

INTERMODAL FREIGHT CORRIDOR DEVELOPMENT IN THE UNITED STATES

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Abstract:

This chapter compares port hinterland access strategies in the form of intermodal freight corridors connecting ports and inland intermodal terminals. Interviews and site visits were conducted at a number of locations in the United States in order to compare strategies of stakeholder management, planning and policy issues and access to private and public funding.

Detailed case studies on the Alameda Corridor, Alameda Corridor East, Norfolk Southern's Heartland Corridor and CSX's National Gateway are presented in this chapter. The various projects represent corridors of different sizes, objectives and challenges relating to stakeholder management. Furthermore, as government policy in the United States has developed over recent years, ports and railroads have needed to alter their approach to project planning in order to attract public funding of various types, from national to state and local.

Results indicate the importance of aligning stakeholder objectives with funding sources and planning schedules. Of particular importance to the development of hinterland access is recent US policy towards the provision of public funding through discretionary funding programmes. These developments are discussed in the context of US transport policy and the difficulties of government involvement in a traditionally privately owned and operated rail industry. Such issues need to be understood in order to limit their constraints on port development options.

Keywords: hinterland, intermodal, corridor, port, rail

1. Introduction

While some degree of multimodalism (the use of multiple modes) has existed throughout history, intermodalism in the modern era is a relatively new phenomenon. During the mid 1980s, carriers operating in the transpacific trade were suffering from excessive tonnage and lower rates. To increase its cargo volumes, American President Lines (APL) formed the first transcontinental double stack train services, recognising that an intermodal routing provided a ten day service advantage over an all-water service through the Panama Canal to New York. While the transit time was important, APL also offered more services to the shipper as the customer could receive a single through bill of lading while knowing that APL had committed service schedules to deliver the cargo.

The growth of discretionary cargoes allowed APL and other shipping lines to expand their capacity in the transpacific. By using larger, faster ships, a carrier could offer a fixed, weekly sailing schedule, while the additional capacity reduced per unit costs. With the double stack train, these new services were competitive because they increased the amount of revenue that each unit train could generate, provided a shipper with a single through bill of lading and lowered the net cost of inland transportation.

Traditionally, intermodalism in North America referred to discretionary cargoes destined for areas east of the Rockies, but that arrived along the West Coast. They are truly discretionary, as any West Coast or East Coast port that possesses the adequate facilities and services to satisfy a shipper's needs could receive this cargo. For the Eastern US, intermodal traffic has been developing, but not with comparable volumes to cargo moving off the West Coast into the east. Today, there are reverse land bridge flows, with some speculation about the magnitude of intermodal diversion from the West Coast to the Eastern United States.

In addition to rail corridors, several short sea shipping or container on barge operations have been explored in the United States. This includes the recent 64 Express, which operates a barge service between Richmond, Virginia and the Hampton Roads area. The failed New York to Albany Port inland water service represents an example of misaligning an intermodal corridor project without securing committed partners.

Given the lessons learned, the US Government is currently exploring the importance of examining and improving operations along freight corridors for the next bill authorising the nation's highway transportation. There are discussions about examining multimodal corridors to manage highway traffic, emissions, and related externalities associated with commercial freight movement, but these research efforts are still in their infancy.

Major infrastructure projects represent long-term commitments and they have far-reaching implications for future transport operations. Legacy obligations therefore exert perhaps the most significant single influence on transport planning. There appears to be a real desire on the part of the US Department of Transportation to deliver a unified transport vision but due to other financial and statutory obligations the ability to deliver this vision may be compromised.

2. US ports and shipping

Table 1 shows the top ten US container ports in 2009.

USA Ranking	World Ranking	Port Name	Trade Region	Total TEU
1	16	Los Angeles	West Coast	6,748,994
2	18	Long Beach	West Coast	5,067,597
3	21	New York/New Jersey	East Coast	4,561,831
4	42	Savannah	East Coast	2,356,574
5	51	Oakland	West Coast	2,051,442
6	59	Houston	Gulf Coast	1,797,198
7	60	Virginia	East Coast	1,745,228
8	62	Seattle	West Coast	1,584,596
9	65	Tacoma	West Coast	1,545,855
10	102	Charleston	East Coast	1,277,760

Table 1. Top ten US ports by container throughput in 2009 (Source: Containerisation International)

The dominance of the Los Angeles/Long Beach port complex can clearly be seen, although some shippers have diversified their gateways into the U.S. in the aftermath of the 2002 West Coast labour lockout. Three new opportunities are arising that have the potential to influence port competition in the United States.

The first is the expansion of the Panama Canal, due to accommodate 13,000 TEU vessels by 2014. This will allow large vessels coming from the Far East to bring cargo for the eastern United States through the canal and directly into east coast or gulf ports (draft permitting). The port of Virginia at Hampton Roads is expecting to be the major beneficiary of this development. New York/New Jersey also has the requisite draft but is currently limited by air draft restrictions (although there is some talk of altering the offending bridge). Other ports in the Gulf and the Atlantic Seaboard are also struggling to get the necessary depth to receive these larger vessels. However the additional time taken to traverse the canal and reach the east coast may be unattractive to shipping lines. For example, to reach Chicago via Los

Angeles/ Long Beach takes 14 days at sea plus 5 days on rail, whereas it takes approximately 25 days to reach Norfolk by sea from Shanghai, with an additional 2 days to Chicago.

