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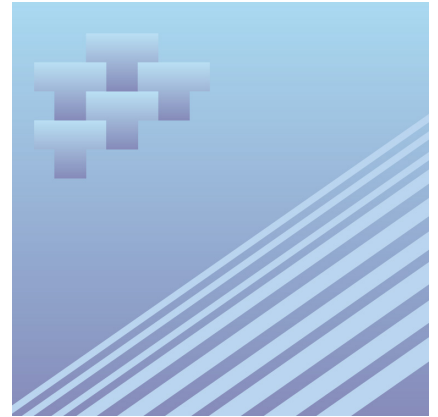
The future for Canada-U.S. container port rivalries

Revised March 2003

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The Future for Canada- US Container Port Rivalries

Introduction

“The Panel suggests that the government should continually scrutinize the performance of Canadian ports relative to U.S. competitors, and be prepared to take policy action if the U.S. government funding seriously distorts competitive traffic patterns.
(Canada Transportation Act Review Panel, *Vision and Balance*, June 2001, p. 137)

This paper updates the article entitled “*The Future for Canada-US Container Port Rivalries*” that appears in the 2001 proceedings of the Canadian Transportation Research Forum. This update is timely due to various considerations discussed in the paragraphs that follow.

Canada’s container ports are operating in a competitive environment that is undergoing radical change. Since September 11, 2001, public attention has focused on North America’s container ports as key hubs of international trade that could expose the continent to more terrorist activity. Ports in Canada and the United States are being pressured to make costly security-related investments and to accommodate regulations that complicate their primary goal of rapid and efficient cargo movement from ships to port hinterlands.

This security imperative occurs on the heels of significant legislative change. The 1998 Canada Marine Act transformed the governance of major Canadian ports, increasing their local autonomy but limiting their financing. U.S. ports experienced the 1999 implementation of the U.S. Ocean Shipping Reform Act with confidential contracts and ocean freight rates no longer subject to public oversight. These changes were not reflected in the 1999 data used in the previous study.

The earlier study also did not capture the competitive impacts of recently completed or ongoing infrastructure investments of the U.S. container ports and their intermodal partners. On the Atlantic coast, the U.S. Congress approved \$88.5 million for continued dredging at the Port of New York/New Jersey (NY/NJ) in November 2001¹. By August 2002, NY/NJ had completed the deepening of berths at the Port Newark/Elisabeth terminal to 50 feet and awarded contracts to commence channel dredging². On the Pacific coast, the \$2.4 billion Alameda Corridor rail freight expressway opened in April 2002 eliminating over 200 at-grade crossings through 8 cities along a 20-mile route serving the ports of Long Beach and Los Angeles³.

This update extends the previous analysis with data to year 2001. It does not capture the impacts of the recently completed infrastructure projects or the security initiatives. It may therefore serve as a baseline for future assessments of the impacts of these major changes.

This report uses two primary data sources, namely: Statistics Canada's Marine International Origin/Destination (O/D) database and the U.S. Department of Transport Maritime Administration's (MARAD) Annual Import Export Waterborne Databank which is based on Journal of Commerce P.I.E.R.S. data. The units of measure are tonnes of containerized cargo and Twenty-foot Equivalent Units (TEU) for containers with cargo, that is the Laden TEU (i.e., no empty containers). As in the previous report, there are some limitations with respect to the overall accuracy of the TEU data and the comparability of Statistics Canada and MARAD's data. These limitations might affect the reported totals but are not expected to significantly impact the comparative analysis. More detail is provided in the endnotes of this paper⁴.

Current Trends in the Ocean Container Shipping Industry

The twin scourges of overcapacity and bargain-basement freight rates continued to plague the ocean container shipping industry in 2000 and 2001. Drewry Shipping Consultants reported that while world container trade increased just 2.5% in 2001, effective ship capacity in terms of available TEUs rose 6.3%, exacerbating the existing imbalance in supply and demand. Drewry forecasted that container trade would rise by 8.4% in 2002, which is significantly less than the annual rates over 10% registered through the 1990s, and that overcapacity would continue to increase through 2002 and 2003⁵.

Throughout much of the 1990s, the ocean container industry responded to weak prices by seeking economies of scale through mergers and alliances that produced larger companies and by building larger containerships⁶. The trend to larger companies stalled in 2001, perhaps victim to the dramatic fall in profitability of nearly all of the industry's major players⁷. However the trend to larger ships continued.

