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7. Author(s) Robert Harrison, Chandra Bhat, and Jolanda Prozzi Center for Transportation Research Stephen S. Roop, Curtis Morgan, and Jeff Warner Texas Transportation Institute			8. Performing Organization Report No. 0-4410-2		
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16. Abstract The Texas Department of Transportation (TxDOT) has supported several freight studies since 2000 to enhance the transportation of freight in the state. The report covers the results of a study to examine container flows in Texas, display available data using a GIS platform, and evaluate the potential for diverting containerized traffic from Texas highways to other modes, such as rail and barge. Chapter 2 gives background of the growth of rail-containerized flows and reports on the current flows of containers in the state. Chapter 3 provides current developments in containerized flows on rail and the potential for growth. If greater volumes are to move on rail, there needs to be a more structured relationship between TxDOT, the rail sector, and other private entities. This calls for an understanding of the nature and characterization of public-private partnerships, and Chapter 4 sheds light on that subject. Finally, Chapter 5 summarizes the findings and makes recommendations based on the conducted research, including some policy options to divert more containerized flows on rail.					
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DIVERTING CONTAINERIZED FREIGHT FROM KEY TEXAS CORRIDORS

Robert Harrison, Chandra Bhat, and Jolanda Prozzi
Center for Transportation Research

Stephen S. Roop, Curtis Morgan, and Jeff Warner
Texas Transportation Institute

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Center for Transportation Research
The University of Texas at Austin
3208 Red River
Austin, TX 78705

www.utexas.edu/research/ctr

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Project Engineer: Robert Harrison
Research Supervisor

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1. Introduction

The growing role of the United States economy in global trade drives and shapes a large part of the demand for international transportation services, particularly those on the Northern Pacific routes. The “China effect,” reflecting the move to China of many manufacturing plants from North America, Europe, and Japan, has created double-digit trade growth on the various transportation routes between the Far East and the United States since 2000. Among many other effects, it has resulted in increased congestion at a number of U.S. West Coast ports, particularly those located in Southern California that connect a majority of container ports to inland markets. This trade is largely driven by containerized merchandise composed of finished or consumer durable goods. This has given rise to transportation systems having to cope with the movement of both loaded and empty containers, the latter of which are repositioned along various supply chains. In 2002, the latest information available to researchers in 2004 (Containerisation International Yearbook, 2004), around 28 U.S. container ports handled over 29 million 20-ft. equivalent units (TEU). Throughput at these ports ranged from 6.1 million TEU at Los Angeles to 23,700 TEU at San Francisco. From these marine deep-water locations, containers are moved by rail or truck to local, state, or national destinations in the U.S.

Freight issues in the U.S. have risen in importance as metropolitan areas have grown and transportation systems—including highways—experienced both persistent levels of congestion and a reduction in levels of service, in terms of speed and safety. Aware of the economic importance of maintaining freight flows, federal and state departments of transport have attempted, since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, to improve both highways and their connectors to intermodal sites, such as deep-water ports, airports, railroads, waterways, and inland ports. The U.S. Department of Transportation (USDOT) has increased its financial support of freight initiatives, and its current project is evaluating freight highway corridor performance in 2004 (ATRI, 2003).

This has not come a moment too soon. All modes have been under funded to some degree and their poor performance threatens U.S. economic growth. A recent report by the Inland Waterway Board makes grim reading (U.S. Army Corps of Engineers, 2004). The state of the inland waterway system is alleged to have fallen to a point at which agricultural exports are in peril, consumer durable manufacturing costs may rise, and further environmental degradation is likely, as more products are moved over land—particularly by highway. The report mirrors other conclusions reached by transportation specialists and recognizes this increasingly dire situation as a “call to action.” Gecowets and Ackerman offered eight predictions for the logistics industry in the 21st century (Gecowets and Ackerman, 2003). The final, overarching prediction was that the federal government will be forced to rebuild the transportation infrastructure. The authors forecast that rail and highway infrastructure will deteriorate to the point that only the intervention of the federal government will be able to save it.

The Texas Department of Transportation (TxDOT) has recognized the importance of free flowing freight movement in the state and is attempting to develop a variety of solutions to address key problems facing the state in this critical area. It is imperative that solutions to these problems are found because more than 30 percent of the state GDP is associated with

international trade, and this number is growing. Industrial activity remains highly concentrated in the “Texas Triangle” of DFW/Houston/San Antonio. The triangle is advantageous for companies because it is served by several key freight corridors and modes comprised of highways, rail, deep-water gulf ports, and the Gulf intracoastal waterway. The corridors that have formed as a result of this agglomeration and clustering of industries not only serve the state’s economy but also play critical roles in the supply chains linking the region and the nation. All modal providers, from highways to rail and seaports, are struggling to fund improvements to their systems and are seeking ways to allow their systems to provide the range of services now required by global shippers. One way of relieving the stress on a single mode, such as highways, is to stimulate multimodal freight flows that take traffic off of highways.

TxDOT, as part of this mission, is strengthening its multimodal planning through partnerships with marine ports and railroads. This ranges from long-term programs like the Trans-Texas Corridor (TTC) to the more immediate landside access challenges at specific deep-water ports (TxDOT Study Report 0-4437 “Landside Access Needs for Deep-water Ports in Texas” IAC 04-0215 Port of Beaumont Railroad & Traffic Safety 2004). As part of this policy the department sponsored project 0-4410—“Containerized Freight Movement in Texas”—to show where containerized freight was moving and to offer insight to two general questions:

- Can the container movements seen on our highways be transferred to rail; and
- Can more truckload commodities go by intermodal rail?

These simple questions carry with them a sense of urgency since containers are now predicted to grow at substantial rates over the next 20 years (Vickerman, 2004). In addition, as will be shown in this report, any effective program to raise the share of intrastate container flows by rail requires new thinking on the part of all parties involved—from the department to the average Texan, who will need to support new initiatives. Effective policies are only created by engaging all of the interested stakeholders on the key issues and seeking broad-based public support.

The objectives of study 0-4410 are to examine container flows in Texas, display available data using a GIS platform, and evaluate the potential for diverting containerized traffic from Texas highways to other modes, such as rail or barge. The first segment of this study was report 0-4410-1, titled, “What We Know about Containerized Freight Movement in Texas,” (Prozzi, Spurgeon, Harrison, and Roop, 2003), which sought to gain a better understanding of containerized flows in Texas and to display their movements on the state’s transportation system using a GIS platform. Another product associated to report 0-4410-1 is, “Diverting Containerized Freight from Texas Highways: Instructions for Using the Freight Assignment and Mode Choice Models” (Bhat and Prozzi, 2004). This product provided instructions for installing and using TransCAD embedded models to display containerized flows on Texas road and rail infrastructure, as well as for conducting mode choice analysis to establish the potential for diverting containerized freight from road to rail. This report, titled “Diverting Containerized Freight From Key Texas Corridors,” is the final report and documents the strategic aspects of containerized flows in Texas, particularly concentrating on policies that the department may consider implementing.

The report is organized as follows: Chapter 2 gives some background of the growth of rail containerized flows—the main land alternative in Texas to moving containers by highway—and reports on the current flows of containers in the state. Chapter 3 builds on the rail chapter in 4410-1 and provides insight into the latest developments with respect to containerized flows on rail. If greater volumes are to move on rail, there needs to be a more structured relationship developed between TxDOT, the rail sector, and other private entities. This calls for an understanding of the nature and characterization of public-private partnerships, and Chapter 4 sheds light on that subject. Finally, Chapter 5 summarizes the findings and makes recommendations based on the conducted research, including some policy options to encourage more containerized flows on rail.

2. Moving Containers in Texas

2.1 Background

This chapter reviews the various modes used to move containers across Texas, emphasizing the role of railroads, since this is the mode best positioned to further divert containerized traffic from state highways. In providing a background to a more current treatment of rail operations—the subject of Chapter 3—it recognizes the role of the Association of American Railroad’s (AAR) 1991 initiative to change the U.S. railroad business model. It specifies some of the characteristics upon which rail partnering with TxDOT could be undertaken—more fully addressed in Chapter 4—and closes with some thoughts on the scale and scope of change within the Texas transportation system to keep containers on modes other than trucks.

2.2 Moving Containers by Truck

2.2.1 Background

Trucks provide a key component in the movement of containers because they are almost always used for the first and last legs of any container trip. Cost analysis has shown that truck trips only become less competitive, when compared to rail, once trip distances exceed 500 to 600 miles in length. However, verifying suggestions that some container trips exceed these trip distances is difficult because of a paucity in data on truck container movements in the U.S. and even more so for truck container movements in Texas.

There are three main databases that provide some insight into highway container movements: Bureau of Transportation Statistics (BTS) Transborder Freight Database; BTS Container Border Crossing Database; and the Federal Highway Administration (FHWA) Freight Analysis Framework (FAF) State Commodity Flow Database. The Federal Highway Administration removed all data related to container movements on Texas’s highways from the State Commodity Flow Database. Although container data were added to derive flows in the FAF, when the state data files were made available to third parties, the state container data (for Texas, as an example) had been removed. This was apparently a consequence of a dispute between Reebie and FHWA on the level of disaggregation to be made available publicly for individual states. A private database, Reebie TRANSEARCH Freight Database, also provides containerized tonnage data.

There are three overarching benefits to shipping by truck, including:

Trucking Rates

Studies have found that for inland transportation of marine containers, trucks were always the lowest-cost mode for movements up to 400 miles and usually the lowest for movements between 400 and 700 miles. A 1986 study analyzing the inland transportation of marine containers conducted by Sea-Land in Port Elizabeth, New Jersey, found that motor carriers transported the vast majority of containers for distances up to 500 miles on outbound trips, and that for inbound trips 82% of containers terminated within 400 miles.

Personal communications and Web inquiries by the Center for Transportation Research found that truck rates from Houston to El Paso were cheaper than rail rates. The quoted rail rates were ramp-to-ramp rates and did not include the additional charges for local drayage and equipment per diem. When these additional charges were added to rail rates, trucking rates were lower than rail rates.

Travel Time

Trucks generally provide a faster door-to-door travel time when compared to rail. The rail travel times are only ramp-to-ramp times and additional time must be added for local drayage.

Quality of Service

Studies have found that for all modes of transport the most important quality of service factors were:

- On-time delivery
- Reliability
- Damage-free delivery
- Ability to expedite; and
- Flexibility in scheduling

The trucking mode has traditionally provided superior service compared to rail in fulfilling these desired requirements. Class One rail companies have begun to guarantee more competitive delivery times (see Chapter 3), but difficulties persist in terms of their ability to expedite shipments and in flexibility of scheduling compared to the trucking companies.

2.2.2 Containerized Truck Flows in Texas

CTR estimated truck and rail container tonnages to/from the Port of Houston and across the Texas-Mexico Border in 2003 as part of this study (Prozzi, Spurgeon, Harrison, and Roop, 2003). As no public database is available regarding truck container movements, the 1996 Reebie TRANSEARCH Freight Database was used to estimate container movements on the Texas network. These results were visually displayed on the GIS platform (TransCAD). Stakeholder interviews were also conducted with trucking companies. The analysis revealed that:

- Six out of the twelve trucking companies moved containers within the Texas Triangle; the remaining six operated throughout the U.S.-Latin and South America, but mostly in Texas.
- Truck rates were lower than the rail carriers' rates on the Houston to El Paso route.
- Trucking provided a faster door-to-door travel time compared to rail.
- Most of the container tonnage entering the U.S. from Mexico crosses the Texas-Mexico border (70% of the truck container tonnage and 80% of the rail container tonnage). The northbound split for containerized tonnage revealed that truck transport dominated the movement of containerized imports. It should be noted, however, that not all containers trucked across the border end up on the highway system. For example, some containers at Nuevo Laredo are trucked across the border for transfer to UP's intermodal terminal 12 miles north on IH-35. What did become evident was

- that most of the containerized tonnage (67%) and value (72%) entering Texas from Mexico passes through Laredo.
- The number of containers crossing the Texas-Mexico border increased by 45% between 1996 and 2001. The number of empty container crossings as a percentage of total container crossings has been decreasing since 1997.
 - Truck container flows were also generated at intermodal facilities. The stakeholders indicated that a substantial share of containers had either an origin or destination at a rail intermodal yard. One stakeholder, however, noted that all their containers were destined for a rail intermodal yard.
 - The research team also found that in terms of numbers of containers, mixed freight represented the most significant share at 55% of the containers on the Texas road network. Hazardous materials, construction materials, and food represented 39% of the containers, and manufactured products represented 6%.
 - What was most noticeable was that empty containers were being moved—as part of global and regional repositioning—on the state’s highway system, although distances were not significant, according to one stakeholder, because containers are moved by rail wherever possible.

In terms of value, containerized manufactured products represented the most significant share of containerized imports crossing the U.S.-Mexico border (56%) although manufacturing and equipment represents 24%. In looking at containerized tonnage, manufactured products again represent the largest share of U.S.-Mexico border crossings at 44%.

2.3 Moving Containers by Barge

Successful Container-on-Barge (COB) operations are often seen in Europe and the Far East. In Rotterdam, for example, trucks transport less than half of all landed containers. Bomba and Harrison (2002) reported that approximately 1.52 million TEUs were moved by barge in Antwerp in 2000. The U.S. has not enjoyed the same level of success as Europe and the Far East, but there are some notable small success stories. Osprey Lines, for example, based in Houston, provides feeder services for Gulf Coast ports and operates from New Orleans to Corpus Christi by offering one scheduled service and an on-demand cargo needs service. A new Osprey service that specializes in moving food aid and in repositioning empty containers between port facilities has just been started from Houston to Tampa, Florida.

The benefits of barge operations are:

- Reduced energy consumption – barges consume less energy per ton-mile than railcars and trucks.
- Water Quality Impacts – after initial scares regarding the negative impact on water quality, various studies have concluded that water quality is more influenced by natural phenomena than by commercial barge traffic.
- Congestion – COB does not suffer from the congestion problems faced by the trucking and rail modes. Barges could form part of an intermodal solution to reduce congestion - a single barge could divert 58 container-carrying trucks off the roadway (Bomba and Harrison, 2002).

