Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA/TX-09/0-5937-P1		

4. Title and Subtitle	5. Report Date
GUIDEBOOK: POTENTIAL POLICIES AND INCENTIVES TO ENCOURAGE MOVEMENT OF CONTAINERIZED FREIGHT ON TEXAS INLAND WATERWAYS	August 2008 Published: February 2009
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
C. J. Kruse, C. A. Morgan, and N. Hutson	Product 0-5937-P1
9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Texas Transportation Institute The Texas A&M University System College Station, Texas 77843-3135	11. Contract or Grant No. Project No. 0-5937
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Texas Department of Transportation Research and Technology Implementation Office P. O. Box 5080 Austin, Texas 78763-5080	Product
	14. Sponsoring Agency Code

15. Supplementary Notes

Project performed in cooperation with the Texas Department of Transportation and the Federal Highway Administration

Project title: Development of Potential Policies and Incentives to Encourage Movement of Containerized Freight on Texas Inland Waterways

URL: http://tti.tamu.edu/documents/0-5937-P1.pdf

16. Abstract

This guidebook is designed to answer three basic questions:

1. Why is the Texas Department of Transportation interested in moving more cargo by water?
2. What are the potential benefits of moving more cargo by water?
3. What specific steps can TxDOT or the State of Texas take to encourage more waterborne freight movements?

It describes the need for increased utilization of marine freight options, summarizes what other Gulf states are doing, looks at the challenges involved, describes the potential benefits of increasing the utilization of marine freight options, and recommends several steps TxDOT could pursue in the short term to encourage more waterborne shipments along the coast. A chapter of Frequently Asked Questions (FAQ) regarding "Short Sea Shipping" or "Marine Highways" is included for readers who do not regularly deal with marine transportation issues.

17. Key Words	18. Distribution Statement

19. Security Classif.(of this report)	20. Security Classif.(of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	40	

GUIDEBOOK:
POTENTIAL POLICIES AND INCENTIVES TO ENCOURAGE MOVEMENT OF CONTAINERIZED FREIGHT ON TEXAS INLAND WATERWAYS

by

C. J. Kruse
Texas Transportation Institute

C. A. Morgan
Texas Transportation Institute

and

N. Hutson
Center for Transportation Research

Report 0-5937-P1
Project 0-5937
Project Title: Development of Potential Policies and Incentives to Encourage Movement of Containerized Freight on Texas Inland Waterways

Performed in Cooperation with the
Texas Department of Transportation

August 2008
Published: February 2009

Texas Transportation Institute
The Texas A&M University System
College Station, Texas 77845-3135

Disclaimer

The contents of this product reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the Texas Department of Transportation. This report does not constitute a standard, specification, or regulation.

ACKNOWLEDGMENTS

We would like to acknowledge the guidance and support provided by the TxDOT Project Monitoring Committee: Jennifer Moczygemba, P.E., project coordinator; Scot Sullivan, P.E., project director; Orlando Jamandre, project advisor; John Sabala, project advisor; and Stephen Ndima, project advisor.

Purpose of this Guidebook

This guidebook is designed to answer three basic questions:

1. Why is the Texas Department of Transportation interested in moving more cargo by water?
2. What are the potential benefits of moving more cargo by water?
3. What specific steps can TxDOT or the State of Texas take to encourage more waterborne freight movements?

The fiscal and regulatory framework within which the marine transportation system functions is constantly changing. For this reason, this volume should serve only as a beginning reference for those who are interested in better planning for waterborne freight in Texas.

A detailed report is available at http://tti.tamu.edu/documents/0-5937-1.pdf, "Development of Potential Policies and Incentives to Encourage Movement of Containerized Freight on Texas Inland Waterways."

Table of Contents

Page

List of Figures ..... **x**

List of Tables ..... **xi**

At a Glance ..... **xii**

Chapter 1: The Problem **1**
Background 1
Other State Programs 4
Texas Programs 5
Challenges 5

Chapter 2: Potential Benefits **9**

Chapter 3: The Way Forward **13**
Background 13
Types of Measures 13
Prevent Encroachment on the GIWW 14
Marketing by the State 14
Provision of Data 14
Promotion 15
Designating Overweight Freight Corridors 15
Air Quality Credits 16
Greater Cost Recovery from Large Trucks 16
Summary 17

Chapter 4: Current Private Sector Initiatives **19**
Cedar Port 19
Brownsville-Houston Barge Express 20
National Shipping of America 20
SeaBridge Freight 21
Case Study: Port of Richmond, Virginia 22

Chapter 5: FAQs **25**

LIST OF FIGURES

Page

Figure 1. Ton-Miles per Gallon by Mode 9
Figure 2. Summary of Emissions - Grams per Ton-Mile 10
Figure 3. Ratios of Fatalities and Injuries per Ton-Mile. 11

LIST OF TABLES

Page

Table 1. Texas Waterborne Container Traffic 3
Table 2. Potential Measures and Responsible Agencies..... 18

AT A GLANCE

The State of Texas may achieve direct benefits in the short term by moving freight off the highways and onto the waterways:

- Improved interstate and international trade possibilities (p. 9)
- Improved energy efficiency (p. 9)
- Reduced emissions (p. 10)
- Reduced injuries and fatalities (p. 10)
- Increased ability to attract business to the state (p. 11)
- Congestion mitigation (p. 11)
- Reduced wear and tear on highways (p. 11)

Measures TxDOT can implement in the short term to encourage more waterborne freight movement include:

- Prevent encroachment on the GIWW (p. 14)
- Provide marketing data (p. 14)
- Assist in developing targeted overweight freight corridors (p. 15)
- Develop air quality credits for activities outside non-attainment areas (p. 16)
- Implement greater cost recovery for trucks (p. 16)

CHAPTER 1: THE PROBLEM

Background

The expansion of opportunities for waterborne freight transportation is critical for developing a sustainable freight system in the United States. Developing water alternatives for freight will:

- Enhance the state's and the nation's total transportation capacity,
- Relieve congestion in highway and rail corridors that are at or over capacity,
- Improve the energy efficiency of freight transportation, and
- Make the freight network less vulnerable to labor and energy shortages.

The water corridors that can be used for additional freight transport already exist and have significant untapped capacity. Nevertheless, creating the proper conditions to facilitate the sustained growth of water transport in order to take trucks off of the highways will require a long-term plan, including investment by the public and private sectors.

Despite the overwhelming need for new freight capacity in the United States, freight corridors can only succeed if they are well positioned to serve population centers and provide measureable advantages in time, cost, or reliability over existing corridors. There are several water freight corridors in Texas that have the potential to meet one or more of these conditions.

