Exclusive Facilities for Trucks in Florida: An Investigation of the Potential for Reserved Truck Lanes and Truckways on the State Highway System

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ABSTRACT
The movement of freight by truck has grown tremendously in the United States. Exclusive highway facilities for trucks (EFTs) are often identified as a countermeasure to reduce congestion, enhance safety, and improve the flow of freight. The Florida Department of Transportation expressed interest in further investigation of the potential for EFTs in Florida and contracted with the Center for Urban Transportation Research (CUTR) to lead the research effort. This project focused on the feasibility of separating large trucks out of the traffic mix. Target areas of concern were instances where trucks had a significantly negative impact on safety and congestion. After conducting a thorough literature review, researchers identified national case studies and visited sites where special treatments had been implemented. Researchers obtained input from state and local transportation officials, highway safety professionals, planners, enforcement agencies, and truck driver public interest groups. CUTR developed a methodology to select sites in Florida that warranted further consideration for EFTs. Specifically, researchers constructed several GIS models to identify “hot spots” based on truck crashes, truck volume and percent, and level of service. Rural and urban locations were both considered, as each scenario presented a different set of challenges. CUTR visited sites in Florida and worked with local officials to document additional details about local streets and interstate highways. Lastly, CUTR assessed the feasibility of countermeasures for each site. Researchers determined that most of Florida’s Interstate system was suitable for EFT consideration; with the most appropriate areas having sufficient available right of way.

Key words: Florida highways—geographic information system traffic models—trucks—truck lanes—truck traffic
INTRODUCTION

Exclusive highway facilities for trucks (EFTs) are often identified as a countermeasure to improve the flow of freight, reduce congestion, and enhance safety. Preliminary observations suggested that there might be both urban and rural locations in Florida where reserved lanes for trucks or separate “truckways” should be considered. The Florida Department of Transportation (FDOT) contracted with the Center for Urban Transportation Research (CUTR) to lead the research effort.

The purpose of this research was to evaluate the potential for reserved truck lanes and truckways in Florida. CUTR examined previously completed scholarly research, as well as prior and ongoing applied projects, and instances where EFTs were considered but not implemented. CUTR also sought to find examples of EFTs, if they did indeed exist. The project specifically examined the current and future potential for reserved truck lanes and truckways on the State Highway System (SHS) and presents a methodology to allow others to evaluate this potential solution. The research examines conditions favorable to reserved truck lanes or truckways and evaluates specific potential applications on the SHS. Operational considerations and practices necessary to feasibly implement this potential solution are also presented.

LITERATURE REVIEW

A considerable body of prior research has discussed the use of exclusive highway facilities for trucks. For this project, information was culled from many diverse sources, including scholarly research projects, private proposals, policy papers, and applied projects. Some projects briefly mentioned the concept as a countermeasure to increase safety on congested highways, while others analyzed several configuration options to improve freight movement or extend roadway life. National, state, and local governments have investigated the potential for implementing special lanes for trucks. European nations have also considered the idea. Applications of truckways have been considered to improve conditions for short- and medium-range facilities such as bridges and port area roadways, as well as along entire corridors such as the proposed NAFTA Superhighway. In some cases, the option has been studied and rejected, while others have yet to reach a firm decision on a course of action.

The literature review revealed several different configuration options for exclusive truck facilities. They range from adding lanes in the median space of an existing highway to the construction of a separate, parallel roadway (1, 2). Some studies suggested acquiring additional right of way to add lanes (2), while others opt for an elevated structure built in the median (3). Truck lanes may be placed on the inside or outside of the roadway, and they may or may not involve a barrier to separate them. Some interior-lane options have been designed as three-lane, variable passing lane facilities (2). A few areas, Seattle, Washington for example, have even discussed allowing trucks to share the HOV and/or bus priority lanes (4). In any event, tolls may or may not be part of the plan.