- Safety – Barges do not operate through downtown districts or residential areas and have limited interaction with the public. The USDOT and the U.S. Coast Guard have reported that water transportation is the safest mode of transportation and has the fewest number of incidents, injuries, and fatalities compared to other modes. Barges operate on a right-of-way that is shared with few other operators and has few crossing junctions.
- Emissions impacts – EPA reports have shown that inland barges produce significantly fewer pollutants compared to trucks and trains. This is attributed to the fuel efficiency per ton/mile and because COB do not operate in congested environments.

System requirements for successful COB operations do not require additional infrastructure if a port already handles containers. Osprey Lines, for example, noted that COB operations require less than 10 feet of channel depth and a flat space on stabilized ground (which is already available at container ports). Specialized equipment, usually cranes, move containers on/off barges. Ports wanting to use this service would require this type of crane, which can be extremely expensive. For this reason, Osprey has promoted the use of a rubber-tired crane capable of operating on tidal berths that is substantially cheaper to purchase and operate. Table 2.1 specifies some of the key criteria for successful COB operations, as they relate to both supply and demand characteristics.

Table 2.1 Criteria for Successful COB Operations

- Volume sufficiently large to lower average costs per container-successful COB transports low-value bulk commodities and empty containers.
- Product supply chain structured to allow barges to be complemented to trucks/rail-barge transportation, like rail, is more competitive as distances increase.
- Prices, including drayage and lifting charges, must be competitive with other modes. COB must offer more than a port-to-port service; an intermodal service that is door-to-door is required for competitiveness.
- Interacting with a regular steamship call frequency raises demand – a frequent scheduled service is critical to success.
- Dense population – COB operations are successful in Europe due to the high population density along inland waterways. COB in Texas provides unique challenges because population is concentrated in four cities, and only one is close to the coast.
- Lower operating costs/rates – COB operations are successful in Europe because they are more cost competitive compared to truck. European fuel, roadway user fees and other ancillary costs are higher than those in the U.S. These interact to make COB a viable alternative in Europe even when accounting for time (inventory) and transfers (infrastructure). There has been some suggestion that with the trend toward mega-containerships a niche market for a feeder service to smaller ports might occur. However, in the near-to-medium term, mega-container volumes at Texas ports are not in the mega-ship range.

There have been a few cases of profitable COB services in the U.S., but overall, the success of these operations has not been high. Texas COB operations failed in 1985 and in 1994. The 1985

failure of a Houston-to-Brownsville line was attributed to reticence by steamship agencies to use barge over truck or rail. The 1994 Burlington Northern suspension of an 18-month-old barge service between the Port of Galveston and Port of Coatzacoalcos, Mexico, was attributed to high operating costs.

So what are the main impediments to successful COB?

- Slower transit times – in an age of global supply chains and just-in-time manufacturing commodities must be transported faster or delivered within a specific time window. Trucks provide the flexibility to accommodate production windows and shifting schedules. Barge transport, on the other hand, takes a longer time than other surface modes. For example, a barge would take three or more days to travel from Jacksonville to New York. The same trip can be undertaken in 20 hours by truck and 24 to 36 hours by train.
- Rail competition – rail operators have been accused of reducing tariffs to price barges out of the market. For example, they successfully used price strategies along the Mississippi River to defeat COB operations. Many COB operators are in small firms that cannot successfully compete in a price war with Class One railroads.
- Shortage of container equipment – because special equipment, including cranes that cost millions of dollars, is required to efficiently service barge operations, many smaller ports may not recuperate their sunk costs on such a large investment. Currently only three ports in Texas have the required container equipment. Smaller Texas gulf ports that sporadically handle containers use ship-based or general-use cranes for moving containers. The American Association of Port Authorities found in 1999 that only three out of seven of the Texas ports were profitable. Therefore, the desire and the financial resources required to invest in container infrastructure in smaller ports (that are not profitable) is not likely to shift in the near future.
- Texas's inland waterways – most of Texas's inland waterway system consists of the Gulf Intracoastal Waterway. Texas does not have a navigable inland waterway. Most of its rivers are dammed without ship locks and it is not financially or environmentally feasible to dredge rivers in Texas to facilitate barge operations because of geographical impediments in the rivers themselves.
- The Jones Act – prevents foreign-owned shipping companies and foreign-built vessels from operating between U.S. ports, which prevents the major container shipping companies (all of which are foreign owned) from operating a COB service. These large carriers have the expertise and financial resources to provide competitive COB service but are precluded from this activity by this act (Merchant Marine Act, 1920).

Finally, there is the concern of the overall cost associated with containers on barges. In Texas it has been argued that it is doubtful whether a Texas COB service could provide an alternative to truck and rail in cost terms, especially if COB rates reflected infrastructure costs and the time cost of containers in transit. With the relatively low costs of truck and rail transport in the U.S., it is difficult for a COB service to compete on a scheduled pattern equivalent to a steamship liner schedule once infrastructure costs are reflected in COB rates. Access to data regarding costs and information is often proprietary and therefore restricted, which makes it difficult to assess profitability. It is known, however, that port charges are substantial components in the cost

structure of barge services. Another cost driver is the unloading/loading of barges, which is influenced by labor rates, port work rules, and productivity.

2.4 Moving Containers by Rail

2.4.1 Background—Association of American Railroads Vision 2000

In the early 1990s, the larger railroads began to change their policies toward the trucking sector, moving from head-to-head competition to a more cooperative approach that focused on mutual interest. To support its newfound approach, the Association of American Railroads (AAR) engaged a consultant to create a vision describing how U.S. railroads could improve their services so that, by the year 2000, they would offer clear benefits to shippers, the U.S. public, and, of course, the railroad companies themselves. The consultant used the stability created in the 1980s after the passage of the Staggers Act (which deregulated U.S. railroads and gave them latitude to set their own rates. The act also facilitate railroad mergers and the establishment of short line railroads) to argue that this laid the groundwork for developing the rail industry of the future. This thesis was based on the idea that innovation during a period of long-term stability provides a mechanism for achieving traffic growth and higher profitability. In the 1980s, labor productivity (ton miles/employee) and network productivity (ton miles/network-mile) rose 138 percent and 55 percent, respectively. Though these productivity gains had an important effect on railroad operations, service quality was still relatively poor and the share of the long haul market remained flat. Falling interest rates and a reduction in the workforce reduced the costs of capital and narrowed the gap between railroad return, net investment, and the costs of capital. The AAR postulated that a railroad renaissance built on the strengths of lower line haul costs, high network capacity, energy efficiency, environmental attractiveness, and the growth of intermodal traffic, would take place during the 1990s. The Class One railroad company was used as a successful paradigm in the year 2000 because it was seen as a company that offered lower costs, faster and more reliable services, more business options, was easier to do business with, and finally offered more capacity for growth.

Table 2.2 gives the AAR prediction of truck ton-miles if the railroad program, as detailed in its vision, was fully implemented. Using its Rail Diversion Model, an estimate of diverted ton-miles was used for each of three classifications of line haul.

Table 2.2 Vision 2000 Reduction of Truck-Ton Miles

Length of Haul	Rail Market Share (Ton-Miles)*		Diverted Truck Ton-Miles (Bn)
	1990 (%)	Vision (%)	
Short (under 500 miles)	10	14	5.4
Medium (500-1,000 miles)	33	44	22.8
Long (over 1,000 miles)	51	67	72.2

*Market-defined as non-bulk rail and rail competitive truck (over 200 miles)

Source: Association of American Railroads, Vision 2000

After comparisons between 1990 and predicted 2000 values were made, it was determined that the greatest diversion occurred over routes longer than 1,000 miles. A central feature of the political program developed by the AAR to support its vision was the need to prevent any further changes to the U.S. commercial vehicle size and weight regulations. In this respect, it was partially successful. Congress decided to leave the size and weight regulations unchanged in the final version of the ISTEA of 1992 and has since kept these measures frozen. But Congress has allowed individual states to permit longer semi-trailers, which have increased in size from 48 feet to 53 feet on average in the recent decade. Texas allows semi-trailers of up to 57 feet.

However, AAR got basically what it wanted—a freeze of the axle and gross load limits, which, if raised, would have threatened its core traffic of moving coal and other bulk commodities. AAR lobbyists successfully convinced Congress that reduced shipper costs, lower rail costs, and an improved service would generate a shift from truck to rail. Furthermore, the association asserted that the impact of such a shift was clearly beneficial to a U.S. public whose vehicle miles of travel was growing at a faster rate than any DOT could meet through new construction and improved traffic management. If the truck traffic diversions shown in Table 2.2 occurred, then the U.S. public would benefit through increased global competitiveness (jobs), reduced highway costs (lower taxes), reduced highway congestion (fewer delays), and finally, a lowering of overall fuel consumption for the transportation system (reduction in air pollution).

2.4.2 Railroad Policies for the Decade 2000–2010

The decade of the 1990s started in a promising fashion, suggesting that a growth of U.S. railroad operations might mimic the vision. Technologies were being adopted at a reasonably efficient rate and new investments in intermodal terminals, together with the improvements in existing older terminals, positioned most railroads to take advantage of the growth in containerized trade. That growth was a central feature of international trade flows in the 1990s and by the close of the decade most non-bulk commodities were moved in containerized boxes, propelling the rail intermodal segment growth. So far, everything was proceeding to plan.

However, what the vision failed to address—or could not foresee—were the disruptions caused by further mergers between the remaining Class One Railroads. The decade opened with 12 Class One Railroads and finished with around half that number. Table 2.3 gives a timeline of railroad mergers in the United States since 1995, with the largest occurring during the latter part of the 1990s.

Table 2.3 Recent Railroad Mergers in North America since 1995*

Burlington Northern with Atchison, Topeka and Santa Fe, 1995
Union Pacific with Southern Pacific, 1996
Conrail split by CSXT and Norfolk Southern, 1999
Canadian National purchase of Illinois Central, 2000
Canadian National purchase of Wisconsin Central, 2002
*Dates of filing with Surface Transportation Board

Notwithstanding the economic benefits given to the Surface Transportation Board from efficiencies gained, the large mergers resulted in substantial disruption, particularly between Union Pacific and Southern Pacific, which paralyzed much of the resultant network for many months. Prior to the date of the Union Pacific-Southern Pacific merger, some industry experts had suggested that within the first decade of the next century there would be only two transcontinental railroads. The disruption, higher costs, and diseconomies of scale that are still to some extent being addressed by the industry have postponed such an ambitious view. Therefore, it is unlikely that the merger process will gather any support (at least from shippers) in the period 2000-2010. If indeed there is to be a period of industrial and economic stability within the rail sector, then it is likely that further improvements to overall service efficiencies within all the business sectors, including intermodal traffic, can be reached. Evidence supporting this is found in the partnering and innovation displayed in the cross-rail solution to Chicago (termed CREATE), although the 2004 UP engineer shortage shows that stability remains a real challenge.

2.4.3 Partnering Opportunities to Promote Rail Intermodal Services

Figure 2.1 illustrates the strengths and constraints of the rail industry and how these intertwine to create opportunities that might improve containerized flows in Texas. While the strengths and constraints are somewhat general, reflecting the challenges facing the major railroad industries, the opportunities have been specified to fit the current Texas business environment. The findings from this study suggest that this is an opportune time for TxDOT to develop stronger links with the rail and trucking industries to determine the appropriate amount of investment for freight flows within the state. The growing interest in freight needs at the federal level could make this an especially timely initiative. Although TxDOT has staffed a successful multimodal section in the Transportation Planning and Programming Division, most of the highway data collected in the last 10 years has had a strong metropolitan automobile origin, leaving freight and corridor data somewhat neglected.

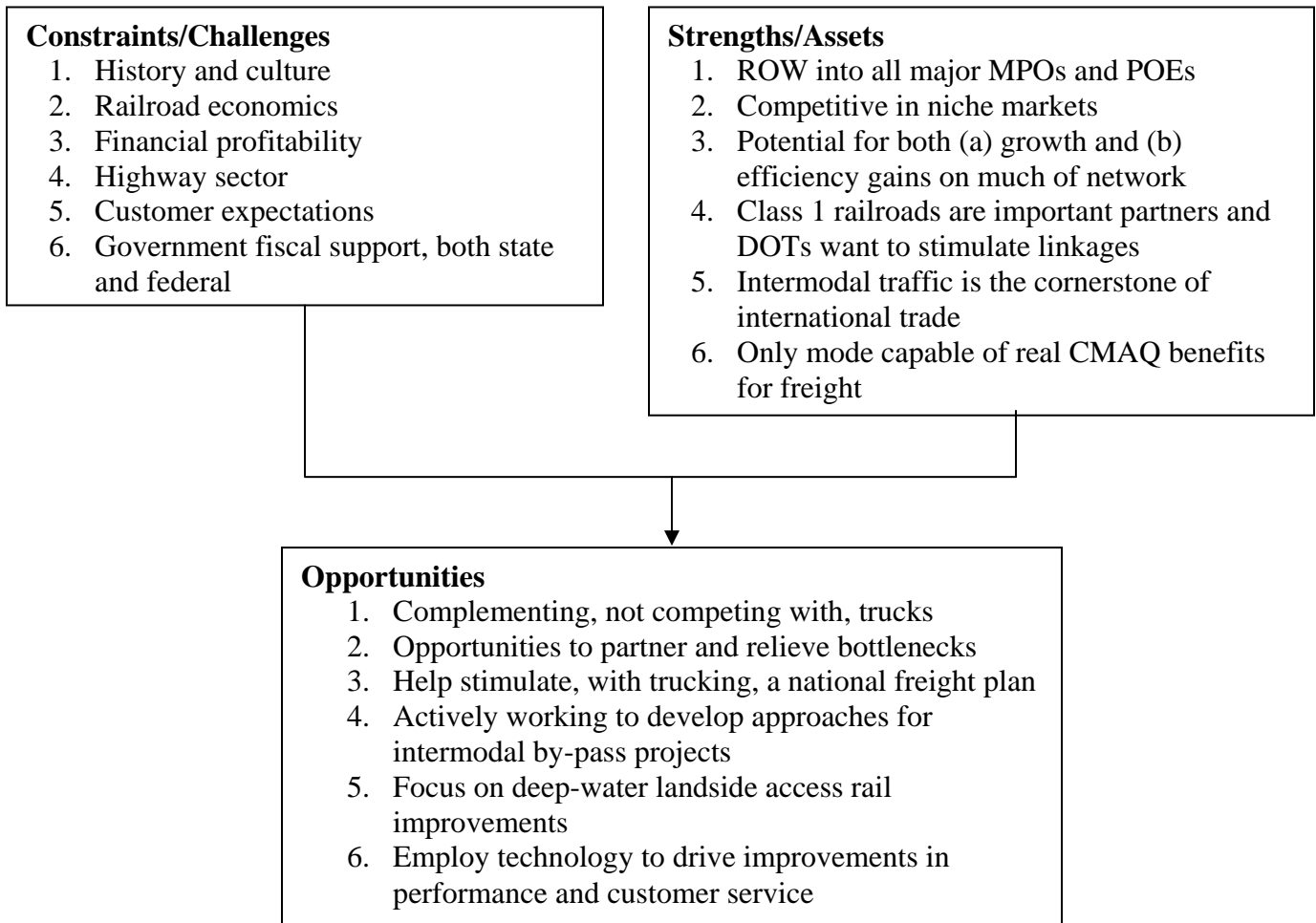


Figure 2.1 Railroad/DOT Partnering Opportunities

The importance of freight in both state and federal transportation planning is now widely recognized and there is a growing effort to address both freight collection and the modeling of freight investments in a more coherent, effective manner. Traditionally, TxDOT, like other state DOTs, has paid for freight data to be collected in a variety of ways that sometimes require driver intercept surveys. By developing partnerships with both rail and trucking, it may be possible to obtain trucking information to produce accurate performance measures over the highway system, reflecting, to a certain degree, the Rail Waybill Sample provided by the AAR.

