

CHAPTER 9: MOTOR FREIGHT

9.1 Introduction

In today's global economy, commercial transportation is crucial to a region's business and industrial development potential. For many industries, economic competitiveness is defined by the ability of goods and services to be transported in a time-definite manner. A well functioning commercial transport system brings modern quality-of-life benefits that consumer's value. However, freight also may be viewed by many as a threat to commute times and safety.

In the current cost effective business environment, time sensitive transportation services are increasingly a strategy for gaining a competitive advantage in manufacturing and service based industries. Global integration of the U.S. economy has grown at a rapid pace as domestic manufacturers now shop the world for components and subassemblies to manufacturing processes. Advances in technology and management practices are also allowing U.S. firms to develop strategies that enable customized products for mass market distribution.

Many industries that are intent on minimizing costs have focused on ways to manage supply chains effectively and in doing so have placed a premium on logistics and transportation.

Logistics, simply put, is the art of moving the right material, to the right place, at the right time, at the least cost. For some industries, logistics are approximately 40-60 percent of the overall costs of a supply chain.² The major costs of logistics are typically broken down into transportation and warehousing, with transportation serving as the highest logistics cost.

Transportation is also a variable cost, which can be managed to reduce overall costs. However, all industries have to rely on the nation's highway, rail and port systems to move their cargo. A supportive transportation infrastructure for freight movement will continue to drive the U.S. economy by providing reliability and accessibility to local and state markets. Table 1 presents the cost of logistics as a percent of sales. Transportation accounts for almost 6 percent of total sales and almost 60 percent of logistics costs nationally. This data indicates the importance of logistics to business and the need for efficiencies within the transportation industry to minimize costs.

Table 9.1: Cost of Logistics

Cost Category	Total Costs (\$ Billions)	% of Sales	% of Logistics Costs
Transportation	590	5.90%	58.40%
Warehousing	78	0.80%	7.90%
Inventory Carrying Costs	299	3%	29.70%
Administration	39	0.40%	4%
Total	1006	10.10%	100%

In summary, the importance of reliable, safe and efficient transportation is paramount to ensure the efficient delivery of goods to population areas throughout the U.S.

9.2 Existing Conditions

9.2.1 System Overview and Highway System

The Central Midlands region is currently served by an adequate, well functioning multimodal freight network of highway, rail, and air cargo infrastructure. The backbone of the region’s highway system is composed of Interstate highways: Interstate 20, Interstate 77, and Interstate 26, and the Interstate 126 spur connecting I-26 with downtown Columbia. Currently, I-77 carries the highest levels of truck traffic among interstate facilities in the region, at roughly 18 percent of the annualized daily traffic of just over 79,000 vehicles. A variety of arterial highways also support the region’s freight network, including US-76, US-378, US-1, SC-555, US-21, US-321, US-601, SC-34 and SC-215. Most of these facilities carry 10 percent truck traffic or less.

9.2.2 Rail

Both CSX Corporation and Norfolk Southern own and operate an extensive rail network through and within the Central Midlands Region, with approximately 308 route miles of active railroad lines in the four counties. The rail lines within the Central Midlands region are predominately single track, with no extended sections of double track. The usage of single track limits rail line capacity, since trains must wait on sidings to pass each other. The capacity of single track depends on a number of factors including the number of sidings, the mix of trains using a segment, the track grade, curvature, speed limits in effect, and the method of dispatch control. The Central Midlands region also supports a robust air cargo network centered on the Columbia

Metropolitan Airport. The Columbia Metropolitan Airport supports scheduled air cargo flights on DHL, FedEx, and UPS, with UPS operating a regional air cargo hub serving five states in the South East U.S.

