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How Will Existing Modes Meet This Increased Demand?

Turning the Sea into a Bridge

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TURNING THE SEA INTO A BRIDGE

Introduction – The Looming Freight Capacity Crunch

The efficiency of freight movement strongly influences the vitality of the U.S. economy. Yet, the performance of the U.S. freight transport system has been steadily deteriorating. The congestion most people endure when commuting to work during the week or ferrying children to sports and other activities on weekends also undermines the US economy by increasing the cost and environmental impact of freight transportation.

Federal, state and local transportation policy makers and the business community have become increasingly alarmed by a freight capacity crunch of unprecedented dimensions that they see looming in the next decade. As importantly, they know that building more roads and expanding rail capacity to meet expected demand are not viable options, even if they were possible.

Using the coastal seas surrounding the U.S. to absorb some of the projected freight growth and thereby add capacity to the existing system appears, at least theoretically, to be workable. Not only is sea "free" in that "rights of way" are available at no cost, but its surface is also ready to use without the extensive engineering or construction work required of highway or railroad infrastructure projects. It is not surprising, then, that the U.S. Department of Transportation ("DOT") has identified the development of short sea shipping services as a top national freight transportation priority.

Yet, theory and government encouragement aside, can domestic sea transport services really add freight capacity to the U.S. transportation system beyond moving international freight containers and bulk commodities? The answer depends on how well such services are integrated into the existing national highway network, which is the backbone of the U.S. domestic transportation system, and how attractive these services are to the trucking industry, which transports by far the largest percentage of U.S. domestic intercity freight using that network.

Six years of investigation and study have convinced SeaBridge that services, which use the sea to increase the productivity and efficiency of the trucking industry, will enable the marine sector to add significant freight capacity to the U.S. transportation system by maximizing utilization of the existing highway system. Other marine services, which aim to get freight "back" from truckers by offering truck competitive price/service options directly to shippers, may succeed in moving some freight from the roads to the sea, but the market opportunity for such services is considerably more limited.

Advances in marine design and technology make it possible for roll-on/roll-off ships, designed to load and unload quickly using simple port facilities, to move 125+ tractors-trailers, other vehicles and people at speeds up to 46 mph. Deploying such vessels along U.S. coasts at key points within the existing highway system can create the functional equivalents of bridges, which truckers can take to transport their existing freight in less time than if they were to use their current road options.

In evaluating short sea shipping proposals, the Administration and Congress need to assess how each proposal would strengthen the efficiency of the overall freight transportation network. Short sea shipping is, after all, not being promoted as a marine support program, but as a national freight capacity solution. If coastal sea shipping services succeed and are, in fact, used by the widest possible customer base, they can provide economic growth through new employment and tax revenue; create important environmental, congestion mitigation, and highway safety benefits; and support the U.S. shipbuilding industry and the defense mobilization base.

Stripped to its barest essentials, short sea shipping's potential to add freight capacity and generate public benefits is inextricably linked to the commercial success of proposed services. Those services with the widest freight market appeal can deliver what federal, state and local governments and the public want and the freight transportation system needs – more capacity with less environmental impact at lower cost and in a shorter time frame than any other infrastructure alternative.

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If you got it, a truck brought it!

In many areas of the U.S. today, highway, rail and port facilities are nearing capacity. Recent DOT reports indicate that demand for domestic freight transportation will increase from 13.5 billion tons in 1998 to 22.5 billion tons by 2020. Over the same period international freight is expected to grow from 1.8 to 3.3 billion tons. In short, by 2020 U.S. highways, railways and ports will be expected to move 70% more freight than they did in 1998. The value of the freight carried will triple over this period – from $8 trillion today to $30 trillion in 2020 – with highway freight movements accounting for nearly 80% of that value.

Transportation represents seven cents of each dollar of U.S. gross national product and trucking is by far the dominant mode. DOT's 2002 Commodity Flow Study showed the trucking industry's share of the total value of all goods moved jumped 24.5% to $6.2 trillion (of a total of $8.4 trillion) in 2002 from $4.9 trillion (of a total of $6.9 trillion) in 1997. Figures published recently by the American Trucking Associations indicate that trucking accounted for 69.1% of all freight tonnage in 2002. As staggering as these volumes and values are, the critical role that transportation in general and trucking in particular play in the U.S. economy is often overlooked until the system breaks down.

Costs and Limits of Land-based Options to Add Freight Capacity

Although demand for freight transportation is expanding, capacity to move freight is not. Several factors are driving an increase in demand for transportation services in general, and for truck service in particular, including: changes in manufacturing and inventory management, increased use of direct business to consumer shipping generated by wider use of the Internet for sales, as well as substantially increased freight flows, accelerated by the North American Free Trade Agreement.

Between 1990 and 2000, vehicle miles went up 80%, but the number of lane miles of public roads grew by only 2 percent. That trend is expected to continue because adding freight capacity to U.S. road and rail networks is not only expensive, it requires long-term advance planning to create. Indeed, the next six-year highway reauthorization bill is expected to cost more than $300 billion, but most of the money is earmarked for highway maintenance, not expansion. Adding lanes to existing highways or building new ones costs on average $32 million per lane mile,[1] excluding the cost of overcoming public resistance to real or perceived negative environmental and economic impacts.