Moreover, the role of the Los Angeles area as the largest manufacturing area in the country means that many forwarders will not want to forego the economies of scale that can be gained by transporting all their US cargo to this location then separating freight for inland destinations at this point for onward transportation by rail.

Secondly, the advent of the port of Prince Rupert in Canada provides a one-day shorter west coast option to shipping lines seeking to access North American markets. The port currently has a capacity of 500,000 TEU (but with room for expansion up to 2m TEU), and with sufficient depth to accommodate container ships up to 12,000 TEU (Fan et al., 2009). In 2009 the port handled 265,258 TEU (Containerisation International).

A third and (less important) development is the gradual westward movement of some manufacturing in the far east (to India, Thailand, etc.), leading to a potential scenario whereby the Suez Canal route to eastern American markets becomes time-competitive with the Pacific route to the west coast, and would require a shorter rail journey once the cargo is landed, not to mention removing the requirement to change from western to eastern railroads at Chicago.

All three developments will challenge the dominance of the San Pedro Bay ports, although it is unlikely that any of these changes have the potential to capture more than a small percentage of their cargo. However, as will be discussed below, hinterland access strategies of these ports will have a determinative impact on port competition.

3. Rail Freight in the USA

3.1 Overview

There are three classes of railroads in North America: Class I (national), II (regional) and III (shortline). Not including passenger railroads (Amtrak in US and Via Rail in Canada), there are currently 9 class I railroads (annual revenues in 2008 of over \$401.4 million) in North America. 7 operate in the USA: the big four (BNSF and UP in the west, CSX and NS in the east) plus the two Canadians (CN and CP) and the smaller KCS.¹ There are also two in Mexico: Ferromex and Kansas City Southern de México (wholly owned by Kansas City

¹ For ease of reference, the following abbreviations are used. BNSF: Burlington Northern Santa Fe, UP: Union Pacific, NS: Norfolk Southern, CN: Canadian National, CP: Canadian Pacific, KCS: Kansas City Southern. Note that CSX is the full name and not an abbreviation.

Southern). There is also a fourth class of railroad that performs switching and terminal operations.

2009 revenues at each of the Class I Railroads are shown in figure 1. The difference in revenue between western and eastern railroads is striking, illustrating the earning potential arising from greater distances and fewer interchanges characteristic of the western United States railroad network.

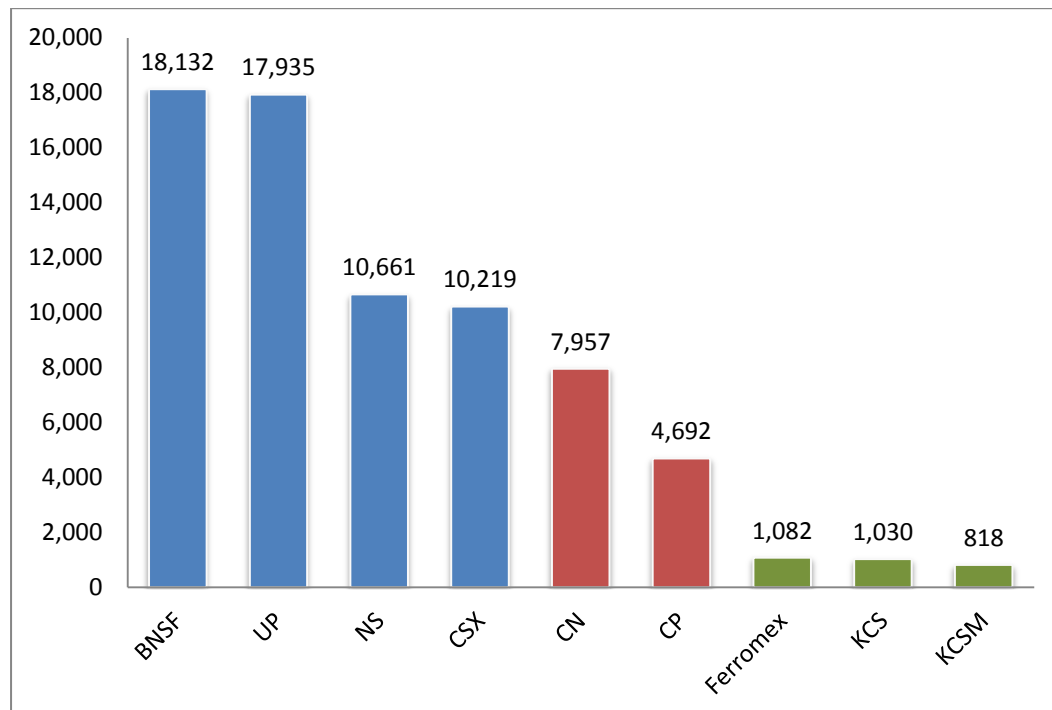


Figure 1. Annual revenues at class I railroads in 2009. (Source: AAR, 2010a)

Based on the Freight Analysis Framework, a national database integration effort, total freight transportation in the U.S. is forecast to increase over the next thirty years. Over that same period of time, total international trade shipments will grow from 11% of the weight of all shipments to 16% of all shipments in 2040. For the railroads, international cargo as a share of total transportation by weight will increase fourfold (from 3% to 12%) (FHA, 2010a). Table 2 presents this data.