9.2.3 Freight Movements

In 2006 it is estimated 228 billion tons of commodities moved into, out of, within and through the Central Midlands region. Of the total volume of goods movement, 73 percent passes through the region and 92 percent moves by truck. Over the next 25 years, the total volume of freight moving over the region's infrastructure is projected to increase by 42 percent, to an estimated 325 million tons by 2030. Over the next 25 years, truck shipments are forecast to grow by 30 percent and air shipments by 82 percent, while rail shipments are projected to increase by 18 percent, primarily due to through movements. The volume of freight moving in Fairfield County is estimated to grow by 745 percent by 2030 (to 5.5 million tons annually), while Richland County is projected to experience a doubling in freight movements (to 45 million tons annually). This level of growth may strain highway infrastructure, specifically routes such as I-20 and SC 78.

Currently, the primary commodity transported to, through and from the region is Nonmetallic Minerals, with projected additional growth in volumes of 18 percent by the year 2030. Secondary Traffic defined as freight transiting to and from distribution centers or through intermodal facilities, is projected to surpass Nonmetallic Minerals as the top commodity volume in the region by 2030, growing by 122 percent.

Based on projections from Global Insight, trucks will continue to serve as the primary mode of transportation in the region in the future. The Central Midlands region is a gateway for freight movement throughout the southeast, and the area also serves as a major hub for the consolidation of freight. It is also important to note that the types of commodities that originate in or are destined for the region that are projected to increase are primarily bulk commodities. These commodities are typically used for pure manufacturing purposes and the final products will most likely be consumed outside of the Central Midlands region. From an infrastructure perspective, these commodities dictate mode choice and supply chain efficiency, and are likely to impact roadways in the region by increasing Class 8 truck traffic. This effect will be offset somewhat by the leveling off of growth in some of the commodities that account for the heavier volumes, such as Nonmetallic Minerals.

9.2.4 Safety

Between 2004 and 2006, South Carolina had 9,539 recorded commercial vehicle crashes and 1,515 (15.8%) of these occurred in the Central Midlands region. Almost half of the truck related crashes occurred in Richland County (47%), while Lexington County accounted for an addition 35 percent of the four-county total. Fifty truck-related crashes resulted in a fatality. Additional concerns regarding the safe movement of freight in the region include hazardous materials movements. In the Central Midlands area, Lexington County may be viewed as having high risk transportation corridors for hazardous materials due to the frequency of bulk flammable materials transported, specifically natural gas.

9.2.5 Stakeholder Survey

A survey of regional businesses provided freight stakeholders the opportunity to identify issues of concern regarding the region's transportation system. Of nearly fifty companies who responded to questions regarding capacity of the region's highway system 12 percent indicated that congestion does cause significant delays in the shipment of their goods.

9.2.6 Roadway Bottlenecks

Specific congestion points/bottlenecks that directly effecting local operations included I-20 and I-26, South Lake Drive, Custom Ports, I-77 Killian and Farrow Roads, Clemson Road, and lane widths throughout the region. Reported strengths of the transportation system in the Central Midlands Region included: availability of I-20 and I-26 provides good access; convenient terminals located at the Columbia airport, a good highway system overall and reasonable regulations. Suggestions for improving the transportation services in the Central Midlands Region included reducing the congestion on I-26 and I-20, more lanes and wider roads, improved transit systems, and many specific operational and pavement condition improvements to the roadway system.

9.3 Objectives and Strategies

1. Create Design Standards for Freight Infrastructure (Short-term)

Officially recognized infrastructure and operational design guidelines implemented by all jurisdictional bodies within the region are a fundamental element of effective metropolitan freight and goods movement planning. Truck traffic, particularly heavy-truck traffic, causes a disproportionate amount of roadway wear in comparison to passenger vehicle traffic. Central Midland’s roadways should be designated on a network of freight transport corridors and designed to common physical standards that are more freight-tolerant than conventional roadways. For example, freight network roadways should be designed to higher lane and curb lane widths, as well as shoulder widths. Pavement Condition Rating (PCR) values, as well as intersection radii should also be designed for a significantly higher volume of freight traffic than other facilities. Developing a truck friendly lane in each direction consisting of a 12 to 13 foot lane with freight friendly geometrics would promote freight mobility and enhance safety of operations for both trucks and passenger vehicles.