The rail sector continues to be dynamic with a certain degree of controlled experimentation. Some of it is not working out as hoped. One example of this is whether it is possible for rail to match truck speed on a long haul route. As train speed increases, network capacity reduces and the system of “flighting” train platoons becomes more problematic because slower trains are held to allow the faster train to maintain its schedule. Theoretically, it is possible to operate 70-mph trains over many Class One railroad lanes, though not over the entire network. UP designed such a service for United Parcel Service, which became problematic when implemented. The delays to slower trains were so great that their engineers ran out of crew time and the system became bottlenecked at key points. As is well documented in the trade journals, UP’s average speed fell

to around 4 mph in the latter part of 2004 because of substantial increases in costs. Premium rail services need to be modified to fit within the constraints in the existing network. From a bottleneck standpoint, there is much greater opportunity for focused DOT intervention and support to increase transportation efficiency. The proposed improvements to the rail service at the Port of Beaumont are a good example of relatively simple changes in a network that can lead to substantial improvements in system efficiency.

The emphasis on container flows has been focused on Class One Railroads, which in Texas means UP, Burlington Northern Santa Fe (BNSF), and to a lesser extent, Kansas City Southern (KCS). It is also worth noting that a number of short lines are operating successfully in the state and that short-line rail operations may play an integral part in strengthening the rail network over the next two decades. Box 2.1 gives details of a railroad purchased from Conrail that is now starting to play an important part in moving freight through the northeast.

Box 2.1 The Resurrection of a Railroad

Less than half of the Western New York & Pennsylvania Railroad's 185-mile track, which stretches from Hornell, NY to Meadville, PA, was operational in March 2001. Parts of the line were washed out and other segments were overgrown by trees. The prior operators (Conrail) had delivered fewer than 200 cars to customers on the line during the previous 12 months. Now, that line is in operation over its entire length at speeds up to 40 mph, is handling cars to online customers at a rate exceeding 2,500 per year, and is part of a through route for daily unit trains.

Unique to Texas are Rural Rail Transportation Districts (RRTD) that, although not yet operating, remain as potential contributors to some regional operations in the future. This involves connecting the counties to create a more substantial network until it is developed (like the South Orient Railroad) so that it can function as a secondary rail freight artery in selected regions.

The challenge for state transportation planners is to determine how best to foster multimodal systems to move containers, given the modal constraints described in this chapter. The situation seen in 2004 is one dominated by cost and market forces. Trucks dominate the trips up to 700 miles and rail thereafter. Waterborne traffic—intercoastal, river, and (ultimately) short sea—is one driven by cost and volumes for non time-sensitive commodities. The role of ships and barges in the movement of empty containers over both short and long distances may grow in the future. For planners seeking short-term relief to highway congestion (and consumption), rail remains the key. Just how might this be implemented as policy? First, current rail intermodal container operations in Texas need to be described to identify various opportunities for TxDOT to support. The next chapter provides information on that subject.

3. Rail Intermodal Container Operations in Texas

3.1 Introduction

The freight railroads have long been known for their slow transport of bulk materials such as aggregate and coal. Today railroads are a vital component of the fast, efficient movement of intermodal containers and trailers throughout the U.S. Intermodal freight is the top revenue source for the first time in the railroad industry's storied history (AAR, May 2004). Wall Street analyst Anthony Hatch indicates: "Growth in intermodal signifies railroads' progress and strength. It means that an industry once thought to be stodgy and slow is actually high service, high-speed and totally modern. It also means that railroads are a vital link in the global supply chain and that shippers like saving money with rail." (AAR, May 2004).

Intermodal is likely to remain one of the fastest growing segments of the U.S. rail industry as projections indicate steady growth in intermodal. Texas plays an integral role in the transport of intermodal shipments by rail because major intermodal facilities are located at:

- several of the state's top inland markets;
- the busiest U.S.-Mexico border crossings; and
- one of the most heavily trafficked container ports on the Texas Gulf Coast.

This chapter provides some positive attributes of rail intermodal, illustrates the location of the major intermodal yards and intermodal flows in Texas, discusses some of the planning activities that could potentially affect intermodal operations in the state, and describes some hot-button national intermodal activities and issues.

3.2 Characteristics of Rail Intermodal

Although using trucks to move containers is often preferred because of their flexibility and convenience, using rail to transport containers has a number of financial, social, and environmental benefits that trucks cannot match. These benefits are summarized below:

Shipper Cost Savings

- *Reduced Shipping Costs Compared with Truck* - Moving containers by rail saves money on shipping. These savings include the cost of owning and operating or, alternatively, leasing its own fleet of trucks, paying drivers, and performing maintenance on the truck equipment. Shippers can also reduce their costs for truck terminals if they originate their goods directly by rail via a rail spur or siding that serves the plant or industrial park where the goods are made.

Highway User Benefits

- *Reduced Congestion* - Moving containers by rail removes heavy trucks from the roadways, helping to reduce congestion on highways, especially in heavily traveled urban areas. The AAR estimates that one 8,000-foot double-stack container train can

move the equivalent of 280 trucks, increasing available highway capacity by approximately 1,100 automobiles (AAR, February 2003). A double stack rail intermodal train can carry different configurations. Normally, a container train might carry:

(a) 100 76.9-foot-long double-stack platforms—each holding two containers. Depending on the manufacturer of those platform rail cars, each rail car can hold:

- i.) two TEUs in the bottom-well
- ii.) one 48-foot container in the top position, overhanging the bottom TEU, or
- iii.) two TEUs on the top of the bottom container

(b) a more expensive well car can hold two double-stacked 53-foot containers. (Blaze, 2005)

- Reduced Roadway Maintenance Requirement - Moving containers by rail also reduces the amount of maintenance on our nation's roadways. Heavy trucks do extensive damage to our highways. A fully loaded (80,000-lb) truck inflicts pavement damage equal to approximately 9,600 cars (Wilson, 1998). While most individual COFC/TOFC loads do not approach this upper weight limit for trucks on Texas highways, the incremental damage caused by increased truck usage is avoided when any heavy freight load is moved by rail.

Energy Savings

- Fuel Usage - Moving more freight by rail generates a savings of millions of gallons of fuel. AAR estimates that rail can move a ton of freight approximately 400 miles on one gallon of diesel fuel in comparison, trucks require four times as much fuel to move a ton of freight the same distance. The fuel savings of moving more freight by rail likely generates a savings of millions of gallons of fuel each year (AAR, January 2003).
- Reduced Dependence on Foreign Oil - Using intermodal rail reduces aggregate fuel usage on a national basis and helps the U.S. become less dependent on imported oil.

Environmental

- Reduced Pollution - Moving more freight by rail reduces pollution because large numbers of equivalent trucks are consolidated into single double-stack trains. Rail produces less NOx and particulate matter than trucks on a ton-mile basis (AAR, January 2003).

Truck-Competitive Special/Priority Services

- Special Priority Train-Handling - Intermodal rail can move containers as quickly and efficiently as trucks. Several railroads have introduced special priority trains that provide expedited coast-to-coast or inter-regional services to compete with truck delivery times.

Long-distance transport

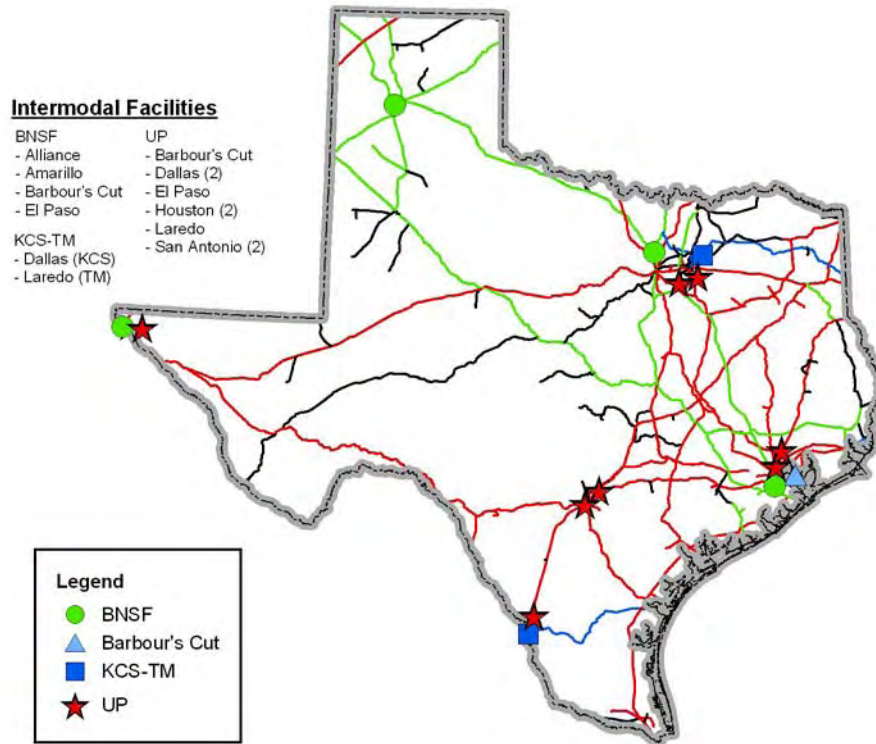
- *Specialized Effort* - Rail most efficiently transports intermodal traffic over the long-distance, line-haul portions typical of intermodal shipments and also provides direct connections to major container ports. Although rail's fixed infrastructure does not typically allow for direct door-to-door pick up and delivery of intermodal traffic, intermodal rail is a specialized effort that encompasses trucks, rail, and port terminals to take advantage of each mode of each transportation's strengths.

3.3 Texas Rail Intermodal Infrastructure

Infrastructure in Texas supporting rail intermodal movements include both major intermodal facilities where the loading and storing of containers and building of intermodal trains takes place and also major rail corridors, which are utilized to transport intermodal trains. Texas's geographic location places it on major transportation routes for both north-south movements, serving international/NAFTA traffic, and east-west movements, serving cross-country movement of goods within the U.S. The following sections describe the location of the intermodal facilities in Texas and the intermodal lanes traversing the state.

3.3.1 Major Intermodal Facilities

The major intermodal facilities in Texas are concentrated in three areas of the state in or near major urban centers where large quantities of goods are produced and consumed, along the Texas Gulf Coast for marshalling of containers to and from port facilities, and near the international gateways along the U.S.-Mexico border. Figure 3.1 shows the major intermodal facilities located in Texas, with each railroad's facilities identified and uniquely marked on the map. The Barbour's Cut facility is a Port of Houston facility served by both BNSF and UP and operated by the Port Terminal Railroad Association (PTRA) who build and air-test the rail cars prior to the arrival of the Class One locomotives.



