Technical Memorandum

Feasibility of Diverting Truck Freight to Rail in the Columbia River Corridor

Draft

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Executive Summary

Shippers and customers in the Portland/Vancouver region have multiple options to deliver and receive goods. There is an international airport, two international marine ports, two Class I railroads, several shortline railroads, a pipeline, three interstate highways, and a half-dozen major state highways.

Despite this broad range of options, most commodities moved in the region can only use a portion of these modes because of their handling requirements. For example, fragile and perishable commodities experience a much higher rate of damage on rail than they do on other modes.

When the volume, origin, and destination of freight are considered, fewer modes are effective for shipments. Large volumes of certain commodities are better suited for barge, rail, and ocean-going vessel (and for petroleum products, pipelines) than trucks or airplanes. Conversely, small packages are more appropriately shipped by truck and airplane. Goods destined for Asia can use air and steamship, but if a large volume of goods were being shipped, they would need to travel on steamship. Conversely, small packages and smaller loads would typically be transported by air and truck, depending on the distance traveled.

A principal factor in the movement of commodities is the schedule for delivery. Many goods are moved by express services (one- and/or two-day service), and others are on a critical intermodal schedule; both of which require high levels of reliability. Many of the above modes (rail, truck, air, river, and ocean) are used for intermodal shipments, but generally, truck and air are used for express deliveries.

Overriding all of the above factors is meeting the customer's needs. The customer dictates how, where, and when the commodity will be shipped based on their production, logistics, and other requirements.

Modes Used to Move Commodities in the Portland/Vancouver Region

As with other urban areas throughout the U.S., the majority of the freight moved into, out of, within, and through our region is accomplished using trucks. In fact, 67% of all freight in the region travels by truck, which is projected to grow to 73% by 2030.

Table ES-1. Freight Tonnage by Mode in the Portland/Vancouver Region (millions of tons)

	2000		2030		GROWTH
MODE	TONS	%	TONS	%	2000-2030
Truck	197.2	67%	380.0	73%	93%
Rail*	32.9	11%	59.2	11%	80%
Water**	43.5	15%	50.3	10%	16%
Air	0.4	0.01%	1.1	0.02%	175%
Pipeline	22.2	7%	31.2	6%	41%
Total	**296.3**		**521.6**		**76%**

Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast
*Includes intermodal.
**Combines ocean-going steamships and river barges.

The high rate and increasing use of trucks is a reflection of our growing, diversifying and more demanding regional economy, which is leading to shipping practices becoming more tailored to our needs. There will continue to be a significant movement of bulk commodities in the Portland/ Vancouver region—which rely on non-truck modes—but their growth will occur at a slower rate than the smaller shipments of higher value products such as machinery, electronic components, prepared meat and seafood products, and mail and express traffic (principally moved by truck), which will represent a larger segment of our future economy. A corresponding phenomenon is that smaller shipments (under 1,000 lbs.) have been, and will continue to be, the highest area of freight traffic growth.[1]

Opportunities to Divert Freight from Truck to Rail

Given the fact that the customer determines what modes will be used to move their freight, one can only speculate about where it would be to a customer's advantage to use rail in place of truck. If a shipper or customer is not located on a rail spur or at a rail terminal, or at a dock along a river, they are forced to use trucks for either the entire shipment or a portion of it. As intermodal service (and rail terminal capacity) grows, businesses will be able to place goods in trailers or containers that can efficiently be placed on rail lines; although, because of the extra handling fees this practice creates, this is only practical and/or cost-effective for long-distance hauls (over 500-750 miles).

In addition, the rail industry is moving away from internal regional moves to focus more on the long-haul, single-commodity cargo and/or container traffic between major hubs (e.g., Seattle/Tacoma to Chicago) because those movements have low operating costs, use existing infrastructure, and they generate the highest profits for the rail carriers. Since the railroad mergers of the 1990s, the longer-distance moves by the Class I railroads (in the Portland/Vancouver region, the Union Pacific and Burlington Northern & Santa Fe [BNSF] railroads) have increasingly become the norm, with local movements by rail delegated to the shortline rail operators. Many of these shortline operators are underfinanced and over-worked, and their networks are inconsistent and incomplete, requiring access to other railroads (which can be costly and slow) and/or transfer to truck.

While there are certainly some commodities that could shift from truck to rail in the region, it is probably a very minimal amount, and probably not part of a consistent and regular shipment schedule. Shippers and customers are aware of the region's rail service and use it where appropriate and advantageous to their needs. As with all business matters, shipping practices are based on market conditions including service, cost, and schedule conditions. As demonstrated in the Commodity Flow Forecast, the region will increasingly be expecting higher levels of service (in terms of travel time and door-to-door service) for a wider variety of products to a wider range of locations. These conditions will increasingly require the flexibility and convenience provided by trucks.