2. Prepare and adopt Regional Truck Route Plan (Short-term)

Truck routing strategies and restrictions for regional jurisdictions vary. Some cities and counties have an extensive truck route system while others have provided limited guidance to the trucking industry on preferred routing. It is recommended that a Regional Truck Route Plan be pursued to identify where trucks can and cannot travel in the region. In addition to the other benefits discussed, this will provide a better and more concise way to identify maintenance needs along the regional system. Also, and as noted previously, the identification of a truck route system will help recognize the appropriate routes that trucks hauling hazardous materials can take, since there are currently no restrictions.

Identifying truck routes is an important component of freight mobility and mitigation of freight passenger conflicts. Designated truck routes focus on the following:

- Targeted design standards: Truck routes provide a means for targeting truck supporting design standards and policies toward specific corridors rather than across the board;

- Cost effective infrastructure: Improving roads to accommodate larger trucks requires significant investment. Designated routes provide a means to rationally allocate resources to specific corridors with higher benefits. Truck routes also allow favorable opportunities to implement Intelligent Transportation Systems (ITS) applications;
- High safety standards: Improving design standards and segregating freight traffic along specific corridors would also reduce operating incompatibilities and diminish the incidence of crashes; and;
- Operational productivity: Improving truck operations within trade corridors leads to increased productivity, lower truck operating costs and improved reliability.

Identifying methods to improve these transportation routes that share a significant amount of truck traffic in the region will improve access to the freight facilities along major corridors.

Based on analysis conducted in this study, a regional truck route system is proposed, to improve freight operations on the region's road network. A tiered roadway system is proposed made up of certain routes best suited for truck travel. The proposed truck route system can be framed around road characteristics, truck traffic and accessibility to major terminals and markets. The following was used to develop the tiered system:

Tier I

Roads classified as "Tier I" are routes highly used by trucks. These routes primarily experience high truck volumes compared to other routes in the region. Over 1,200 trucks per day use these routes. From an industry usage standpoint, these routes should at least be able to support Class 9 commercial vehicles of up to 102" in width, 65 feet in length at a gross vehicle weight of 80,000 pounds. These routes should have no restrictions and be open for all commercial vehicles to travel at any time. In addition, these routes should provide access across the Central Midlands region and to markets outside of the region.

In addition, the road characteristics of the route are suitable for truck travel and contain the following:

- Wide lanes of 12 feet or more;

- Pull off shoulders of 4 feet or more;
- Clear site lines;
- Bridges and overpasses along the route are over 14.6 feet in height;
- Minimal 90 degree sharp turns;
- Roads carrying a high volume of truck traffic;
- Roads with high overall traffic volumes (passenger and truck);
- Major regional connectors to surrounding regions;
- Roads best suited for transport of Hazardous materials; and
- Suitable for all levels of truck traffic; allow for Class 9 to Class 13 trucks with no restrictions.

The following roads are suggested as Tier I:

- 77
- I-26
- I-20
- I-126
- US 76
- US378
- US 21
- US 277
- US 321
- US 601

Tier II

Roads classified as “Tier II” are routes that used frequently by trucks, but due to road characteristics and route locations, these roads may not best suited for large commercial vehicles (Class 8). These routes can experience high truck volumes similar to Tier I of over 1,200 trucks per day, but truck traffic on the route would be composed of smaller commercial vehicles. These routes may have more narrow lanes, more narrow shoulder widths and more turns along the route than Tier I roads. From an industry usage standpoint, these routes should be able to support Class 5 to Class 8 commercial vehicles. Although these routes are travelled by Class 9 vehicles, these routes may not be as suitable as Tier I roads and would be more suitable for vehicles that have fewer 5 axles but greater than two axles, with six tires. These roads may have restrictions and may not be open for all commercial vehicles to travel along certain segments of the route. In addition, these roads should provide access across the Central Midlands region but not

necessarily to markets outside of the region. The road characteristics for these roads contain the following:

- Lanes of less than 12 feet;
- Pull off shoulders of 6 feet or more;
- Bridges and overpasses along the route are over 14.6 feet in height;
- Moderate number of sharp turns;
- Roads carrying an intermediate level of truck traffic;
- Roadway design and pavement condition less suitable for heavy truck traffic volume; and
- May consist of truck restrictions along the route.