Some considerations were found to be common among many projects. In most cases, three factors were measured to determine the feasibility of exclusive truck facilities: safety, operations, and roadway geometrics. Average annual daily traffic (AADT), percent of trucks in the traffic mix, level of service, and lane and shoulder width were usually among the more important items. Others involved available median width, vehicle characteristics, and roadway and vehicle design. Scholarly approaches often employed a reconfigured traffic model to project future volumes and economic feasibility (5).

No true exclusive highway facilities for trucks were found to exist. 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 (2), and high costs were
attributed to right of way acquisition, required heavy-duty construction, and design type (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 also has been skeptical of the benefits of reserved truck lanes, often pointing to a reluctance to pay tolls and the potential for low public opinion. Most agree that it is difficult to estimate the trucking industry’s level of compliance if a special facility was in place (2).

It is important to note that a number of studies have evaluated restricting trucks from travel in certain lanes of the highway, and over half of the states impose some form of highway lane restriction on trucks. While these studies are significant, the subject area was considered beyond the scope of the project.

National Case Studies

Few truly exclusive facilities for trucks and/or heavy vehicles actually exist. Although the literature review revealed no long-range, truck-only highways, a few short-range, special-use facilities were found. The roadways are site-specific and usually serve a limited portion of traffic, such as port-related freight movement or international border crossings. However, in most cases, the implementations have had a significant impact on local truck traffic. CUTR visited six special truck facilities in Newark, New Jersey; Boston, Massachusetts; New Orleans, Louisiana; and Laredo, Texas, and met with agency officials responsible for planning, management, and operation. The purpose of these visits was to identify specific conditions that led to their construction and to document lessons learned during the implementation process. The project team gained significant insight into the planning and management of such facilities and was better able to refine the site selection criteria for potential applications in Florida.

RESEARCH METHODOLOGY

CUTR developed a methodology to select sites in Florida that warranted further consideration for truckways or reserved truck lanes. First, criteria to identify potential applications were documented. Important factors included truck crash rates, truck volumes, highway level of service, and percent of trucks in the traffic mix. To pinpoint specific priority areas, researchers constructed two geographic information systems (GIS) models. One model was used for long-range travel, while the other examined scenarios within major metropolitan areas. GIS methods lent themselves particularly well to this research project. The technology allowed researchers to handle large volumes of data, to integrate several data sets, and to weight each variable according to importance and relevance. Primary factors mentioned above could be weighted heavily, while secondary factors could be included at a low enough level to be relevant but not confound the outcomes.

CUTR relied exclusively on FDOT data for the creation of the GIS models. The results consisted of a series of maps that showed specific areas in Florida that warranted further consideration. The entire state, including close-ups of individual areas, was shown. Specifically, critical factors were scored on a scale of 1 to 9. The factors were combined and each ½-squared mile was given a final score. The map was configured to show only squares that received a score of 6 or higher. Individual crash locations were overlaid to show problem areas.

CUTR planned site visits to particular areas in Miami, Jacksonville, Orlando, Ft. Myers, and Tampa, as well as rural locations, and worked with state and local officials to document specific details about local streets and highways. Researchers also investigated the potential use of abandoned rail rights of way and other under-utilized corridors to remove truck traffic from local streets and urban neighborhoods.
Researchers assessed the feasibility of truck-only countermeasures for each site. CUTR developed 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 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 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.”

**Between Cities Model**

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%. Six potential corridors emerged from this model.

**Within Cities Model**

The design of the Within Cities Model attempted 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.

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.
RESULTS

Potential Sites in Florida

Most of Florida’s Interstate System emerged as suitable 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 is available.

Between Cities Model

Miami to Titusville Portions of the I-95 corridor from Miami (the southern terminus of I-95) to around Titusville scored very high on the Between Cities Model. The highest scores in the 210-mile corridor were in the southern Broward County area. Interstate Route 95 in South Florida serves 4 major seaports in the region and provides a primary commuter route into and out of the major employment centers of Florida’s Gold Coast.