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[1] *Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast*, for the Port of Portland et al, by DRI-WEFA, BST and Cambridge Systematics, Inc., June 30, 2002, page 57 and Figure 5-3
http://www.portofportland.com/PDFPOP/Trade_Trans_Studies_LCR_Cmdty_Flw_Rpt.pdf

SECTION 1

Introduction

The Columbia River Crossing study area hosts one of the most dynamic and multimodal corridors in the country for freight movement. The corridor combines two interstate highways, two Class I railroads, two international ports, an inland waterway, and an international airport. Each of these transportation systems are interrelated and form an important hub for the Pacific Northwest, as well as a critical link in the nation's goods movement supply chain. Shippers, manufacturers, and consumers in the region benefit from the high-quality services, low shipping cost, and access to domestic and international markets, provided by the concentration of these modes in our region.

As the region's highway and railroad systems experience higher levels of congestion, however, we are in danger of becoming a less competitive and convenient market to move freight. While high congestion levels have been documented in the regional railroad system[2], some individuals have asked whether freight can be diverted from trucks traveling in the I-5 corridor to the railroad system. More specifically, can enough freight be diverted to reduce or eliminate the need for truck mobility improvements identified in the Columbia River Crossing Draft Problem Definition statement[3]?

Purpose of this Memorandum

This memorandum responds to the question of why freight is moved by truck or rail and what opportunities are available to divert freight from truck—the dominant mode for freight movement—to the railroad system. The question is complex involving detailed information about freight volume, its origins and destinations, its delivery schedule, shipping cost, large scale and localized logistics, customer and shipper requirements and facilities, requirements set in contracts between customers, carriers, and manufacturers/suppliers, etc. Moreover, the question cannot be answered definitively or in a summary fashion because of the broad range of requirements associated with each shipment.

This memorandum describes the volume of goods that are moved in the region, what modes are used to move them today, and what modes are expected to be used to move them in the future. In addition, this memorandum explains the future trends in commodity movement in the region, and finally, describes whether or not there are opportunities to divert goods from truck to rail in the Columbia River Crossing Bridge Influence Area.

Organization of this Memorandum

The information provided in this paper is organized as follows:

I. Background of existing commodity flows
II. Characteristics of rail and truck modes
III. Future trends in commodity movements

[2] *I-5 Rail Capacity Study*, prepared for the Oregon and Washington departments of transportation, by HDR Engineering, Inc., 2003, http://www.oregon.gov/ODOT/RAIL/capstudy.shtml

[3] *Columbia River Crossing, Draft Problem Definition*, Columbia River Crossing Team, Vancouver, WA, October 6, 2005, http://www.columbiarivercrossing.org/materials/projectDocuments/100605_ProbDefinition_Draft.pdf

IV. Opportunities to divert freight from trucks
V. Conclusions

Case Studies – Georgia Pacific, Camas, WA; Schnitzer Steel, Portland and McMinnville, OR

The intent of this organization is to provide the foundation data and estimates that are being used to forecast future travel in the I-5 corridor before evaluating whether modifications to the estimates of modal use should be considered.

SECTION 2

Background: Existing Commodity Flows

In 2000, over 345 million tons of cargo was moved within and through the Portland/Vancouver region with a total estimated value of $457 billion[4]. Gas, fuel, and petroleum/coal products represent the largest commodity group (in terms of tonnage) with 16% of tonnage moved that year, followed by nonmetallic minerals (11%), cereal grains (9%), and wood products, gravel and crushed stone, sand, and logs and other wood in the rough (each at 8%)[5].

Table 2-1. Ten Largest Commodity Groups Shipped Within and Through Portland/Vancouver Region in 1997* (in 1,000's of tons)

COMMODITY GROUP	TONS (IN 1,000'S)	% OF TOTAL
Gas, fuel, petroleum/coal products	42,238	16%
Nonmetallic mineral products	29,627	11%
Cereal grains	24,301	9%
Wood products	22,139	8%
Gravel and crushed stone, sand	21,688	8%
Logs and other wood in the rough	20,541	8%
Foodstuffs and alcoholic beverages	19,269	7%
Base chemical	12,228	5%
Mixed freight	8,695	3%
Waste and scrap	5,792	2%
Total	**206,518**	**79%**

*1997 is the latest year available for existing regional commodity groupings.

Over one-third (36%) of the freight tonnage moved in the region is inbound freight, followed by outbound freight (29%), and internal freight (freight with both an origin and destination in the region) is 21% of all tonnage moved in the region in 2000 (see Table 2-2). About 49 million tons of freight was moved *through* the region (i.e., tonnage that had neither an origin nor destination within the region) in 2000 (or 14%).