The Fairplay Ship Register for December 2002 (see Table 1) shows ships over 3000 TEUs accounted for 21% of the world's active containership fleet up from 17% in December 2000. However, in terms of TEU capacity these larger ships accounted for slightly over 50% of the capacity versus 43% in 2000. The capacity growth was due mainly to Post-panamax-class (4500 + TEUs) with 35 ships adding 40% of the new capacity in 2002⁸. According to Fairplay, the largest ship delivered to date has a capacity of 10,000 TEUs.

Table 1: World Container Fleet by Size, Capacity and Age

| Size in TEUs | Share of Ships | Share of TEU Capacity | Average Age in Years |
|--------------|----------------|-----------------------|----------------------|
| <501 | 17% | 3% | 15.6 |
| 501-1000 | 17% | 6% | 11.3 |
| 1001-2000 | 30% | 21% | 10.6 |
| 2001-3000 | 15% | 20% | 9.6 |
| 3001-4000 | 8% | 15% | 9.4 |
| >4000 | 13% | 36% | 4.5 |

Source: Fairplay Ship Register, December 2002

Much larger ships are on the drawing boards such as the 18,000 TEU Malacca-Max containership. Studies suggest that this behemoth would have cost levels 16% less than 8,000 TEU Super-Post-Panamax ships⁹ and might revolutionize bulk shipping with rates that would attract traditional bulk commodities¹⁰. But can this trend realistically be expected to continue?

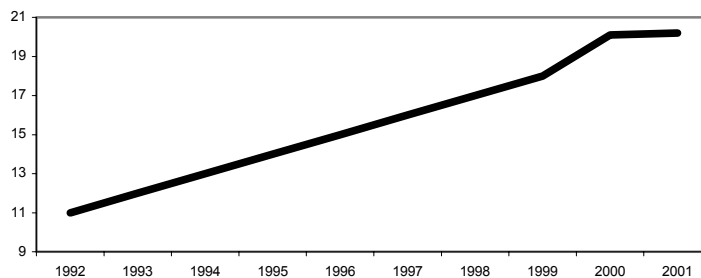
Cullinane and Khanna seem to suggest that there are limits to the economies of scale that depend on the length of the sea route as there are diseconomies for the time that the ships spend in port¹¹. Martin Stopford found that the economies of scale diminish with size such that the benefits primarily accrue when upsizing smaller ships. Stopford estimated a cost saving of 20% per TEU when increasing ship size from 1,000 to 2,000 TEUs versus just 4% when increasing from 4,000 to 6,000 TEUs. Increased insurance costs particularly influenced this finding as underwriters have added higher war risk premiums on the larger ships¹². Fewer ports are capable of handling post-Panamax ships and a cost saving of just 4% can quickly be eaten up by container transshipment costs.

If containership companies experience such declining economies, there could be a reversal in the trend to mega-containerships. It is still possible that a handful of super-ports could handle almost all of the international containers for North America. However, before making the substantial investment required to attract super post-Panamax ships, ports and their inter-modal partners must now consider the risk that the industry may decide to limit its investment in this technology.

The North American Ocean Container Shipping Market

In 2001, North American ports (excluding Mexico) handled 20.2 million laden TEUs (i.e., containers with cargo) in trade with overseas ports. This market grew by just under 1% over 2000, far below the decade's average annual growth rate of 6.5%. Asia and Oceania remained the dominant trade route with 60% of the laden TEUs in 2001, followed by Europe with 23%. Container traffic in these trade lanes grew by 16% and 5% respectively, since 1999.

Figure 1: Laden TEUs to/from Overseas Ports and Countries
(1992-2001, Millions of TEUs)



Source: MARAD Annual Import Export Waterborne Databank and Statistics Canada's International Marine Origin/Destination database

Pacific coast ports accounted for 51% of the total traffic, because they dominated the Asia and Oceania trade lane. Atlantic coast ports handled 43.0% of the laden TEUs due mainly to traffic with Europe. Gulf coast ports handled almost all of the remaining TEUs as Great Lakes ports handled just 18,205 TEUs from/to overseas ports in 2001.