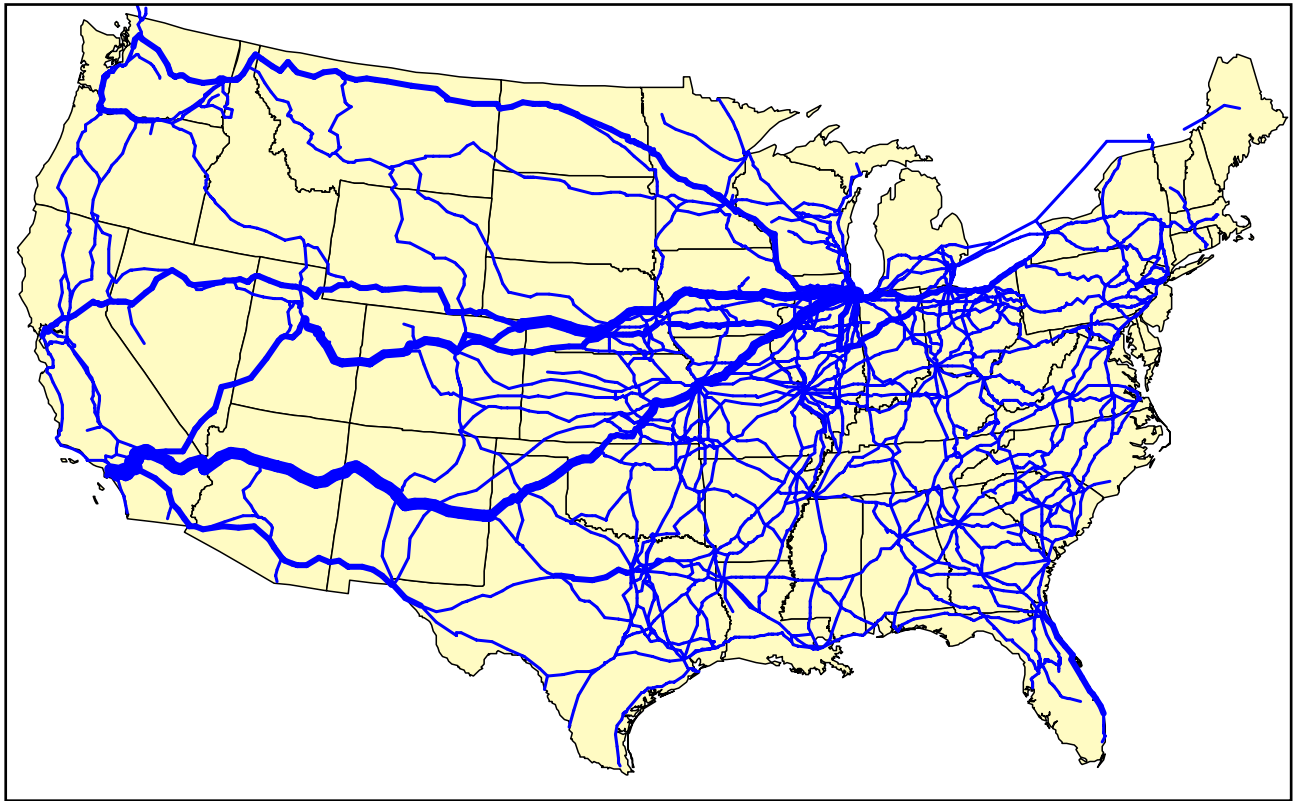
Source: Texas Transportation Institute with data from the 2003 NTAD, BTS.

Figure 3.1 Major Rail Intermodal Facilities Located in Texas

Most of the original intermodal movements were Trailer on Flat Car (TOFC) movements where trailers were placed on trains at many small facilities located at irregular intervals along the rail lines. As container movements dramatically increased, a shift occurred in which intermodal activities consolidated at fewer, larger facilities. This evolution has created the current network of critical facilities designed to efficiently facilitate the movement of both intermodal containers and trailers.

3.3.2 Texas Intermodal Lanes

Rail intermodal rarely competes with trucks for movements of freight that are 500 miles or less. In fact, the most important truck-rail intermodal lanes in the U.S. take full advantage of rail transportation's ability to transport goods efficiently and more cost effectively over long distances. Figure 3.2 shows rail intermodal flows in the U.S. As can be seen in the figure, the largest volume, single-route movement of intermodal traffic is between Los Angeles, California and Chicago, Illinois, traversing Texas's Panhandle region via the BNSF's Transcon line. Additional high-volume intermodal destinations on the West Coast are the Oakland, California area and the Pacific Northwest region, including the ports of Seattle and Tacoma, Washington. From Chicago, significant flows head to New York and New Jersey.



Source: Maring, Gary. USDOT. "Intermodal Freight History and Current Issues."

Figure 3.2 U.S. Intermodal Flows

Although not highly bolded on the map, several lanes within Texas play a major part in intermodal transport. In addition to the BNSF Transcon line, additional trans-continental traffic between southern California ports traverse eastward through Texas before connecting with the eastern railroads. The intermodal movements primarily travel along UP's Sunset Route to El Paso and then head eastward through San Antonio or Houston. These movements then either continue on the Sunset Route to New Orleans or go through Dallas along the former Texas and Pacific (T&P) line, now owned by UP, and continue eastward to Memphis. Movements by BNSF to Memphis and New Orleans branch from the Transcon line over several routes, including multiple routes through Texas. Major north-south movements flow from Laredo through San Antonio and Dallas before heading to Chicago. The Port of Houston Barbour's Cut container terminal also contributes to significant north-south and east-west intermodal movements.

3.3.3 Recent Rail Intermodal Infrastructure Improvements in Texas

As stated previously, intermodal represents the fastest growing market for the railroads and now signifies the largest revenue market in the rail industry. In order to accommodate the projected growth in intermodal, the railroads are continuously evaluating intermodal facilities and rail lines for opportunities to improve operations. The following sections demonstrate some of the recent activities in Texas undertaken by the railroads to improve intermodal operations.

3.3.3.1 Intermodal Yard Developments

The most notable recent development in intermodal facilities planning for Texas are UP's plans to construct a new yard facility in southern Dallas County. The 342-acre facility will be located south of Dallas, within the city limits of Wilmer and Hutchins. The planned yard will be part of a business park with nearby access to I-45. UP indicates that the rail port will include approximately 23 miles of track, 3200 trailer stalls, and state-of-the-art computerized security and entry system (UP, January 2004). Construction of the yard is anticipated to begin in May 2004. The facility will expand intermodal capacity in the Dallas region, which experienced intermodal growth for international volumes of more than 20 percent during 2003 (UP, January 2004).

3.3.3.2 Corridor Upgrades

Several of the major intermodal corridors experienced infrastructure improvements over the past several years. These improvements are listed below:

UP – Dallas-to-Laredo Corridor

The intermodal rail corridor between Dallas and Laredo is described best by segmenting it into two categories—the segment from Laredo to San Antonio and the remaining segment between San Antonio and Dallas. The 150-mile route segment from Laredo to San Antonio is a single mainline, while the route between San Antonio and Dallas consists of two separate rail line routes utilizing one-way traffic on each line, commonly referred to as “directional running.” UP implemented directional running after its (1996) merger with Southern Pacific in several areas of their network where each entity possessed parallel routes.

The directional routes extend beyond Texas. The major corridor between Laredo, St. Louis, and Chicago has southbound traffic traveling on the former Southern Pacific route and northbound trains on the parallel UP route (UP, 1999). Operating on parallel lines directionally eliminates oncoming train conflicts and increases operational efficiency. From San Antonio, northbound shipments travel a distance of approximately 310 miles through San Marcos, Austin, Waco, and Fort Worth before reaching Dallas. The southbound shipments from Dallas travel an approximate distance of 335 miles through Corsicana, Hearne, Smithville, and San Marcos.

The section between San Antonio and San Marcos consists of two separate parallel lines: one formerly owned by Missouri Pacific Railroad (MP), and the other formerly owned by the Missouri Kansas Texas Railroad (MKT). Restored operations over the MKT line occurred in 1998 when UP spent \$15.7 million to rehabilitate the 17-mile stretch of tracks between San Marcos and San Antonio (UP, December 1998). Track improvements over the MP rail line included a \$6.8 million project in 2001 for cross tie and rail upgrades from New Braunfels to Austin (UP, October, 2001).

UP – Dallas to El Paso Corridor

A corridor of little importance previously, this corridor now represents one of UP's critical east-west trans-continental corridors. UP identified this route as critical to their trans-continental operations of intermodal traffic from California to Memphis, where the shipments interchange with one of the eastern railroads.

According to UP's *Third Annual Report on Merger and Condition Implementation* (1998), \$106.6 million was spent on the T&P line between Fort Worth and El Paso to increase speed and capacity (UPC, 1998). These upgrades were necessary to implement the direct route from El Paso to Fort Worth via the T&P line versus moving traffic along the Sunset Route over to San Antonio and up to the Dallas-Fort Worth area. This improvement in system operations allows UP to battle for the vital long-haul traffic from the West Coast to Texas, Memphis, and the Eastern U.S. The three major infrastructure improvements focused on siding lengths and locations, signal systems, and track conditions (Frailey, 2002). With these improvements, train speeds have increased along the route. Union Pacific news releases indicate new operating speeds of 60 mph through Abilene, Midland, and Odessa (UP, October 2002 and March 2003).

BNSF – Los Angeles to Chicago Transcon Main Line

As denoted in Figure 3.2, BNSF's Transcon line between Los Angeles and Chicago represents one of the heaviest traveled long-distance routes in the U.S., mostly due to intermodal shipments from the Los Angeles-area container ports. Passing through the Texas Panhandle, it provides the main corridor through which many of BNSF's lines traversing Texas connect, including shipments between Alliance Yard north of Fort Worth and the West Coast. In addition, the line running north from El Paso connects to the Transcon line in New Mexico. BNSF indicates that 60 trains per day currently use this line with peak levels approaching 75 trains per day. For the portions located in Texas, BNSF implemented a three-phase double-tracking program in 2003 totaling 43.3 miles of new double track. An additional 60 miles of double track is scheduled to be built in the Texas Panhandle and western Oklahoma for 2004 and 2005 (BNSF, November 2003).

3.4 Nationally Significant Developments

Rail intermodal operations generally exist over long, high-density rail lines, with the predominant movements between the West Coast container ports and Chicago. The above discussion indicated several infrastructure and operational improvement activities within Texas that affects rail intermodal transportation. The following sections describe some of the nationally significant activities that potentially affect rail intermodal. These include construction of new intermodal facilities, public involvement in intermodal around the country, and some industry news items.

3.4.1 Intermodal Facility Construction

With the continued growth in intermodal traffic, many intermodal facilities in the U.S. are approaching or exceeding capacity levels. Historically, rail intermodal terminals have been located within urban areas, and as a result have had no place to expand. Today railroads are developing new, larger facilities located outside city centers, allowing the railroad companies to use these new facilities in combination with existing facilities or to consolidate their intermodal operations and convert their older, urban facilities for other rail operations or reuse/sale. The following list provides examples of the sizes of several new facilities located around the country.

- *UP Global III Intermodal Facility (Chicago)* – Costing \$181 million to construct and covering over 800 acres, this facility is designed to handle 720,000 lifts annually.

The facility contains four full intermodal train-length tracks and offers 4,000 parking places for trailers and containers (UP, August 2003).

- *UP Marion, Arkansas Intermodal Facility* – This \$70 million facility replaces two outdated facilities located near Memphis, Tennessee. Located on 600 acres, this facility is designed to lift 375,000 trailers and containers annually and offers 2,600 parking spaces (UP, July 2002).
- *BNSF Logistics Park (Chicago)* – In addition to intermodal operations, this facility also offers transload services with distribution and warehousing. The entire Logistics Park resides on 621 acres and expands BNSF's Chicago-area lift capacity from 400,000 to over 3 million annually (BNSF, October 2002).

Comparing these new facilities against the major yards in Texas, only BNSF's Alliance facility closely resembles the size and operational levels. It inhabits 289 acres of a 13,000-acre industrial park and annually lifts 433,000 trailers and containers (BNSF, 2002). UP's largest yard, in terms of physical area, is the Mesquite yard and resides on 130 acres while performing approximately 17,000 lifts per month or about 200,000 lifts per year (Shelton, 2002). An example of a boundary-constrained yard is UP's Miller Yard, which operates on only 68 acres of land but still manages to perform approximately 15,000 lifts per month or about 180,000 lifts per year (Shelton, 2002).

3.4.2 Industry News

A shortage of available train crews and increased demand for rail use has led to traffic congestion forming around the rail system. A change in federal retirement law reduced the age of retirement from 62 to 60 years of age for eligible employees in the railroad industry (National Corridors, April 2004). The result of this change is train crew shortages that led to traffic congestion. UP was particularly affected and this led to significant congestion within its system. For UP, the problems began in late 2003 and are most visible on the routes between Los Angeles and El Paso. The train crew shortage was exacerbated by a jump in demand for rail service, which corresponded to the U.S. economic improvements. In an effort to curb the crew shortage problems, UP hired 1,500 employees in 2003 and planned to hire an additional 4,200 train service workers by the end of 2004 (National Corridors, April 2004). One effect of UP's problems is the cancellation of an express train contract with United Parcel Service. The TOFC intermodal service ran once a week each way from Los Angeles to New York, with CSX handling the eastern portion of the trip from Chicago to New York. However, services between Los Angeles, Dallas, and Memphis were maintained despite the difficulties (Trains.Com, May 2004). The various elements of this broad description of rail intermodal activities in Texas (and elsewhere) suggests a wide variety of ways in which TxDOT can partner with railroad companies to support, enhance and broaden rail's role in state transportation planning. The potential for partnering is described in the next chapter.

4. Public-Private Partnerships (PPPs) and Intermodal Rail Service

4.1 Introduction

The desire to conserve highway resources by diverting truck traffic to rail continues to stimulate discussion and debate. The private nature of freight rail companies and the historical separation of public and private transportation activities in the freight arena have served to effectively isolate the planning functions of these respective parties. The goals of the public transportation sector and those of private freight concerns, both road and rail, have shared little in common and have rarely even been compared to determine if commonalities or compatibilities do in fact exist. As highway capacity has steadily diminished and congestion increased, the role of the trucking industry in exacerbating these difficult conditions has come under increasing scrutiny. State transportation agencies are beginning to see railroads as a way to combat growth in intercity truck traffic and as a tool to help curb the steady rise in highway-borne freight.

In considering how to do so, the public sector has begun to appreciate the divergence of their planning processes and concerns from those of private freight carriers, who have more immediate and financially oriented goals. The emerging desire to form partnerships with railroads is complicated by these differences and understanding how to form effective public-private alliances with compatible goals is essential to achieving results that benefit both parties. The obvious ability of railroads to carry large amounts of intermodal freight – including container traffic – has appeal to the public sector and the potential for public and private benefits in this context is the subject of the following discussion.

4.2 Defining Partnerships and PPPs

A partnership is an agreement formed between two or more parties to pool their resources and attain a common goal. Partnerships are formed when one party lacks specific skills, financial backing, or is not large enough to handle an entire project using only its own assets or strengths. Partnerships can be formed between governments, private companies, public companies, or individuals in any combination. Partnerships formed between a government entity and any private entity are referred to as Public-Private Partnerships (PPPs).

