

Briefing

Grain Transportation: Exporting Through the West Coast Ports

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This Briefing is prepared for the Pacific Gateway Alliance Working Group on Performance and Market Access. The group is developing an action plan to address supply chain issues in Western Canada as identified at the New West Partnership Transportation Summit held in November 2014.

The objectives of this briefing are to describe a typical order fulfillment process for a sale of bulk grain^{*} to an international buyer and identify some of the key issues in the performance of the bulk grain logistics system. It provides a common base of information to the Pacific Gateway Alliance's Performance and Market Access Working Group in advance of a Roundtable Workshop scheduled for May 27, 2016, in Regina. The Workshop will provide an opportunity for senior decision-makers to discuss improvements to grain supply chain visibility and performance.

The information in this briefing was gathered in telephone interviews conducted with stakeholders in April and May 2016. Secondary sources were used to fill data gaps. WESTAC thanks those involved in the grain handling and transportation system for their input.

A. Order Fulfillment Process

The movement of bulk grains for export is a 'pull' logistics system. Grain is moved to export terminals to coincide closely to vessel arrival. To fulfill an order, grain is pulled from the farmer, moved by rail to tidewater, unloaded and prepared for shipment at a port terminal and finally loaded onto vessels.

This briefing uses the hypothetical sale of canola to a buyer in Japan as representative of a typical bulk grain order fulfillment process.

1. Pre-sale planning

- before sales agreements are negotiated with foreign buyers, grain companies go through an annual capacity planning exercise to determine likely sales volumes by product and by month
- known physical capacity and throughput of port terminals and country elevators are taken into account
- unknown variables include the size of the crops and rail capacity; grain companies will use average crop sizes and past railway service in their planning

* the term 'grain' is used in the broadest sense to include the major crops exported from Western Canada: wheat, canola, peas, durum wheat, barley, flaxseed, lentils, soybeans and oats.

2. Sale & Vessel Planning Processes

- canola sales are made between 2 to 5 months in advance of vessel loading at a West Coast port; some sales may be made as few as 30 days in advance or up to 10 months in advance
- vessels are typically booked about 12 weeks in advance; charters can be made as much as 6 months in advance and on rare occasions may be chartered only 14 days in advance; shorter bookings are unlikely
- the terms of the contract will determine whether the buyer or seller charters the vessel (see box on CIF vs. FOB)
- contracts typically have a 30-day delivery 'window' for the vessel to call and load and have a bill of lading issued
 - for example, delivery will be between November 1 and 30.
- closer to the vessel calling (typically 30 days prior to the narrowed period), the window is narrowed by the buyer (if FOB) or seller (if CIF); window size varies by contract – between 7 and 14 days
 - for example, on October 15, the window may be narrowed to November 1 to 10
 - the grain company must ensure that the product is positioned in port during this window
- the name of the vessel calling at the port is usually identified 10 to 14 days before arrival
- the location of the vessel can be monitored using the marine Automatic Identification System (AIS)
- depending on the seller's ownership of or access to port terminals, the contract will specify 'West Coast', a specific port, or a specific terminal for loading
- if the contract specified 'West Coast', the seller will determine which port 5 to 10 days before vessel arrival

CIF vs. FOB

CIF – Cost, Insurance & Freight

- seller charters the vessel
- ownership of product transfers upon arrival at destination port (e.g. Japan)
- most sellers prefer CIF sales as it provides greater control

FOB – Free on Board

- buyer charters the vessel
- ownership of product changes when the it leaves the port
- most buyers prefer to buy FOB as they could reduce their costs

3. Country Sourcing Processes

- canola is purchased from growers anywhere from 'spot' basis (i.e. little advance notice) to 9 months in advance (i.e. canola is grown under contract)
- grain companies communicate with their country elevator network regularly, providing 4 to 8 week rolling plans for each country elevator
- trucks deliver canola to the country elevator up to 15 days before anticipated departure for port