The most clearly evident basis for the creation of a "Marine Highway" system is that it can effectively serve rapidly growing coastal populations. In Texas, the population of coastal counties increased by 52 percent, or 2.5 million persons, between 1980 and 2003. Population density grew from 54 persons per square mile in 1980 to 84 persons per square mile by 2008.[1] Robust growth is expected to continue along most of the Gulf Coast for the foreseeable future and will be reflected by increasing traffic demands along already heavily traveled coastal highways such as I-10, Highway 77, and Highway 59.

[1] Population Trends Along the Coastal United States: 1980-2008, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Washington, DC, March 2005.

In addition to population growth, the increased reliance on international trade has created significant demand for port facilities to process containerized consumer goods and move cargo between manufacturing centers along the coast. These activities are placing a growing burden on the Texas road network. Almost all of the containerized cargo in Texas is presently cleared from the port area by trucks. The Port of Houston Authority's Bayport Container Terminal, which celebrated its grand opening on February 8, 2007, is the primary location through which the entire Port of Houston complex expects to eventually triple its current container handling capacity over the next 20 years. Additional deepwater container terminals may be developed along the Texas coast in locations such as Corpus Christi, Freeport, Galveston, and Texas City. The projects in Corpus Christi, Freeport, and Texas City have received construction permits from the U.S. Army Corps of Engineers (USACE) for their new container facilities, and Port Freeport has already initiated construction on its Velasco Terminal.

Two metrics are commonly used to measure freight flows. For non-containerized freight, the typical unit is the short ton, which is 2,000 pounds. For containerized freight, the unit of measure is the Twenty-foot Equivalent Unit (TEU). One 20-ft container is one TEU, while one 40-ft container is two TEUs. Likewise, container ships are classified by the number of TEUs which they can carry.

The growth trend in international trade is expected to increase even further with the expansion of the Panama Canal, which is now scheduled for completion in 2015. According to a recent study conducted by Cambridge Systematics for TxDOT:

> This expansion…will significantly impact the intermodal transportation system in Texas and accelerate growth at all of the state's seaports. In the short term, these impacts will be felt most heavily on and around the Port of Houston, the state's largest container port and a key trading partner for goods shipped via the Panama Canal.[2]

This additional growth will result in three specific effects on marine trade: (1) growth in Houston will be significant, (2) a need for feeder services to move cargo in and out of the Houston area will most likely surface, and (3) the prospects for developing significant containerized activity in Freeport and Corpus Christi will improve greatly.

[2] "Effects of the Panama Canal Expansion on Texas Ports and Highway Corridors", Cambridge Systematics, October 2006.

Historically, Texas ports have handled primarily bulk and general cargoes (petroleum, petrochemicals, steel, minerals, project cargo, etc.), yet containers make up a growing share of the total. Table 1 shows the growth in freight since 2001 in terms of tons and TEUs.

Table 1. Texas Waterborne Container Traffic

Year	Total Tons All Cargo (000's)	Texas TEUs[3]	Houston TEUs
2001	454,765	1,215,959	1,057,869
2002	442,251	1,265,513	1,147,489
2003	473,941	1,321,561	1,243,866
2004	502,038	1,516,444	1,437,585
2005	487,100	1,677,968	1,594,366
2006	488,357	1,691,155	1,606,786
2007	N/A	N/A	1,768,627

With new terminals and larger channels coming on line, the amount of freight will increase even more rapidly and will tend to come in significantly larger "pulses" as average vessel sizes continue to increase. Texas' transportation system has reached a point where it is no longer advisable to consider each of the modes separately—the objective must be to maximize throughput for the transportation system as a whole. One strategy for mitigating the impact of increased freight volumes, as well as lessening environmental and safety impacts on the general population, is to create the conditions necessary to move more coastal freight traffic by water. It is an option that has so far seen comparatively little public investment. New marine services or expansion of existing services could take place within the Gulf Intracoastal Waterway (GIWW) or coastwise in oceangoing vessels.

Waterborne containerized cargo in Texas is highly concentrated in the Houston-Galveston-Freeport area. To be able to impact a broader geographic area, it will be necessary to: (1) establish feeder services that move cargoes to and from the Greater Houston area and other coastal areas in Texas and (2) establish new coastal marine services that do not exist today.

[3] TEU information obtained from American Association of Port Authorities, "U.S. / Canada Container Traffic in TEUs (1990 - 2007)", as of May 27, 2008.

There is now a significant amount of literature that discusses impediments to establishing a sustainable short sea or inland waterway shipping system. Among some of the most frequently mentioned impediments are:

- The need to alter or retrofit port facilities,
- The Harbor Maintenance Tax (a levy placed on the value of foreign cargo imported to a port within the United States or that is transported between two U.S. ports),
- Shipper reluctance to try alternative modes,
- Ship financing/availability,
- Lack of statistical data needed for making an accurate analysis of trade flows, and
- Focus of planners on specific modes rather than a system-wide approach.

Other State Programs

Many states regularly facilitate site purchase, permitting, and tax incentives for major industrial developments. Other states in the Gulf of Mexico region have instituted programs to specifically encourage the development of marine freight infrastructure in their states. The marine freight transportation industry in Texas must compete with service providers in other states where these incentives are available. Examples of such policies in other Gulf Coast states are:

- **Alabama:** Alabama provides tax breaks to companies making capital improvements at the State Docks. It dedicates a portion of the Oil and Gas Capital Payments originally being paid into the Alabama Trust Fund to port and intermodal development. Thus far, $100 million has been dedicated to the Alabama State Port Authority for port revitalization and the new container terminal at Choctaw Point.
- **Florida:** Florida has the Florida Seaport Transportation and Economic Development (FSTED) Council. The Council is a public entity created by statute and charged with implementing the state's economic development mission by facilitating the implementation of seaport capital improvement projects at the local level. The FSTED program requires consistency with local plans and matching funds from each seaport; thus, seaport investments are driven by a local commitment to meet the community's strategic objectives, but are subject to oversight at the state level. Funding has been

running at $15 million for several years, although an additional $50 million was appropriated in 2007.

- **Louisiana:** Louisiana has a Statewide Transportation Plan that includes the Ports Construction and Development Priority Program that provides assistance in the form of construction funds and guidance. Currently the priority program is funded at $20 million per year. As of March 2007, $335.5 million had been allocated, allowing funding of 160 projects. The State approved another $27.6 million for new project starts in 2007.
- **Mississippi:** Mississippi has established the Port Revitalization Revolving Loan Program (Port Loan Program), administered by the Mississippi Development Authority (MDA), that makes loans to state, county, or municipal port authorities (local sponsors) for the improvement of port facilities to promote commerce and economic growth in the State of Mississippi. These loans have a maximum term of 10 years, a maximum amount of $750,000, and an interest rate of 3 percent. MDA is authorized to issue up to $12 million in bonds for this program.