	2007				2040			
	Total	Domestic	Exports ²	Imports ²	Total	Domestic	Exports ²	Imports ²
Total	18,581	16,576	656	1,349	27,104	22,772	1,811	2,521
Truck	12,766	12,580	95	91	18,445	17,963	274	208
Rail	1,894	1,745	61	87	2,408	2,109	155	144
Other Modes	3,921	2,250	499	1,172	6,251	2,701	1,382	2,169
Water	794	360	52	382	1,143	482	105	556
Air, air & truck	13	3	4	6	41	5	16	19
Multiple modes & mail¹	1,531	519	409	603	3,119	724	1,179	1,216
Pipeline	1,270	1,100	4	166	1,509	1,158	9	342
Other & unknown	313	269	29	15	440	331	73	35

Table 2. Weight of Shipments by Transportation Mode: 2007 & 2040 (million tonnes). Source: FHA, 2010b

1. Multiple modes & mail includes export and import shipments that move domestically by a different mode than the mode used between the port and foreign location.

2. Data do not include imports and exports that pass through the United States from a foreign origin to a foreign destination by any mode.

However, based on studies commissioned by the American Association of Railroads and the American Association of State Highway Transportation Officials, there are lingering questions about the future reliability of both the highway and rail networks in the future.

A number of key points need to be understood by non-US readers in order to gain an appreciation of the US system, addressed in turn below.

3.2 Economies of scale gained by long, double-stacked trains.

The reason that rail has a higher market share in the US than in Europe is because it is the natural mode for long distance hauls, able to generate economies of scale. This is particularly the case for the western railroads, which enjoy longer distances and fewer interchanges than the eastern operators. Similarly, double-stacked capacity on many lines, in addition to train lengths of over 10,000ft in some cases mean that US trains can reach capacities of 650 TEU (compared to around 80-90 TEU in Europe). Therefore Class I railroads are profitable businesses, unused to government intervention, as they operate as private, and not public companies. (Also, American freight trains tend to focus on freight, and not passenger, movements, leading to a greater focus on network efficiencies, and not necessarily local transit movements.)

3.3 Vertical integration and total separation of east and west markets.

In the US, railroads are vertically integrated, meaning that each company owns its own tracks and rolling stock and in most cases terminals. Therefore they operate completely

separately from one another, although railroads may allow for track usage in certain situations. In Europe rail operating companies compete with each other on common-user track, forcing the maintenance issues into the public, and not private, sector. Furthermore, in the U.S., the east and the west of the country are entirely separate. BNSF and UP compete from the west coast to Chicago, while NS and CSX compete between Chicago and the east coast. The two Canadian railroads, CN and CP operate predominantly in Canada, although CN runs down from Chicago, through Memphis to the Gulf of Mexico (more on CN in a later section).²

3.4 Role of Chicago as the central rail hub

Due to historical development reasons, all 6 class I railroads mentioned above meet at Chicago. The city has some of the largest intermodal terminals in the world, each handling many hundred thousand lifts per year. The Chicago area includes approximately 900 miles of track and 25 intermodal yards, accommodating roughly 1300 trains daily (CSX, 2010). Approximately 14m TEU transited the metropolitan area in 2004 (Rodrigue, 2008). This amount of traffic brings its own problems, but what is under consideration here is that freight needing to cross Chicago needs to be transported between east and west coast railroad terminals, either by rail or road. Whereas full trains that do not require reworking will change crew and power at the arriving terminal and then depart, trains carrying containers for more than one destination will need to be split and reassembled into new trains that may then need to be transported to another railroad across town. This reworking can take up to 48 hours, therefore “rubber tyre transfers” are more common. According to Rodrigue (2008), “about 4,000 cross-town transfers are made between rail yards each day averaging 40km each.”

As cross town transfers grew more frequent, road congestion at grade crossings grew more severe.³ In the winter of 1999/2000, a large snowstorm caused so much chaos for railfreight that a political tipping point was reached when the city exerted pressure to get the railroads to work towards a collective solution. This was the beginning of the CREATE (Chicago Region Environmental and Transportation Efficiency Program) project, which took shape over the next couple of years. CREATE is a public private partnership involving the federal DOT, the state of Illinois, the city of Chicago, all the Class I railroads (except KCS) and the passenger lines Amtrak and Metra. The project is an umbrella group, formed in order

² The University of Memphis has an interactive railroad map on their website, showing complete networks of each class I railroad separately or together. https://umdrive.memphis.edu/haklim/public/final_the3rd.swf

³ There had been times when long trains being assembled on the mainline were blocking traffic at grade crossings for so long that police were putting parking tickets on the trains.

to seek funding for a number of individual engineering works, including: “six grade separations between passenger and freight railroads to eliminate train interference and associated delay; it includes twenty-five grade separations of highway-rail crossings to reduce motorist delay, and improve safety by eliminating the potential of crossing crashes; and it includes additional rail connections, crossovers, added trackage, and other improvements to expedite passenger and freight train movements nationwide.” (FRA website) The estimated cost for the entire project is \$1.534bn, \$232m of which will come from the railroads, described as “an amount which reflects the benefits (as determined by the Participating Railroads and agreed to by CDOT [Chicago Department of Transportation] and IDOT [Illinois Department of Transportation] prior to the execution of this Joint Statement) they are expected to receive from the Project.” (CREATE, 2005) The remainder of the funds are expected to be sourced through a variety of federal, state and local sources. \$100m was received through the TIGER grant scheme (see below).