Forward Planning: Sharing Information

- many grain companies share forward-looking information with railways to indicate future demand for rail service
 - the extent of the forecasts shared with railways varies significantly among grain companies
 - some companies provide railways with annual forecasts by corridor, by elevator, and by commodity which are later updated by quarter and by month
- in the spring, discussions take place regarding rail car allocation for the next crop year

4. Rail Logistics

- CN and CP have distinct rail logistics processes as described below

CN

Rail Car Orders

- CN has set one day a week for each elevator on its network for possible loading
- grain companies place car orders on a weekly basis for specific elevators requiring service the following week (all orders must be submitted by Tuesday for service the following grain week^{*})
- orders can be placed up to 16 weeks in advance but 80% are placed the week prior^{**}
- on Wednesdays, CN reviews all orders received – by grain runs, by priority and specific requests
- on Thursdays, CN assigns service to orders according to service days and special requests;
- on Fridays, plans are released to customers
- any last minute changes to loading plans or due to operational issues are communicated
- the process described above accounts for approximately 98% of CN's grain traffic

Export Fleet Integration Program

- voluntary program in which a few grain companies participate
- grain companies supply hopper cars for integration into CN's general fleet, thereby increasing the overall size of the fleet for grain exports
- it provides participating grain companies with 'preferred' allocation and year-round off-the-top car supply in minimum 25-car block shipments
- participants are not compensated for the use of their cars as these cars are used for revenue cap regulated shipments
- program is intended to provide for consistent year-round shipping
- CN also has a Commercial Fleet Integration Program for domestic movements

CP

Dedicated Train Program (DTP)

- described as a virtual shuttle train
- grain companies estimate how many shuttle trains they need for the next crop year and commit to using the trains throughout the year
- each shuttle is 112 cars
- their estimate is based on expected cycle times and expected volumes for export
- example: a grain company may expect trains will cycle 2x/month in winter and 3x/month for the remainder of the year
 - if the company commits to 5 shuttle trains they would expect to have available 10 trains per month (1,120 cars) in winter and 15 trains per month in non-winter months (1,680 cars)
- grain companies have greater control as they determine origin, destination and timing (shipper controls the day of loading and unloading, CP controls transit times)
- grain companies manage their virtual fleet and do not place orders on a weekly basis
- about 70% of CP's bulk grain traffic is part of the DTP

General Orders

- grain companies must order general cars 10 days in advance (outside the DTP)
- no pre-determined day(s) for servicing elevators

^{*} the shipping year runs from August to July; for the 2015-2016 crop year, there are 53 weeks, week 1 starts the first week of August and week 53 the last day of July. For example, a shipper will place an order on May 10 (grain week 41) for rail car delivery at the country elevator in week 42.

^{**} while the web application accepts orders up to 16 weeks in advance, grain companies report that CN prefers orders placed one week in advance and that CN advises whether an order was accepted one week in advance.

5. Port Processes

- once the train arrives in port and is 'spotted' for unloading it takes up to 1 day to be unloaded
- vessels generally arrive in port 2 to 3 days in advance of the narrowed delivery window; late arrivals in port are rare and are usually the result of bad seas
- it takes between 3 and 4 days for a vessel to be loaded with product from the terminal
- many vessels today are Panamax-sized or greater, and carry multiple commodities to multiple discharge ports (see box)
- a stow plan for each vessel, approved by the vessel master, governs the configuration of the load by vessel hold (i.e. which commodity in each hold) and load rotation in terms of holds and terminals
 - the stow plan's key priority is stability of the vessel during loading and sailing; it must also account for ease of discharge
- sequencing of train arrivals at port can significantly impact vessel loading, even for single-commodity/destination vessels, and can result in the need for multiple berths and/or delays to loading
- vessels may go to a terminal once for loading or may push back to an anchorage and wait for additional product from the same terminal or may go to multiple terminals for loading (for example, if a purchaser has contracts from several grain companies or if a grain company has more than one terminal with product destined for the vessel)

Vessel Sizes are Increasing

For the 2014-2015 crop year, the average load/vessel was 48,400 tonnes in Prince Rupert and 45,500 tonnes in Vancouver. In comparison, for the 1999-2000 crop year, the average loads were 37,700 tonnes in Prince Rupert and 25,300 tonnes in Vancouver.

