

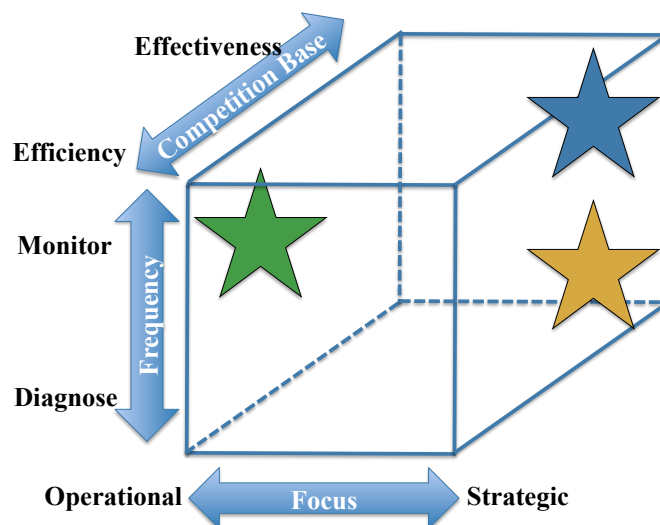


Measuring Fluidity in Maritime Supply Chains

Presentation to IAME
August 25, 2016

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Measuring Effectiveness is Different than Measuring Efficiency



Source: Variant of Griffis et al. (2007). "Aligning logistics performance measures to the information needs of the firm." *Journal of Business Logistics*, 28, 2, 35.



Looking at Fluidity as a Critical Element in Port Performance

- The measurement of fluidity in a supply chain is essentially the measurement of time in a flow (movement) or time in dwell (at rest). **Fluidity deteriorates when congestion increases or the management of dwell time is poorly executed.**
- Deteriorating fluidity may result in consequential business losses from an inability to compete for global market share. As congestion and delay are the antitheses of fluidity, research focused on finding potential improvements in fluidity must therefore identify factors that lead to congestion (bottlenecks) and resultant delay.
- **Reliability** of that time is of two types: (1) x minutes late for the delivery window (suitable for perishables and just-in-time cargo, and (2) delay of y hours such that a consequential business loss is incurred (Brooks et al., 2012). **Reliability results when fluidity improves and is consistent.**

Perspective is Important to Effectiveness Measurement: Who Do Ports Deliver Services To?

- **Cargo interests**, defined as those responsible for the purchase of some of the transportation services for (a) goods they sell/buy or (b) on behalf of some importer and/or exporters.
- **Shipping lines**, defined as companies supplying container ship services that call ports with container-handling facilities.
- **Supply chain partners**, defined as (a) warehouse operators that service port(s) with container handling facilities, (b) asset-based logistics service suppliers that use port(s) as part of the services provided and/or (c) trucking or rail companies that service port(s) with container-handling facilities.
- Europeans also include **port services suppliers** (pilots, towage, bunkering, etc) but these are not currently validated in SEAPort instrument (Schellinck & Brooks, 2016).

Transport Canada's Current Fluidity Indicators are Efficiency Indicators

Intermodal Indicators (containers)	Bulk Indicators
Average truck turnaround time (in minutes)	Average vessel turnaround time (in hours)
Berth utilization (in TEU/ metre of workable berth)	Berth occupancy rate (%)
Vessel turnaround time (in seconds per TEU)	Gross berth productivity (in tonnes / berth hour)
Average truck turnaround time (in minutes)	Total tonnes
Vessel turnaround time (in hours)	Number of vessel calls
Average container dwell time (in days)	Average tonnes per vessel call
Dwell target (% under 72 hours)	Average time at anchor (Vancouver only)
Port productivity (in TEU per gross hectare)	
Vessel on-time performance (%)	
Crane productivity (in lifts per hour)	
Number of vessel calls	
Container throughput (in TEU per month)	
Average TEU per vessel call	

Which Ports Participate? (Bulk)

Commodity	Participating Ports
Coal	Port Metro Vancouver, Hamilton Port Authority, Port of Belledune
Dry Bulk	Port of Trois-Rivières
Forest Products	Nanaimo Port Authority, Port Alberni
Grain	Port of Montréal
Iron Ore	Hamilton Port Authority, Port of Sept-Îles
Liquefied Natural Gas	Port Saint John
Logs	Nanaimo Port Authority, Port Alberni
Petroleum Coke	Port of Belledune, Port of Sept-Îles
Potash	Port Metro Vancouver, Port Saint John

Source: Transport Canada (2015), Fluidity Web Portal, accessed May 22, 2015

Which Ports Participate? (Container)

- Container ports participating are fewer:
 - Port Metro Vancouver, BC
 - Prince Rupert, BC
 - Montreal, PQ
 - Saint John, NB (is the process of developing capability)
- Notable by their absence are Halifax, NS and St. John's, NL.

“ports that choose not to participate will ultimately be left behind...”



“Without knowing the best practice benchmark, complacency is more likely to set in and innovation less likely to happen.”