The operational issues discussed above have also led to some innovative responses by individual railroads. Both eastern railroads NS and CSX are developing hubs in Ohio (see below). Likewise, western railroads will sometimes rework trains before they reach Chicago, for example BNSF will sometimes do this at Clovis (New Mexico) or Fort Madden (Iowa). This strategy allows the train to go straight through to the eastern railroad terminals without being reworked at BNSF’s Chicago yard. Another strategy has been pursued by CN, which purchased the old EJ & E line that bypasses the city down the west side. They began operating on this line in January 2009 and also sell paths on that line to other railroads. Therefore the future could see CN moving containers between Prince Rupert and their newly redeveloped hub at Memphis,⁴ using the EJ & E line to bypass the congestion at Chicago.

3.5 Role of international vs domestic containers

The scale of domestic cargo in the US needs to be mentioned. As well as the millions of international TEU, 89% of cargo in the US is domestic cargo (FHA, 2010a). Therefore this market dominates, and domestic cargo moves in 53ft boxes (as opposed to 40ft and 20ft maritime boxes). Therefore it makes sense both operationally as well as financially (i.e. it is cheaper per tonne for trucks and trains because fewer boxes are moved) to transload foreign cargo at or near the port from 40ft boxes into domestic 53ft boxes. (This also makes it expensive to reposition empty containers for outbound shipments from many hinterland

⁴ Memphis is also a key rail hub in the US, where five Class I railroads meet.

markets that do not have sufficient inbound international container traffic.) About 25% of all international cargo moved by rail is transloaded into these domestic containers (Rodrigue & Notteboom, 2009). Therefore in the area surround Los Angeles/ Long Beach, millions of square feet of warehousing is located for these transloading activities. Additional reasons to transload include the fact that since the US is a net importer, taking a maritime container thousands of miles inland without an export load to send back means that the container will need to be shipped back empty to the port. Interestingly, Notteboom & Rodrigue (2009) speculate that due to the concentration of trade lanes between China and the USA, and since most of the 53ft containers are manufactured in China, perhaps a decade hence there may arise the possibility of the 53ft maritime container. But in the meantime, existing investments in current ships designed for multiples of 20ft will inhibit that possibility.

3.6 Operational differences

Inland terminals in the USA tend to be larger than in Europe, as railroads are used more as landbridges across the country than a network of small linked terminals like in Europe (Rodrigue & Notteboom, 2010). A number of interesting operational differences may also be observed between Europe and the USA. In Europe, intermodal terminals are generally grounded facilities, meaning that containers are transferred between train and truck, and if a direct transshipment is not made, the containers are stacked on the ground. The truck driver will arrive at the terminal with a chassis and the container will be lifted onto this. By contrast, in the US, both chassis and containers are owned by the carrier (be that the shipping line or 3PL), while the truck driver simply arrives in his tractor. Containers are loaded onto waiting chassis and the arriving driver will hook up to a loaded chassis and take it away. These wheeled facilities require a great deal more room as there is less equipment that can be stacked, but they can be quicker for the incoming drivers who do not have to wait for their container to be located in a stack. This also means that cranes make fewer unproductive moves to pick through a stack of containers. They are also less capital intensive than grounded facilities because they require less specialised handling equipment (Talley, 2009).



Figure 2. Crane unloading train onto chassis. (Source: authors)

Yet the problem of having enough available chassis of the correct company has caused problems for terminal operators, and despite recent establishment of chassis pools (a number of owners sharing each other's equipment), there is now a move by some terminal operators towards the European model of grounded facilities. These require more use of cranes but utilise a far smaller footprint. Therefore they not only avoid the chassis problem but also account for the fact that land is not as available nor as cheap as it was in the early days of intermodal terminal construction.

New terminals of both wheeled and grounded type are being built, largely with automatic stacking equipment. The 185 acre BNSF intermodal yard at Memphis, TN, opened in 2010, is a grounded facility. It represents a \$200m development with 8 wide-span cranes, 5 for operating the working tracks and 3 for the stack. The site has 48,000 feet of track with enough length to work a full train without cutting. Likewise, the new CSX terminal at North Baltimore (due for completion in 2011 as part of the National Gateway project - see below) will be a grounded facility of similar design. Both sites will have capacity to handle over 500,000 containers per year. By contrast, the NS intermodal terminal at Rickenbacker near Columbus, Ohio (opened in 2008 as part of the Heartland Corridor project – see below) is a wheeled facility covering 125 acres (with 175 acres for development) with a capacity of 250,000 containers annually and 40,580 feet of track.

Rationalisation of the rail business in the 1980s (see discussion on the Staggers Act, below) resulted in fewer, larger intermodal terminals. The rule of thumb for rail operators is now about a minimum of 100,000 lifts annually for a feasible terminal. Therefore shippers will need to locate near these large sites to gain access to the main trunk routes, as has occurred in the Rickenbacker International Airport development.

In terms of port operations, the large shipping lines will have their dedicated terminals (therefore not operated by a railroad). On-dock railheads are very expensive to run because the trains must be loaded using longshore labour, which also raises issues as to whether the trains are loaded to the exact specifications of the rail operator. Shipping lines may not have enough volume for one location to fill daily train loads direct from their terminal so often there is no genuine need for on-dock rail. Therefore in some cases it may be more effective to dray the container a couple of miles to a near-dock facility where the containers can be consolidated from multiple terminals into trains bound for each location. If a full load is possible then on-dock is more efficient and cheaper, therefore it can help to make a rail move more competitive than road (because it removes the pre-haul), but as this is not always the case, using on-dock rather than near-dock can be problematic.