The speed and reliability of the freight system are expected to worsen, as vehicle traffic grows and congestion increases. Congestion levels on many U.S. highways are already reaching a point that shippers have been forced to formulate alternative strategies. These strategies include: mode and route changes, holding higher levels of inventory, increasing the size of their vehicle fleets, relocating warehouses and/or factories, finding vendors that are closer to production facilities, and reducing the number of shipments with larger order sizes. Such long-term redesign and restructuring will increase overall logistics costs and reduce productivity.

Although use of rail intermodal for long distance transport has increased significantly over the past decade, it accounts for only a fraction of total domestic freight volume. As with highway capacity, adding rail capacity is expensive, time consuming, and in some instances physically impossible and environmentally detrimental.

Interstate 95 on the East Coast, I-5 on the West Coast, I-10 on the Gulf Coast, I-35, I-55 and I-65 along the Mississippi-Ohio River system and I-90 and I-94 in the Great Lakes region are the most severely congested routes

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[1]Captain William G. Schubert, Maritime Administrator, International Transportation Management Association Luncheon, Houston, Texas. January 8, 2003. http://www.marad.dot.gov/Headlines/speeches/2003/ITMA.htm

in the U.S. Along the I-95 and I-5 corridors – the most stressed ones – expansion of road or rail capacity will be marginal at best, as there are limited realistic options to add capacity.[2] It is not a question of whether or not to spend money. The federal and state governments will spend a lot of money on transportation infrastructure in the next decade because they have no choice but to add freight capacity. The challenge is to find new ways to add freight capacity without relying solely on the existing land-based road and rail systems.

Can the Sea Play a Role in Adding Capacity?

Much of the early economic development of the United States relied heavily on coastal trade. While roads existed, ships could carry valuable cargoes faster, more reliably and in significant quantities over long distances, as compared to land based alternatives. Today, the roles are reversed. During the 20th Century, the U.S. road system became the backbone of the US domestic freight transport system. U.S. Jones Act[3] operators use barges and ships to move bulk commodities or containers between U.S. ports or from the continental U.S. to Hawaii, Puerto Rico, and Alaska. In fact, except for Totem Ocean Trailer Express, Inc., whose Alaska-Washington ro-ro service competes with a highway alternative through Canada, and some coastal container on barge operators, who move containers to major international container ports, no U.S. maritime operator moves freight that could otherwise go by highway.

Containerization revolutionized international freight movements and has grown with the phenomenal growth of international trade. Today, larger and larger container ships carry an increasing volume of trade to and from U.S. ports, creating pressure on the capacity of those ports. However, the lift-on/lift-off process that allows overseas cargo to move quickly from ship to landside transportation provider, be it truck or rail, cannot compete with domestic door-to-door service standards and price points offered by truckers and rail intermodal service.

The longstanding maritime view of the competitive advantage of ships has focused on the ability of a ship or barge to carry large volumes of freight cheaply, if slowly. Thus, maritime operators appear to consider truckers and railroads as competitors whose prices and services they have to match or beat.[4] This view limits how these operators perceive the role of the sea in building freight capacity.

Technical and operational innovation

Advances in ship design and technology during the past ten years have produced faster, larger, and more fuel-efficient vessels. Propulsion systems, such waterjets, allow for faster, more maneuverable operation. Refinements in the shape of monohulls enable such vessels to carry 125 or more trailers or tractor-trailer combinations weighing more than 5,000 tons, to move at cruising speeds over 32 knots (36.8 mph). The patented pentamaran hull form can move the same number of trucks and deadweight at cruising speeds at or above 40 knots (just over 46 mph). Vessels able to move at least 125 full-sized tractor-trailers provide far greater operating economies than catamarans or trimarans, which can carry less than half that payload. The newer hull designs can be adapted to roll-on/roll-off configurations (commonly referred to as ro-ro, or ro-pax if they carry passengers and vehicles). Such vessels are designed to allow vehicles to drive on and off the ship, dramatically reducing port turnaround time, labor costs and the need for elaborate port facilities as opposed to container operations that require lift-on and lift-off equipment and facilities. Port locations can be determined by

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[2]The I-95 Corridor Coalition estimates the cost of congestion along the I-95 corridor alone to about $24 billion per year. (http://www.i95coalition.org)

[3]The Jones Act (Merchant Marine Act of 1920) requires that ships engaged in coastwise trade must be owned by a U.S. company, crewed by U.S. citizens, and built by a U.S. shipbuilder.

[4]Mottley, Robert. "SCOOP Promotes Short-Sea Shipping." *American Shipper*. March 2004, pp 78-81.

user needs in relation to the road network and proximity to key customer distribution centers, not the need for specific types of port facilities.

Carrying trucks, trailers, buses, cars and people at speeds up to 40 knots (46 mph) and being able to move in and out of ports quickly will increase substantially the ability of sea services to add new freight capacity because such services can add value to distribution through increased driver and vehicle productivity while still matching the speed with which goods are expected to move through the supply chain.

