COMMERCIAL VEHICLE ACCOMMODATIONS

Description

Commercial vehicle accommodations focus on areas where increases in truck traffic may warrant special or unique roadway design treatments in order to reduce congestion and increase freight efficiency and safety. Some of the more common techniques related to commercial vehicle accommodations include improving:

- Shoulder width and pavement structure.
- Intersection design.
- Parking.
- Acceleration/deceleration lanes.
- Truck and car separations.

Increases in truck traffic have resulted from increases in time-sensitive freight (e.g., just-in-time deliveries), the North American Free Trade Agreement (NAFTA), and until recently a robust economy.[1] Figure 1 illustrates sections of Texas highways experiencing Annual Average Daily Truck Traffic (AADTT) levels in each of the respective categories.

On freeways and some major streets, the roadway shoulder width and corresponding shoulder material can impact commercial vehicles. On high-speed, heavily-traveled highways and highways with large numbers of trucks, shoulders provide a needed and necessary refuge. Inadequate shoulder design can present challenges to disabled motorists and trucks needing a place to "pull off" the highway quickly.

Some intersection designs on local streets are out of date and do not provide adequate turning areas for today's larger commercial vehicles. Turning radii on some major streets can be extremely difficult for trucks to maneuver.

Commercial vehicle parking is typically limited to roadside truck stops and state provided rest stops. With increased commercial vehicles traveling the highways, convenient and frequent truck parking is critical in keeping the commercial vehicle driver rested and alert on long duration trips.

Cost:	●●○○○
Time:	**Short**
Impact:	**Spot**
Who:	**City/State**
Hurdles:	**Low Interest**

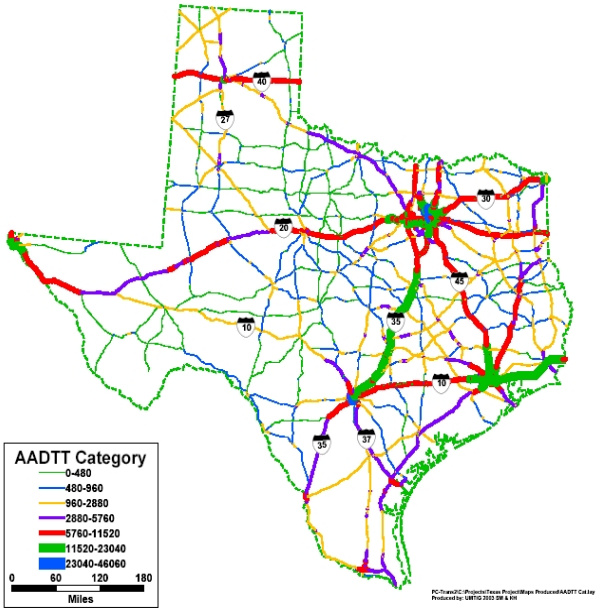

Figure 1. Texas Highway AADTT Categories (*Source: University of Manitoba)*

For more information, please refer to: http://mobility.tamu.edu/mip/strategies.php.

Trucks have different operating characteristics than cars. Trucks may be forced to speed up or slow down at a different rate than cars, which can lead to unsafe maneuvers. On freeways, acceleration and deceleration lanes are speed-change lanes that provide adequate distance for vehicles to accelerate or decelerate to near highway speeds before entering or exiting the through lanes of a freeway.

Separation of trucks from cars in the traffic stream is another potential technique that can reduce congestion while enhancing roadway safety. Whether a separate facility is provided exclusively for trucks or trucks are limited to certain lanes in a corridor, this countermeasure can improve the flow of freight while reducing the interaction between cars and trucks.

Target Market

- *Freeways and major streets with high commercial vehicle volumes*
  Commercial vehicle accommodations should be considered in urban areas where maneuvering trucks can cause congestion both on city streets and freeway entrance/exit ramps.
- *Freeways with steep grade locations*
  Acceleration and deceleration lanes (also referred to as climbing lanes) can provide designated areas for truck traffic to speed up or slow down without disrupting through lane traffic.
- *Outdated major street design locations*
  Many older major streets have not been reconstructed with the latest design guidelines. Larger trucks have a difficult time turning at locations with small turning radii.

How Will This Help?

