On Time Performance in the Maritime Sector

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Since the financial crash of 2008 the maritime sector has endured a significant downturn in volume growth and revenue. The Baltic Dry Index has remained at levels around four times lower than its peak in 2007, while operating costs have continued to rise year on year. Some sectors, such as cruise, have seen improvements and there are signs of container rates increasing in 2017[i], but the industry is now only three years away from its next financial shock. The introduction of the IMO sulphur cap on bunker fuel is likely to hit the industry with up to $60bn a year in increased fuel costs[ii]. How can the maritime sector escape its ongoing depression and plan for a return to growth and higher profits?

Ports generate reams of statistics, which are published relentlessly on websites and in annual reports. Yet comparing port performance can be difficult and inconsistent: customers struggle to track their consignments, maximise efficiency and avoid unnecessary charges. Maritime sector analysts and commentators often criticise industry operators over poor innovation in information management. The US based Journal of Commerce recently wrote that a lack of understanding of how well US ports perform is holding back efficiency gains, contributing to port congestion and leaving transport providers and shippers blaming each other.[iii]

One Key Performance Indicator (KPI), which spans both port and ship operators, is ship turn-round time. The importance of this metric has been known for centuries, as noted by the 19th Century French historian Alexis de Tocqueville almost 140 years ago. When asked:[iv]

> "One hears that American shippers have the lowest running costs. How does that happen?"

He replied:

> "From mental qualities and not from physical advantages.… There is never an English or a French ship that crosses the ocean in as short a time as ours, none that stays so short a time in port. Thus we make up and more than make up for our disadvantages."

Alexis, Viscount de Tocqueville, 1805-59

The UN highlights this KPI today, with global estimates for the cost of delays put as high as US$38k per port call[v]. Our own analysis carried out with our strategic partner Nisomar Ventures, pinpoints an average turnaround time at a major UK container port of 26 hours, which is typical for north European ports, but significantly longer than the 17 hours East and North Asia ports allow[vi].

So what does that mean for ship owners, operators, charterers, their customers and the ports they pass through? Is it just inevitable 'noise' which varies widely because of regional and physical differences between ports? Or is it inefficiency and cost which can be driven out to reduce that $38k figure? Supply Chain best practice suggests ***On Time*** performance is critical and that we should be able to ***manage*** it better through enhanced ***measurement***, benchmarking and KPIs, bringing improvements in efficiency and profitability.

How to Measure?

In its Review of Maritime Transport 2016, the UN Conference on Trade and Development (UNCTAD) used AIS data from 2015 to analyse 9,250 Bulk Vessels' Port Calls across the World:

Table 4.5 Average dwell times for bulk vessels, selected countries, 2015

Row labels	2014 Sample size	2014 Quantity (thousand tons)	2014 Average waiting time (days)	2014 Average working time (days)	2015 Sample size	2015 Quantity (thousand tons)	2015 Average waiting time (days)	2015 Average working time (days)
Australia	4 438	455 907	5.50	10.95	2 461	517 066	4.52	5.55
Brazil	1 533	252 707	6.44	12.08	1 537	258 899	5.17	2.04
Canada	151	17 779	5.08	2.58	36	3 327	2.33	2.69
China	599	76 347	3.73	2.74	1 470	183 976	1.81	2.42
Taiwan	..	..	..	..	107	8 858	0.68	3.40
Colombia	48	4 838	1.75	0.82	213	19 304	0.36	1.95
India	2 302	163 729	3.96	10.68	1 865	124 192	2.28	3.63
Indonesia	2 609	182 875	2.55	4.06	281	19 430	2.99	4.05
Netherlands	51	7 416	0.12	2.78	72	8 947	1.09	2.59
Republic of Korea	..	..	..	..	167	19 145	2.64	3.75
South Africa	..	..	..	..	994	89 376	2.32	2.33
United States	188	13 819	4.74	2.31	55	5 129	1.51	1.63
Grand total	**11 925**	**1 176 315**	**4.53**	**8.80**	**9 258**	**1 257 650**	**3.46**	**3.86**

Source: UNCTAD secretariat calculations, based on raw observational data provided by Wilhelmsen Ships Service.

Adding together the waiting and working time gives a total port time of 7.3 days and a spread of 2.3-10.1 days:

- The global average waiting time was 3.46 days (spread of 0.4-5.2 days).
- UNCTAD estimated the cost of delay at US$38k per port call.