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4 *Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast*, for the Port of Portland et al, by DRI-WEFA, BST and Cambridge Systematics, Inc., June 30, 2002, tables 1 and 6 http://www.portofportland.com/PDFPOP/Trade_Trans_Studies_LCR_Cmdty_Flw_Rpt.pdf

5 Ibid, Table 2

Table 2-2. Summary Origins and Destinations of Portland/Vancouver Region Freight Tonnage in Year 2000[6]

ORIGIN AND DESTINATION	TONNAGE (IN MILLIONS)	% OF TOTAL
Inbound freight traffic	123	36%
Outbound freight traffic	99	29%
Internal freight traffic	73	21%
Through freight traffic	49	14%
Total	**344**	**100%**

Modes Used to Move Commodities

Six transportation modes are used to move freight in the Portland/Vancouver region: truck, rail, air, ocean-going vessel, river barge, and pipeline. A portion of the tonnage moved in the region uses a single mode (e.g., petroleum products through the Olympic Pipeline use a local network of pipelines to several customers, and soda ash moves by rail from the Powder River Basin in Wyoming directly to terminals 4 and 5 at the Port of Portland), and many other commodities are transferred to one or more modes between origin and destination points.

As shown in Table 2-3, trucks move the most freight in the region (67%), followed by pipeline (7%), rail (11%), ocean-going vessel (10%), barge (5%), and air (<1%).

Table 2-3. Portland/Vancouver Region Freight Tonnage by Mode in Year 2000 (in millions of tons)*

MODE	2000	
	TONS	%
Truck	197.2	67%
Pipeline	22.2	7%
Rail*	32.9	11%
Ocean	28.4	10%
Barge	15.1	5%
Air	0.4	<1%
Total	**296.2**	**100%**

*Includes intermodal, container on flatcar, and/or truck trailer on flatcar.

On a national scale, rail systems account for 16% of the domestic freight tonnage moved, and trucks carry 78% of domestic freight tonnage.[7] Similarly, statewide in Oregon, rail accounts for 14.3% of all freight tonnage moved in the state.[8]

(Tonnage is the uniform value provided in the Commodity Flow survey because it is based on the demand for a wide range of goods, which are typically reported in terms of weight. It is not possible to correlate the number of tons estimated in the survey with the resulting

6 Ibid, Table 14 and Figure 3-4.

7 *Freight Rail and the Oregon Economy: A Background Paper*, prepared for the Port of Portland by Cambridge Systematics, Inc., March 2004, http://www.portofportland.com/pdfpop/Freight_Rail_OR_Econ.pdf

8 Ibid.

number of trips needed to move that tonnage without the use of a regional travel demand model. Future analyses of freight movements in the Columbia River Corridor will utilize the travel demand model being prepared by Metro and the Regional Transportation Council to translate these tonnages into freight trips.)

Commodity Value by Mode

As expected, the most costly means of freight movement—air and truck—carry the most expensive freight (see Table 2-4). That is, while air cargo represents 1/10th of 1% of freight tonnage moved in the region in 2000, the value of that cargo is 1.1% of all regional freight. Trucks carry 67% of all freight tonnage, which is valued at 82% of all freight moved in the region (2000).

Table 2-4. Value of Freight Moved in the Portland/Vancouver Region by Mode in 2000 (in $billions – constant $)

MODE	2000	
	$	%
Truck	$371	82%
Pipeline	$ 9	2%
Rail	$ 48	11%
Water*	$ 25	5%
Air	$ 5	1%
Total	**$457**	**100%**

*Ocean-going and river barge modes were combined in the forecast.

SECTION 3

Characteristics of Rail and Truck Modes

Comparing the operations, capacities, and services available for rail and highway modes is not an "apples to apples" exercise because the systems have different alignments and terminals, provide different functions for shippers, and there are performance, efficiency, and cost factors associated with each particular mode.

In general, rail systems are used for long-haul, low-value, and high-volume/tonnage movements (see Table 3-1). In the Portland/Vancouver region, trains travel an average distance of 911 miles, while trucks complete deliveries within an average range of 199 miles.[9] One train can carry the equivalent volume of containers of 300-375 trucks. For bulk cargo, one typical unit train (i.e., 100 cars) can move as much tonnage as 200-400 trucks (depending on commodity and truck capacity).[10]

Table 3-1. Selected Rail and Truck Characteristics

	RAILROAD	TRUCK
TONNAGE CAPACITY	20,000 TONS/TRAIN 112 TONS/CAR	50 TONS/TRUCK
Equipment required for 10,000 tons	1 train/100 cars	200 trucks
Persons required to move 10,000 tons	2-4	200
Average trip distance	911	199
Average long-haul speed*	50-70 mph	50-70 mph

*Speeds are considerably lower where rail and trucks enter shipping terminals, slow down for railroad/roadway crossings and other impediments in urban areas.