Monitoring a Route's Fluidity (1)

Government of Canada / Gouvernement du Canada Français | Logout

Transport Canada Canada

Fluidity - Port Utilization Indicator - Border Wait Times - Carbon Footprint Model -

Fluidity > Container Import

Transit Times Segment Proportions U.S. Comparisons Variability

West Coast

East Coast

Origin: ☐ Antwerp ☒ Valencia

Gateway: ☒ Montréal

Destination: ☐ Toronto ☒ Chicago

Segment: ☐ Landside(P+I) ☐ Marine (M) ☒ Port (P) ☒ Inland (I) ☐ End-to-End

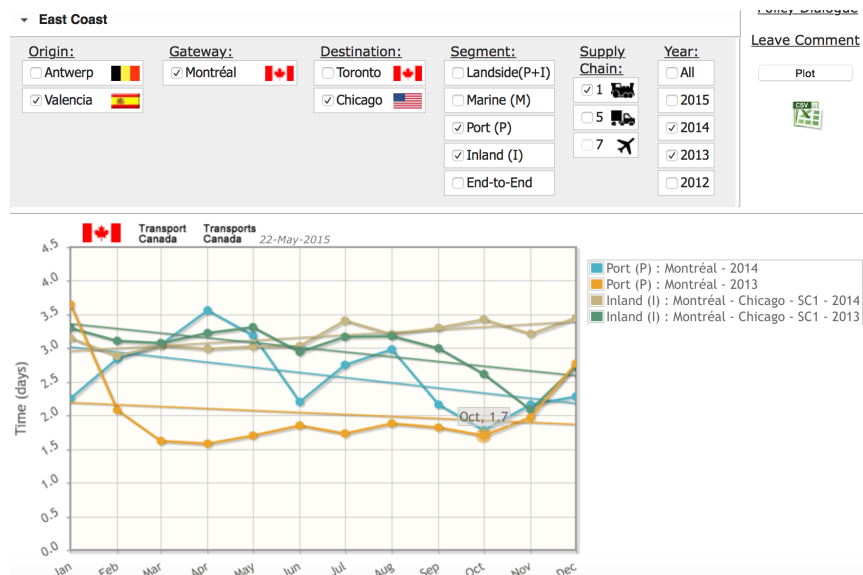
Supply Chain: ☒ 1 ☐ 5 ☐ 7

Year: ☐ All ☐ 2015 ☒ 2014 ☒ 2013 ☐ 2012

Data Consistency Policy Dialogue Leave Comment

Plot

Monitoring a Route's Fluidity (2)



Other Forms of Information-sharing Improve Fluidity: Dashboards & Webcams Give Supply Chain Partners Choices



portmetrovan

Current

Hourly

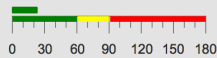
Estimated truck waiting and flow times at Port Metro Vancouver terminals

Current date/time: Apr 28, 2015 05:22 PM. Refresh in 15 seconds.



Centerm

Today's total average wait time: 24m
Current total average wait time: 23 minutes
Terminal Pregate ≤ 5 minutes
Terminal 18 minutes



Operating Status:

Operating Normally



Possible Future Fluidity Indicators Not Now Collected

- Gate accessibility (perceived by supply chain partners, an **effectiveness** indicator)
- [Perceived] availability of dockworkers (an **effectiveness** indicator for shipping lines)
- [Perceived] timeliness of port services (pilotage, mooring, etc, an **effectiveness** indicator for shipping lines)
- [Perceived] vessel turnaround time (an **effectiveness** indicator for shipping lines)
- Maritime fluidity (between two geo-fenced channel points or from anchorage to berth approaches, an **efficiency** indicator)
- [Perceived] berth availability (an **effectiveness** indicator for shipping lines)
- [Perceived] crane availability (an **effectiveness** indicator for shipping lines)



Relevant Conclusions of Report to CTAR Panel (1)

- Canada is not alone in facing the challenge of handling cargo surges and measuring fluidity and congestion/delay.
- While Canada has many options for addressing surges, congestion and delay, they all depend on quality data for decision-making and on decision-makers having timely access to the data they need without having to make special requests of government departments. Good investment decisions by both government and industry require both better data and the right data be collected.

“the first challenge for ports is to recognize the pre-cursors to a surge.”



Relevant Conclusions of Report to CTAR Panel (2)

- **Efficiency** metrics are concluded to be mostly complete but their adoption has not happened at all Canada Port Authorities or the largest non-CPA ports (who might like the opportunity to participate).
- The challenge of an **inconsistent approach to service metrics** was discussed and suggestions were made to make the metrics profile holistic.
- The report also explores questions for further discussion by the Panel about Canada's transport policy in terms of:
 - who collects the data,
 - whether it should be voluntary or mandatory, and
 - if it should be in the public domain. (If industry must ask and wait, it can be neither nimble nor innovative.)



Relevant Conclusions of Report to CTAR Panel (3)

- **Effectiveness:** The challenge is that while some Canadian ports conduct customer surveys, they are few in number. Ports see their results in isolation and not compared with other ports.
- These questions have not been researched in a cogent and significant way:
 - What is the service quality provided by Canadian ports?
 - Does it meet the expectations of service delivery by Canadian manufacturers and retailers?
 - Does it meet the expectations of Canadian port users and logistics service suppliers, like those in trucking and rail companies?
 - Does it meet the requirements of foreign flag shipping lines?



Port Performance Measures
Identification, Summary and Assessment of Port Fluidity and
Congestion Measures

T8080-140627

Final Report

Submitted by

Mary R. Brooks Transportation Consulting

16 July 2015

Thank You!
Mary R. Brooks
m.brooks@dal.ca



Download the report at <http://marybrooks.ca>