With median constraints on the southern end of this corridor, it seems doubtful that an exclusive truck facility could be easily constructed. An alternative, that at first glance seems, to make sense is to try to route long haul trucks to Florida’s Turnpike. A serious attempt to do this was conducted in the mid-1990s with little success; however, other potential opportunities do exist. One low cost potential is to make the existing HOV lanes available in the off-peak hours to trucks only. Another is a scheme that would involve operating I-95 and Florida’s Turnpike as one facility on the northern part of the corridor providing exclusive, separated lanes for commercial traffic.

Daytona to Jacksonville The I-95 corridor from Daytona to Jacksonville, Florida generally scored high on the Between Cities Model. The highest scores in 89-mile the corridor were on I-295 near the I-10 interchange area. The corridor serves as a commuter route, is part of the intra-regional circulation network, and handles significant seaport, airport and intermodal facility traffic. Upon construction of the “eastern bypass,” there seems to be a potential for a shift of significant truck traffic from existing I-295 to the east side of the urban area. This may be one of the only opportunities in the state where taking an existing mixed-use lane and converting it to a truck-only lane may be worth considering.

The additional through traffic capacity that will be available with the completion of the loop provides decision makers with a unique opportunity to provide an incentive for long distance trucks to use one side of the loop or the other. If it was deemed more appropriate that through truck traffic be on the west side of the loop, then an exclusive truck lane, signed and striped, could be instituted at a fairly low cost. The converse is not true given that the new facility is only a four-lane highway.

Naples to Ft. Myers The region served by this 36-mile corridor can be characterized as an area in transition. The traditional agricultural and mining uses to the east of the interstate are giving way to large-scale, low-density residential development. Uses of I-75 seemed to be a mix of interstate through traffic, localized commercial uses, commuter traffic and recreational travelers. The operating characteristics of agricultural and mining trucks are not as appropriate for a high-speed facility as are those for an “over the road” tractor and trailer combination. During times of citrus harvest, the increases in these kinds of vehicles affect the highway’s performance. This traffic mix, along with high AADT on a four-lane highway causes this section to rank high among the corridors examined across the state.

The only apparent opportunity in the corridor from Naples to Ft. Myers is to widen I-75 to the “inside” and create exclusive truck lanes. Without the proposed widening now programmed for preliminary engineering, there seems to be sufficient median width (minimum of 80 feet) to consider a fully separated
exclusive truck facility. Once the widening is completed, it is doubtful that the corridor will score as high on the GIS model. The remaining median width, after the widening, will still afford a future opportunity to provide exclusive lanes and, perhaps, even a separated facility.

**Tampa through Orlando to Daytona** Interstate 4 scored highest at its western most end (actually a portion I-275.) This 139-mile corridor changes character dramatically, heavy with commuter and recreational traffic for most of its length. It also serves as one of only a few through freeways in Orlando and Tampa. With the Port of Tampa on one end, massive distribution and significant manufacturing uses in Polk County, and the intense development of all kinds in the greater Orlando area, this corridor will continue to present challenges to transportation professionals.

Opportunities for facilitating easier truck movement on the Tampa end of the corridor will be discussed in a section addressing the “Within Cities” findings that follows. While the corridor is long and very complex, some opportunities may present themselves to help in the movement of trucks. The “take a lane” option does not seem feasible, and the median is not of an adequate and consistent width across the entire corridor to consider a simple solution. It is possible that a “total transportation corridor” could emerge as a viable future solution to the growing demands for this corridor and could include accommodation for an exclusive truck facility.

**Venice to the Florida State Line** Interstate Route 75 from Venice north to the Florida/Georgia State line was another long distance corridor that rated a high score. The longest of the corridors identified, it scored highest at three locations (Venice, I-4 and U.S. 27) along its 270 miles. Interstate Route 75 serves both a heavy demand for interstate through movement as well as handling significant commuter traffic around the Tampa and Ocala areas. Its interchanges with Interstate Route 10, U.S. Route 301, and Florida’s Turnpike are all critical linkages for truck traffic.