Table 2: Millions of Laden TEUs Handled at North American Ports by World Region of Origin/Destination in 2001⁽¹⁾

| World Region | North American Coast | | | Total |
|--|----------------------|---------|------|-------|
| | Atlantic | Pacific | Gulf | |
| Asia & Oceania | 2.35 | 9.63 | 0.04 | 12.03 |
| Europe | 3.65 | 0.38 | 0.56 | 4.58 |
| South & Central America ⁽²⁾ | 2.07 | 0.25 | 0.53 | 2.85 |
| Middle East & Africa | 0.57 | 0.07 | 0.11 | 0.75 |
| Total | 8.64 | 10.33 | 1.24 | 20.21 |

(1) Excludes Greenland, Ste. Pierre and ports on the Great Lakes and in Alaska. (approximately 20,000 TEUs)
(2) Includes Mexico. Total may not add due to rounding.
Source: MARAD Annual Import Export Waterborne Databank and Statistics Canada's International Marine Origin/Destination database

Competition with U.S. Ports

In 2001, North America's top 20 container ports handled 96% of the laden TEUs exchanged with overseas ports. Since 1992, these Ports (see Table 3) experienced average annual growth rates (A.A.G.R.) of 6.5% with the rates at individual ports ranging from -0.7% for Baltimore, MD, to 12.5% for Vancouver, BC.

The southern California ports of Los Angeles and Long Beach were the busiest ports with 3.4 million and 3.2 million TEUs respectively followed by New York/New Jersey (NY/NJ) with 2.4 million TEUs in 2001.

Canadian ports handled 11.7% of the laden TEUs handled by North American ports in 2001. Canada's major container ports, Vancouver, Montreal, and Halifax held positions 5, 8 and 15 with 1.0 million, 849 thousand, and 413 thousand TEUs respectively. Vancouver's and Halifax's A.A.G.R. exceeded the North American average by far, while Montreal was close to the average.

Overall 2001 was not a good year for Canadian container ports. While the total overseas TEU traffic for North America increased slightly from 2000 to 2001, the total for Canada declined by 1%. Hardest hit was the port of Montreal with a 3.5% decline, while Halifax experienced a decline of 0.5%. Vancouver gained just 1.6%, far below its annual average for the decade. U.S. ports experienced just a 1% gain in TEUs from 2000 to 2001, but the year-over-year change varied widely among the ports. NY/NJ, the main competitor for Montreal and Halifax, had a gain of 7.0%. Seattle and Tacoma, Vancouver's main competitors, suffered declines of 14.1% and 5.6% respectively.

The order of the ports changes when the data are expressed in terms of tonnes of containerized cargo. All 3 major Canadian ports move up in the standings, to 4th, 6th and 14th for Vancouver, Montreal and Halifax respectively (see Table 4). It is difficult to tell if this variance between TEU and containerized tonnage standings is due to the commodity mix handled at the ports or inconsistencies in TEU data.

**Table 3: Top 20 North American Ports for Laden TEUs Exchanged
With Overseas Ports 2001 Compared to 1992**

| Port | TEUs 1992 | TEUs 2001 | Average Annual Growth Rate (%) |
|---|-------------------|-------------------|---------------------------------------|
| Los Angeles, CA | 1,638,483 | 3,425,460 | 8.5 |
| Long Beach, CA | 1,354,732 | 3,194,332 | 10 |
| New York/New Jersey | 1,289,215 | 2,352,453 | 6.9 |
| Charleston, SC | 564,423 | 1,158,720 | 8.3 |
| Vancouver, BC | 359,399 | 1,034,074 | 12.5 |
| Oakland, CA | 745,180 | 963,177 | 2.9 |
| Norfolk, VA | 516,286 | 884,070 | 6.2 |
| Montreal, PQ | 497,983 | 848,762 | 6.1 |
| Seattle, WA | 742,682 | 823,913 | 1.2 |
| Savannah, GA | 386,891 | 812,972 | 8.6 |
| Houston, TX | 368,137 | 783,307 | 8.8 |
| Miami, FL | 417,595 | 716,828 | 6.2 |
| Tacoma, WA | 556,186 | 610,558 | 1.1 |
| Port Everglades, FL | 209,580 | 415,639 | 7.9 |
| Halifax, NS | 161,593 | 413,501 | 11 |
| Baltimore, MD | 290,085 | 272,498 | -0.7 |
| New Orleans, LA | 190,053 | 217,130 | 1.5 |
| Portland, OR | 154,251 | 206,372 | 3.3 |
| Gulfport, MS | 70,692 | 132,278 | 7.2 |
| Wilmington, DE | 67,522 | 128,028 | 7.4 |
| Other Canada | 16,559 | 71,613 | 17.7 |
| Other U.S.A. | 886,517 | 765,348 | -1.6 |
| Total | 11,484,044 | 20,231,033 | 6.5 |
| Source: MARAD Annual Import Export Waterborne Databank and Statistics Canada's International Marine Origin/Destination database | | | |