Using the Sea as a Bridge

Combining vessel size/payload with speed represents the critical technology barrier that must be overcome to enable the coastal shipping to become a viable alternative to road transport. Vessels carrying 125+ trailers or tractor-trailer combinations at speeds between 33 and 40 knots, at fuel consumption levels comparable to conventional ships and connecting strategic port pairs can be used to create the functional equivalent of bridges, offering users faster, easier and/or more cost-effective alternatives to road travel.

Twelve hour service between New London, CT and Norfolk, VA or twenty hour service between New York, NY and South Georgia/North Florida illustrate the speed of a sea link compared to how long it would take a truck and a single driver to cover the same route by road. Furthermore, the new hours of service rules for truck drivers,[5] which went into effect on January 4, 2004, will adversely impact existing transit times, magnifying the gain of using the sea instead of the road. In fact, this "sea bridge" approach can increase truck utilization and driver productivity significantly on road routes that require more than 11 hours of driving to complete in that they will enable truckers to move any combination of driver, power unit, and trailer while the driver would otherwise be required to rest with the vehicle parked.

To work as bridges, these short sea services need to operate at times and with frequencies that match the users' needs. "Demonstration projects" will not work. Routes must be in place to offer scheduled, reliable, and consistent service before "sea bridges" will be integrated into the existing U.S. transportation network. To put these kinds of services in context, compared to other freight capacity options, the full capital cost of SeaBridge USA's proposed coastal services, including the construction of 12 ships in the U.S., creation of port facilities in 10 ports, and startup expenses and working capital needs for the first three years of operation, at which point the venture is expected to be profitable, is less than half of the lowest cost proposal to expand I-81 in Virginia. Successful East Coast sea bridges will benefit not only states in the I-95 corridor, but also reduce demand on by-pass routes, such as that very same I-81.

Conclusions

Privately owned and operated short sea services can add capacity to the U.S. surface freight transportation system at a cost and in a time frame that compare favorably with almost all highway alternatives. Effectively developed and implemented, coastal shipping services offer the lowest cost, most timely solution to adding freight capacity to the US highway system.

U.S. transportation policymakers have been promoting the potential of the sea as a cost-effective way to build freight capacity. Yet, no current operator has come forward with a compelling commercial case for a service that will add freight capacity by attracting highway traffic to the sea. The simple truth is that no such capacity-building alternatives will come into being without vision, innovation, and financial risk.

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[5]The new hours of service rules increase the amount of driving time by one hour to 11 hours in a day, but reduce overall working time by one hour from 15 to 14. More significantly, the new rules virtually eliminate the driver's ability to extend his duty time by booking time as "off-duty". The new rule is similar to "running" time instead of "stop" time in a basketball game.

Based on its own projections of significant limitation in freight capacity, the federal government can:

- Ø Do nothing and hope that the private sector or one or more state agencies comes up with an alternative to increase freight capacity;
- Ø Design and implement its own alternative; or
- Ø Develop a program to foster innovative freight capacity building projects that maximize public benefits and minimize public costs.

The first choice is untenable. The second is probably unworkable. The third would require the government to develop a scorecard of public benefits and countervailing public costs that new freight capacity building projects, of whatever type or kind, would generate. It is the government's role to set acceptable public policy objectives and to balance those objectives against the costs of achieving them. The National Institute of Standards and Technology (NIST) program of the Department of Commerce is one example of government sponsoring private sector innovation in the national interest. The Department of Defense (DOD) also has various programs to foster innovation across a spectrum of industries.

Recommendations

If short sea shipping is to be more than a nice idea, policymakers and legislators need to take action immediately:

- Ø To create a program that fosters innovation particularly aimed at generating creative, cost-effective ways of building freight capacity by any and all means, not only use of the sea. The NIST program is an excellent model for such a program. DOT has pushed Short Sea Shipping to the top of its agenda, but has not backed up that priority with an identifiable source of funds to support promising new initiatives. Policy objectives that lack funds to support them are not likely to be achieved.
- Ø To develop a benefits and costs scorecard for all transportation infrastructure projects that takes into account their expected economic and non-economic benefits and costs, and then evaluate and, more importantly, fund new projects according to that scorecard.

Senators and Representatives with ports or shipyards in their states or districts and those interested in improving highway safety and reducing environmental impacts by reducing highway congestion need to recognize the significant long-term benefits of using the sea to create added freight capacity, and the value of including financial support for such projects in special transportation infrastructure appropriations.

Short sea shipping will add freight capacity and generate public benefits in direct proportion to its ability to attract the widest range of users. Otherwise, it is just a nice idea or a marginal contributor to the overall solution to the freight capacity crunch. The upside of successful privately owned commercial short sea shipping ventures is substantial. Not only can such ventures add significant freight capacity to the highway system without adding on-going demands on the federal treasury, they can also provide trained merchant seamen for use in times of national emergency and ships with militarily useful applications. Only short sea shipping services with the widest freight market appeal can deliver what federal, state and local governments are looking for from a sea-based solution – more freight capacity for the transportation system with less environmental impact at lower cost and in a shorter time frame than any other infrastructure alternative.