3.7 Other relevant issues

The Rail Safety Improvement Act of 2008 required all railroads that carry passengers or toxic materials to implement Positive Train Control (a safety process that uses GPS to prevent train accidents by monitoring their movement and overriding their progress if it is deemed unsafe) by 2015. The legislation was controversial in the industry as the railroads are required to fund it themselves, at a cost of over \$5bn for installation alone, resulting in a total cost of around \$13.2bn for installation and maintenance over 20 years (AAR, 2010b).

A second issue that may impact on the rail industry is the new safety criteria for truck drivers based on proposed changes to the current “Hours of Service” rules and other driver licensing requirements. The safety record will now follow each truck driver from state to state as well as between jobs. The likely result of this change is that insurance rates will probably go up and the driver workforce will potentially fall. These additional costs placed upon the road haulage industry are likely to make rail freight more attractive.

4. Government policy and legislation

In order to understand the current system of intermodal transport and the role of policy and regulation in the US, a brief overview of legislation to this point is required. Although container operations were developing in the 1960s and 1970s, several laws passed in the early 1980s allowed for cooperation between different transportation groups to develop. One law was the Staggers Act of 1980, which partially deregulated some areas of the railroad industry. The Staggers Act reduced the number of crewpersons needed for each train, which lowered total labour costs for each train. Secondly, the Staggers Act removed several pricing and

scheduling limitations, which increased the railroad's ability to become flexible in changing to market needs. These changes were designed to make the railroads more competitive for long distance domestic freight that had been lost to truck companies during the 1970s. As in other countries, this eventually led to a number of mergers and there are currently nine Class I railroads in the US (see above). The Ocean Shipping Act of 1984 relaxed many restrictions faced by the carrier operators and allowed an ocean carrier to provide inland distribution on a single through bill of lading.

The Intermodal Surface Transportation Efficiency Act (ISTEA) (1991) heralded something of an intermodal approach to highway and transit funding, including collaborative planning requirements (Chatterjee & Lakshmanan, 2008). It provided supplementary powers to metropolitan planning organisations and designated High Priority Corridors in the National Highway System. In 1998, the Transportation Equity Act for the 21st Century (TEA-21) authorised the federal transport programme until 2003. The act required a number of planning objectives for regional transport plans, including safety, economic competitiveness, environmental factors, integration and quality of life. However despite these attempts to foster an intermodal approach to transport planning, key government agencies (such as DOT departments) and industry bodies remain modally-based. (Holguin-Veras et al., 2008).

Two key issues often raised by intermodal transport operators that tend to shape discussions on future legislative efforts include the Jones Act (1920) which requires that any vessel operating between two US ports must be US-built, -owned and -manned, and the Harbour Maintenance Tax (HMT). Originally introduced in 1986, the HMT is a federal tax imposed on shippers based on the value of the goods shipped through ports. Its purpose is to fund maintenance and dredging of waterways, which are the responsibility of the US Army Corps of Engineers. Perakis and Denisis (2008) discuss the obstacle that HMT presents to the development of short sea shipping in the US. As the tax is applied at every port, a water leg in an intermodal chain will attract this fee whereas transloading to road or rail will not. In addition, a national ports policy is not possible because the US Constitution places limits on the role of the federal government in relation to ports (Talley, 2009).

5. New developments in government policy and legislation

At this point, US federal freight policy is moving towards a more integrated transportation system, however, the necessary funding to do so remains in various agencies that do not necessarily have the authority to work on cross-jurisdictional projects. In some cases, modal agencies may be more responsible for safety and not infrastructure investment,

while in other cases the role of regulatory oversight may reside in different agencies, depending upon the area of concern. Finally, the infrastructure for waterways is actually managed by the U.S. Army Corps of Engineers, and not the U.S. Department of Transportation.

Normally the federal DOT allocates money to the state DOTs and they decide how to spend it, but this system creates little incentive for states to spend money on projects that are perceived to be of primary benefit to other states. Therefore there has been a realisation at national level that attention should be paid to cross-border projects. This led to the projects of national and regional significance (see below). This was quite a new development, and especially for railroads to be eligible rather than just road projects.

The Safe, Accountable, Flexible and Efficient Transportation Act: A Legacy for Users (SAFETEA-LU, 2005) introduced approximately \$1.8bn in congressional earmarks, designated projects of national and regional significance. These were large infrastructure project funds decided by Congress. Benefits could include improving economic productivity, facilitating international trade, relieving congestion, and improving safety. One example is the Heartland Corridor, which will be discussed below.

The stimulus package, named the American Recovery and Reinvestment Act (2009), provided \$1.5bn for transport projects through the Transportation Investment Generating Economic Recovery (TIGER) programme. This money was available for all transportation projects (not just freight) and would be awarded on a competitive basis, with applications due in September 2009 and announcements made in February 2010. Private money in TIGER applications was matched by public money. The five major goals for TIGER grants were economic competitiveness, safety, state of good repair, liveability and environmental sustainability. This was the first time money was awarded in this fashion, and a second round of \$600m was awarded in September 2010. The popularity of the funding programme meant that the DOT was swamped with applications for each round of funding, receiving almost 1,500 applications totalling nearly \$60bn for the first round, and almost 1,000 applications totalling \$19bn for the second round. The recent experiences of the TIGER Program, where the Department of Transportation solicited many multimodal projects (both for passenger and freight) demonstrated the need for such programs, but also the lack of guidance available to engage in such broad comparisons.