Vancouver experienced an increase in containerized tonnage of just under 1% from 2000 to 2001, compared to an 11.1% increase in the previous year. Vancouver continued to be the 3rd largest North American port to handle container tonnage exchanged with Asia and Oceania, with the same share of that traffic (10.3%) as in 1999. Asia and Oceania is the crucial trading region for Vancouver, accounting for almost 95% of its containerized cargo. Vancouver's main competitors on this trade lane, Seattle and Tacoma, both experienced a decline in their share of this trade since 1999. Their declines appear to have been to the benefit of Los Angeles and, surprisingly, NY/NJ which displaced Seattle from its 4th standing in 1999.

Montreal continued to be the leading container port on the European trade route in 2001 but its lead over NY/NJ declined from 1.13 million tonnes in 1999 to just 110 thousand tonnes in 2001. Montreal and NY/NJ together accounted for almost 40% of European origin-destination (O-D) container tonnage and have a longstanding rivalry in this trade lane. Europe is the crucial trading region for Montreal, accounting 95.5% of its containerized freight in 2001. NY/NJ is less dependent on the European trade lane than Montreal as it accounted for just 40.8% of its 2001 container tonnage. Asia and Oceania accounted for a further 36.2% of the NY/NJ containerized tonnage.

Halifax has traffic distribution that is similar to NY/NJ with Europe and Asia & Oceania accounting for 55.8% and 24.3% respectively of its 2001 containerized tonnage. However, Halifax was not a major contender in either market with just 5.3% and 1.0% respectively of the tonnage on these trade lanes. Nonetheless, Halifax was the 6th placed North American port on the Europe trade route and 11th on the Asia & Oceania trade route.

Vancouver, Montreal and Halifax handled 96.6% of the overseas containerized tonnage handled by Canadian ports in 2001. Since 1999, Fraser River has emerged as Canada's 4th largest container port overtaking Saint John, NB. Fraser River's container tonnage grew from 188 thousand tonnes in 1999 to 467 thousand tonnes in 2001, due to the relocation of a carrier from Vancouver¹³ and various new services. Saint John handled 265 Kt of containerized freight in 2001.

Table 4: Containerized Cargo Handled at North American Ports in 2001 by Region of Origin/Destination

| Port | Europe | Middle East & Africa | Asia & Oceania | Central & South America | Total* |
|---------------------|--------|----------------------|----------------|-------------------------|--------|
| Millions of Tonnes | | | | | |
| Long Beach, CA | 0.81 | 0.09 | 22.19 | 0.67 | 23.76 |
| Los Angeles, CA | 1.16 | 0.29 | 19.92 | 0.69 | 22.06 |
| New York/New Jersey | 7.91 | 1.55 | 7.01 | 2.90 | 19.38 |
| Vancouver, BC | 0.13 | 0.08 | 9.57 | 0.30 | 10.08 |
| Charleston, SC | 4.69 | 0.86 | 2.68 | 1.66 | 9.89 |
| Montreal, PQ | 8.02 | 0.29 | 0.05 | 0.04 | 8.40 |
| Oakland, CA | 1.12 | 0.10 | 6.91 | 0.16 | 8.29 |
| Houston, TX | 4.10 | 1.00 | 0.51 | 2.17 | 7.78 |
| Norfolk, VA | 3.42 | 0.62 | 2.55 | 0.90 | 7.49 |
| Savannah, GA | 1.49 | 0.55 | 4.39 | 0.53 | 6.96 |
| Seattle, WA | 0.17 | 0.04 | 6.23 | 0.10 | 6.53 |
| Miami, FL | 1.20 | 0.13 | 0.74 | 3.83 | 5.91 |
| Tacoma, WA | 0.01 | 0.10 | 4.68 | 0.00 | 4.79 |
| Halifax, NS | 2.18 | 0.38 | 0.95 | 0.40 | 3.91 |