The following roads are suggested as Tier II:

- SC 6
- US 1
- SC 555
- SC 34
- SC 48
- SC 215

Tier III

Roads classified as “Tier III” are primarily connectors to major freight clusters and industrial areas. Although these routes have lower truck volumes than Tier I and II, they are critical to the region’s transportation system. Since these roads serve local businesses, all classes of commercial vehicle usage are permitted. These routes may be two lane roads providing direct access to terminals and facilities. From an industry usage standpoint, these routes can be used by all vehicle types and have no truck restrictions. The road would primarily be short in length (less than 5 miles) and connect to State routes. The road characteristics for these roads contain the following:

- 11-12 foot lane widths;
- Pull off shoulders of 2 feet or more;
- Limited turns;
- Low truck volumes compared to Tier I and Tier II;
- Provides direct access to freight clusters; and
- Low passenger traffic volumes.

The following roads are suggested as Tier III:

- Old Dunbar Road;
- Cook Road;
- SC 200;
- SC 219; and
- North Point Blvd.

All of these roads that have been identified are suggested routes for commercial vehicle usage based on existing traffic data and road conditions. Additional analysis would be needed to fully determine geometric design pavement conditions necessary to support truck traffic.

US-76, originating at I-77, eastbound for 2.5 miles, utilizes eight traffic signals. Signal duration is adequate for at-speed tractor trailer combinations. Traffic density and numerous local businesses raise noise and air quality issues as these units decelerate, accelerate and idle to match existing traffic conditions.

Designation of existing routes, with necessary improvements, may provide a short to moderate term solution versus new roadway development. As an example, eastbound SC-768 to north Pineview Road, between I-77 and US-76, could possibly alleviate five of the six signaling devices while reducing traffic volume.

3. Improve Signage and Signalization along Key truck routes (Medium-term)

Key routes that are used by trucks often suffer from poor signage and signal timings. The following routes were identified as routes to consider improving signage or adjusting signals.

- US 1/378 to Interstate 20
- US 601 from Leesburg road to Bluff road

These routes can be further assessed determine the need for improved signing or better signal timing to prevent consistent stopping and starting of trucks lane restrictions.

Permanent sign placement and temporary signage requirements warrant review for modification or further enforcement. Figure 81, 82, 83, SC 378, westbound traffic, between Lewie Rd and Breezy Bay Dr (approximately 1150 feet), approaches a downgrade bending to the

right, with visibility restricted by the grade and the natural vegetation. The speed limit is 55mph.

Stopping distance for an 80,000 lb tractor-trailer combination is 426 feet on a dry, level roadway. The road sign is approximately 650 feet from both the intersection and local business [alcohol licensed]. Additional signage or a change in placement may assist in earlier detection and response.

SC-34 (**Figure 84**) is a freight route which consists of two lanes, no median and limited shoulder. Temporary signage indicating lumber and pulp industry activities for traffic awareness can be improved.

These industries enter the roadway via unimproved or improvised avenues. Limited signage poses a possible safety hazard passenger and freight users of the main freight route. Freight route designation and utilization of rural routing to satisfy freight flow requirements should coincide with a review of all signage. Increased heavy equipment use requires a change in strategies, from earlier utilization marked by predominant passenger use.

4. Support Regional Economic Development (Short-term)

Working with various county economic development agencies in the Central Midlands region will improve the COG's understanding of the transportation needs of the region. This will begin to integrate the appropriate organizations into the planning process and assist in proactive planning. As metropolitan truck corridors often span multiple jurisdictions across a region, it is essential that there exist inter-jurisdictional cooperation so that the maximum benefit of this strategy comes to fruition. Understanding the travel flow patterns for heavy-duty vehicles allows transportation planners to approach planning from a systems and corridors approach. Thus, it is recommended that developers be required to provide an overall concept plan that identifies the key routes that are expected to be utilized in their review submissions. Critical to this process is the identification of local routes (typically under-designed for heavy vehicles) that are intended to be truck routes between key freight generation and attraction points.