The result of this round of funding has been a significant revival of interest in rail projects. As states were the only eligible applicants, Class I railroads were required to form partnerships with the states in order to process an application. The list of recipients indicates

that taking an integrated approach to transport problems by focusing on corridors was considered an attractive proposition for federal legislators. The majority of awards were for public transit programmes, highways and other infrastructure upgrading, however freight-specific projects such as transportation hubs and port upgrades also received financial support. Some larger freight projects included \$98m for the CSX National Gateway project (see below), \$100m for the Chicago CREATE project and \$105m for the Norfolk Southern Crescent Corridor (see below). A marine highways project in California was also among the recipients.

The Energy Independence and Security Act (2007) included a provision for “America’s Marine Highway Program” to integrate the nation’s coastal and inland waterways into the surface transportation system. Therefore Congress instructed the DOT Maritime Administration (MarAd) to create a Marine Highway program that examined ways to utilise waterways where they may provide some services on parallel highway routes to alleviate bottlenecks. They assessed the country’s waterways and invited applications and in August 2010 eventually designated 18 marine corridors, 8 projects, and 6 initiatives for further development. These 8 projects are now eligible to bid for a total of \$7m in funding.

As will be seen in the following discussion, there is an increasing focus on infrastructure corridors. As these projects encompass a number of localities, regions and states, not to mention private and public stakeholders, they have necessitated new methods of management and new funding schemes. However the real role for this money is to enable large consortia to come together where public and private benefits can be clearly identified amongst all the parties. In reality the federal government could never spend enough money to exert significant influence on the operations of the rail industry. Indeed, railroads in the past have been reluctant to accept public money for fear of strings being attached.

In addition, some problems will be solved by the market without the need for government intervention. As discussed earlier, chassis management has become a problem over the last decade but the issue is beginning to resolve itself, first through chassis pools and then through the growing trend of grounded facilities. In this case, policy intervention has not been required as a combination of operational efficiency on behalf of railroad terminal operators and the increasing costs to carriers to maintain chassis fleets have resulted in new methods of operation.

Therefore it can be seen that different issues can best be solved by different approaches, whether through policy intervention, planning strategies, operational changes or market

forces. The difficulty for politicians and planners lies in recognising which freight issues can best be solved by which measure.

6. Corridors – current and new developments

In order to improve hinterland access with the aim of capturing or retaining inland markets, a number of rail corridor projects have been undertaken with involvement of US ports to greater or lesser extents. The most significant of these will be discussed below.

6.1 Alameda corridor

The Alameda Corridor Transportation Authority (ACTA) is a joint powers authority that was set up by the ports of Los Angeles and Long Beach in 1989. The ports purchased the required rail lines from the railroads and the crucial factor in the project was that the railroads agreed to use the corridor once it was built.

The Alameda Corridor is a short (20 miles) high capacity (3 double-stack tracks) line designed to reduce congestion and other negative externalities associated with the extremely high container flows of the San Pedro Bay ports (Los Angeles and Long Beach – combined 2009 throughput of 11.8m TEU). The project consolidated 4 branch lines, reduced conflicts at 200 grade crossings and included a 10 mile trench. The line was opened in 2002, with a capacity of about 150 trains per day.



Figure 3. Map showing Alameda Corridor. (Source: ACTA, 2010)

The total cost of the project was \$2.43bn, split between \$1,160m revenue bonds, \$400m federal loan (the first of its kind), \$394m from the ports, \$347m MTA grants and \$130m from other sources. (ACTA, 2010) The ports are directly involved in the project, as they are the financial guarantors of the corridor and will lose money if the route is not used and incurs losses. While the two ports are located immediately next to each other and have acted together in this instance, they remain separate institutions, each administered by their respective city's harbour department (Jacobs, 2007).

In 2009, of the 11.8m TEU through the ports, 3.4m TEU travelled up the corridor (2.8m TEU using on-dock connections and 0.6m TEU near-dock). 0.7m TEU used off-dock rail, 3.4m TEU used rail after transloading into 53ft domestic containers and 4.3m TEU travelled inland by truck. (ACTA, 2010)

Yet while the corridor solves certain problems for the port, it presents other issues for the two competing rail operators. UP operates a large intermodal yard (ICTF) in Carson – about 4-5 miles from the port, therefore they are able to truck their containers there for consolidation on block trains, then send those up the Alameda Corridor and across the country. However BNSF's main yard is at the end of the corridor, in Los Angeles. Therefore

BNSF often drive trucks to transloading warehouses, then truck the 53ft container to their LA yard, thus bypassing the corridor. BNSF wants to build a new yard near UP's ICTF yard. This situation relates back to the early days of intermodalism, when SP (later bought by UP) bought the ICTF yard, as much to do with the location of the site relative to their business as clairvoyance with regard to the bright future of intermodal transportation. BNSF has small rail sidings near the port as well as an agreement with Maersk to use space within their LA port terminal, whereas UP has, in addition to their ICTF terminal, large rail sidings between the port and ICTF. Therefore when rail corridors are built, it is important to understand issues such as train marshalling that can have major impacts on usage of the mainline.

6.2 Alameda Corridor East

The Alameda Corridor East is primarily a highway programme, with the aim of removing a number of grade crossings (including a 2.2 mile trench) on the rail line heading inland from the Alameda Corridor terminus at Los Angeles. It will reduce congestion because, as rail traffic has priority (the rail tracks are on their own private land), road traffic has to wait whenever a train passes. A secondary aim is to increase safety through avoiding potential collisions. \$1.14bn has already been spent, with an estimated \$0.3-0.6bn required to complete the remaining grade separations. Of the money already spent, \$219m came from federal sources (including \$134m from a TEA-21 earmark and \$65m from SAFETEA-LU), \$536m from state sources, \$340m from the MTA (metropolitan transportation authority), \$23m from the city/county and \$20m from the railroad Union Pacific. (ACE, 2010).