| | | | | | |
|---|-------|------|-------|-------|--------|
| Port Everglades, FL | 0.14 | 0.00 | 0.02 | 2.89 | 3.05 |
| Other U.S.A. | 4.28 | 0.63 | 3.87 | 7.65 | 16.43 |
| Other Canada | 0.06 | 0.01 | 0.34 | 0.39 | 0.80 |
| Total* | 40.89 | 6.72 | 92.61 | 25.28 | 165.51 |
| *Excludes Ste. Pierre and Greenland. | | | | | |
| Source: MARAD Annual Import Export Waterborne Databank and Statistics Canada's International Marine Origin/Destination database | | | | | |

Competitive Issues for Canadian Ports

The statistics suggest that Canadian ports continued to compete successfully for North American container cargo despite the overall slowdown in this sector in 2001. Their 14% share of this market compares favorably to Canada's 10% share of population, 7% share of retail sales and 8% share of manufacturers shipments for North America¹⁴. As the previous study discussed, the ports have substantial potential to capture much more traffic with their natural endowments and excellent rail and road access to all major North American markets. Whether the ports should attempt to maintain or enhance their market share is a question that can be studied by others.

If the ports are to maintain their current market share, they may need significant investments, assuming that the 2001 slowdown was an aberration and the growth rates of the past decade resume. There are also a number of competitive issues for Canada's ports relative to U.S. ports, particularly: financing capital investment¹⁵; costs and pricing of services¹⁶; and the potential impacts of increased Canada-United States border security¹⁷.

Financing Capital Investment:

The 1998 Canada Marine Act (CMA) listed among its objectives "...making the system of Canadian ports competitive, efficient and commercially oriented." The Act achieves this objective in part by prohibiting Canada's major ports from using parliamentary appropriations to discharge liabilities and from pledging port lands for loan guarantees as these lands remain vested in the Crown. The CMA further requires the ports to pay an annual stipend to the federal government based on their gross revenues and to make payments to local municipalities in lieu of property taxes. In essence, Canadian ports are not eligible for subsidies under the Act and must secure private capital to finance investments with a pledge of the future revenues. It appears that the risks of such investments fall squarely on the shoulders of the Port Authorities and their private financiers.

In contrast, a study by Luberoff and Wider of Harvard's Kennedy School of Government concluded that U.S. ports often did not exercise sound business practice in funding multimodal

facilities and routinely shifted the risks of such investments to tax payers¹⁸. In addition to port revenues, U.S. port authorities have the capability of raising financing through the issuance of bonds (General Obligation (GO) Bonds and Revenue Bonds), loans, grants and taxation¹⁹.

The extent to which U.S. ports use these financial instruments varies among regions and individual ports. The Marine Administration (MARAD) of the U.S Department of Transportation reported that for 2000 the ports financed US\$898 million of capital investment through Port Revenues (48.1%), GO Bonds and Revenue Bonds (20.0%), Grants (16.0%), Loans (3.8%) and Other Sources (12.1%). MARAD was unable to determine funding sources for another US\$160 million in port capital²⁰. This US\$1.1 billion was spread over 49 ports.

New York/New Jersey had the 2nd highest level of capital investment among US ports in 2000. NY/NJ's US\$153 million investment was more than double the US\$74 million reported by funding source by ports in the North Atlantic and probably comprised the bulk of funding for which MARAD could not determine the source. Seattle had the 5th highest level of capital investment among U.S. ports in 2000 with US\$50 million.

An accurate comparison of Canadian and U.S. ports in terms of the extent and the efficiency of their capital investments is complicated due to the variety of port types. Some U.S. ports such as NY/NJ and Seattle are non-operating ports, essentially landlords who lease port facilities to private operators. Canadian ports operate some facilities while others are leased to operators and yet others are privately owned. Investments by private owners and operators are not reflected in the port authorities' accounts. Investments by other government agencies may be included if they are in the form of a grant.