Partnerships, including PPPs, can take many forms, but the key attribute that differentiates them from other types of agreements is risk sharing between parties. In most types of contractual agreements, one party agrees to pay another party for services performed according to a service agreement and the contracting party is obligated to pay the contractor for services rendered. In a partnership, parties that enter into a contract share the risks inherent to the project. They contribute their resources to the project in exchange for a share of the reward but are also exposed to the potential losses. The result is that both parties have a vested interest in the success of the project and will work collaboratively to guarantee success. The exact terms of the partnership must be negotiated before the work of the partnership begins.

Parties that enter into a partnership are not limited to only providing capital investment. They can contribute in other ways, such as providing credit worthiness/reduction of project risk, political

support, technical expertise, and specialized equipment or labor. Ideally, all parties in the partnership are actively involved and bring their strengths or talents to the table to offset the weaknesses of the other members. In essence, parties in the partnership contribute a certain amount of value to a project and expect to receive rewards in proportion to the value they have invested in the project.

Partnerships are easiest to form when the parties involved share common goals, expected results, and measures of success, but this is often not the case. Partnerships are most difficult to form when, despite a common goal, one party does not appreciate or give validity to another's goal. PPPs can be a highly contentious type of partnership for this very reason. While there is little inherent difference between this type of partnership and many other types of partnerships, there are significant cultural, philosophical, and operational differences between public and private entities. These differences are significant enough to create problems if they are not carefully managed and controlled.

Before seeking private partners, public agencies such as TxDOT must select and/or modify a form of PPP that is acceptable to the state and attractive to private rail firms for facilitating intermodal services. In doing so, the department must be sure to safeguard the public's investment while at the same time balancing the private railroad's desire to earn a reasonable profit.

4.3 Comprehensive Rail Policy Considerations

Development of a cooperative atmosphere at the policy level is an important precursor to direct involvement in a PPP between public agencies and the railroad companies. This helps to build up a framework of common interests among the parties so that conflicts can be more easily resolved as the project or projects grow in complexity over time. Thus, in addition to understanding the full range of PPP possibilities that are available, there should be a comprehensive rail policy framework in place that will help the public agency to preserve, encourage, and participate in rail transportation projects that benefit Texas citizens.

4.3.1 Possible State-Rail Public-Private (PPP) Strategies

Following the passage of ISTEA in 1991 and its reauthorization through TEA-21 in 1998, several methods have emerged through which state transportation agencies can enter into PPPs with private rail firms to fund rail projects. Several of these strategies, along with the pros and cons of each, are listed in the 2003 American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on Rail Transportation (SCORT) Freight Rail Bottom Line Report, which was prepared to guide Congressional deliberations regarding the reauthorization of TEA-21 for the FY 2004-FY 2009 period. This list, shown in Table 4.1, outlines 14 financing methods through which freight rail-oriented PPPs could potentially participate in intermodal projects. While this list is not exhaustive, it provides a good cross-section of the types of PPP strategies that are available.

Table 4.1 AASHTO SCORT Freight Rail PPP Funding Strategies

Direct Funding out of Railroad Revenues
Definition: Railroad companies fund improvements out of their own profits for projects beneficial to the public and themselves
Pro: Railroads can make investments where they generate sufficient revenue to repay the investment and serve profitable markets.
Con: Limited railroad investment funds; railroads are not earning their cost of capital, making borrowing on the open market more difficult and expensive; railroads cannot afford to invest in lower-profit lines and services; unlikely to invest in projects in order to achieve public benefits.
Rail User Fees or Surcharges
Definition: Public money is used to improve existing or build new rail infrastructure and then rail companies are charged user fees at a specified rate developed through a prior agreement (e.g., on a per car or per ton-mile basis) for use of the facilities
Pro: User fees generate revenues to pay back construction bonds financed by the states or special purpose authorities. The leading, successful example is the recently opened Alameda Corridor.
Con: Requires stable and increasing volumes of traffic to generate revenue stream. The Alameda Corridor is a relatively unique situation. The corridor serves the high-volume container ports of Long Beach and Los Angeles; other locations may not have sufficiently stable and growing traffic to support user fees. Most manageable when applied to short, well-defined corridors or bridges and tunnels. More difficult to manage when multiple improvements must be made across a network and across a multi-state region.
Direct Federal Appropriations and Earmarks
Definition: Federal funds are appropriated to a specific rail project, often for a specific use, through Congressional action
Pro: Ensures targeted public investment in rail projects that have significant national, public benefits.
Con: Limited funds; requires lengthy public planning and review process; typically entails compliance with federal labor and other laws that are generally unacceptable to the railroads.
Congestion Mitigation and Air Quality (CMAQ) Program Grants
Definition: CMAQ grants are authorized to EPA non-attainment areas for projects that improve air quality within that region
Pro: CMAQ grants have been used to fund transportation improvements that reduce congestion and engine emissions in regions that do not meet national air quality standards.
Con: Lack of explicit eligibility for freight rail; limited funding.

Table 4.1 AASHTO SCORT Freight Rail PPP Funding Strategies (continued)

Transportation Infrastructure Finance and Innovation Act (TIFIA)
Definition: US DOT/federal loan program specifically for major transportation projects (total costs exceeding \$100 million)
Pro: Provides loans and loan guarantees for large transportation projects.
Con: Lack of explicit eligibility for freight-rail and intermodal projects; requires revenue stream to pay back loans; high threshold for project eligibility.
Railroad Rehabilitation and Improvement Finance (RRIF) Program
Definition: TEA-21 federal low-interest loan program that is administered by the Federal Railroad Administration (FRA) that provides loans to both large and small railroad companies for capital improvements
Pro: Loan program specifically for rail improvements; congressional proposals would significantly expand funding for the program.
Con: Limited funding at present; FRA lacks authorization to fund the mandated project credit risk analysis, so few projects have been initiated; funding focuses on investments with private, rather than public benefits; financially constrained railroads unlikely to invest in projects in order to achieve public benefits.
Borders and Corridors
Definition: Two, jointly administered, TEA-21 programs that are focused on meeting the transportation corridor needs along the U.S.-Canada and U.S.-Mexico borders and international transportation corridors
Pro: Provides funds to states to plan and develop multi-state trade corridors serving international trade gateways.
Con: Popular program but over-subscribed with limited funding, much of which has been earmarked to highway projects; rail projects are not explicitly eligible.
Section 130 Grade Crossing Program
Definition: Federal funding source, administered by states, for closing unnecessary highway/rail grade crossings or improving safety at highway/rail grade crossings by adding warning devices
Pro: Provides for use of highway funds to eliminate dangerous highway/rail grade crossings or improve existing grade separations.
Con: Limited funding available; states and railroads are discussing expansion of the program but have not resolved concerns about assignment of liability for accidents at crossings

Table 4.1 AASHTO SCORT Freight Rail PPP Funding Strategies (continued)

Federal Tax-Credit Bond-Financing Programs
Definition: Funding source under which the federal government would allow private rail companies to take tax-credits in an amount proportional to funds that are spent on capital improvements to their rail infrastructure
Pro: Tax credit financing might be used to generate funds for investment in rail infrastructure projects; funds could be distributed as grants, loans, or credit enhancements; could be targeted to specific types of businesses and improvements; does not impact discretionary portion of federal budget.
Con: New program not easily understood; numerous details to be worked out; impacts revenue side of the federal budget.
Issuance of Tax-Exempt Debt for Railroad Infrastructure
Definition: Federal government would allow private firms (railroad/non-railroad) to purchase tax exempt debt instruments for funding rail infrastructure and other capital improvements
Pro: Holders of debt would be exempt from tax on interest earned, resulting in reduced cost of funds; could be targeted to specific types of businesses and improvements; debt could be acquired by investors other than railroads; does not impact discretionary portion of federal budget.
Con: Will likely require congressional action to increase ceiling on state per-capita debt limit and to allow tax-exempt debt for private activity; impacts the revenue side of the federal budget.
Use of Rail Share of Gas Tax for Dedicated Railroad Trust Fund
Definition: Current federal 4.3 cent per gallon diesel-fuel tax paid by railroads would be devoted to rail use instead of going to the general fund
Pro: Would reallocate 4.3 cent/per gallon diesel-fuel tax paid currently by the railroads from the general fund to a dedicated railroad trust fund for rail infrastructure projects.
Con: Railroad industry opposes the tax; generates a modest amount of funding (\$160 million per year).
State-Based Loans and Infrastructure Banks
Definition: State-level funding programs would be created that could be given the flexibility to be used for rail infrastructure
Pro: Would provide states with a mechanism to invest in rail improvements.
Con: States require seed money for banks and programs.

Table 4.1 AASHTO SCORT Freight Rail PPP Funding Strategies (continued)

Sale of Freight Assets for Rail Passenger Use
Definition: Conversion of existing freight rail facilities or rights-of-way to public for passenger rail purposes in exchange for direct financial payment or improvement to a rail company’s core rail facilities
Pro: Generates cash, in-kind improvements, or state matching funds that states or railroads can use to invest in freight-rail service improvements.
Con: Limited opportunities; primarily in high-density metropolitan rail corridors; states must have sufficient transportation revenues to support purchase of assets or access rights.
Relief from State Property Taxes on Rail
Definition: State and local governments would reduce or eliminate property taxes on rail infrastructure in exchange for reinvestment of those monies into rail improvements
Pro: State property taxes on rail were estimated at \$453 million in 1999; relief could be coupled with requirements that the funds be dedicated to rail improvements.
Con: Would represent a loss of state revenues that would have to be made up from other taxes or fees.

4.4 Application of Public Private Partnerships (PPP) in Texas

Up to this point, the broad array of possible PPP forms and funding strategies has been described. This section of the report will describe how, and if, recent legislative measures passed in Texas will limit or expand the choices available within the state. This section will also make observations regarding the types of PPPs that might be applied to the enhanced intermodal scenarios examined in this study.

4.4.1 Examples of Potential Private Participants in Rail-Related PPPs

- **Railroad Companies-** Railroad companies have existing rail infrastructure but limited funding available for added capacity or expansion of their systems for new services. A private-public partnership potentially allows private rail companies to open new markets while providing a public benefit through the diversion of freight and passenger traffic from the highway system.
- **Railroad Contractors-** Railroad contractors, both rail operators and those who specialize in rail construction, signaling, or equipment, may also be interested in partnering. These railroad-contracting companies stand to gain in projects where state-owned facilities may require their services for operation or maintenance.
- **Highway Construction Firms/Infrastructure Firms-** Major construction firms that now specialize in the building of highway facilities may be interested in participating in projects that have both highway and rail features. These companies may branch out into rail construction or simply take part in the highway construction portion of such a partnership. Their experience in management and execution of large construction projects may also be of great benefit to any PPP team.

- **Consortia/Joint Ventures-** Several private firms may choose to form subsidiaries or joint ventures for a specific project. This model has been evident in recent large TxDOT projects, such as SH-130 and initial proposals for construction of the high-priority routes of the Trans-Texas Corridor.
- **Operations and Maintenance (O&M) Companies-** Companies that specialize in the operations and maintenance of large transportation facilities may wish to partner in order to participate in O&M of the facility following construction.
- **Trucking Companies-** Trucking companies might be interested in participating in rail projects that could meet specific performance standards for movement of their cargoes that either augment or improve their truck or driver availability. Rail service that can move TOFC or Container on Flatcar (COFC) quickly and efficiently for relatively long segments of the trip can enhance truck operations by freeing up drivers and tractors for other purposes, thereby reducing maintenance, fuel, and personnel costs.
- **Third Party Logistics (3PL) Companies-** 3PL companies are contractors that take responsibility for making sure that a company's freight products are delivered on time. 3PL companies choose the mode by which that freight should move. Rail projects that increase delivery reliability and/or reduce the cost of delivery may interest 3PL companies enough to participate in a PPP to move their contracted freight.
- **Private investment firms-** The prospect of a rail project generating a long-term profit may be high enough to interest a private investment firm to participate. The interest of the private financial firms would be largely dependent on the projected traffic or ridership of any such rail project.

4.4.2 Possible Scenarios for Enhanced Intermodal Service

Following are three possible scenarios through which TxDOT could possibly participate in a partnership that provides an enhanced intermodal service. This list is not all-inclusive and is designed to give a few examples of possible structures and objectives that might drive team formation.

4.4.2.1. TxDOT/Regional Mobility Authority (RMA)/RRTD-funded railroad corridor services for TOFC/COFC

In this scenario, state entities such as TxDOT, a RMA or an RRTD, (or a combination of these entities) would partner with a railroad company to provide additional intermodal rail services in a heavily congested truck corridor. Government involvement and funding assistance is typically necessary for rail movements of less than 500–700 miles, where rail rates and delivery times are less competitive with trucks. In concept, this type of partnership works in the following manner. Funds from one or more of the state entities subsidize rail companies to a level that allowed them to charge rates that are competitive with trucking companies at these distances. Rail companies earn a reasonable profit in accordance with the partnership agreement, and, in exchange, the state benefits by reducing the number of shipping containers using the existing highway system, thereby decreasing congestion and maintenance costs.

If the costs to participate in such a partnership are less than or equal to the costs saved in reduced maintenance or reduced construction to handle increased traffic, such a partnership would make

sense for the state to consider. Such other societal benefits as environmental benefits and traffic safety could also be taken into account. For the railroad companies, the ability to generate a reasonable rate of return based upon the state investment potentially makes this type of project feasible. Trucking companies might also benefit from concentrating drivers' efforts upon delivery from the rail terminals rather than the line segment where rail was used.

TxDOT's interpretation of HB 3588 (see Box 4.1) may require that the state have an ownership role in some fixed assets in order to participate. The state constructing and owning some fixed assets that make COFC service possible, such as an intermodal terminal, might satisfy this requirement as opposed to the state purely subsidizing new intermodal train service by the private railroad company.

Box 4.1 HB 3588

HB 3588—Provides TxDOT with a new set of financial tools, including giving the department authority to build and manage rail infrastructure. HB 3588 authorizes the department to plan, construct, and maintain rail facilities or systems. It also allows TxDOT to acquire and develop existing rail facilities.