Texas Programs

In the Texas Ports 2007-2008 Capital Program published by the Texas Department of Transportation (TxDOT), port authorities identified $35,100,000 in improvements as being important to the functioning of shallow draft operations. In 2001, the Texas Legislature created a mechanism to assist in financing port security, infrastructure projects, and studies (the Port Access Capital Fund), but the Legislature has not yet capitalized the fund.

Challenges

There are a number of challenges in modernizing the domestic marine transportation system so that its market can be expanded and diversified. Some of these issues can be addressed directly by the State of Texas, whereas others must be resolved by the federal government or private industry.

- **Speed of delivery/Scheduled delivery.** Waterborne trade historically has been composed of high-volume bulk cargoes that are not time-sensitive. For these cargoes, cost is more important than speed. However, in today's market, more and more industries are using just-in-time (JIT) production methods, which require speed,

timeliness, and reliability. Inventory costs are becoming very important in the decision-making process as cargo values rise. Shippers are increasingly demanding set schedules with firm delivery windows from waterborne freight services. While this is primarily a problem for private industry to address, TxDOT can assist by working to prevent encroachment by recreational land uses along the GIWW. This encroachment threatens to limit the waterway's productivity and can lead to unforeseen delays in shipments.

- **Lack of market data.** There are very limited non-proprietary market data upon which interested service providers can base routes, schedules, and equipment allocation. The data that are available are typically port-to-port data, which do not reveal the origin of the cargo or identify the end user. Without this information, it is difficult to determine which markets a carrier should aggressively pursue or which routings could be altered to move on water. Texas agencies could assist by working with shippers and freight service providers to determine what market data would be necessary to ensure that potential providers of waterborne freight have a clear understanding of the unmet demand. Appropriate agencies to conduct these efforts may include the Economic Development and Tourism Office or TxDOT.
- **Need for specialized container handling equipment at ports and terminals.** Many inland waterway terminals are not designed or equipped to handle containers efficiently. For a competitive system to develop, additional terminals will need to invest in cranes and yard space. As of 2006, 43 terminals on the entire U.S. inland waterway system were handling containers, 32 of which were located in deep draft seaports. Only seven other terminals could begin to handle containers without major investments.[4] The State Legislature could address this issue by capitalizing the Port Access Capital Fund, which was created during the 2001 legislative session.
- **Harbor Maintenance Tax issues.** The Harbor Maintenance Tax is repeatedly mentioned by carriers and shippers as a deterrent to domestic coastal freight movements, particularly those of high value containerized goods, given that the tax is assessed on the value of cargo. The Harbor Maintenance Tax is a levy (0.125 percent) placed on the value of foreign cargo imported to a port in the United States or that is

[4] Container-on-Barge Market Analysis, Texas Transportation Institute, 2006.

transported between two U.S. coastal ports. This issue principally impacts domestic (cabotage) shipments. In these cases, the cargo is being double taxed whereas a truck or rail movement would not be charged the tax. This is a federal issue that must be resolved by the U.S. Congress.

- **Resistance by logistics managers to experiment with alternative transport.** Many logistics managers are reluctant to experiment with an alternative transportation system, particularly if that alternative is seen as less reliable. In order to remain viable in an extremely competitive market, logistics managers are required to maintain a near perfect record in terms of on-time delivery. Logistics managers are required to have their shipments where they need to be on time and in good condition and cannot afford a breakdown anywhere in their logistics chain. Given the historical nature of waterborne cargo (non-time sensitive movements), many logistics managers are simply skeptical of the availability of marine commerce to meet their needs. However, because the industry is so competitive, there is a small but growing number of ambitious logistics firms that are looking for alternatives – particularly if those options provide a fuel cost advantage. This is primarily an issue for the private sector, but the State of Texas could help by committing to a diversification of future modal split and providing appropriate research on freight flows and the costs of transportation.
- **Jones Act[5] issues.** The ability to expand the fleet of coastwise shipping vessels is made more difficult by the legal framework established in the aftermath of the First World War to restrict foreign ownership of commercial marine vessels. Because of Jones Act requirements, carriers are not allowed to use foreign-made vessels in the trade, and the supply of domestic vessels suited for this type of activity is currently quite limited. The requirement to construct these vessels in the U.S. simply places a steep capital requirement on most start-up operators. As with the Harbor Maintenance Tax, the potential to modify this restriction lies solely within the domain of the U.S. Congress.
- **Single mode focus in transport planning.** Most transportation system planners still focus on a particular mode with only incidental attention paid to other modes. In

[5] "Jones Act" typically refers to Section 27 of the Merchant Marine Act of 1920, which requires that all shipments by water between ports in the United States (including Puerto Rico) be carried by U.S. flag, U.S. built, and U.S. crewed vessels.

today's freight environment, which is heavily intermodal, there must be more of a system-wide approach to planning. This change in mindset is difficult to overcome, especially when so much of the funding for transportation is allocated to a single mode. A good example of a "system" approach is the development of targeted overweight corridors that can feed intermodal rail or water hubs so that containers loaded with heavy commodities can be moved intact from origin to destination without placing undue strain on the road network. Another example is the development of a tax and regulatory system that fully incorporates the externalities of each mode into its cost structure, thereby encouraging the shipper to utilize the mode that places the lowest overall cost on society and receive credit for actions taken that improve congestion, reduce pavement deterioration, or improve air quality.

CHAPTER 2:
POTENTIAL BENEFITS

There are several strong reasons why it is sound public policy to promote moving freight by water. These include:

- **Improved interstate and international trade possibilities.** Marine freight transportation industry makes international trade and trade with other states possible. It can open up markets and trading relationships that had not before been possible due to high transportation costs and can preserve markets that are currently under threat due to increasing transportation costs. The system that is made up of the Gulf Intracoastal Waterway, the Gulf of Mexico, and the state's ship channels is heavily used by businesses that need a cost-effective solution for shipping their goods.
- **Energy efficiency.** Marine freight is the most energy efficient form of cargo transport. In a recent TTI study conducted for the Maritime Administration and the National Waterways Foundation,[6] marine transportation was documented to be much more efficient than highway or rail modes when measuring ton-miles per gallon of fuel consumed, as shown in Figure 1.