Nonetheless, MARAD's *Public Port Finance Survey Report for FY 2000*²¹ suggests that Canadian ports generally have less capital invested than their U.S. port competitors but generate better returns on that investment. Vancouver's construction-in-progress was valued at 47% of Seattle's while its total assets were 28% of the U.S. competitor. Vancouver's net income was US\$2.1 million less than Seattle's, but represents a 5.0% return on total assets versus just 1.6% for Seattle. Similarly the construction-in-progress for Montreal and Halifax combined was less than 1% of the NY/NJ's and their combined total assets were less than one-quarter of NY/NJ's total marine assets. However, where NY/NJ had a net loss over US\$6 million, Montreal and Halifax combined net income was almost US\$7.7 million. The federal port lands appear to have been included with the assets of the Canadian ports.

The Canadian ports performance relative to their U.S. competitors is likely understated as payments in lieu of taxes and the federal stipend appear to have been deducted to arrive at net income.

**Table 5: Comparison of Selected Canadian and US Ports 2000 Financial Performance
(US\$ '000)**

| | Seattle | Vancouver | NY/NJ | Montreal | Halifax |
|--------------------------|-----------|-----------|-----------|----------|---------|
| Operating Revenue | 99,250 | 56,683 | 114,290 | 40,878 | 11,880 |
| Marine | 28.0% | 56.2% | 43.8% | 85.9% | 81.2% |
| Other | 72.0% | 43.8% | 56.2% | 14.1% | 18.8% |
| Operating Expense | 95,075 | 33,058 | 102,980 | 38,758 | 7,510 |
| Other Income | 14,678 | (6,900) | (17,372) | 2,288 | (1,093) |
| Net Income (NI) | 18,853 | 16,725 | (6,062) | 4,408 | 3,277 |
| Total Assets (TA) | 1,176,670 | 331,906 | 1,028,703 | 182,385 | 62,349 |
| Construction in Progress | 58,562 | 27,555 | 130,607 | 827 | 267 |
| NI/TA | 1.6% | 5.0% | -0.6% | 2.4% | 5.3% |

Source: MARAD *Public Port Finance Survey Report for FY 2000*

Costs and pricing of services:

In choosing among container ports the ocean container shipping company or freight forwarder must consider the costs for the ocean journey, port interface, transshipment and inland journey. While ports may be able to influence their costs, they have less influence over the costs of other service providers, including intermodal services and marine services provided by other government agencies.

A complete analysis of the costs and pricing of these services is beyond the scope of this report, but there are other studies that suggest that Canadian ports have an edge in these areas as well. A study by the Australian Productivity Commission found that average Canadian rail freight rates were 9.5% lower than American rates in real terms²².

Similarly, according to a study done for Consulting and Audit Canada, Canada collected CA\$65.96 million on 348 million tonnes of marine cargo in 2000, while U.S. government agencies collected CA\$1,399.64 million on 2,233 million tonnes²³. This suggests that Canadian marine user fees average about 19¢ per tonne versus 63¢ per tonne for U.S. marine user fees. The U.S. Harbor Maintenance Tax, which was declared unconstitutional for exports in 1998 but is still being applied to marine imports, accounted for almost 71% of the U.S. marine services fees.

However, the Consultant and Audit Canada report did not include port related expenses. It is difficult to say what effect the inclusion of such charges would have on the analysis. It should be noted that the cost advantage of a weak Canadian dollar affected the outcome of both these studies.

Potential impacts of increased Canada-US border security

The shock of September 11th heightened the sense of vulnerability of U.S. citizens and prompted U.S. Customs Services to tighten security at all points of entry. At this time, the impact of tightened security on Canadian ports that serve as North American gateways for U.S. O-D containers is not clear, but it could be negative²⁴.

U.S. Customs implemented its Container Security Initiative (CSI) in December 2002 requiring that the contents and pertinent information on exporters and importers of all containers onboard ships headed for the U.S. be reported to Customs 24-hours before the container is loaded onto the ship. Major U.S. container ports were quick to react to the possibility that CSI could cause traffic diversion to Canadian and Mexican ports. U.S. Customs responded by seeking reciprocal agreements with the Canada and Mexico and encouraging them to adopt similar timeframes for advance customs reporting²⁵.

US Customs has stated their intention to implement similar advance reporting for goods transiting the Canada-U.S. border. U.S. Customs proposed that trucks submit cargo information electronically 4-hours in advance of loading goods in Canada destined to the U.S. and 24-hours in advance of loading goods in the U.S. destined to Canada. Similarly, rail shipments would require advance reporting of 4-hours and 8-hours for southbound and northbound cargo, respectively. An outcry from industry and carriers prompted Customs to further consult on these timeframes, but it seems that some form of advance reporting at the Canada-U.S. border will become mandatory²⁶.