Rail systems, however, do not possess the convenience and door-to-door service provided by trucks (except where a shipper has a rail spur between the rail line and its shipping docks). Moreover, trains cannot move smaller loads (e.g., under 50 tons) as cost-effectively as trucks and may even be more costly than many larger truck loads (e.g., up to 500 tons) for shipping distances under 500 miles. While truck movements are more expensive than rail movements, trucks are a necessary part of nearly all freight movements, including local distribution, drayage between port and rail facilities, and where rail systems are not available to meet shipper's needs.

In addition, trucks offer shippers the ability to ship goods to a railhead that offers the best shipping rate. For example, even companies with dedicated rail spurs on their property could seek better rates by trucking their goods to a competitive railroad at a different location.

Shipping Cost Comparisons

Cost is a critical consideration when selecting one mode over another. As the transportation carrier industry has been de-regulated, there is no accurate way to compare shipping costs of

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9 *2002 Commodity Flow Analysis*, Port of Portland, 2002

10 *Alternate Transportation Mode Comparison*, US Army Corps of Engineers

the modes. Shipping costs are based on a wide range of factors including negotiated contract rates, volume of shipment, ultimate destination of shipment, discounts for backhaul, and use of a certain supply chain. Operating costs, however, can provide a general appreciation for what shipping costs might be.

Railroads generate lower operating cost/ton or operating cost/mile for large shipments than do trucks, because each long train carries the equivalent volume of 300-400 large trucks (300 trucks can move roughly the same number of containers as one train; some trains carrying bulk cargo can move as much as 400 trucks), and does so with fewer staff and handling costs. This is the case whether the shipment is long-distance or a short haul (see Tables 3-2 and 3-3). The converse is true with small shipments where trucks have lower operating costs on a per ton and a per mile basis because the initial operating cost of a train is so high.

Table 3-2. Estimated Rail and Truck Operating Costs between Portland/Vancouver Region and Chicago (assumed 2,000 miles)

	50 TON LOAD		10,000 TON LOAD	
	BY TRUCK	BY RAIL	BY TRUCK	BY RAIL
Operating cost/hour	$82[11]	$1,000[12]	$82	$1,000
Travel time/trip	36 hours	48 hours	36 hours	48 hours
Number of trips	1	1	200	1
Direct operating cost	$2,952	$48,000	$590,400	$48,000
Cost of drayage to rail	$0	$82	0	$16,400
Total operating cost	$2,952	$48,082	$590,400	$64,400
Operating cost/mile	***$1.48***	***$24.04***	***$295.20***	***$32.20***
Operating cost/ton	***$59.04***	***$961.64***	***$59.04***	***$6.40***

Table 3-3. Estimated Rail and Truck Operating Costs between Portland/Vancouver Region and Eugene (assumed 75 miles)

	50 TON LOAD		10,000 TON LOAD	
	BY TRUCK	BY RAIL	BY TRUCK	BY RAIL
Operating cost/hour	$82	$1,000	$82	$1,000
Travel time/trip	2 hours	4 hours	2 hours	4 hours
Number of trips	1	1	200	1
Direct operating cost	$164	$4,000	$32,800	$4,000
Cost of drayage to rail	$0	$82	0	$16,400
Total operating cost	$164	$4,082	$32,800	$20,400
Operating Cost/Mile	***$2.19***	***$54.43***	***$437.33***	***$272.00***
Operating Cost/Ton	***$3.28***	***$81.64***	***$3.28***	***$2.04***

[11] Based on an assumed trip of 60 miles in one hour at 10 miles/gallon of fuel, at $2.00/gallon of fuel, or $12.00. In addition, wages of $30/hour and $30/hour fringe benefits for drivers. Finally, assumed $10/hour for insurance.

[12] Industry standard cited by Bill Burgel, HDR Engineering, Inc., December 2004

SECTION 4

Future Trends in Commodity Movements

The *Lower Columbia River Commodity Flow Forecast* estimated growth in commodity tonnage and value by mode between 2000 and 2030, including two intervening years. The trends in the forecast are very interesting, such as:

- Freight tonnage moved in the region will grow by 76% between 2000 and 2030 (see Table 4-1);
- The value of that freight will grow by 81% (see Table 4-2);
- Trucks will carry 73% of freight tonnage in 2030, representing 84% of the total value of regional freight;
- Air cargo and truck will grow at the fastest rates (175% and 93%, respectively); and
- The value of freight carried by the air mode will increase by 160%.

These estimates are particularly interesting because they are based on an assignment of commodities to modes operating in an unconstrained transportation system. That is, the forecast assumes that each of the modes is able to operate in an optimal manner and that capacity and equipment is available to move the goods generated by consumer and manufacturer demand. In other words, goods will travel on the modes they are assigned to because those are the modes appropriate to the type, volume, origin-destination, shipping rates, and other factors, associated with the cargo traveling in the region.