Like most of the other corridors examined, the highway median is rapidly being consumed for “mixed use” lane capacity additions. Given that the northern section of I-75 may be able to be widened once more within the existing right of way, and the truck mix is in this area is one of the highest found in the study, the “last widening” should be considered for exclusive truck use.

**Lake City to Jacksonville** The Interstate Route 10 corridor from Lake City to Jacksonville (60 miles) was, overall, on the lower end of the highest scoring highways on the GIS Between Cities Model. Interstate Route 10 provides the primary east-west access across all of northern Florida. I-10’s 369 miles connect Pensacola, Tallahassee, and Jacksonville with significant truck interchange points and links the ports of Pensacola, Panama City, and Jacksonville to rest of the state and to the states west of Florida. Throughout its length, the corridor has sufficient median width to accommodate even a separated facility within the existing right of way. Few highway overpasses exist that would require modification, and little vertical curvature exists throughout this portion of I-10.

**Within Cities Model**

The scores for the Within Cities Model were lower than the Between Cities scores; however, this is not to suggest the importance of the routes identified by this model are less critical than those identified in the Between Cities Model. The different variables used and their associated weightings account for these differences. As in the Between Cities Model, the Within Cities scores are a ranking of relativity, that is, the scores represent a highway or highway segment’s position to all other highways on the State Highway System. Based on the model scores, the areas of Miami, Jacksonville, and Tampa were examined more closely for potential opportunities to enhance freight mobility through the use of exclusive truck facilities.
This model attempts to find areas of need to carry freight “the last mile.” While much attention is usually given to through and interstate movements of freight, a common critical constraint is moving from an intermodal transfer point to a higher level of the transportation system.

**Miami** This area includes parts of Miami and Fort Lauderdale. The presence of the ports and airports in the region contributes to the high scores in the area. Around the Miami International Airport, the highest scores occur on I-95 south of the Palmetto Parkway interchange south to the East-West Expressway. The intense distribution activity that has developed west of the Miami International Airport generates significant truck traffic. The ability of this traffic to move to and from the major sea- and airport facilities of Miami is impeded by the lack of any free flow east to west facility.

The concept of a truck tunnel in and out of the Port of Miami has been studied for some time and would alleviate some of the congestion depending on its western terminus. Although extremely expensive and not easily constructed, perhaps an elevated facility on either the east-west toll road SR 112 or SR 836 for use by automobiles with the existing at-grade lanes reserved for trucks is viable for, at least, study.

**Tampa** The difference in this look at Tampa is the relatively high scoring and length of the corridor leading out of the port area toward the interstate. These characteristics, combined with the examination of the I-75 corridor in the Between Cities Model, seem to indicate the need for more direct expressway access to the area around Tampa’s port. Currently, truck traffic moving to and from the port that is destined for all points other than west, must wind its way through the local system. Local studies of this condition are underway. Perhaps special accommodation for Port of Tampa truck traffic could be incorporated into any adopted design. This could potentially remove additional truck traffic from city streets.

**Jacksonville** The model for Jacksonville indicates that the northwest section of Interstate 295 scores very high with truck volume and percentage. The site-specific need that this model attempts to locate seems to be for the U.S. 1 area from the port activity along Tallyrand Avenue to I-95. The opportunities outlined in the Between Cities discussion of the Jacksonville area would seem to have little potential impact on what appears to be a local access issue. This would be required before any recommendation could be made for this area, particularly given that the model used in this study only dealt with state highways. The nature of the Tallyrand access area requires detail for the local street system.

**CONCLUSIONS**

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.

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 New Jersey Turnpike, the percent of trucks in these areas is lower than the 15 percent 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.

REFERENCES