With 137,375 port calls by bulk carriers recorded for that year, this represents ***an opportunity cost of $5.2bn.***

Measurement – North America

Figures of this size are not just eye-catching, but you'd expect them to be compelling for ship and port operators, particularly during this extended period of financial downturn for many segments of the industry. Yet many ports and shipping operators are not focused on On Time performance, preferring to headline sheer quantities of TEU or tonnage handled by their assets. One exception to this is the port of Vancouver, which tracks and publishes data on ship and truck turn-round times. It does this because it sees it as evidence of its competitive advantage over US West Coast ports, thereby attracting more supply chain business to the USA via Canada. Industry commentators in the States have been urging their Government to look north for examples of port efficiency measurement to follow[vii]. Canada introduced this open architecture of port performance data from 2008 and it has remained voluntary, unlike in Australia, where going back to the late 1980s ports have been required by the government to collect and publish data on their performance.[viii]

The Port of Vancouver is particularly interesting because it does not show that the port is the best in the world – indeed as discussed further below it is in a region of relatively poor performance for ship turnaround. But it does show that it is well placed to challenge its competitors down the coast at Seattle, Long Beach and Los Angeles.

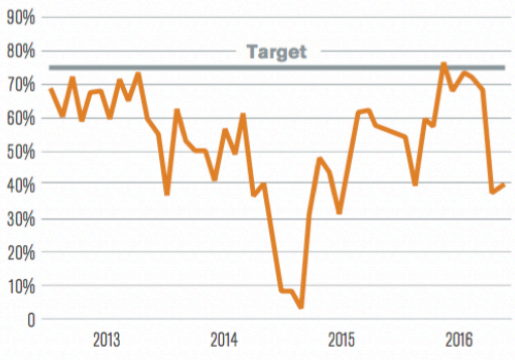
PORT of vancouver

Improving port efficiency and reliability

Ocean-going vessel arrivals

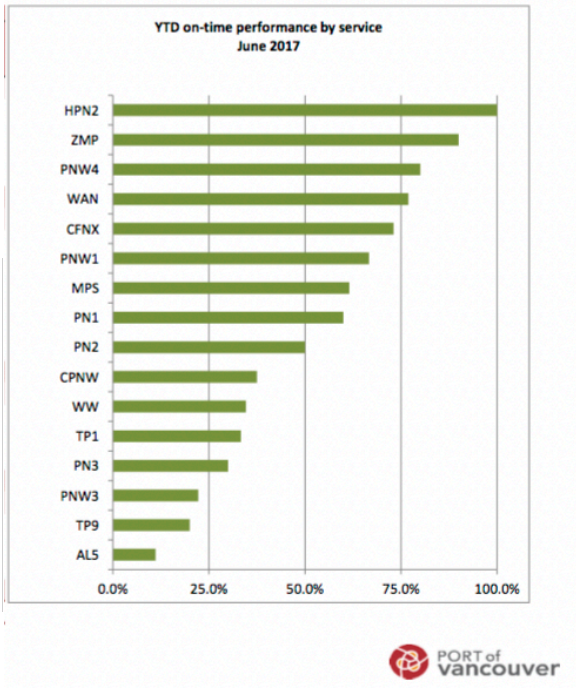
Knowing when container cargo will arrive enables terminal operators, railways and trucking companies to better plan their operations to handle goods efficiently and cost-effectively. Our Container Vessel On-Time Incentive Program provides discounted wharfage fees to recognize container vessels that arrive on time. Weekly container volume forecast reports, which provide a two-week view of import containers arriving in Vancouver including their destination, help terminals and railways plan their operations. In 2016, we developed a model to forecast container volumes three to six months in advance, based on past trends and economic indicators. This model will be launched in 2017 to enable more informed decisions by supply chain partners.

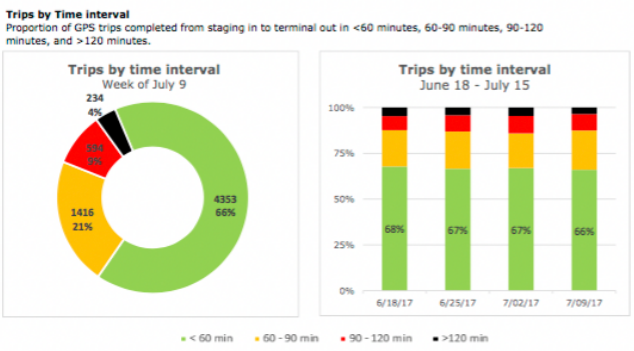
Vessel on-time arrival



Vessel on-time performance is based on the ship's arrival within eight hours of the container scheduled berth window. Our target is for 75 per cent of vessels to arrive on time. In 2016 our average was 59 per cent. ✓ Independently assured

It appeals to customers through transparency and giving them the ability to plan on when their goods will arrive or depart via the sea-land supply chain. It also incentivises ships for timeliness and focuses on using its data to forecast how the port will perform three to six months hence[ix].