Table 4-1. Freight Tonnage by Mode between 2000-2030 in the Portland/Vancouver Region (in millions of tons)

MODE	2000	2010	2020	2030	ANNUAL GROWTH RATE*
Truck	197.2	223.1	315.6	380.0	2.22%
Rail	32.9	33.6	47.6	59.2	2.00%
Water	43.5	43.3	47.7	50.3	0.49%
Air	0.4	0.5	0.8	1.1	3.50%
Pipeline	22.2	30.2	30.7	31.2	1.20%
Total	**296.3**	**330.8**	**442.5**	**521.6**	**1.91%**

*Compounded between 2000 and 2030.

Table 4-2. Commodity Value by Mode between 2000-2030 in the Portland/Vancouver Region (in billions of $-constant $)

MODE	2000	2010	2020	2030	ANNUAL GROWTH RATE*
Truck	$371	$405	$575	$697	2.14%
Rail	$48	$45	$62	$74	1.45%
Water	$25	$26	$29	$31	0.70%
Air	$5	$6	$10	$13	3.25%
Pipeline	$9	$12	$12	$12	0.95%
Total	**$457**	**$494**	**$688**	**$827**	**2.00%**

*Compounded between 2000 and 2030.

What is Driving the Growth

The growth in freight movement projected for the Portland/Vancouver region is higher than the growth anticipated nationwide, but less than the estimates for the ports of Los Angeles, Long Beach, Seattle, Tacoma, and Oakland. That is, the west coast ports will grow at a higher rate than the U.S. average, but Portland/Vancouver will grow at a slightly slower rate than the other international west coast ports.

These high growth rates are attributable in part to the growing demand for low-value imported goods produced in Asia, but also to the growth of the region's economy and population. Our growing economy will become more diversified and our demand for goods will become more tailored to our needs. There will continue to be a significant movement of energy and agricultural products in the region, but their growth will be slower than higher value products such as machinery, prepared meat, fish and seafood products, and mail and express traffic (see Table 4-3).

Table 4-3. Fastest Growing Commodity Groups in Portland/Vancouver Region between 2000 and 2030[13]

COMMODITY GROUP	ANNUAL GROWTH RATE*
Machinery	3.7%
Meat, fish, seafood, and preparations	3.5%
Foodstuffs and alcoholic beverages	3.3%
Mail and express traffic	3.3%
Milled grain products, preparations, bakery products	3.3%
Electronic/electrical/office equipment, components	3.2%
Precision instruments and apparatus	3.1%
Printed products	2.9%
Nonmetallic mineral products	2.9%
Miscellaneous manufactured products	2.7%

*Compounded between 2000 and 2030.

[13] *Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast*, for the Port of Portland et al, by DRI-WEFA, BST and Cambridge Systematics, Inc., June 30, 2002, Table 15

In addition to our growing appetite for more goods, another significant contributor to this high rate of growth in freight movement is related to "just-in-time" shipping practices, which reduce the need for warehousing products as shipments are based on actual orders for goods, rather than estimates for developing inventories. These forms of shipping also help control and reduce inventory costs, providing incentives for manufacturers and shippers to use them.

This approach to shipping products, however, results in more movements of goods. For example, rather than moving a large amount of inventory directly to a warehouse where goods are shipped to customers after an order is made, shipping is completed (even overseas shipping) after a customer has placed an order, eliminating the need for warehousing. Many shippers are also offering one- and two-day service for shipments, which also increases the volume of goods being shipped and the requirements of the transportation system infrastructure to accommodate these demands.

Information technology systems combined with coordinated logistics strategies are used to execute high-volume, reliable, and relatively quick shipping, through use of shipment and asset tracking tools, routing and dispatch optimization models, commercial transaction management software, artificial intelligence warehouse and assembly systems, and other systems.

Understanding these shipping trends leads to an appreciation for the findings of the forecasted increase in truck movements. Customers dictate how goods will flow today based on a variety of factors, most importantly, access to transportation, distance, volume, and time. In the future, more customers will be demanding more products to and from more diverse locations, which in urban areas, especially, will require an increasing number of trucks that can deliver via the wide network of streets in contrast to the limited access to land uses provided by rail alignments.

Another way to appreciate these trends is to review how the inbound, outbound, internal, and through movements are expected to change. The data in Table 4-4 indicates that goods shipped into the region will continue to be the largest amount of tonnage, and that internal (i.e., goods with an origin and destination in the region) will move up from third place in 2000 to second place in 2030 (or from 21% to 26% of the region's tonnage from 2000 to 2030). Internal and through movements will grow at the highest rate.