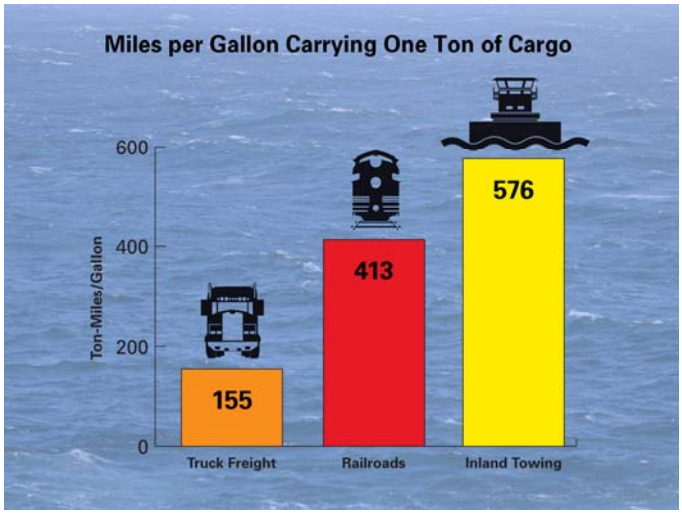


Figure 1. Ton-Miles per Gallon by Mode

[6] "A Modal Comparison of Domestic Freight Transportation Effects on the General Public", Texas Transportation Institute, December 2007.

By way of illustration, 7.23 billion ton-miles of waterborne traffic were recorded on the Texas portion of the GIWW in 2006. This resulted in a savings of five million gallons of fuel versus what would be consumed by rail to accomplish the same level of effort, or 34 million gallons versus highway transport. In an era of skyrocketing fuel prices and uncertain future supply, it is good policy to ensure that the U.S. freight sector is as fuel efficient as possible.

Reduced emissions. By the same token, because less fuel is consumed by waterborne freight movements than the other modes, fewer emissions are produced. For every major pollutant tracked by EPA, marine transportation produces the smallest quantity per a given unit of effort, as shown in Figure 2.

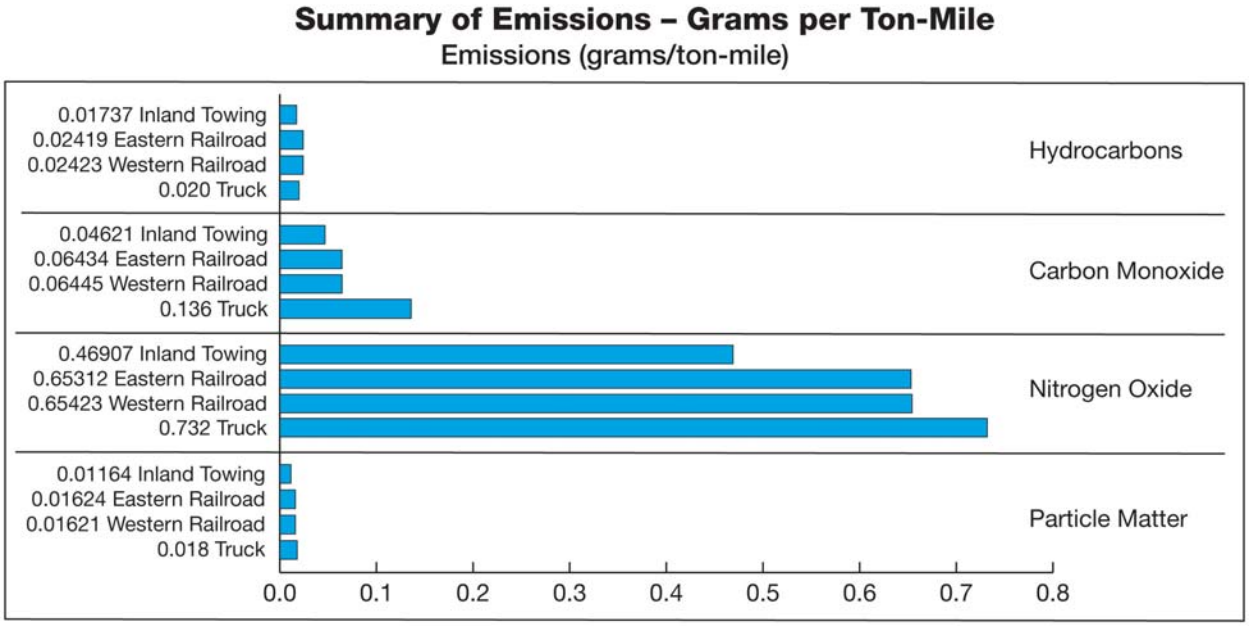
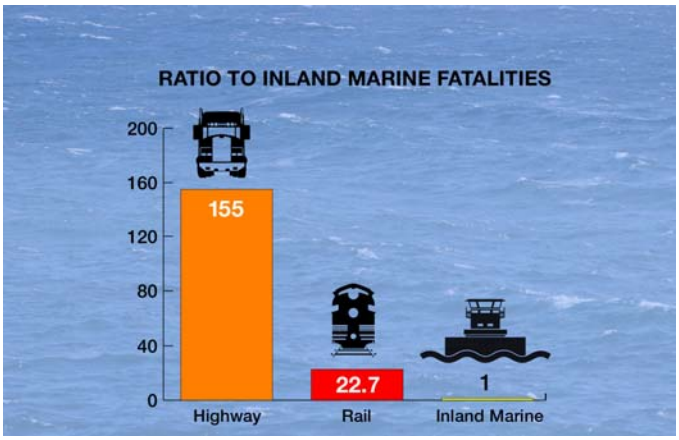


Figure 2. Summary of Emissions - Grams per Ton-Mile

- **Reduced injuries and fatalities.** The risk of a freight-related fatality is 155 times higher for truck than for inland marine transportation, based on ton-miles of activity. For injuries, the risk is *2,172* times higher for trucks than for inland marine. Figure 3 illustrates these large differences.



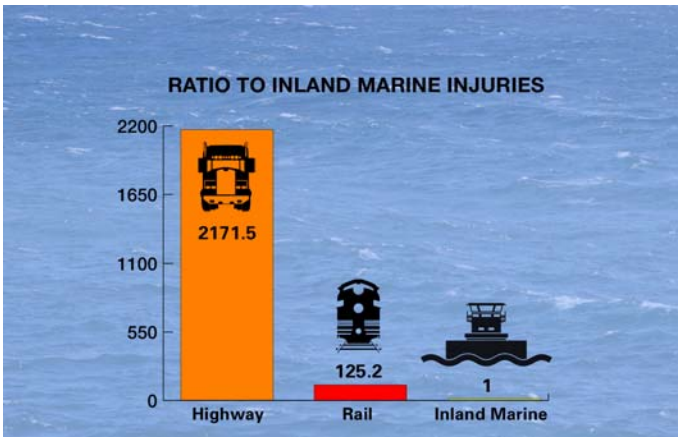


Figure 3. Ratios of Fatalities and Injuries per Ton-Mile.