5. Work with governments and the private sector to mitigate crossings including reducing the number of downtown at-grade crossings (Long-term)

Minimizing the number of crossings is the optimal way of addressing at-grade crossings and should be employed when possible. However, elimination is not always feasible. In those circumstances and as a shorter term mitigation strategy when closing may be a long-term alternative, enhancing the safety at rail crossings should be a priority. This can be accomplished via gate systems and signaling devices. The top rail grade crossings that should be addressed are:

- Whaley Street
- Assembly Street

6. Begin to integrate ITS application along freight corridors (Long-term)

South Carolinas' Intelligent Transportation System (ITS) provides real time traffic information across the interstate system pertain to accidents and detours. The ITS system include eleven Variable Message Sign (VMS) and 20 traffic cameras which are placed along the interstate and managed from the SC DOT control center which alerts travelers of the need for detouring or cautious driving during accidents or unusual road conditions. Variable message signs to inform truckers of lanes restrictions or dangerous ramps can further promote safety and mobility. Further evaluation of the specific locations of the variable message signs would need to be made to determine effectiveness and feasibility, but some suggested corridors include:

- US 321; from Winnsboro to downtown Columbia; and
- I-26; from I-20 through Irmo.

Both safety and cost-revenue enhancements are viable with the implementation of manned or unmanned monitoring systems along the rural freight routes, within the Central Midlands region. Increased heavy truck traffic and the possible inability to appropriately allocate the cost of through traffic will drive the need for non-traditional solutions.

In-ground, manned and unmanned, vehicle weigh station technologies can reduce or maintain existing roadway maintenance budgets and provide visible assurances, to the driving public, of ongoing monitoring for safe transit of these freight routes.

Speed detection devices, manned and unmanned, may also reduce the need for additional costs associated with monitoring increased traffic along these same freight routes. Providing both awareness to the route

user of unsafe driving practices and identification of these individuals could enhance the CMCOG's local revenue position and reduce expenditures in emergency response and staffing requirements for law enforcement needs.

7. Improve Data Collection between Agencies and Private Sector (Medium-term)

Coordinating with various agencies in the region will help improve planning needs. The various agencies recommended to retrieve data from are:

- S.C. Department of Transportation Regional Operation center;
- Federal Motor Carrier Safety Administration;
- South Carolina Highway Patrol;
- South Carolina Trucking Association;
- SCDOT Permitting Office;
- South Carolina Manufacturers Association;
- SCDOT District engineers;
- SC Transport Police
- SC Department of Public Safety

Freight data helps transportation planners and economic development analysts understand the trade environment of a community, region, state or multistate region. Commodity flow data helps supports the link between transportation and economic development by revealing information about key domestic and trading partners, key international gateways, high volume and high value industries, and provides indications of how private sector supply chains work.

8. Establish Advisory Group to Retrieve Input on Freight issues (Medium-term)

CMCOG has established guidelines for public involvement, but has not developed practices or guidelines specifically for engaging the private sector in planning activities. To facilitate greater participation in state and metropolitan transportation planning, federal legislation encourages states and Metropolitan Planning Organizations (MPOs) to provide opportunities for various interested parties to provide input into the development of transportation plans and programs. Regarding freight, for example, SAFETEA LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users) stipulates that MPOs and states shall provide freight shippers and providers of freight transportation services with reasonable opportunities to comment on

transportation plans and programs. The Central Midlands COG is positioned to begin to lead a group of representative from local stakeholders to retrieve input from the private sector and begin to include freight in the transportation planning process. This group can include but not be limited to:

- South Carolina Trucking Association;
- Economic Development Agencies (Fairfield, Newberry, Richland and Lexington);
- South Carolina Manufactures Association; and
- Select citizens throughout the region.

This group can serve as a subcommittee to the Technical Committee. The main goal would be to review future transportation plans, and provide input and recommendations that are focused on improving freight needs in the region. This group can also begin to enhance economic development opportunity around the region.