

McMaster Forum Event #3: Leveraging and Integrating Data for the Marine Sector (July 29th, 2020)

Overview

This July 29th virtual event, which was moderated by Keith Robson (JKR Associates and Chair of MITL Advisory Board), explored the potential for data to play a more prominent role in expanding marine and multi-modal freight movements in the supply chains tied to the region. The session featured a presentation that showed the potential for data associated with a specific technology (AIS), one that explored how the St. Lawrence Seaway leverages data and finally an overview of how the Hamilton-Oshawa Port Authority is at the heart of a new multi-modal integration pillar centred on leveraging data.

Introductory Remarks

- Saiedeh Razavi, from MITL, welcomed participants, outlined the series of events associated with the Forum, and offered a few highlights that emerged from the prior event in the Forum,
- Louis-Paul Tardif, from Transport Canada, expressed excitement about the supply chain initiatives unfolding in this region and noted that Transport Canada has been involved in similar efforts elsewhere in Canada; Noted that the Golden Horseshoe is at the heart of the Canadian economy and stressed the opportunities available; Noted that reform of the Transportation Act has induced efforts towards more transparency on supply chain information

Automatic Identification System (AIS) Data and Marine Connectivity (Marin Kress, United States Army Corps of Engineers)

- AIS stands for Automatic Identification System
- A real time shipboard broadcast system - ship to ship and ship to shore - originally a safety technology -- transmission frequency every 6 seconds (i.e. high temporal resolution)
- "GPS with more" - speed, direction heading and vessel identifiers, some data elements are not dynamic
- Required for most commercial vessels in US and used by many recreational vessels
- US coast guard enforces AIS standards
- On-shore signals received through a series of towers - excellent coverage given the effective radius around towers -- good coverage around Great Lakes but the lower St. Lawrence is not covered well within the U.S tower network.
- There are various applications beyond tracking where vessels go (e.g. dwell time, port efficiency, resiliency, fog impacts, accidents and impacts on operations and others)
- Shoreline erosion - while there are high water levels now in the Great Lakes, AIS assists with assessing vessel activity in relation to dredging requirements
- Understanding waterway usage is a big focus -- visualize vessel traffic densities
- Heatmaps show a lot of vessel "hotspots" in vicinity of western Lake Huron, for example
- Create a vessel trackline -- where do vessels go? Vessels can be sorted by types: tugs, tankers etc.
- Cargo vessels traverse the lakes while recreational vehicles quite localized to western Lake Ontario; tug and towing patterns clearly show Hamilton linkages with Toronto/Oshawa and secondarily to Welland Canal
- Movements can be colour coded by speed -- how are vessels interacting with different circumstances? Are they going too fast and breaking the speed limits?
- Results shared of a Port of Hamilton case study for 2019 traffic - 24 hour movements of vessels that passed near the Port are shown
 - For example, a lot of tug and towing activity between Hamilton and Oshawa
 - Tankers mostly moving to and from St. Lawrence - cargo vessels seem to cover a little wider area and more of a linkage to Welland Canal
- Port Pair Analysis is possible, and this facilitates origin-destination matrices
 - A lot of movements from Hamilton to/from Welland Canal and secondarily to/from Toronto
- Overall, AIS offers an important source of information in helping to understand regional supply chains and also offers a host of potential applications

Leveraging and Integrating Data for the Marine Sector (Ken Carey, St. Lawrence Seaway Management Corporation)

- Hwy H₂O - 3700 km marine highway that also consists of a large network of partners (though some Ports are competitors)
- Seaway linked to 41 ports and acts as the gateway to the heartland; Supports 238,000 jobs
- A vessel into Hamilton could be an outbound load out of a US partner
- Cargo volumes down 10-12% year-to-date but for rail movements, some commodities are down much more (given the trying current circumstances)
- Predictability - is important and shippers want to know what they can count on (e.g. advance notices of Seaway opening and closing dates)
- Big challenge is the Seaway closure due to winter (end December to March) but about 10 days has been added to navigation season on average since year 2000
- Severe ice problems two years ago towards Montreal
- Reliability - once open, we stay open (some locks in Mississippi may be more in the "60% open" range versus 99.5% in Seaway -- but complications do happen even in the Seaway)
- Advanced technologies have been important:
 - 3D navigation and draft optimization-- now it is a time of high water but there is always a need to max out cargo,
 - vessel self-spotting
 - hands free mooring -- good for managing COVID (not originally anticipated)
- Data analytics used to characterize Seaway delays: 60% due to pilotage issues, 32% environmental (high winds), and other elements are less prevalent (e.g. system unavailable due to maintenance)
- Fluidity - currently at 50% of capacity - there is an aim to attract more traffic from road and rail; traffic data are leveraged to maintain efficiency and fluidity
- Resiliency - the Great Lakes market has been very resilient; Hands Free Mooring has shown adaptability to market needs
- Our Catalyst Role - we work with a wide range of partners (carriers, ports/terminals, government, 3PLs, shippers)
- Organization is not-for-profit but we do charge a toll for transiting locks
- Interesting 4 minute information video on Seaway shown for participants
 - Great Lakes St. Lawrence Region would rank as 3rd largest economy in the world if it were a country
 - Draft information system - 3D model of channel
 - Each lock has 3 Hands Free Mooring units - safe and less wear and tear on locks, less need for special vessel fittings