- Commercial vehicle accommodation techniques enhance freight movement efficiency by increasing truck speeds, which can improve overall congestion.

- Adjusting the facilities for commercial vehicles improves safety for passenger vehicles. Exclusive highway facilities for trucks are often identified as a countermeasure to improve the flow of freight, reduce congestion, and enhance safety. The turbulent flow that can result from car and truck traffic utilizing the same roadway can be reduced by separating the two vehicle types on separate roadways or by restricting trucks to a certain part of the roadway.
- Implementing commercial vehicle accommodation measures has a relatively low cost when compared to other congestion mitigation methods. It is much cheaper to provide shoulders, acceleration/deceleration lanes, increased turning radii and parking locations compared to total corridor rebuilds.

Implementation Examples

The best example in the U.S. of a truck roadway alongside a car roadway is the New Jersey Turnpike, where the inner roadway is reserved for light vehicles only, and the outer roadway is a truck-preferred road, but is open to passenger vehicles as well. Figure 2 on the next page shows the separated facilities, also referred to as **dual-dual segments**, which were implemented to relieve congestion. The turnpike has a 32-mile segment that consists of interior (passenger car)

lanes and exterior (truck/bus/car) lanes within the same right-of-way.[2]

Approach Techniques and Principles

As a result of increasing demand on freeways, a variety of strategies or countermeasures for commercial vehicles have been implemented in an attempt to mitigate the effects of increased truck traffic. These techniques include highway shoulder enhancements, updated intersection design elements, additional truck parking, acceleration and deceleration lanes, and truck and car separations.

Highways with a deficient shoulder or lacking a full-width shoulder can be enhanced across the state to increase safety and provide continuous refuge for disabled vehicles. Upgrades are usually simple and accomplished with little effect on adjacent traffic. Upgrades can include changing the materials used (i.e., changing from gravel to asphalt or from asphalt to concrete) and increasing the width of the shoulder (i.e., from the common 10 feet to 12 feet or greater). Extra wide paved shoulders enhance safety for disabled commercial vehicles by providing more separation between the disabled vehicle and the adjacent high speed moving traffic and can be implemented in select areas where sufficient cross-section is available (see photo in Figure 3). Many older major streets were designed for passenger cars and shorter wheel based trucks and do not include the latest design standards that address todays larger commercial vehicles.

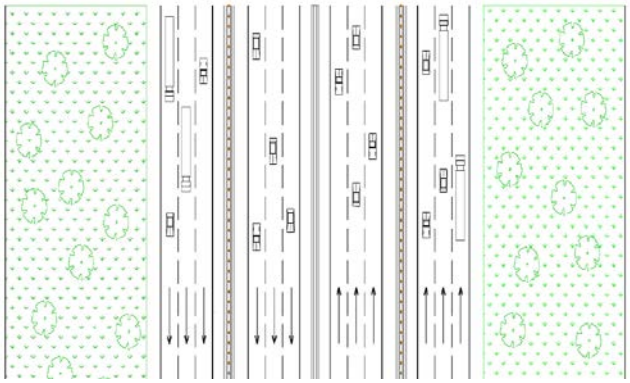

Figure 2. Typical Cross-Section of Dual-Dual Segment[2]

Figure 3. Photo of Extra Wide Paved Shoulder[1]

One of the techniques that can enhance older major street intersections is to increase the turning radii in order to provide greater clearance for right turning commercial vehicles. However, spacious areas created by increased turning radii at intersections can create confusion for drivers. Therefore, channelized islands should be used in combination with the increased turning radii design so that the proper course of travel is obvious to a driver.

Commercial vehicle parking provides motor carriers with a safe location to rest in order to meet federal hour-of-service rules. Currently in Texas, commercial truck stops provide 97 percent of available parking, and public rest areas provide 3 percent of available parking.[1] Unfortunately, the available public rest area parking does not accommodate the demand of commercial vehicles. Some techniques to address this deficiency include expanding public facilities, expanding or improving commercial truck stops, encouraging the formation of public-private partnerships, and educating or informing drivers about available spaces.