Could new customs procedures that cause a bottleneck at the Canada-U.S. border be detrimental to Canadian container ports as intermodal investments at U.S. ports come to fruition? According to Containerisation International, a number of new initiatives being undertaken by railroads, port authorities and ocean carriers should reduce the bottlenecks at U.S. ports even as intermodal volumes continue to increase²⁷.

Closing Comment

Canadian container ports continue to compete successfully with U.S. container ports for North American container traffic. Despite competitive pressures, they also appear to have remained fiscally responsible.

- ¹ Dredging News Online V1 Issue 68, Nov 23, 2001 **URL:** www.sandandgravel.com/news/news/news_510.htm
- ² Port of New York/New Jersey Dredging Project Status Report, Oct 16, 2002 **URL:** www.panynj.gov/commerce/dredge1002.htm
- ³ *TR News*. Alameda Corridor Freight Rail Expressway Opens. No 221, July-Aug 2002, p.45
- ⁴ Statistics Canada derives TEU statistics from container counts by size of container reported on Custom's A6 General Declarations. These data are not reconciled with manifest data. MARAD's TEU statistics are derived from the weights of container cargo reported on ships' manifests. TEU origin/destination are the country of export/ import for P.I.E.R.S. while the Statistics Canada data use country of port of loading/ unloading. TEUs by world region for Statistics Canada data were derived by apportioning reported TEUs based on the weight of containerized freight by region.
- ⁵ Drewry Shipping Consultants Ltd. *Drewry Annual Container Market Review and Forecast 2002*. Oct, 2002.
- ⁶ Tirschwell, P. Mergers reshape shipping. *Journal of Commerce*. 5 January 1998. P8.
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- ⁹ Wijnolst, Niko. Mallacca-Max: the ultimate container carrier. Delft University Press, 1999.
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- ¹³ *Lykes Lines moves Vancouver operations to Fraser Surrey Docks*. Canadian Sailings. July 9, 2001 p 12.
- ¹⁴ O'Keefe, Doug. *The Future for Canada-U.S. Container Port Rivalries*. Canadian Transportation Research Forum Conference Proceedings. 2001
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- ¹⁶ Consulting and Audit Canada. *Cumulative Impact of Federal Fees on the Commercial Marine Industry in Canada: Synthesis of Background Information*. March 2002 **URL:** www.cmc-ccm.com/report-TreasuryBoardStudy.html
- ¹⁷ Kuzeljevich, Julia. *Stretching the boundaries* Canadian Transportation and Logistics. **URL:** www.ctl.ca/research/infrastructure/features/boundaries.asp
- ¹⁸ Luberoff D. and Walder J. U.S. Ports and the Funding of Intermodal Facilities: An Overview of Key Issues. *Transportation Quarterly*. V.54, No 4, Fall 2000 p23-45.
- ¹⁹ Ibid. Sparks Companies, Inc.
- ²⁰ MARAD *United States Port Development Expenditure Report*. Dec 2001 **URL:** www.marad.dot.gov/publications/index.html
- ²¹ MARAD *Public Port Finance Survey Report for FY 2000*. Nov 2001. **URL:** www.marad.dot.gov/publications/index.html
- ²² Australian Productivity Commission. *An Assessment of the Performance of Australian Railways* **URL:** www.pc.gov.au/inquiry/rail/finalreport/supplement/index.html
- ²³ HLB Decision Economics Inc. *Comparison of Marine User Fees in Canada and the United States, Final Report* Mar 2002. **URL:** <http://www.cmc-ccm.com/report-TreasuryBoardStudy.html>
- ²⁴ Association of Canadian Port Authorities. *Port Government Interface: Focus on Security Still!* Feb, 2003 **URL:** www.acpa-ports.net/03prtgov.pdf
- ²⁵ *Port shopping could undermine security*. Fairplay.V.345 I.6189 Aug 29, 2002 p29
- ²⁶ Toews, Bonnie, Smyrlis, Lou. *Choke Point*. Canadian Transportation and Logistics. V.106 N.2 Feb2003, p20-24.
- ²⁷ *Stacked against bottleneck*. Containerisation International's Regional Review. Sept 2002. p.32-36.