How this relates to the modal forecast is that the growth in rail usage can be explained by the growth in inbound, outbound, and through freight tonnage[14], but that the Portland/Vancouver region being the "last mile" (or origin and/or destination) for freight means that most freight needs to move from facility to transportation system, which is generally accomplished by truck. In addition, the growing internal traffic will nearly all (97%[15]) be carried by truck.

[14] According to Lower Columbia River Forecast..., rail and truck are expected to carry 44 million tons and 31 million tons of through freight tonnage in 2030, respectively – (see Figure 3-4).

[15] Ibid, page 45.

Table 4-4. Origins and Destinations of Portland/Vancouver Region Freight Tonnage 2000-2030[16]

DIRECTION	2000	2010	2020	2030	ANNUAL GROWTH RATE
Inbound	123	138	179	210	1.8%
Outbound	99	104	133	151	1.4%
Internal	73	89	130	161	2.7%
Through	49	57	87	103	2.5%
Total	**344**	**388**	**529**	**625**	**2.0%**

16 Ibid, Table 14 and Figure 3-4.

SECTION 5

Opportunities to Divert Freight from Truck

Given the understanding provided in the preceding analysis, and the findings of the commodity flow forecast, it is possible to identify where there might be opportunities to divert freight from trucks to rail.

The economics and supply needs of local customers and shippers generally dictate that rail is the preferred mode for large volumes of low-value bulk commodities (e.g., unit trains of soda ash). Most of the containers for export are also placed on rail for shipment to and from California and Puget Sound ports, though most of those are drayed to rail lines by truck. It appears that the market for shipping large volumes and containers is already in effect—there are complaints by shippers that they cannot get enough rail service, which is reinforced by the findings of the Commodity Flow Forecast.

It is also not practical for small loads or loads that have local origins and destinations to use rail (i.e., the operating costs are too high for rail to move goods short distances or to move low volumes of goods). There is the potential to aggregate a large number of small loads to or from a common origin or destination for rail—what are known as merchandise trains—however, these trains have low-priority access to the mainlines. That is, they are placed in rail sidings or terminals until intermodal trains, passenger trains, and unit trains have completed their travel over the mainline track needed. Moreover, the cars for these trains are assembled from a variety of locations, which requires additional time to string together enough cars to form a train. Hence, the schedule for moving these goods is slow and unreliable.

The volume of commodities moved is one primary consideration. Another is the handling characteristics of the cargo. Rail typically is not used to handling high-value and perishable commodities. For example, some of the region's major commodities, including electronics and machine parts, finished and/or refined products, assembled products, and perishable products such as fruits and vegetables, are generally not placed on trains because far more damage to these products occurs on trains in comparison with trucks. The kind of handling equipment and operations that move freight into and out of trains, and the movement of cargo on trains, leads to a relatively high percentage of product damage. While rail cars can be refrigerated and loads can be better secured with more protective packaging, the economics of introducing these mitigating systems are not beneficial and have not been generally employed.

Shipper/Customer Location on Rail Line

Clearly, if a shipper or customer is located on a rail spur or a rail terminal, their need for drayage by truck is vastly reduced. Many of these shippers and customers are located at the Port of Portland or Vancouver facilities; others are located along shortline railroads. These shippers use rail for large volume shipments, often by unit train, and would have difficulty conducting business as they do if they had to rely solely on trucks for delivery.

Freight with a Regional Origin and Destination

As the cities of Portland and Vancouver are the freight hubs for Oregon and southwest Washington, they host many shippers and customers who operate in what is known as the "last mile" connectors to the freight supply chain. Local shippers and customers not located on a rail line that produce and/or receive goods to and from points outside the region need trucks to move goods either to a rail, marine or air terminal, or to another facility/location not served by these other modes. The internal regionally moved freight was 21% of freight tonnage being moved in 2000, which is estimated to grow to 26% of freight tonnage in 2030.

The conclusion from the above is that the freight that can potentially be diverted from truck to rail is large freight loads traveling long distances that are of low value and do not require special or protective handling. The data is incomplete about the commodity types that have all or some of these characteristics, except for the origins and destinations of the freight loads that are moving in the region, i.e., freight that has either an origin or a destination in the region, or freight that is passing through the area.

Freight with Either a Regional Origin or a Regional Destination

Imports and exports to and from the region represent the largest category, by direction, of freight tonnage in the region. The majority of the region's freight is moved to the region from a non-regional origin (36% in 2000 and 34% in 2030), followed by goods that are shipped from the region to non-region destinations (33% in 2000 and 24% in 2030). Outside the region can mean locations ranging from the central or southern Willamette Valley to international locations. Like the freight that is moving within the region, the generators of this freight are shippers and customers located on the "last mile" local connectors that provide access to the state, the rest of the Pacific Northwest, the nation, and international transportation systems. That is, unless the shippers or receivers of goods are located directly on a rail line, they are using trucks for the entire delivery or to dray goods to or from a rail, marine, or air facility. In other words, most of the shippers and customer sending or receiving goods to/from outside the region need trucks to access or deliver those goods.