- **Waterborne freight capabilities attract businesses to all parts of the state.** In order to attract major industry to any part of the state, there must be reliable, cost-effective transportation available. There would be almost no petrochemical or refining industry in Texas if not for the availability of marine transportation.
- **Congestion mitigation.** Marine transportation provides a level of congestion mitigation for the state's highways. A jumbo box barge (195 ft x 35 ft), the standard for the GIWW, can carry 24 loaded 40-ft containers (48 TEUs) or 36 empty containers (72 TEUs). Assuming that two-thirds of the remaining capacity of the GIWW could be used for container-on-barge capacity, that tows will be one-barge tows, and that loads would consist of full containers in one direction and empty containers on the return trip, it would theoretically be possible to move 840,960 loaded TEUs in a year and 1,261,440 empty TEUs in a year. This equates to the avoidance of 1,161,547 truck trips annually. Of course, two-barge tows, which are common on the GIWW, would be twice as effective.
- **Reduced wear and tear on the state's highways.** Studies have shown that a fully loaded 80,000 lb truck can cause the same amount of damage as 6000 automobiles. In its 1997 Federal Cost Allocation Study, the Federal Highway Administration calculated that trucks traveling on urban interstates caused 409 times the pavement damage caused by automobiles. Recent estimates indicate that it costs $800,000/mile to build a road for just cars; it costs $10,000,000/mile to build the same road to truck standards.

The car road will last for 50 years, while the truck road will need major maintenance in 10 years.

CHAPTER 3: THE WAY FORWARD

Background

One method of promoting more waterborne freight that has been attempted in the past, both in the United States and in Europe, is to simply provide operating subsidies or grants to carriers and infrastructure providers. However, unless these funds are specifically correlated with identifiable benefits associated with mode shift this is not a practical, long-term solution. There are other measures that can be taken to ensure the long-term health of the system and to enable carriers (both existing and start-up) to be more competitive in the freight transportation marketplace. Several of these measures are discussed in detail below. Table 2 at the end of this chapter provides a summary of the state agencies that would be expected to implement these measures or provide significant support for them.

Research has not revealed any freight opportunities that could be immediately "jump started" solely by actions that could be taken by TxDOT. TxDOT and other state agencies facilitate rather than generate coastwise marine freight initiatives. There has been a fairly steady stream of inquiries and visits at Texas ports regarding waterborne freight opportunities along the coast. Research, in conjunction with these inquiries, has revealed a number of measures the State could take to increase waterborne freight efficiency and effectiveness, and thereby encourage shippers to use the marine mode more frequently.

Types of Measures

Measures that could be enacted by state agencies can be classified as short-term or long-term. Other measures are items which only the legislature can address. A short-term measure to address waterborne freight project development will encompass the following three elements:

1. The measure will not require substantial changes in channel depth, port capital asset, or regulatory changes.
2. The measure will present positive benefit/cost ratios when congestion mitigation, safety, and air quality considerations are taken into account.
3. The measure will include the active involvement of participating port authorities.

Longer-term measures would have the following two elements:

1. The measure will remove impediments to increased usage of marine highways for freight traffic.
2. The measure will encourage greater utilization of marine transportation.

The following sections list several *short-term* measures that can be taken to address the needs of waterborne freight in Texas.

Prevent Encroachment on the GIWW

The State should take an active role in controlling any waterfront development along the GIWW that would encroach on the navigable waterway or encourage more recreational activity in the waterway itself. As a rule, the general public does not understand the maneuverability constraints inherent in barge operations. Encouraging unnecessary interaction between recreational users and commercial users simply increases the likelihood of a serious incident. Restricting the "right of way" in which barges can maneuver also decreases the effective capacity of the waterway and increases transit times. As local sponsor for the GIWW, TxDOT must actively discourage any development that would decrease capacity or increase operating costs unnecessarily.

Marketing by the State

Provision of Data

The State can assist ports and potential operators with localized and statewide market studies to identify and pursue emerging markets. The State should fund research that will identify the origin and final destination of cargo that originates in Texas or is imported into the state. It should also analyze traffic flows between the state's ports and the Mexican border. TxDOT, possibly in cooperation with other state agencies and local and regional economic development agencies, should work to identify niche markets and promote the use of public port facilities.

Promotion

The State should actively participate in promoting the state's ports and terminals. The goals of a statewide marketing campaign might include:

- Gain public awareness of the port facilities,
- Promote the benefits of waterborne transportation and the positive economic impacts of the maritime sector,
- Assist with business negotiations and provide incentives to encourage prospective industrial tenants to use the Texas public port facilities, and
- Provide funding for localized niche market analysis and port development studies needed to help struggling smaller ports identify and move into new markets.

Additionally, a statewide marketing promotion effort could identify public policy options for maritime development, build stakeholder coalitions with other states (especially states along the GIWW), and promote national waterways agendas.

Designating Overweight Freight Corridors

Overweight corridors allow heavy loads to move by water and then between the water and a storage or staging area without having to incur the cost of transloading the cargo. Other states have established such corridors with great success, most notably California and Washington. Several Texas ports have stated that such corridors in their area would greatly enhance efficiencies and their competitive position. Legislation that was passed by the Texas legislature in 1997 (SB 1631) paved the way for the designation of specific overweight corridors. This legislation authorized several key activities for TxDOT:

- The department may contract with a third party to act as the department's agent in the processing of a permit application and the distribution of a permit issued by the department under this section.
- An agreement entered into under this section may provide for a third party to act as the agent of the State in the processing of a permit application and the distribution of a permit issued by the State under this section.
- The Texas Transportation Commission may adopt rules for the payment of a fee.

Three overweight corridors have been specifically authorized by the legislature, two of which were actually implemented. The two that were implemented are Brownsville (SB 1271, 1997) and Chambers County (HB 1044, 2005). A corridor was also authorized for the Port of Victoria in 2003 (SB 20), but it has not been implemented. Other ports could take advantage of such a corridor along specific routes.

Marine carriers can handle containers and general cargoes that greatly exceed the limits for Texas highways. TxDOT should work with Texas port authorities to identify potential overweight corridors that would enable shippers to take advantage of the load capacities that water offers without damaging the state's highways. Planners for such corridors should take into account the concentration of freight movements in the area and the landside transportation patterns for freight.