Impacts:

- requires additional loading time
- may increase the number of commodities per vessel; therefore, increases the complexity of coordination as products may be sourced from different regions, arrive on different railways, and arrive in separate trains
- vessel may call at multiple terminals for loading or make repeated calls at one terminal

Exports from Western Canadian ports (million tonnes) [hopper car movements]

Crop Year	Prince Rupert	Vancouver	Total
2010-2011	4,433.8	16,732.1	21,165.9
2011-2012	4,718.2	16,532.0	21,250.2
2012-2013	5,111.3	16,976.7	22,088.0
2013-2014	6,107.8	20,080.6	26,188.4
2014-2015	6,152.2	22,491.4	28,643.6
2015-2016	5,104.7	17,606.4	22,711.2

(to week 40)

Source: Quorum Corporation Annual Report [Table 2B-4] and Performance Update report for Grain Week 40 [Table 4-A]

B. Key Performance Issues

Overall, the system has performed well for the 2015-2016 crop year. Winter was extremely mild and did not disrupt rail service. Volumes are down for other commodities, providing additional rail capacity for grain exporters. Grain exports this year through the West Coast ports may reach record levels.

In interviews, the following issues were raised:

- how to balance an organization's interest with overall supply chain optimization
- ageing government-owned hopper car fleet
- inefficient grain fleet (about 60% of railway fleets are low-cube cars which carry 12-15% less than jumbo cars)
- need for better forecasting
- uncertainty over the continuation of the Grain Monitor Program
- need for better communication between grain companies and railways
- rail capacity is not certain therefore must sell conservatively and possibly miss out on sales opportunities
- lack of accountability from the railways regarding guaranteed car supply and penalties for missing timelines
- economic implications of exporting grain on a consistent basis throughout the year (demand is not linear)
- minimal surge capacity on railways
- more peak capacity needed to handle variability in demand
- more capacity needed, in general, to accommodate greater export volumes in future
- will exports grow fast enough to service expanded terminal capacity
- need for greater switch capacity within an interswitch zone (ability to switch 100 cars+ at a time)
- interest in planning further out, i.e. order rail cars further than one week in advance
- winter train lengths – any technology solutions to increase length in cold weather
- sequencing of trains into port is controlled by railway (CN model) which reduces a shipper's pipeline planning control
- variability in rail transit time between country and port – trains may arrive out of sequence for efficient vessel loading
- access to the North Shore terminals – capacity & vulnerability of Thornton Tunnel and Second Narrows Rail Bridge
- impact of external 'political' decisions on fluidity (e.g. dockage levels in canola to China)
- interest in rewarding efficient grain companies through improved rail service and penalizing the inefficient
- unable to finish loading vessels in inclement weather

At the workshop on May 27, stakeholders will discuss the overall performance of the system for exporting grain through west coast ports and opportunities to improve visibility and performance. Following the workshop, a post-meeting report which summarizes the discussion will be circulated.

Industry stakeholders have invested in improving capacity and throughput of the grain handling and transportation system. For example:

- new rail cars hold 10 metric tonnes more than the government-owned hopper cars; a productivity boost of 10%
- upgraded port terminal equipment reduces time to unload rail cars and also increases vessel loading speeds – one port terminal will be able to unload a train in 2 shifts instead of 3; another facility will be able to load vessels up to 5x faster
- new high-throughput country elevators are being built and other elevators are being expanded
- Richardson has completed the expansion of its terminal in North Vancouver, expanding storage capacity by 80,000 tonnes and improving its rail yard and receiving system

Additional investment is being considered. For example, G3 may construct a new terminal with a rail loop track in North Vancouver that could be operational by the fall of 2019. Annual throughput is estimated at 8 million metric tonnes.