4.4.2.2. TxDOT/federal track improvements in a specific corridor

In this type of partnership, TxDOT, on its own or as a pass-through agency for federal loans or grants, partners with a private railroad company to make infrastructure improvements along a specific corridor in order to achieve transportation benefits that have a statewide or national benefit. For example, rail improvements in the congested NAFTA corridor through Texas might be considered in order to divert some of the current truck freight from I-35. In fact, construction of a railway along a portion of I-35 to handle increasing freight traffic was considered as one alternative during the 1999 I-35 Trade Corridor Study although this option was not a part of the final recommended strategy (HNTB, 1999).

This form of partnership has public agencies incrementally invest in improvements to existing rail corridors to improve their speed and efficiency, thereby increasing their competitiveness with truck-only solutions. Railroad companies benefit by gaining a more efficient and capable rail system and public agencies benefit by reduced highway maintenance and decreased congestion-related construction/expansion costs. By focusing funds in a designated corridor, transportation improvements over longer travel segments will potentially be realized. As in the previous example, roles for each of the participants and desired performance measures need to be spelled out in advance before public funds could be invested in the private rail network. Limited public ownership roles for certain components of the system might have to be devised before state funds approved by HB 3588 or from the State Infrastructure Bank (SIB) could be allocated to such a project by TxDOT. In other cases, federal loans or grants or highway fund reimbursements might be approved in which TxDOT played an administrative or oversight role for truck diversion to intermodal movement. The railroad company's acceptance of allowing limited supervision of rail operations by a public entity might also be an obstacle to forming a partnership of this type.

4.4.2.3. Texas Mobility Fund/GARVEE-type bonding for PPPs

The Legislature's approval of additional funding mechanisms for TxDOT has opened up myriad possibilities that did not exist previously for rail related intermodal PPPs in Texas. The availability of such bonding programs, such as the Texas Mobility Fund, to provide rail infrastructure to relieve urban congestion is one option among many that may appeal to the fund's users. It is possible that stable (i.e., known and steady quantities) funding available for rail purposes as provided in HB 3588 or the creation of a more stable federal funding source for rail infrastructure could allow GARVEE-type bond financing of rail facilities. A larger variety of PPP forms may become viable as new financial tools become available.

4.5 Guidelines for Setting Up Enhanced Intermodal Public Private Partnerships in Texas

Several types of recommended guidelines for the creation of PPPs in Texas could be made, but this report will limit its recommendations to those guidelines that have been proven successful in practice and documented in transportation research literature. The National Cooperative Highway Research Program (NCHRP) published a report in 1999 that conducted in-depth case studies of multimodal transportation project partnerships as well as evaluating data from a database of 58 other multimodal projects (NCHRP Report 433). NCHRP Report 433 outlines three stages to general partnership development—prior to developing a partnership, developing a partnership, and maintaining a partnership as shown in Table 4.2. A checklist that provides advice on specific issues to consider is also included for each of these steps. An analysis of these steps shows that partnership formation is an ongoing process that requires continual effort throughout the life of any project for which a PPP is formed.

In general, partnership development tends to adhere to the following pattern. Under each step, a list of issues to consider based upon the recommendations of NCHRP Report 433 and other sources are listed.

Step 1. Determine the need to form a partnership

- TxDOT (or another public agency) may lack the financial or technical resources to develop a project “in-house” using internal expertise.
- An evaluation of the public agency's strengths and weaknesses should be done to determine if the private sector has strengths that can offset the identified weaknesses of the public sector participant(s), thus making the project feasible. If so, formation of a PPP should be explored.

Step 2. Determine the partners needed for project success

- Careful consideration should be given to which (i.e., how many?) public and private sector partners should be included in the PPP for a given project. Appropriate public agencies should not be excluded simply because they do not invest funds in the project—they may play an important role in public awareness and/or acceptance of the project. At the same time, however, the addition of too many partners into the PPP can unnecessarily slow down the project development process.

- Private sector participants should generally be limited to those that have skills and/or financial resources that are directly related to the project, its planning, its construction, its operations, or its maintenance.

Table 4.2 Stages of Partnership Development

Stage A: Prior to Developing a Partnership
<ol style="list-style-type: none"> 1. Reasons for forming a partnership 2. Activities prior to deciding to partner 3. Activities to initiate a partnership 4. Identifying stakeholders
Stage B: Developing a Partnership
<ol style="list-style-type: none"> 1. Activities included in kick-off workshop 2. Partnership components 3. Legislation and other legal issues 4. Institutional issues 5. Community involvement issues
Stage C: Maintaining a Partnership
<ol style="list-style-type: none"> 1. Internal communication components 2. Tracking progress 3. Legal issues 4. Institutional issues 5. Community involvement activities

Source: NCHRP Report 433.

Step 3. Identify common goals and resources for partnership members

- For any PPP to be successful, the goals of each member of the partnership should be clearly understood. Often, public and private sector agencies may have divergent, but compatible goals. For example, a private rail company may participate in a project because it is interested in generating new business and therefore larger profits. This goal could be compatible with TxDOT’s goal of decreasing the number of trucks on the highway for congestion reduction and maintenance savings or for an environmental agency’s goal of reducing truck emissions—differing goals, but common methods of meeting them.
- Each member of the PPP brings its own resources “to the table.” Public agencies may be able to qualify for specific federal or state grants more easily than private

entities. Conversely, private firms may have internal holdings that can be brought to bear on the project or their expertise in a certain area may more readily attract private financing or an improved bond rating. Financial, technological, political, and other types of resources should all be considered.

Step 4. Develop a plan/process for dealing with anticipated and unanticipated legal, political, and financial conflicts that may occur

- Inevitably, difficulties of this type will occur during the life of the project, so having a plan in place to deal with them is a vital part of partnership formation. For example, agreeing to settle disputes through a defined arbitration process rather than through legal means is strongly recommended for any PPP.
- Additionally, methods of handling conflicts over purchasing requirements, project scheduling, and financial matters should all be discussed and codified as part of the partnership agreement.

Step 5. Clarify roles and responsibilities of each of the partners for all project stages

- Each party should be aware of their role throughout the project.
- Project roles may vary during the different stages for each partner.
- Leadership roles in the partnership at each stage should be explored and documented.
- Both the scope and extent of the responsibilities of each partner, at each stage of the project, should be determined.

Step 6. Complete and coordinate the necessary financial and technical planning documents

- Financial agreements must allow for the different methods of tracking expenditures and follow-up accountability for investments. For example, public agencies generally must comply with accounting principles that are in-line with the Governmental Accounting Standards Board (GASB) in their reporting of financial transactions. Private firms do not have the same set of rules for accounting and may vary from firm to firm. Parties in a PPP must come to some agreement on the accounting practices that will be acceptable in and for the PPP.
- Planning documents should take into account the varying policies and desires that public and private sector firms have regarding project approval and completion schedules. Public sector agencies usually work from a predefined and agency approved planning process that may seem tedious and repetitive to the private sector members of the partnership. Private firms, on the other hand, are typically more flexible and interested in getting the project completed in short order so that their operations can be positively affected through increased efficiency or increased profits (NCHRP Report 433). The agreement must address expectations and limitations on project completion from both perspectives.

Step 7. Secure project resources as planned or through alternative means

- Once a PPP is formed and necessary items are negotiated into an approved project agreement, all parties should begin to pull together the resources (financial and technical) that each has committed to the project.

- Occasionally, planned resources and/or funding options will not materialize as anticipated in the project agreement/planning document and alternative means of replacing those resources must be found. Early identification of alternate funding sources or other firms that can quickly replace a PPP member firm that is in default of the project agreement is vital.
- If at all possible, resources should be identified and solidified prior to completing the project agreement, PPP formation and planning stage. This may include considerable effort to develop public support for the project.

Step 8. Build infrastructure/operate service as outlined in project agreement

- Execution of the project plan should begin as scheduled, if at all possible. Delays in construction or service affect resource availability with each of the partners.

Step 9. Evaluate conditions and success of partnership and project

- Operation of new infrastructure (or new operations over existing infrastructure) should be evaluated to determine if traffic levels/usage are in accordance with the financial and operational projections made before construction.

Step 10. Negotiate/re negotiate partnership structure as necessary

- If a project is not meeting the forecast level of service, partners in the PPP should be consulted to identify reasons for this shortfall and suggest methods to address the problem.
- It is possible that changes to the PPP structure and/or membership may be necessary for continued operation of the facility/service.
- Lessons learned should be documented for future PPP formation.

4.5.1 Public Sector Intermodal Planning in Texas

The following section provides several examples of potential public involvement in freight rail and rail intermodal planning activities and projects.

4.5.1.1 State of Texas

On March 18, 2005 a memorandum of understanding between the State of Texas acting through TxDOT and UP for a cooperative partnership to address freight railroad relocation issues in the State of Texas was signed (See Appendix A).

4.5.1.2 Harris County and the Houston Metropolitan Region

Harris County Judge Robert Eckels recently proposed a commuter rail plan consisting of more than 165 miles of commuter rail service over existing freight rail lines. The purpose of the plan is to provide the citizens with a non-highway alternative that is more cost effective than Metro's Houston area light rail plan. One of the first proposed routes would be along UP's rail line that heads northwest out of Houston along US Highway 290. This is a lightly used rail line by UP and has been identified by UP as having potential for passenger service; however, most of the remaining rail lines identified in Judge Eckels' proposed plan currently have heavy freight rail traffic and, in some cases, represent vital freight rail lines for Houston.

The commuter rail proposal opens the door for reviewing the entire freight rail operations in the Houston area and examining ways to more efficiently operate while implementing commuter rail service for passengers.

Recent studies in the Houston area have looked at improving freight rail operations. In a study titled “Inventory of Railroad Operating Conditions in the East End of Houston,” the Texas Transportation Institute developed baseline data information related to the grade crossings in an area east of downtown Houston and bordering the Houston Ship Channel (Roop, Roco, Warner, and Morgan, 2003). This area represents the major intersection of rail lines in Houston, where lines from all directions converge at a few critical intersections. All of the traffic from the petrochemical facilities along the coast, the container traffic from Barbour’s Cut, and BNSF’s Houston intermodal facility travel through this area. The information developed within this study provides vital information for grade crossing improvements, which will benefit the surrounding communities and also improve rail operations.

Another study examined potential grade crossing improvements along other rail corridors in both Harris County and the city of Houston. Many critical highway arteries within Houston face significant interruptions by at-grade crossings with rail lines. Like the East End study, project information will assist in planning for effectively eliminating grade crossing interruptions at some of the most used roadways in the Houston metropolitan region.

Two additional activities related more specifically to container movement involve the Port of Houston. The first of these is the construction of the Bayport Container Terminal, the Port of Houston’s proposed new container port located just south of Barbour’s Cut on Galveston Bay. Projections for future container growth in the Houston area and the fact that Barbour’s Cut is near capacity indicates that the \$1.2 billion project will help maintain Houston as a major container port competitor. The new Bayport Container Terminal will support direct rail service, with on-dock line capacity for building up to six trains simultaneously (Plume, 2002).

In an effort to plan for the growth in container volumes into the port from both Barbour’s Cut and Bayport and also to potentially redirect traffic that would otherwise come in at other ports, the Port of Houston has proposed a rail rationalization concept that would consolidate the rail lines in Houston onto three dedicated, high-capacity rail corridors that will be grade separated from vehicular traffic. As currently envisioned, this allows higher-speed freight service into and out of Houston while benefiting surrounding communities by eliminating train horns and reducing congestion created by highway-rail grade crossing delays. The three corridors are a north corridor that stretches to Conroe along the Hardy Toll Road and I-45; a west corridor that parallels US Highway 90A; and a port corridor that travels along the Houston Ship Channel serving the petrochemical facilities and the container ports (Hensel, 2004). Operations over the remaining lines are either eliminated or drastically reduced. Adoption of the rationalization plan frees up lines for the proposed commuter rail services described above.

4.5.1.3 North Central Texas Council of Governments

The North Central Council of Governments (NCTCOG), which is the Metropolitan Planning Organization (MPO) for the Dallas-Fort Worth area, plans activities related to the movement of goods that potentially benefits freight rail and intermodal operations. Like Houston, NCTCOG is

actively examining the highway-rail grade crossings in the region in order to eliminate unnecessary crossings and also to identify those critical crossings needing grade separations. NCTCOG's efforts help improve safety at the crossings, reduce vehicular congestion, and improve rail operations.

One of the most critical freight rail issues in the Dallas—Fort Worth area is the intersection of multiple rail lines in Fort Worth at Tower 55. This intersection is the crossroads of a significant portion of all freight and passenger rail traffic that passes through the Dallas-Fort Worth area. The at grade rail intersections at Tower 55 are used by approximately 100 freight trains per day plus additional train movements by Amtrak and the Trinity Railway Express commuter rail service (NCTCOG, 2003). Improving rail operations at Tower 55 enables more efficient freight rail operations and allows for continued growth in passenger rail services. Some initial proposed solutions for accomplishing these goals include maintaining the status quo, improving the existing infrastructure and signaling, constructing grade separations for north-south and east-west movements, constructing grade separations for freight and passenger movements, and constructing a new freight bypass route (NCTCOG, 2003).

4.5.1.4 Port of Corpus Christi Container Terminal Planning

The Port of Corpus Christi is planning to construct a major container terminal on the north side of Corpus Christi Bay. Named the La Quinta Trade Gateway Container Terminal, this project is predicted to average a throughput of approximately 800,000 TEUs annually at full build-out (Bierling, Morgan, Warner, and James, 2003). Projections from modal split scenarios show that rail eventually has the capability to move three trains per day in each direction in and out of the facility.