Air Quality Credits

Many industrial concerns today are able to "bank" credits for reduced air pollution and sell these credits on the open market to firms who need them to build new plants or expanding existing facilities. Air quality concerns in the United States have typically focused on NOx and particulate matter in nonattainment areas. This has the practical effect of discouraging investment in marine equipment to improve air quality since credit is typically only given for reductions that occur within a nonattainment area. Europe has focused on CO_2 as the main pollutant of concern. Instituting such an approach in the United States (or at least in Texas) would allow all modes and types of equipment to compete on an equal footing for funding or emission credits and would reduce the overall environmental burden caused by freight movements.

Greater Cost Recovery from Large Trucks

The Federal Highway Administration's (FHWA) *1997 Federal Highway Cost Allocation Study* reported that trucks were responsible for 40 percent of FHWA program costs, while accounting for less than 10 percent of total vehicle miles traveled (VMT). Studies show that only the very lightest combination trucks pay their share of federal highway cost responsibility. The most common combination vehicles, those registered at weights between 75,000 and 80,000 pounds, now pay only 80 percent of their share of Federal highway costs and combinations registered

between 80,000 and 100,000 pounds pay only half their share of Federal highway costs. In a 2003 Texas highway allocation study conducted by the Center for Transportation Research[7], it was determined that 5-axle combination trucks generate 16.4 percent of revenues but generate 29.7 percent of highway maintenance costs. Requiring a higher percentage of cost recovery from the larger trucks will have the practical effect of inserting the true cost to the public into the mode selection process of shippers. Based on the advantages described in Chapter 2, this will most likely result in more waterborne shipments.

Summary

Table 2 provides a summary of the measures discussed in this chapter and indicates which state and federal agencies should take lead or important secondary roles in implementing each measure.

[7] Texas Highway Cost Allocation Study, TxDOT Report 1810-2, Center for Transportation Research, November 25, 2003.

Table 2. Potential Measures and Responsible Agencies

	TxDOT	USACE	Ports	GLO	Office of Econ Dev	TCEQ
Short-Term Measures						
Prevent encroachment	s	P		s		
Market research	P				P	
Develop potential overweight corridors	P		s			
Higher cost recovery from large trucks	P					
Legislative						
All infrastructure funding issues	P		s			
Authorize proposed overweight corridors	P		s			
Air quality credits	s					P

P = Primary agency
s = Support agency

Agency Codes:

TxDOT = Texas Department of Transportation
USACE = U.S. Army Corps of Engineers
GLO = Texas General Land Office
Office of Econ Dev = Governor's Office of Economic Development
TCEQ = Texas Council on Environmental Quality

CHAPTER 4: CURRENT PRIVATE SECTOR INITIATIVES

The concept of moving truckloads to water gained traction in the last year around the country, partially in response to soaring fuel costs. The U.S. Maritime Administration (MARAD) has actively supported and promoted certain initiatives as part of its own marine highways initiative. There are several initiatives currently underway in Texas. In some cases new infrastructure is being provided that will be conducive to short sea shipping; in other cases shippers are using existing infrastructure to create a new service in order to handle containerized goods previously moved by truck. The following sections provide brief descriptions of recent or planned initiatives in Texas, as well as an example of an innovative initiative from Virginia.

Cedar Port

A case in which new infrastructure has been provided is the Cedar Crossing barge dock near Houston, Texas. In 2008, the Cedar Port public dock was opened by Chambers County Improvement District No. 1 (CCID 1) with the goal of attracting shippers of containerized and bulk goods to move between the Port of Houston complex and industrial facilities in Chambers County. The Cedar Crossing Industrial Park is currently host to several major distributors of consumer goods including Home Depot, Wal-Mart, and General Electric. In total there are over five million square feet of distribution facilities in the Cedar Crossing Industrial Park.

According to Joseph Urey of Greens Port at Cedar Crossing, the Cedar Crossing barge terminal was developed specifically to serve containers. The parties that had the most prominent role in bringing the project to fruition were County Commissioner Bill Wallace, Osprey Line, and Excel Plastics. The first client to show a sustained interest in using the barge dock for this purpose was Excel, which manufactures and containerizes its product locally and was interested in lowering transportation costs by switching to barges for transferring the containers to the Barbours Cut Container Terminal for export. This modal shift would have also allowed Excel to stuff its containers to a greater maximum weight limit. For this reason, an overweight corridor was designated in Chambers County leading to the dock. The cost to complete this infrastructure project was approximately $4 million. The funding was approved in 2007 by CCID 1. This

entity functions as a municipal utility district with taxing authority. According to Mr. Urey, with its present assets the container terminal at Cedar Crossing could process up to 300 containers per day. Furthermore, the dock is a public facility and can be utilized by any stevedore.

Brownsville-Houston Barge Express

One prominent Texas initiative that will not require any change to the existing infrastructure is the Brownsville-Houston barge shuttle that is being developed by Richardson Stevedoring and Schaefer Stevedoring in coordination with the Port of Brownsville. This service will depart every 14 days from Houston carrying a mix of cargo including containerized cargoes to the port of Brownsville. It will then return to Houston with steel and other non-containerized cargoes. The stakeholders in this initiative are committed to seeing that the service runs on a fixed schedule regardless of cargo availability. This service is to be open to any shipper and could handle containerized or non-containerized loads on both the northbound and southbound legs. As a brown water service, this initiative would utilize the Gulf Intracoastal Waterway and is expected to be particularly competitive for overweight containers that would need to be subdivided in order to be moved over the roadway. The service would compete most directly with trucking as there is currently no rail service between these two origin and destination points that would compete with the barge. Furthermore, there seems to be little interest on the part of the railroads in adopting short-haul intermodal services in the immediate future. It appears, therefore, that under the right conditions the Brownsville-Houston link could take trucks off of Highway 77, Highway 59, and the roadway network in and around Houston.

This service was originally scheduled to begin in August of 2008; however, it has been temporarily postponed due to the impact of Hurricane Dolly, which hit the Port of Brownsville in July of 2008, and Hurricane Ike, which came ashore in the Houston-Galveston area in September of 2008.

National Shipping of America

National Shipping of America (NSA) is a Jones Act carrier[8] that is currently planning a domestic container service to link Port Freeport, Texas, to the Port of Chester, Pennsylvania (near

[8] Jones Act carriers are vessels that are U.S/ built, manned, and flagged. Only Jones Act carriers can move cargo between domestic ports.