Figure 4. Map showing the Alameda Corridor East project area. (Source: ACE website)

Callahan et al. (2010) criticised the project for not utilising the same institutional framework as ACTA, but realistically the facts of the situation precluded such a framework. Firstly, the grade separations do not actually provide much of an advantage for the railroad (as they already have the right of way), beyond the removal of the threat of collisions. Indeed, improving road flows could be considered to provide an advantage to road haulage (Callahan et al., 2010). Furthermore, because the project does not consolidate freight on a new line, it was not possible to purchase the tracks under a new authority as in the case of ACTA. However in terms of the actual construction work, the project has been managed under a single joint powers authority ACE Construction Authority, which has been successful in utilising the branding of the corridor to focus public money that may have been more difficult to attract for each construction project individually. The project was unsuccessful in its application for TIGER 1 funding, although a grade crossing further inland at Colton was awarded \$33m through an application by Caltrans, the state transport authority.

6.3 Heartland Corridor

The Heartland Corridor, linking the Hampton Roads area to Columbus Ohio, and eventually to Chicago, represents the first multistate private-public rail corridor in the US. The work involves upgrading an existing coal line with restricted dimensions to handle international maritime and domestic double-stack container traffic moving from the Virginia Port Authority west through Virginia, West Virginia, and Ohio, continuing to Chicago and its interchanges with the western Class I railroads.

The project affords a significant competitive advantage to Virginia's ports by providing a shorter (by over 200 miles) and faster (by about 24 hours) route to the Midwest along with high-speed double-stack capacities. (ARC, 2010). It also benefits communities along the route through Virginia, West Virginia, and Ohio by providing economic development and transportation opportunities. Project funding is coming from both public sources (Virginia Rail Enhancement Grant and Ohio Rail Development Commission Grant) and the private sector (Norfolk Southern Corporation). Federal funding was forthcoming when the Heartland Corridor was designated as a Project of National and Regional Significance under the 2005 SAFETEA-LU legislation.

The project began in 1999 when a study commissioned by the Appalachian Regional Commission (ARC) found that there were impediments to shippers in the region due to poor access to major rail and port traffic routes (RTI, 2000). Once the estimated cost of \$200m had been calculated, a steering group was formed and throughout 2000-2004 the members worked to develop support for the project. The level of public benefits that would accrue from the project were significant enough to generate interest at the federal level and when the 2005 SAFETEA-LU legislation was passed, the Heartland Corridor was designated as a Project of National and Regional Significance. The bill authorised \$95m in federal funds for the project (reduced to \$84.4m by estimated obligation limitations, rescissions, etc.). Of the total cost of \$195.2m, \$84.4m was federally funded, \$101.0 million was contributed by NS, \$0.8m from the Ohio Rail Development Commission (ORDC) and \$9.0m came from the Virginia Department of Rail and Public Transportation (VDRPT).