Acceleration and deceleration lanes encourage smooth increases in traffic flow on freeways by allowing traffic to adjust to the proper speed in a designated area before merging into or out of the main traffic lanes. A climbing lane, a form of acceleration/deceleration lane, provides an extra lane for vehicles moving slowly (typically

commercial vehicles) uphill or downhill so as to not impede faster moving vehicles (typically passenger cars). Climbing lanes have not been used extensively on multilane highways with grades of sufficient length since these multilane facilities have had adequate capacity. However, because of the increasing congestion and the increasing number of serious crashes occurring on mulitlane facilities with grades, climbing lanes can provide the necessary separation between slower and faster moving vehicles.

Common techniques for truck and car separations to be considered include: time of day truck restictions, peak period truck bans, route restrictions and managed lane operations. Managed lane operations for commercial vehicle strategies can include exclusive use truck lanes, truck lane restrictions, and dual use lanes. The strategies of exclusive use truck lanes and truck lane restrictions attempt to decrease the adverse effects trucks have on safety. Truck lane restrictions separate traffic by designating specific usage of lanes by vehicle type, while exclusive use truck lanes designate facility usage by vehicle type.

Issues

Right-of-way is the primary issue with adding acceleration/deceleration lanes, shoulders and exclusive highway facilities. Existing developments may prohibit any adjustments. Complex, dated, or elevated designs make it more difficult and costly to use these types of techniques. Increasing turning radii at intersections may prove difficult due to right-of-way constraints at intersections and may ultimately require a complete rebuild or alternative design. Costs can escalate depending upon the accommodation chosen.

Who Is Responsible?

The state and cities bear the primary responsibility of installing and maintaining commercial vehicle accommodations. On state designated roads, the local TxDOT office may take responsibility. On city roads, however, the local government controls the construction and management of intersections and possibly parking. Any improvements should be coordinated with local citizens and businesses to ensure that the accommodation serves the adjacent land.

Project Timeframe

The timeline for adding commercial vehicle accommodations will differ based upon which method is chosen, current road geometry, and the roadway functional classification. A typical major street can be converted in a shorter timeframe than a freeway section. For example, increasing the turning radii at an intersection may take approximately two months to reconstruct where the addition of acceleration lanes on a freeway in two directions over a one-mile section may take six to nine months to construct. Cost, complexity, design, and benefit should be considered when deciding to add commercial vehicle accommodations to a desired roadway.

Cost

The cost of incorporating commercial vehicle accommodations will differ based on the type of accommodation being implemented. Lower cost accommodations might include adding shoulders at certain critical locations or incorporating truck lane restrictions on existing facilities. A study performed in the Dallas-Fort Worth region in 2006 estimated the cost to implement truck lane restrictions at approximately $3,500 per mile.[3] Medium cost accommodations might include the addition of increased turning radii at intersections (estimated at approximately $40,000 per corner).[4] Higher cost accommodations might include implementing auxiliary lanes on highway facilities (estimated at approximately $560,000 to $600,000 per lane-mile)[5] or implementing a dual-dual roadway with 12 lanes at an estimated cost of $25 to $30 million per mile, excluding interchanges.[1] The cost of any construction method completed on

an at-grade facility is also lower in comparison to an elevated freeway, due to the design, construction time, and material costs.

Data Needs

Useful data for adding commercial vehicle accommodations include speed changes in the main traffic lanes caused by decelerating, exiting vehicles. Vehicle classification and traffic counts on freeway exit and entrance ramps can be useful to determine where large entering and exiting volumes occur. Turning counts by vehicle type on major arterial intersections can be useful to determine the number and type of vehicles slowing down or speeding up. Measuring travel delays before and after the implementation of this technique is useful in evaluating the effectiveness of the method. The number of lanes, their width and location of entrance and off ramps are also needed for the congested roadways. Practitioners should conduct an inventory of truck parking locations in order to identify best locations for additional truck parking needs.

Commercial Vehicle Accommodations Best Practice

- Type of Location: High truck volume routes, older street intersections, limited quality shoulder locations.
- Agency Practices: Interagency coordination and cooperation.
- Frequency of Reanalysis: Vehicle classification counts on roadways, ramps and at intersections every three years.
- Supporting Policies or Actions Needed: Relationships with commercial freight shippers that allow agencies to understand their transportation patterns.
- Complementary Strategies: Intersection improvements, shoulder pavement upgrade, acceleration lanes, access management, traveler information systems.

For More Information

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References

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