4.5.1.5 Interstate 35 Corridor Planning

Planning efforts to implement commuter rail service between Austin and San Antonio could greatly alter freight rail operations over this vital segment, which represents the critical route for NAFTA rail traffic between the U.S., Mexico, and Canada. Options for building upon existing plans to have commuter rail usage of the current rail lines that pass through the communities located along I-35 include adding additional track in the same right-of-way to separate freight and passenger operations or developing a new freight rail alignment that bypasses the communities. According to an executive committee meeting report from the Austin-San Antonio Corridor Council, TxDOT has hired an engineering firm to examine various new freight rail line alignments between Austin and San Antonio (Austin-San Antonio Corridor Council, 2004).

The second major effort to implement commuter rail service between Austin and San Antonio is the high-priority Trans Texas Corridor that parallels Interstate 35 from the Texas-Oklahoma border to the Texas-Mexico border, known as TTC-35. Routing for TTC-35 remains incomplete until two environmental impact statements are completed. TxDOT recently posted a notice of intent to prepare a Tier One Environmental Impact Statement for a proposal to construct TTC-35. This proposal includes provisions for six rail lines, one in each direction for high-speed passenger rail, commuter rail, and freight rail (Behrens, 2004).

In January, 2005, Cintra-Zachry were awarded a planning contract to develop the first phase of TTC-35. The consortium identified four potential projects, at least one of which involved improving rail connectivity in the San Antonio region.

4.5.2. Public Sector Intermodal Planning in Other U.S. States

The following provides examples of public involvement in freight rail programs to raise efficiencies on both rail and highway networks. The Alameda Corridor in southern California is widely known for the partnership between public and private entities to assist in the movement of containers from the port to UP and BNSF yards and also to reduce truck and passenger traffic delays due to grade crossing interruptions. Also described in this section are several other potential public-private projects around the country designed to improve both rail and vehicular traffic operations. As air quality, congestion, and the impacts from increased numbers of trucks continues to worsen, many entities are looking at partnering with the private railroads to create a better balance in the movement of goods and to more efficiently utilize the transportation system. A few examples are listed here, the two major ones involving the Los Angeles area and Chicago.

4.5.2.1. Alameda Corridor East

Some California planners believe the success of the 20-mile Alameda Corridor proves the viability of rail as a means to offset the growth of truck traffic. The Alameda Corridor East would travel eastward from downtown Los Angeles, where the current corridor terminates, and would continue approximately 60 to 100 miles outside the urbanized area to where many distribution and warehouse centers exist. Currently, the ports generate about 20,000 truck moves per week to these facilities (Mongelluzzo, 2003). With roadway congestion between the ports and the distribution centers and truck congestion at the port itself, the idea of a short-haul shuttle train provides an avenue to help relieve some of the congestion. Unfortunately, moving containers by rail for this short distance and then offloading them for local/regional distribution by truck is unprofitable. It falls well below the 500-mile threshold used by most railroad companies as a benchmark for turning a profit. However, moving shipments by rail to these distribution and warehouse centers could generate benefits for the local Los Angeles area, for example, reduced emissions and reduced congestion within the local area and at the port of LA/Long Beach.

4.5.2.2 Chicago—Chicago Region Environmental and Transportation Efficiency (CREATE) Program

As previously indicated, Chicago represents the major hub for freight rail activity, with rail freight volumes valued at over \$350 billion annually (AAR, April 2004). This is because the six Class One railroads (which includes the two Canadian railroads) converge at Chicago, and many of the interchanges between eastern and western railroads take place here. Unfortunately, the rail system connections are so poor that most of these interchanges do not involve direct transfer of the trains to the other railroad but instead require containers being unloaded at one yard and drayed by truck to another yard before continuing on to the second railroad. An estimated 1.2 million truck trips per year take place in the Chicago area transferring cargo from yard to yard (AAR, April 2004).

The CREATE Program is a public-private partnership between the private railroads, the city of Chicago, and the state of Illinois. The CREATE Program calls for “creation of five rail corridors, including one primarily for passenger trains, 25 new grade separations to eliminate many commuter delays, and the opening for commercial development of a key corridor in downtown

Chicago” (AAR, April 2004). The estimated project cost is \$1.5 billion and is expected to take six years to complete.

4.5.2.3 Additional Possibilities

Several other locations in the U.S. are also examining the use of rail intermodal to help reduce the continued growth in truck traffic and curb the negative effects of highway congestion. One of these projects is in the state of Virginia, where many trucks traverse the state on north-south routes between the northeast and southeast states. In 1999, Virginia’s General Assembly commissioned the study of intermodal as a potential transportation solution. Several reports have examined this subject, including one in December 2003 by Reebie and Associates examining the potential to divert trucks traveling along Interstate 81 to rail (National Corridors, May 2004). The state of Virginia is also taking part in the multi-state *Mid-Atlantic Rail Study: A Multi-Modal and Multi-Jurisdictional Case Study*, which plans to utilize public-private partnerships to improve both freight and passenger rail service. Another example is the New York/New Jersey Cross Harbor Freight Movement Project (Cross Harbor, 2004). Started in 2002, the study focuses on the movement of goods between the West-of-Hudson region and the heavily populated region east of the Hudson River, which currently relies strictly on truck transportation because of inefficient rail service with the existing rail infrastructure. Currently, no fixed rail infrastructure crosses the Hudson River within 140 miles of New York City. The project seeks to examine the potential for additional infrastructure, such as a tunnel, and to improve the economic and environmental conditions in the region. The five stated goals of the project include:

- Improving the movement of goods into, out of, and through the New York City/northern New Jersey/southern Connecticut region;
- Creating a more balanced transportation system to move goods in the region;
- Improving environmental quality in the region by diverting freight movements to less polluting modes of transport;
- Promoting economic development in the New York City region through a more efficient goods movement system; and
- Providing an additional option to the region’s vital Hudson River crossings (Cross Harbor, 2004)

This chapter categorized the wide variety of public private partnerships that can be adopted by state transportation agencies like TxDOT. Furthermore it provided examples of the types of potential public involvement in freight rail and rail intermodal planning activities in Texas and other U.S. States. The final chapter of the study summarizes the key challenges to, and opportunities from, partnering with railroads to maintain intermodal efficiencies, together with comments on the likelihood of success.

5. Conclusions and Recommendations

In 2004, intermodal business became the number one revenue-earning category for U.S. Class One railroads, even though the rail market share of U.S. transportation continues to fall (Resor and Blaze, 2004). In the past decade, while rail intermodal—comprising trailers and containers that would otherwise go by highway—grew strongly at around 5 percent, it still could not match truck operations, which grew its tonnage by 7 percent. This suggests that unless new strategies are implemented by railroads, shippers and users, and additional support is provided by the federal and state departments of transportation, even more freight traffic will be carried on the U.S. and Texas highway systems in the next 20 years.

This concluding chapter considers the challenges to, and opportunities from, increasing rail intermodal services. An increase would assist efforts to spread freight demand across all possible U.S. transportation modes and also support efforts to improve economic efficiency and social welfare. Containers moved by rail, rather than on highways, require less energy per ton-mile, produce less air pollution for each ton-mile, and free up highway lanes, thereby improving capacity at key locations and along congested state highway segments. Services currently offered, however, are not cost competitive with trucks on shorter routes, and network capacity and operational constraints are dampening the ability of railroads to gain further market share on longer routes.

The key challenges and opportunities derived from Study 0-4410 are summarized in the chapter, which also contains an assessment on the likelihood of success associated with specific recommendations.

Challenges

1. Class One Railroad Business Models. U.S. Class One railroads are running near or at capacity on certain network segments and at key locations, which has limited both opportunities for business growth (e.g., intermodal business) and their ability to maintain overall service levels. If rail intermodal is to take more traffic off the highway system, it will need to compete more successfully with highway truck services for traffic moving farther than 700 miles in trip length. The challenge is to offer delivery schedules closer to those offered by trucking companies, particularly since truckers want to use more rail services to balance driver shortages and fuel increases. Rail scheduling difficulties, which arise for many reasons, are preventing widespread adoption of higher-speed services from being marketed to rival those offered by trucking companies. Implementing a wider range of service (speed) schedules places constraints on manpower and locomotive availability. It is worth noting that trucking companies generally see themselves as transportation service companies (i.e., gaining profit from a variety of value-added services and competing with both rail and air modes), while railroads are still point-to-point transportation companies, gaining revenue from moving commodities—sometimes at or below cost—on rails.

2. Constrained Rail Network Capacity. The rail network has operational problems at bottlenecks like Chicago and Houston and network problems along portions of key routes like the Sunset Limited in Arizona and at Beaumont, Texas. Traditionally, railroads have funded any changes in network capacity from revenues and bonds, but, the huge cost of the current infrastructure investments now needed to bolster service exceeds the ability of railroad companies to service their financial needs. Railroads are simply not making sufficient profit and rate of return from their current operations and rate structure. Additional U.S. rail capacity is needed, and needed relatively quickly, but it cannot be met by the railroads alone.
3. Partnering Opportunities at both State and Federal Levels. Railroads and state departments of transportation operated somewhat independently of each other for many decades. Each maintained a single mode focus until deregulation took effect in the early 1980s, at which point the culture within both entities gradually began to change. The major change for state departments of transportation came with the passage of ISTEA in 1991. As a consequence, intermodal planning was recognized as a potential tool to assist highway planning and this made rail an important component of statewide transportation planning. In Texas, TxDOT created and then enlarged a multimodal office to reflect this new focus, and has since undertaken a number of initiatives to strengthen non-highway operations. Railroad companies are also changing their business model. BNSF recently created a partnering team to examine opportunities for joint investments and seek ways to identify other beneficiaries from rail investments with whom they might partner. The signs are therefore encouraging, but, as with many institutions founded on single missions, change will be slow and will need consistent encouragement. Central to the success of changing and improving multimodal planning is the role of the federal government. After a number of years of “benign neglect” of freight planning, it is apparent that the USDOT now acknowledges the role of freight planning in the U.S. economy and is undertaking a series of initiatives examining the importance of freight planning to the U.S. economy and identifying strategies to improve national freight performance. Among the issues to be evaluated is the role of rail intermodal and the type of support that needs to be provided to the U.S. railroad systems to maintain competitiveness and grow modal share.

Financing

1. Rail Economics. U.S. railroads are only thinly profitable and thus remain among the weakest of the various transportation modes in terms of capitalization, overall profit and rate of return. This is a serious challenge to growth strategies and limits the degree to which additional capacity and network investments can be made. It also hampers efforts to improve intermodal services to rival other modes. Railroads are to be commended on maintaining a steady stream of modest system improvements in the last 10 years while returning a profit to the shareholders. However, the scale of the investment needed to substantially improve the network is now simply too large to be met wholly from the company balance sheets. Railroad companies are therefore now seeking financial partners to share the costs burden. A case that can be made for encouraging more financial support for rail is to compare the economic analysis of rail operations with other modes. This approach will require that the various external benefits from railroad operations be

explicitly recognized in federal and state transportation planning. These benefits are currently not accounted for in the costing schedules of users and in the cost-benefit analyses of the modes.

2. Intermodal Trips under 700 Miles. This study concluded that almost all the containers seen on Texas highways are there for rational economic reasons, mostly as a result of lower trip costs or lack of competing rail service. There is substantial literature on railroad costing in the United States and the breakeven distances needed to operate rail intermodal service. Rail intermodal service has become more competitive in the last 20 years and rail competed with truck at intermodal trip lengths of around 750 miles or longer in the 1980s. The development of sophisticated double stack services, improved schedules, and greater cost control at rail yards drove this distance down to the current figure of around 500 miles. This still leaves the need to move the container, using either a dray vehicle or a regular tractor, over the final leg of the trip. For example, containers entering the Port of Houston and destined for locations in Harris County are all delivered by truck and cannot be delivered by rail. And when containers are seen moving by truck on longer routes such as Houston to Laredo, it is simply because a competitive rail link does not currently exist, thus making truck the only reasonable mode for shipper.

Drayage costs dominate the overall cost of moving containers by rail over shorter distances. At a trip distance of 200 miles drayage is approximately 75 percent of the total cost, falling to around 66 percent of total costs at 500 miles (Resor, and Blaze, 2004a). There are several strategies that could be adopted to reduce drayage moves and costs (the latter by eliminating waiting and so raising truck utilization). In practice these have been proven difficult to implement. There are many stakeholders that would be affected, including the railroad, the terminal operator, the shipper, the drayage company, and the intermodal retailer (Prozzi, Henk, McCray, and Harrison, 2002). A potential solution is to offer an operating subsidy to the railroad company to allow services to be offered on a regular basis on lines which complement congested highway corridors. Such a program would determine the elements needed to divert containers from the highway system to the rail network and the subsidies needed to get shippers to switch modes.

As far as the DOT is concerned, encouraging railroads to offer more service routes less than 500 miles could result in substantial diversion from competing highways over certain key lanes in Texas. The critical cost component in intermodal transfers of 500 miles or less is the drayage costs at each end of the rail trip. The rail trip is comparatively inexpensive on a per-mile basis and if efforts were undertaken to reduce drayage costs, rail service could be competitive. This is shown in the two cost curves illustrated in Figure 5.1, one for intermodal rail and the other for truck. The shaded area between the two curves is the cost reduction that would have to take place to make rail cost competitive with truck. To give some idea of the cost-magnitude, BNSF has calculated it would need a subsidy of around \$75 per container to move a shipment from the Port of Houston to a destination in the Dallas-Fort Worth region. As an example, if 25 percent of those containers handled by the Port going to destinations beyond Harris County by truck were diverted to rail, an annual subsidy of around \$12 million would be required.