Philadelphia). NSA would be an open ocean service that would be particularly well suited to overweight and hazardous material carriers. The service would principally handle containerized cargo, but could also handle a limited amount of bulk cargo. The service would rely on a single self-propelled containership that would complete the rotation between Port of Chester, Pennsylvania, and Port Freeport every 14 days. NSA plans to offer door-to-door service that would include arranging local truck service at both ports. At the time of this report's publication, NSA did not have a firm date for the initiation of service. The current constraints for beginning service are continued maintenance on the vessel and the need for an additional mobile harbor crane at Port Freeport.

SeaBridge Freight

SeaBridge freight is a blue water carrier that plans to establish container barge service linking the Port of Brownsville to Port Manatee in Florida. This service would initially transport a 600 TEU oceangoing barge with a 4200-horsepower tug providing service every 10 days. Unlike the previously mentioned Brownsville-Houston Barge Express, this service would not utilize the Gulf Intracoastal Waterway. SeaBridge freight would lease equipment from a third party and would not own the barge or the tug. The service is designed to take advantage of the overweight truck corridor leading from Brownsville to Mexico. For several years the Port of Brownsville has been capable of handling a small container service. Similarly, Port Manatee is a rapidly developing port near Tampa Bay that offers a 40-foot channel depth, one million square feet of warehousing capability, access to the CSX railroad, and cold storage capability. The port acquired a mobile harbor crane in 2008, which means that its ability to handle containerized cargo is equivalent to that of the Port of Brownsville.[9] CSX is currently constructing a 1200-acre logistics center that will aid the port in processing containers.

SeaBridge is developing its master plan in three phases. In the first phase, the carrier will provide a single service every 10 days. In the second phase the frequency will be increased to once every five days, and in the third phase SeaBridge will substitute a faster service that will cut transit time to 2.5 days. At this point, the service would be competitive on a time basis with a

[9] Port Manatee master planning concepts, PowerPoint presentation, February 21, 2008. Online: http://www.portmanatee.com/pdffile/Master Plan Presentation - MCPA Meeting Feb 21_2008.pdf

single operator trucking service.[10] SeaBridge launched its service on December 20, 2008.

Case Study: Port of Richmond, Virginia

One intriguing case that is currently under development is on the James River in Virginia. The plan is to move containerized cargo from the Port of Virginia to the Port of Richmond, an inland river port that is capable of handling containers. This initiative is notable in that the location of the destination is only 70 miles by water from the Port of Virginia at Hampton Roads. It is, however, 90 miles by road so the marine distance is more direct. This initiative is being led by the Richmond Metropolitan Planning Organization (MPO). At the Port of Virginia at Hampton Roads, three different terminals will be participating in supplying containers to the Port of Richmond. The initial goal is to divert containerized cargoes that are bound for distribution within 30 miles of the Richmond area. Another longer-term opportunity is to develop a distribution center at the Richmond site since there are no bridge and tunnel restrictions around Richmond. The location at Richmond provides access to both the Norfolk Southern and the CSX rail yards.

One potential advantage that the Port of Richmond has for handling a feeder service such as the James River container barge is that the Port of Richmond already receives deep draft vessels from overseas, specifically Europe and Iceland. This means that inbound containers from Europe to the Port of Virginia would not need to clear customs at the Port of Virginia. Rather, they could receive a Richmond bill of lading and be processed at the Port of Richmond. The exclusive service provider, which is a ship agent and broker named T. Parker Host, will initially move one barge shipment per week. The executive director of the Port of Richmond, David McNeel, believes that the service will be competitive with trucking because shippers will not have to move the containers through the port gates or the congested road network in and around the Port of Virginia but could clear their containers directly at Richmond and supply local distribution centers. Unlike some other container-on-barge initiatives, this service would not initially target overweight containers, but would be available to any shipper who would otherwise ship the container over the road. Loaded barges could also leave the Port of Virginia

[10] Interview with Port Manatee Port Director, June 28, 2008.

en route to Richmond after the Port has shut down its gates for truckers for the day. Therefore, despite the fact that the transit time for the barge is 7 to 8 hours and the drive time from the port of Virginia is only 2 hours, there may be opportunities to save delivery time by using the barge if the gates have already closed for the day. Mr. McNeel, who recently joined the Port of Richmond, is a former terminal manager at Houston's Barbours Cut Container Terminal and has compared this initiative to the Osprey operation that was in existence during his tenure at Houston.

The initiative is competitive in part because it has received a substantial grant in Congestion Mitigation and Air Quality (CMAQ) funding from the federal government. In Virginia, the Richmond regional MPO was able to receive CMAQ funding directly. In order to determine that this container-on-barge project met the criteria for the grant, the MPO had a competitive project selection process. As a freight project, the container-on-barge initiative competed against other projects that were freight oriented. At present the project will receive approximately one-third cost from CMAQ ($2.3 million) over the course of the next three years. The Richmond MPO is hoping that this project will help the Richmond area avoid being placed in non-attainment status for air quality. Without the project, the MPO estimates that the Richmond area may fall into non-attainment by 2010. As part of the agreement, the tug will need to run on low sulfur diesel.

The service was initiated on December 2, 2008. Funding from the CMAQ grant in the first year will be $800,000-$900,000. The Virginia Port Authority is a partner in the project and acts as a fiduciary agent.

The project is notable for the speed at which it went from inception to delivery. The project received funding only six months after it was first proposed. The MPO approved the funds in the spring of 2008 and the Commonwealth approved the project in July 2008.

The volume of cargo that is expected to be moved in the initial period (3-5 years) is 1600 containers per week. This excludes bulk shipments such as steel or timber that may be able to piggyback onto the service. It also excludes a second inter-terminal container barge service that is now under consideration and may widen the market share of barge service at the Port of Virginia. This new initiative resulted from a truck ban placed by the City of Norfolk that has greatly increased the cost of drayage moving between the Portsmouth Marine Terminal and

Norfolk International Terminal. The truck ban ordinance, which can be accessed at the following link, http://www.norfolk.gov/truck_ordinance/default.asp, bans 4-axle vehicles on the principal road corridor used to ship containers between terminals, Hampton Boulevard, between 4PM and 6AM. Trucks may still access the terminal by using a circuitous route that is far more costly. For this reason, an inter-terminal barge is a more effective means to deliver containers between terminals in the times when road access is restricted.[11] Therefore, it is an example that mode shift to barge can sometimes be driven not only by positive incentives, but also by restrictions on alternative modes.

[11] Interview with Barbara Nelson, Principal Transportation Planner, Richmond MPO, August 18, 2008.