Ontario Supply Chain Visibility Project (Ian Hamilton, HOPA Ports)

- Cargo associated with HOPA worth about \$3.5 billion per year
- Data is the new currency - develop other transportation systems through better use of data
- HOPA is leading development of the multimodal integration pillar for the data side of things - (useful schematic diagram available in PDF presentation)
- 3 pillars noted for the Ontario Supply Chain Visibility Project:
 - Planning/Policy (led by University of Toronto - Smart Freight Centre).
 - Business (led by Toronto Region Board of Trade)
 - Multimodal Integration with HOPA as data stewards
- Can draw info from eight data sources and put in one data warehouse (rail, marine etc.) - break down historic silos of how this information is held
- Worth noting that there is a lot of capacity availability linked to **existing** vessel movements - how do we leverage the data that we have to improve matters?
- Considerable focus on the Golden Horseshoe - \$6B estimated annual cost to economy of congestion - better data understanding can help address
- Project Goals:

- Increasing Transparency within the Southern Ontario market
 - Make good infrastructure decisions
 - Bring people together to make supply chain solutions
 - Conversations/collaboration to help create "better mousetrap"
 - Create governance model that helps to protect proprietary information
- Modal optimization
 - Ontario does not have a fully developed modal plan
 - Modes compete but we are not talking about modal shift so much as better modal balance
 - Create new transport products and services
 - Reduce congestion cost and greenhouse gases
 - No longer look at things in isolation -- look at all modes in the data hub
 - Address aspects like driver shortages
 - Work closely with trucking and rail - 500,000 truck trips a year linked to HOPA properties
- 10 main stakeholders (3 modes, municipalities/regions, province, seaway, companies and shipping lines)
- HOPA role
 - Responsible steward -- push info out to enable good decisions
 - Kick start some analytical projects
 - Research projects that address real problems
 - All groups will become more innovative in addressing challenges
 - MITL is a main partner for more in-depth projects; HOPA will look more at ad hoc/smaller projects and noted that Seaway Management Corporation has a good analytical team
- Benefits to stakeholders by putting together the data hub
 - Access to various sources of data including through the other two pillars
 - Results provided in solution-based package (as an answer to a question)
 - No need to manage large data - can ask HOPA for what is required
- Plan for remainder of 2020
 - Governance and sharing (3rd quarter)
 - Data structure and analytics (Q3)
 - Complete public data access (Q4)
 - Provide data to Canadian Centre on Transportation Data (Q4)

Discussion Session led by Keith Robson, JKR Associates

- (Marin Kress) Regarding AIS (terrestrial versus satellite receivers) -- lose recreational movements with satellite as can't transmit to that altitude; Also, satellite is more like 15 minutes temporal resolution (as opposed to seconds) – which could be fine for some studies; Regarding AIS potential: Just scratching the surface -- new groups of people always come back with innovative new applications
- (Ken Carey) -- what missing data elements are most keenly wanted?
 - Where we struggle is with shippers and carriers (upstream in the supply chain) cautious to share plans or still working out details (e.g. shipping and order plans/purchase orders)
- What barriers remain?
 - Ken Carey touched on the willingness to take the risk to share information
 - Ian Hamilton notes the equation of short-term risk for long term opportunity among some actors -- there remains some resistance to change
 - Ken Carey provides an example of how Home Depot dealt transparently with CP and CN Rail in selecting a vendor; his view was that Home Depot learned a lot in the process and benefitted from dealing transparently with both parties
- Where is the Province in all of this?
 - (Louis-Paul Tardiff) Fully supportive and have had this support over many years
 - (Ian Hamilton) Province is doing commercial vehicle study for the vicinity; There has been a jurisdictional challenge -- and the province can further bring multimodal concepts into their planning. Hopefully, the multimodal pillar can "open eyes" to the potential opportunities
- Louis-Paul Tardiff Comment: All the pieces are falling into place -- and quite pleased to hear mention of MITL partnership with HOPA