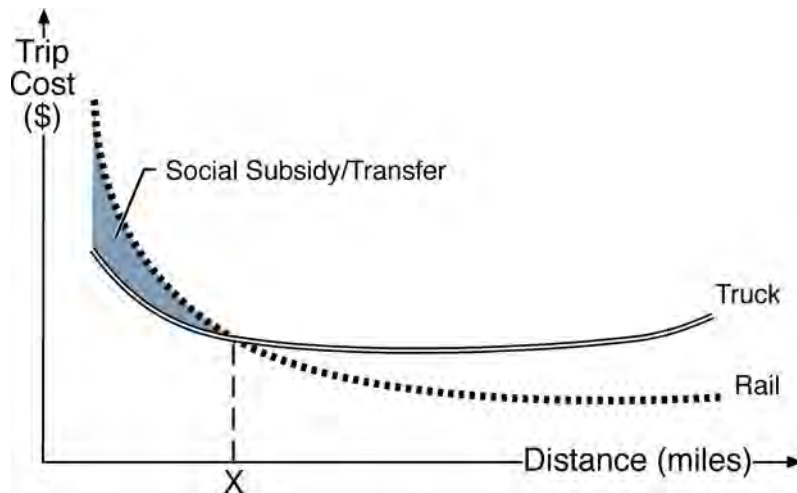


Figure 5.1 Container Intermodal Trip Costs-Impact of Drayage

There are two general ways of addressing this cost reduction. The first is to reduce the dray costs using more efficient methods of scheduling dray vehicles at terminal gates, reducing delays, and allowing them to make additional runs during the day and hence raising total revenues. The other is a social cost method that provides a subsidy based on the marginal benefits gained by society from transferring containers off highways and on to rail. These benefits are well known, though not necessarily easily quantified, and are related to delay, safety, and air quality.

The railroad sectors concern over size and weight legislation has not prevented them from forming close relationships with a wide variety of trucking companies and moving both trailers and containers for these sectors. This takes place in a variety of ways, ranging from the movement of empty semi-trailers for Schneider International Inc through dedicated double-stacked containers for J.B. Hunt Transport Services Inc to international cargo carried for a wide variety of steam shipped companies. Supply chain management and increasingly sophisticated transportation logistics in the 1990s combined to bring the transportation modes into a position where there is substantial cooperation as well as competition. Moreover, the large railroads are now considering developing large hubs outside the larger metropolitan areas to supply transportation services to a wide range of customers. The DOT can benefit from this change in business strategy and the rise in partnering among transportation providers.

Opportunities

1. Partnering with TxDOT. Railroads now recognize that the scale of the problems they face requires them to talk constructively about opportunities for improving their service levels and take advantage of growing market share in the intermodal sector. The Chicago CREATE project is an excellent example of how sophisticated such a partnership can become, although it can be as simple as a bottleneck solution, such as improving rail access to the Port of Beaumont. Similarly, the recent announcement of the memorandum of understanding between the State of Texas and UP regarding rail relocation is another

example of an opportunity to solve corridor congestion by public-private partnering. Chapter 4 described the wide variety of forms that partnering can take and it is expected that there will be substantial opportunities in the next five years for TxDOT to explore opportunities for partnering with a focus on increasing rail efficiencies in Texas. The likelihood of success on this issue for TxDOT is high.

2. Inland Ports. The railroad networks cannot be ignored by transportation planners in the United States since they provide access to almost all major markets, often serving terminals deep in the metropolitan central business districts. The traditional network of lines and central city yards is now being strengthened by the development of large peripheral rail consolidation centers that provide an opportunity to add value to the rail-based transportation services (Port of Long Beach, 2002). This is an important development for Texas because the Alliance inland port in the Fort Worth area, which is served by BNSF, was arguably the first example of this emerging model. This example demonstrated that substantial benefits to shippers could arise from using a major intermodal yard where substantial added values (logistics, distribution, light engineering, links to other modes, Free Trade Zone, etc.) could be offered close to major markets. Over the next decade it is likely that all Class One railroads will begin to transfer key operations from their traditional smaller yards to these larger peripheral yards and retain the smaller yards for “hub and spoke” distribution or real estate assets. It is likely that several opportunities will arise for TxDOT to work with UP and BNSF to provide connectivity and other planned transportation investments to proposed inland port or logistics park locations in the next five years.
3. Moving Containers Efficiently. Containers are now the number one business category for U.S. railroads and this position is likely to strengthen as some of the traditional commodities—particularly coal—decline with the changes in thermal energy uses, particularly those related to electricity generation. The growth of intermodal operations will change the business models of the railroads, the way they are organized, and the way they do business with their key customers. They will move from a passive to a more active role and take advantage of the importance of the rail elements in the supply chain. Class One railroads will negotiate more profitable service contracts with truckers (as they are now starting to do) and shippers.
4. Improving Rail Access. A major opportunity for encouraging container shippers to choose rail lies in the improvement of rail access to those U.S. deep-water ports receiving containers. Some interesting partnering projects to improve rail access were given in the text and include those at the Ports of New York and New Jersey, together with the Port of Long Beach Rail Master Planning Study (2004). In this document, intermodal demand in 2020 is predicted to reach 36 million TEU, of which 18 million will move on rail intermodal services. The Port of Houston has also proposed a rail plan that has received initial approval from the two main rail carriers. TxDOT is aware of this proposal and the need to partner in the development of improving access to the Port of Houston as well as all deep-water Texas Gulf ports seeking improved rail access (Journal of Commerce, October 2004).
5. Multimodal Planning. There are several opportunities for TxDOT rail planning activities to support intermodal services because Texas has specific rail bottlenecks (e.g., San Antonio, Beaumont and Fort Worth) and there is a need to improve rail corridors to

increase regional network capacity. These problems will generate opportunities to partner with the railroads in ways that have a higher probability of success. Improved highway network links to the new peripheral rail centers now being developed by the railroad planners also provides an ideal opportunity for increased TxDOT collaboration.

6. Promoting Intermodal Rail Services within the Texas Triangle. A less certain opportunity centers on offering cost competitive rail services within the Texas Triangle (DFW/Houston/San Antonio). Current calculations by railroads and consultants suggest that it is not possible, even with the improved intermodal service of the 1990s, to be cost competitive with trucking. The mode of transport used would be rather different if external costs were included into the cost calculations, but this is unlikely to occur for many years. The opportunities for TxDOT to benefit from promoting shorter rail trips would seem to rely on two factors. The first involves drayage and the opportunity for making drayage more efficient and therefore less expensive. Operating costs of dray trucks seem to be close to optimal—with very little opportunity for reducing costs further. But there are opportunities for making drayage more efficient by promoting opportunities for more trips to both marine ports and intermodal yards. If turnaround at these sites can be improved, then the overall trip costs (cents per mile) will drop as these efficiencies work their way through the cost structure. Second, there is the opportunity for providing some form of social subsidy that reflects the benefits from taking containerized traffic off of highway and keeping it on rail. At present, this remains theoretical, as no mechanism currently exists to finance such subsidies.
7. Texas Gulf Coast Opportunities. Finally, Texas has the benefit of a marine state border comprising both deep-water and the Gulf Intercoastal Waterway, and these permit water borne modes to offer complementary services for those shipping containers. This can take place by both barge and ship, the latter coming under the general heading of short sea shipping—a topic much in vogue at the present time. Osprey Lines of Houston have operated a COB service to designated Gulf ports for several years and recently announced a new short sea shipping service (Box 5.1). It is important for TxDOT to maintain its current interest and knowledge in the container on barge and other shipping opportunities for taking containers off the highway.

Box 5.1 Osprey Line Launches Houston-Tampa Box Service

Osprey Line launches Houston-Tampa box service

NEW ORLEANS—Osprey Line is set to launch a short-sea coastal container service linking Houston and Tampa.

The container ship Sea Trader is scheduled to depart this evening from Barbours Cut at the Port of Houston. The 220-TEU, U.S.-flag container vessel previously was privately owned and deployed in Alaska. The Sea Trader, which also can accommodate reefer containers, will make weekly calls at each port and connect with already existing Osprey container-on-barge coastal and inland services throughout the Gulf of Mexico and on the Mississippi River system.

Osprey has established a terminal at the Port of Tampa. The terminal offers full depot-level container services with warehouse storage and transfer. Trucking and dispatch services are also available.

Source: Journal of Commerce

This report believes that further opportunities to move containers on water will make an impact in the near future. Not only will this involve specific commodities like food aid, chemicals and plastics, but also empty containers, as they are repositioned along the supply chain. In both cases, trip lengths could be relatively short (especially for empties) and take trips out of non-attainment areas.

Concluding Remarks

This study began with two relatively simple premises. First, could the volume of containerized traffic on the highway be reduced by encouraging shippers to keep containers on rail for a longer period of their full trip? A secondary premise was more general and sought to find out whether commodities currently using trucking might switch to rail intermodal in future. With respect to the first question, the study found that almost all of the containerized traffic moved on the highway is doing so for valid reasons, based on either cost or service levels. Much of the container traffic seen on Texas highways is moving from a rail intermodal yard to a final customer not connected by rail. Therefore, that move would remain on the highway irrespective to changes in improved services on the current rail network. Furthermore, the results suggest that the amount of tonnage moving on the highway in containerized form is relatively low and constitutes less than 2 percent of truck AADT. In other words, it is not central to the immediate problem TxDOT faces when attempting to develop strategies that mitigate congestion.

The findings regarding future intermodal traffic suggest that the rail network is currently near capacity on many parts of the network and that there is not a substantial opportunity for future growth. This is important to recognize given the interest of TxDOT in stimulating strategies that will improve overall railroad intermodal capacity, service capabilities and so keep traffic off highways. A number of shippers using the highway system would like to use rail if it could come close to matching service levels. But the current rail system is incapable of offering the benefits shippers derive from using the highway system. This is an indication that an important segment of the market that could potentially be captured by rail (the higher speed service) simply cannot be offered by railroads (Gallagher, 2004).

A recent AAR-sponsored study (Cox, 2002) recommended tax incentives to help shift freight from highways to rail. It studied 49 major U.S. cities and concluded that if 25 percent of the freight volume is moved from road to rail, 3.3 million truck trips could be switched from highways. The study concluded that this would translate into savings that comprise 44 hours of commuting time per person which itself would represent a reduction of congestion costs of \$620 per household each year. The data for 2025 are given in Table 5.2, which, though clearly sensitive to the assumptions made by Wendell Cox, do support the basic reason for this study, namely to move more containers in Texas on modes other than highway.

Table 5.1 Shifting Freight from Highway to Rail: Predicted Savings¹

City	Hours Saved per Peak Hour per Traveler	Household Commuter Savings	Gallons Saved per Commuter	Trucks Removed Each Daily Peak Period
Austin	47.1	\$651	228	20,000
Dallas/Fort Worth	44.0	\$614	256	94,000
Houston	44.1	\$614	244	79,000
San Antonio	36.9	\$518	218	27,000

Source: Wendell Cox, 2004

Rail intermodal appears to be at a crucial stage in its development. It has become an important sector of railroad business and is now nearing the limit of its capacity to meet shipper demand over key lanes. Unless the obstacles to increasing capacity can be overcome, this suggests that there is little room for rail to take a substantial part of the future predicted demand for intermodal services. Because of this, it is even more important that state departments of transportation like TxDOT position themselves to play an integral role in stimulating the federal and state strategies and partnerships that are necessary to correct this deficiency.

¹ This is a multi-attribute study which reports savings in different forms for a variety of U.S. cities. The table reports the various savings from the Texas cities selected for the study.

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Appendix A: Texas DOT/UP Memorandum of Understanding

MARCH 18, 2005 MEMORANDUM OF UNDERSTANDING BETWEEN THE STATE OF TEXAS ACTING THROUGH THE TEXAS DEPARTMENT OF TRANSPORTATION AND THE UNION PACIFIC RAILROAD FOR A COOPERATIVE PARTNERSHIP TO ADDRESS FREIGHT RAILROAD RELOCATION ISSUES IN THE STATE OF TEXAS

WHEREAS, the Governor of Texas, on behalf of the citizens of the State of Texas, acting through the Texas Department of Transportation (TxDOT), plays a key role in transportation planning and the impact such planning has on communities and citizens all across the state of Texas; and WHEREAS, TxDOT is authorized to participate in the planning, design, and development of multiple modes of transportation within the state; and WHEREAS, investments in the state's rail freight system can be leveraged to provide major public benefits and can play a significant role in addressing growing transportation demands and related public issues such as automobile congestion, pollution, safety, and energy; and WHEREAS, in many communities across the State of Texas development has occurred that has placed businesses and homeowners directly adjacent to pre-existing Railroad corridors that have often been in existence for well over 100 years; and WHEREAS, in certain cases existing Freight Rail Corridors could be available for alternate uses, including service to local Freight Customers, if and when the existing Through Freight Rail operations could be relocated to new corridors where rail infrastructure has been put in place to accommodate Through Freight Operations, and WHEREAS, Union Pacific Railroad (UP) owns and operates rail freight transportation services within the state of Texas; and WHEREAS, UP believes that certain rail relocation projects may be achieved through public-private partnerships and offer important opportunities to improve the state and national freight rail system; and WHEREAS, UP and the State of Texas believe that there are locations and communities in Texas where the relocation of existing Through Freight rail corridors could indeed create significant Public Benefits for Citizens in the State of Texas.

WHEREAS, UP and the State of Texas agree that feasible proposals to relocate existing rail operations planned or developed as a result of this Memorandum of Understanding (MOU) will adhere to five basic principles identified as:

Public-private rail relocation projects undertaken within the scope of this MOU must be voluntary for both parties and will be contingent upon the parties entering into definitive agreements; furthermore, it is understood that TxDOT is responsible for protecting the public interest and investments, while UP is responsible for protecting the interests of its customers, shareholders and employees; and

Investment by Texas to fund any rail relocation project considered under this MOU must be commensurate with the benefit the public derives from the project. The source of such public funds should be from existing funds or some other general revenue source, and will not be funded by a user charge, additional taxes, or new fees levied on the rail industry in the State; and

Any UP contribution toward any rail relocation project considered under this MOU must be commensurate with the private benefit, if any, it derives from the project; and

Planning for rail relocation projects considered under this MOU must be coordinated among stakeholders to insure appropriate investments result from the public-private partnership

process. UP will continue to work with TxDOT on such efforts and will supply reasonable input to the process.

Planning and project implementation must take place in a manner that preserves the existing rail industry regulatory regime as well as ownership rights; and

The State will not expend public funds for any rail relocation project that would alter the existing competitive relationships between and among the railroads.