CHAPTER 5: FAQS

The following questions and answers cover many of the questions that surface when the topic of "Short Sea Shipping" or "Marine Highways" is discussed.

Q1: Does short sea only refer to containers?

Answer: No. In Texas, proposed shifts to water have often focused on bulk cargoes or general cargoes such as steel. While some definitions of short sea in the past referenced only containers, the more common definition these days includes all "commercial cargo" moving between domestic ports. This definition would thereby exclude military cargoes but would include any cargo, regardless of form, that is destined for consumers or a diverse base of commercial clients.

Q2: With just-in-time manufacturing, will shippers need faster transit times than short sea will provide in order to meet their delivery windows?

Answer: In general, shippers can make adjustments to accommodate for slower transit times provided that deliveries are reliable. With careful planning, slower modes of transit can be just as effective in providing the right inventory at the right time. For many shippers, the factor that is more burdensome and unavoidable is the high cost of energy. Without the availability of alternative modes, shippers will be trapped by spiraling energy prices and will have no recourse but to pass the higher costs to consumers. The quest for greater speed in freight transportation in the 1990s was driven by inexpensive energy costs and was effective at lowering pipeline inventory, but the high cost of fuel is causing many businesses to rethink their supply chain strategies. Rapid delivery times are not a matter of necessity for most types of commodities.

Q3: Why is Texas an appropriate market for short sea shipping?

Answer: Texas already has a well developed coastal marine system due to the Gulf Intracoastal Waterway and the various shallow and deepwater ports that are served by the waterway. Texas also has a rapidly growing coastal population and the need to move cargo significant distances

between these population centers that make the transportation costs either prohibitively costly by truck or undesirable due to increased congestion.

Q4: What entities within Texas are pursuing short sea opportunities?

Answer: Short sea shipping opportunities are being pursued by several Texas ports, ship operators, stevedores, and investors. Ports in Texas that have expressed a sustained interest in short sea shipping include, but are not limited to, the Port of Beaumont, the Port of Brownsville, the Port of Corpus Christi, Port Freeport, the Port of Galveston, the Port of Houston, and the Port of Victoria.

Companies that are pursuing domestic short sea initiatives in Texas at present include Osprey Line (a subsidiary of Kirby Corporation), which runs containerized barge shipments between Houston and New Orleans; Houston-based Couch Lines, which can move containerized and non-containerized cargo along the GIWW; California-based National Shipping of America, which is planning an open ocean transit from Port Freeport (and potentially the Port of Brownsville) to the East Coast; SeaBridge, which moves containerized cargo between the Port of Brownsville and Port Manatee, Florida; and Richardson Marine, which in conjunction with Schaefer Stevedoring, plans to initiate a GIWW barge service between Houston and Brownsville in the very near future.

Q5: What is the U.S. Maritime Administration doing to promote short sea shipping?

Answer: Several years ago, the U.S. Maritime Administration (MARAD) launched an initiative to promote short sea shipping. More recently, MARAD has launched what it calls the Marine Highway initiative, which is aimed at identifying key corridors in which short sea services could divert a considerable amount of current and future road/rail freight traffic. While MARAD does not currently have the resources to directly fund or subsidize short sea operators, it has worked to inform the public and policymakers about the general advantages of short sea shipping and call attention to new services as they are proposed. MARAD has advocated for the removal of the Harbor Maintenance Tax, which some short sea advocates believe has inhibited adoption of short sea options by shippers.

Q6: What types of vessels are currently being proposed for use in short sea shipping?

Answer: Various vessel designs have been proposed for future short sea service; however, the most frequently cited example is a modified barge and tow combination. Barges and tugs are typically preferred over self-propelled vessels due to their comparatively lower cost, flexibility of operation, and low crewing requirements. The choice of vessel depends on factors such as the route (protected waterway versus open ocean), minimum acceptable speed, and others.

Q7: Can the U.S. shipbuilding industry build the short sea vessels necessary to move containerized and other road competitive cargoes?

Answer: The U.S. shipbuilding industry has contracted steadily in the last few decades and has become more specialized. Many types of vessels are still constructed in the United States, including advanced military vessels, oil and platform service ships, tugboats, and barges. There is a lack of container carrying vessels and general cargo ships currently constructed in the United States. This is tied to policies that favor the use of foreign built ships for international commerce, not a lack of technology or capital that would be required to build such ships should the need arise. The designs of short sea vessels are very similar to other vessels types that are regularly built in the U.S. There is no long-term technological barrier to the construction of short sea vessels in the U.S.

Q8: If short sea vessels were built in the United States, as would be required by the Jones Act, would they be prohibitively expensive?

Answer: The Jones Act requires marine vessels engaged in the conveyance of goods between two domestic ports to be built and flagged in the United States. Commercial marine vessels are expensive to build and both labor and material costs have increased significantly in recent years. On the other hand, the cost situation in Europe is similar to that of the U.S. and this has not prevented Europe from producing its own fleet of vessels. Because the U.S. does not currently build these vessels in significant quantities, the cost to build a single "custom order" vessel is quite high. However, if a market for these vessels were created through a national prioritization plan, the unit production cost would likely come down significantly. In the past few years, materials cost, as a percentage of total cost, has been increasing. Should this trend continue, it

will lower the potential cost advantage that could be obtained from constructing ships in foreign countries. The Jones Act will continue to be a constraint, but perhaps not as significant as it once was.

Q9: What is the breakeven distance where short sea can compete with trucking?

Answer: It was previously assumed that short sea shipping was appropriate for distances that were equal to or longer than that of intermodal rail (i.e., greater than 500 miles). This assumption is based on the fact that there are fixed costs associated with loading and unloading cargo—containerized or otherwise—at the port of departure and the port of arrival. Recent research indicates that the breakeven distance for short sea can be lowered if: 1) the landside routing is congested and/or circuitous, 2) if cargo is loaded by wheeled conveyance, 3) if the cargo has characteristics that make it unsuitable or undesirable to move over the road, or 4) the waterborne leg can offer a much lower cost than the alternatives. Several short sea initiatives currently in the planning stages in Texas and other states are significantly less than 500 miles. For example, the James River project, which aims to move containerized cargo between Hampton Roads, Virginia, and Richmond, Virginia, will cover a distance of less than 100 miles.[12] However, this operation will be receiving subsidies from a CMAQ (Congestion Management & Air Quality) grant to the Richmond Metropolitan Planning Organization, so this may not be an accurate test of distance.

[12] R.G. Edmonson, "Marad chief says short-sea is taking hold", Gulf Shipper, May 5, 2008.