Freight that Passes Through the Region

The remaining shipments that can potentially be moved off of truck is through traffic, which represents 14% of existing freight tonnage, and 16% of 2030's freight tonnage. Much of this tonnage is already on rail. Though freight could be diverted from truck to rail if rail was advantageous over truck in terms of cost, delivery time, customer's needs, spatial requirements, and other practical considerations. In other words, while much of the pass-through freight traffic may meet the distance measures that make rail more practical, it is unknown whether rail can meet the other requirements for these through movements. It is assumed that shippers and customers again are using the most advantageous modes to move goods.

Other Considerations

In addition to the above, the rail industry has elected to move away from internal regional moves to focus more on the long-haul single-commodity cargo and/or container traffic between major hubs (e.g., Seattle/Tacoma to Chicago) because those movements require less handling and operational costs, and they generate the highest profits for the rail carriers. Since the railroad mergers of the 1990s, the longer-distance moves by the Class I railroads (in the Portland/Vancouver region, the Union Pacific and Burlington Northern & Santa Fe railroads) have increasingly become the norm with local movements by rail delegated to the shortline rail operators; many of whom are underfinanced, over-worked, and whose networks are inconsistent and incomplete requiring access to other railroads (which can be costly and slow) and/or transfer to truck.

In addition, while trains are more fuel-efficient than trucks, both modes would be affected by a rise in fuel costs and/or reduced oil supplies.

Finally, with de-regulation of the transportation industry, public authorities cannot regulate how goods flow. Customers, shippers, and suppliers make those decisions based on business and bottom-line considerations.

SECTION 6

Conclusion

The use of rail is based on the type and volume of freight being moved, whether or not rail can bring freight to and from its origins and destinations, and whether rail can meet the delivery requirements of shippers and customers. These considerations are the foundation data behind the Commodity Flow Forecast, which does not consider any constraints on service or capacity in any freight transportation system, and shows both railroads and trucks moving a great deal more cargo in the future. Rather than decline in overall usage, because of the commodities that will be moving in our region, and their corresponding freight requirements, trucks are anticipated to carry 73% of the region's future tonnage—a growth rate of 93% between 2000 and 2030.

The Commodity Flow Forecast also indicates that commodity movements on the regional rail system (which will grow at a rate of 80% between 2000 and 2030) will be an important component of our future economy as well. In other words, maintaining a well-functioning rail and highway system (as well as marine, air, and pipeline system) is essential for our continued economic prosperity. Shippers and customers benefit from the diversity of modes and systems available to them in the form of lower shipping costs, ability to combine shipments, meeting customer requirements, and flexibility in case of shipment changes.

The Portland/Vancouver region is the "last mile" for 85% of the freight traveling in the region. That is, goods are produced, assembled, and/or delivered within the region, and the overwhelming majority of the local shippers and customers are not located on a rail spur or within a rail/intermodal terminal. Even if there was a targeted effort to use railroads more frequently, the goods would need to travel by truck on regional roads and freeways to arrive at rail terminals. In fact, most of the goods produced or received from the rail system must dray those goods by truck to or from the rail lines; and, increased rail service would likely lead to greater use of truck for this very reason.

In summary, while there are certainly some commodities that could shift from truck to rail in the region, it is probably a very minimal amount, and probably not part of a consistent and regular shipment schedule. Shippers and customers are aware of the region's rail service and use it where appropriate and advantageous to their needs. As with all business matters, shipping practices are based on market conditions including service, cost, and schedule conditions. As demonstrated in the Commodity Flow Forecast, the region will increasingly be expecting higher levels of service (in terms of travel time and door-to-door service) for a wider variety of products to a wider range of locations. These conditions will increasingly require the flexibility and convenience provided by trucks.

CASE STUDY: Georgia Pacific Mill, Camas, WA

The Georgia Pacific (GP) mill in Camas is an extremely busy and efficient place, employing 900 staff over three daily shifts. The facility turns out paper towel and tissue products, pulp, and both high-grade and copy stock paper. Wood chips and sawdust are brought to the mill, converted to pulp, and finished products are manufactured, packaged, labeled, and shipped directly to customers (about 25%) and to three distribution centers in Portland (at Rivergate, Front Avenue, and Kelly Point) for shipment throughout the U.S. Rail is used to ship about 20% of product from the distribution centers to customers throughout North America.

Customers for these products do not require overnight or two-day express delivery, but the facility still needs to move product from the mill and adjacent warehouses very quickly. Though the facility sits on 600 acres and incorporates five paper machines and three warehouses, it can only hold four hours worth of production of towel and tissue-finished product, two days of fine-grade paper, and four days of copy-grade paper.