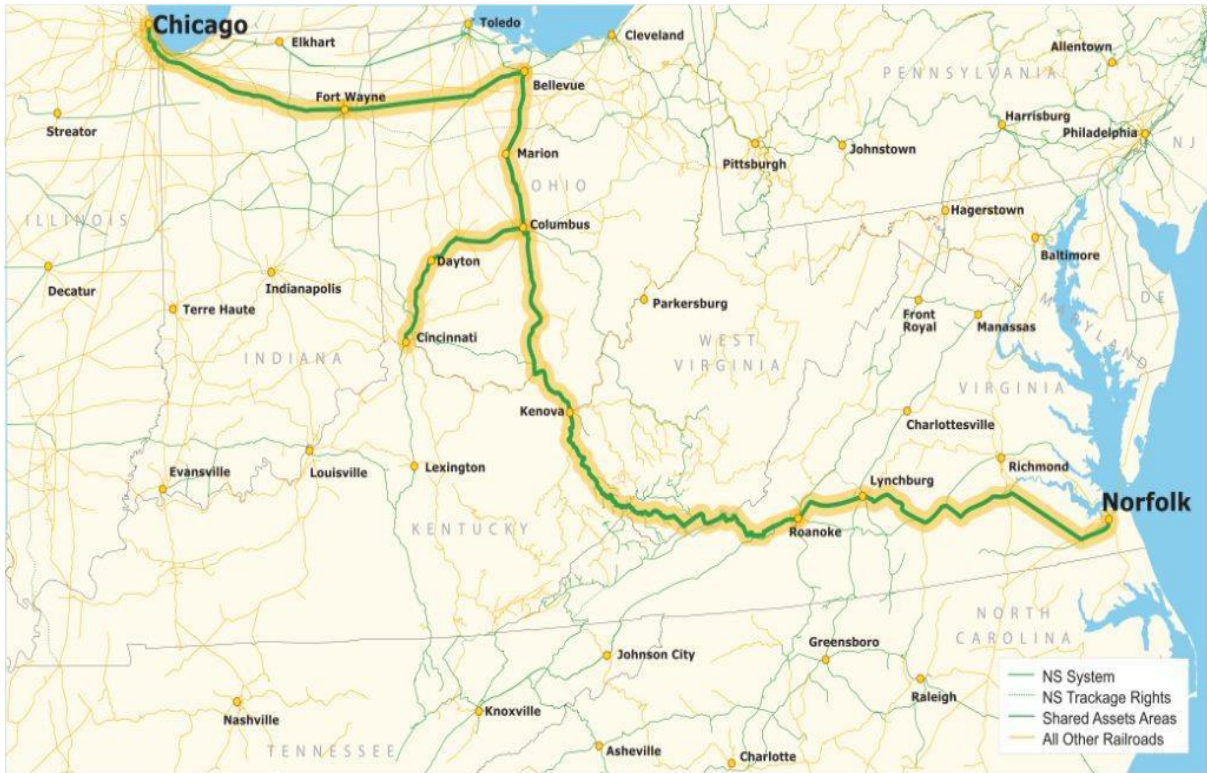


Figure 5. Map showing the Heartland Corridor route. (Source: Norfolk Southern website)

Two Memoranda of Agreement, one between Federal Highway Administration (FHWA) Eastern Federal Lands Highway Division and Norfolk Southern, and the other between FHWA, EFLHD and the three states were completed in August 2006. The agreements identified roles and responsibilities for the Environmental Planning, Design and Construction of the Heartland Intermodal Corridor Project. Furthermore, the MoA established an unprecedented funding mechanism between the federal government and the railroads that allowed money to flow directly to the railroads from the federal government. A key aspect of the MoA was that since the majority of the tunnels were in West Virginia, the other states had to agree that the majority of the money would be spent there, as they would all benefit. It was also agreed that federal money would only be used on the track work. Intermodal terminals would need to be funded from other sources.

Along the route, 28 tunnels and 26 other overhead obstructions needed to be raised to allow the passage of double-stacked container trains. Construction began in October 2007 and the first double stack train ran on 9th September 2010. A large intermodal terminal was opened at Rickenbacker in 2008 (developed through a \$68.5m partnership between NS and the Columbus Regional Airport Authority, \$28m coming from the U.S. DOT) and sites are being developed at Prichard WV and Roanoke VA.

6.4 National Gateway

The National Gateway project bears certain similarities with Norfolk Southern's Heartland Corridor. Both will connect the Virginia Port Authority to the state of Ohio, and then to Chicago, and both will be anchored around a new large terminal in Ohio, both of which were discussed in an earlier section. Both corridors involve a number of clearance upgrades to allow double-stack capability.

The National Gateway⁵ is a Public Private Partnership (PPP) that involves 61 double stack clearances, the construction or expansion of 6 intermodal terminals and will cost \$842m (CSX, 2010), including \$98m in funding from the first TIGER programme.



Figure 6. Map of CSX National Gateway route. (Source: CSX, 2010)

CSX is also attempting to improve connectivity of landbridge services by increasing partnership with western railroads UP and BNSF, aiming to provide a seamless door-to-door service for customers. They are talking to western railroads to run a dedicated train of CSX

⁵For more information visit <http://www.nationalgateway.org/>

cars past Chicago to their north Baltimore hub and they will then split it there, rather than having to marshal the train in the Chicago terminal. This kind of relationship represents a new development for the railroad and is perhaps indicative of greater cooperation between operators.

6.5 Other corridor projects

More recently, the rubric of intermodal corridors is being used to market various upgrades to the US rail network. NS have proposed a number of projects along what they call the Crescent Corridor, a 1,400 mile stretch running between New Orleans and New York. They are aiming to develop a PPP to cover the estimated cost of \$2.5bn. The project involves 13 states, 11 new or expanded terminals and 300 miles of new track. In February 2010 the project was awarded \$105m in TIGER I grants through an application from Pennsylvania DOT and in August 2010 six states submitted applications under the TIGER II programme totalling \$109.2m, although none were successful.⁶ Another corridor project is the Meridian Speedway, a joint venture between KCS and NS over a 320 mile stretch of track upgrade costing \$300m, agreed in 2006.⁷

7. Conclusion

Intermodal freight transport is developing in the United States, particularly through the development of a corridor approach (Rodrigue, 2004). This integrated approach brings together public and private actors in order to direct investment to infrastructure improvements, while aiming to retain the benefits of private sector operation. While public money is targeted at infrastructure development, a crucial aspect of any corridor project is the alignment of terminal facilities with local and regional demand, with a particular focus on the co-location of transport facilities with logistics parks (Rodrigue et al., 2010).

Vital for the successful development of such multi-partner, or indeed multi-region or multi-state projects is the agreement amongst stakeholders that the investment will benefit all locations along the corridor (McCalla, 2009). Thus information sharing and relationship building, along with promotion and branding activities are essential. In addition, innovative planning and funding mechanisms may be required, and the most positive indication that US freight capacity issues are being addressed is the recent development of such mechanisms.

⁶ For more information visit the website. <http://www.thefutureneedsus.com/crescent-corridor/>

⁷ <http://www.kcsouthern.com/en-us/Media/Pages/MeridianSpeedway.aspx>

However ongoing work will be required to continue to negotiate these mechanisms at local, state, regional and national level. Moreover, as such large corridor projects can easily take a decade or more to come to fruition, planners at all levels require a detailed understanding of the freight needs of their area in order to initiate the necessary infrastructure developments for the next thirty years. Given that current planners also have to deal with the legacy obligations resulting from the decisions of previous planners, as well as juggle policy directives from politicians and operational requirements from private operators, the task remains formidable.

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