT is interested in pursuing the concept further of exclusive truck facilities, forecast data and the more refined inputs mentioned above should be run through the GIS screen. Classified traffic counts, the "new" LOS data, and the truck crash rates would all be helpful along with peak hour volume per lane.
- As a part of some effort, the Florida Strategic Freight Network database requires routine updating (perhaps as a part of the SIS work).
- Routine use of left exits in future interstate widening should be carefully considered given that this design element is an impediment to any special use of a highway's inside lanes.

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