The GP facility is situated on the north shore of the Columbia River and has a working dock to load packaged products onto barges. The facility is also bisected by the two-track BNSF mainline, which stops at the Camas depot within the GP property. GP has constructed a siding for trains that pulls up to a warehouse with five loading docks. Finally, the facility is located on Adams Street in downtown Camas, just off the SR 14 business loop.

The facility can rapidly load and unload both trucks and railcars, and load barges.

The plant ships all finished products destined for the Portland distribution centers (about 75% of total production) by truck (approximately, 500 trucks/week) and barge (about four barges/week). Despite the accessibility to the BNSF line, the cost to use rail is three times the cost of trucking, and the service is typically unreliable. This is due in large part to the fact that GP uses the Union Pacific Railroad for its long-haul shipping (BNSF lines do not access their markets and distribution centers), and the BNSF charges a $1,200-$1,300 surcharge/rail car to move GP's rail cars (i.e., trailers on flat cars) to and from the Union Pacific Railroad system. Moreover, the service can take as much as two weeks to set up. GP stopped using rail when fully loaded rail cars that were destined for Texas were shipped back months later without an explanation or record of what had happened to them.

In contrast, the cost to truck goods from GP to any of the three distribution centers is one-third that of rail. Because most of those goods will eventually be shipped by rail, GP places them in trailers on-site.

GP expects its production to grow significantly, which may require that they reconsider rail or increased use of barge. While making the necessary improvements to the river docks will require a significant investment, the poor service offered by rail, and its high cost, may induce the GP to make the investment.

CASE STUDY: Schnitzer Steel, Portland and McMinnville, OR

Schnitzer Steel is one of the nation's largest recyclers of ferrous metals, a leading self-service used auto parts retailer with 50 locations in the U.S. and Canada and a manufacturer of finished steel products. The company and its joint venture partners operate primarily along the U.S. west coast and northeastern seaboard, and are headquartered in Portland. Schnitzer produces about one-half of the steel produced in the U.S., and is a major international supplier.

Scrap metals are collected at the company's Scrap Yard near T-4 (which employs 125 people over two shifts/day), and then shipped to its Cascade Steel Rolling Mill in McMinnville (with a staff of 500 working three shifts/day). At the Cascade Mill, scrap is melted and cast into billets and placed on rolling mills for conversion into a variety of steel products including reinforcing bar (rebar), wire rod, fence posts, and specialty products. The Cascade Mill has a capacity for production of 700,000 tons of finished steel products. To keep up with orders the Mill needs to be operating with a regular and reliable source of scrap metal.

For overseas and long-haul shipping, Schnitzer is highly reliant on railroad service. They are, however, not able to take advantage of regional rail service.

Both the Scrap Yard and Cascade Mill have direct rail access, and the Scrap Yard is located on the river and has a barge dock. Scrap material is brought to the Yard by a variety of suppliers and generates as many as 300 truck trips/day (i.e., from pick-up trucks to tractor-trailers). On average, 20 trucks are used to ship the collected scrap to the Cascade Mill every day. (Schnitzer also ships about 40 containers per month by railroad to the Port of Tacoma for overseas destinations.)

Rail is also used to move product from the Scrap Yard to the McMinnville Mill. Schnitzer requests 200 railcars per month, but has only been receiving about 75 cars, and there is a high degree of variability in both the number of cars that will be provided, and the predictability of service. At present, the cost for shipping by truck or rail on a tonnage basis is about the same, but the rail service has not been reliable. In October 2005, the average number of days to move scrap by rail to the Cascade Mill was five days, in November it was eight days, and in December it was seven days; and, delays as long as 20 days are not uncommon. In contrast, truck service can be arranged in a day or even a few hours, and the travel time is less than four hours.

A major issue impeding the use of rail is that the Scrap Yard is served by the Union Pacific Railroad, which transfers the scrap material to the Portland & Western Railroad (a distance of two miles) for shipment to the Cascade Mill. The Union Pacific Railroad will not permit the Portland & Western Railroad to enter the Scrap Yard via their track to complete the entire maneuver. Schnitzer, a major customer of the Union Pacific, has complained to the railroad's representatives and do not believe the railroad is interested in resolving the problem.

Schnitzer has been told that rail service can be guaranteed with individual orders for 50 cars at a time, but the Scrap Yard cannot accommodate that many rail cars at one time.

Schnitzer expects to grow their operations and knows there will be a time when trucks cannot efficiently move the increasing volumes of scrap metal to the Cascade Mill. They know that they will need to reconsider how to improve the use of rail, but believe they are maximizing its potential now and it is not working for them.

SECTION 7

References

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This report describes the role that freight rail plays in Oregon's economy, and its direct impact on the state's industries. The study considers industries' needs and public policy opportunities to enhance choices for the state's shippers.

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