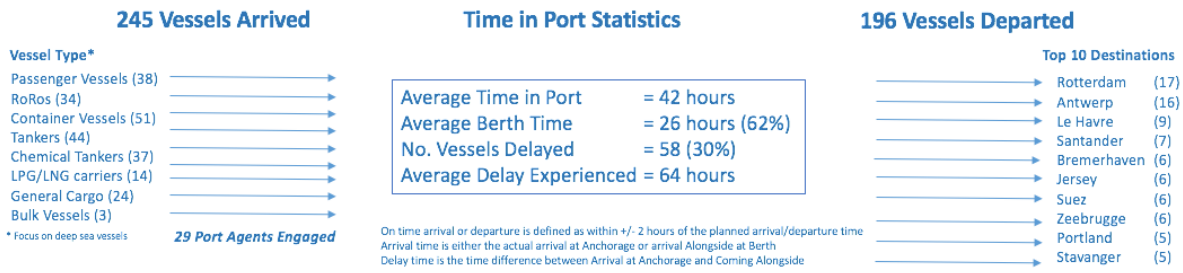


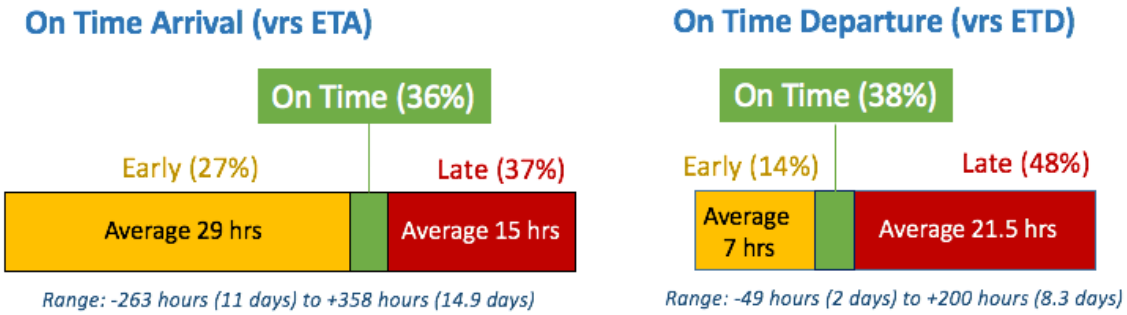


The UN data were for bulk carriers, while Vancouver is showing us container ships, where we would naturally expect to see faster turn-rounds. So we cannot apply the UN estimate of cost per port visit to these numbers. But we can look at what bulk carrier On Time performance looks in other ports.

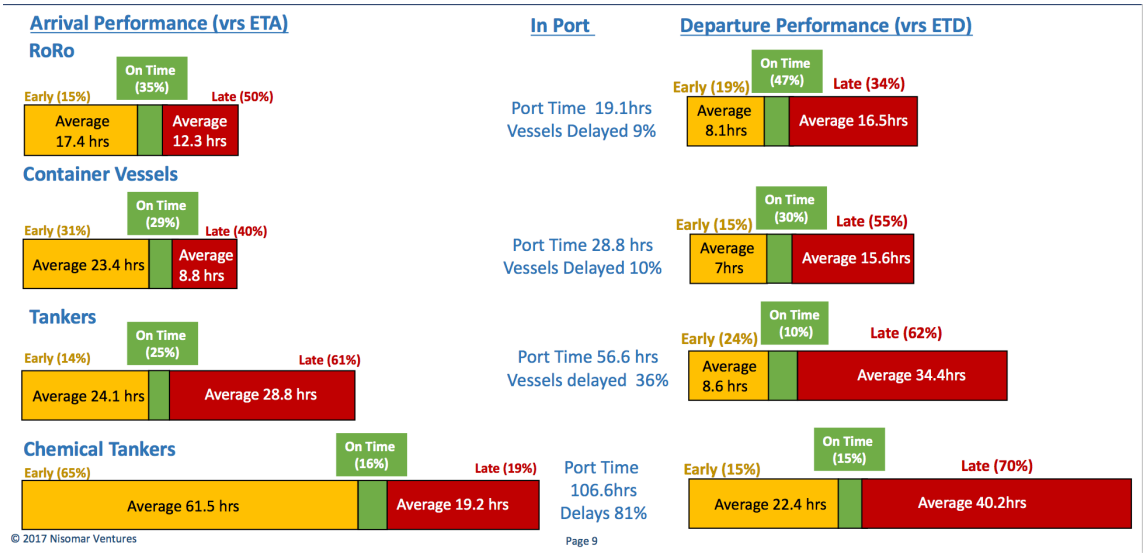
Measurement – Europe

Turning now to a major European port, we found that while it does not focus on ship turn-round in its own published analysis, it makes the data available on how long ships spend in port. These were largely manually input data via the port's Vessel Traffic System. We took a sample of 200 calls over three weeks during the summer of 2017:





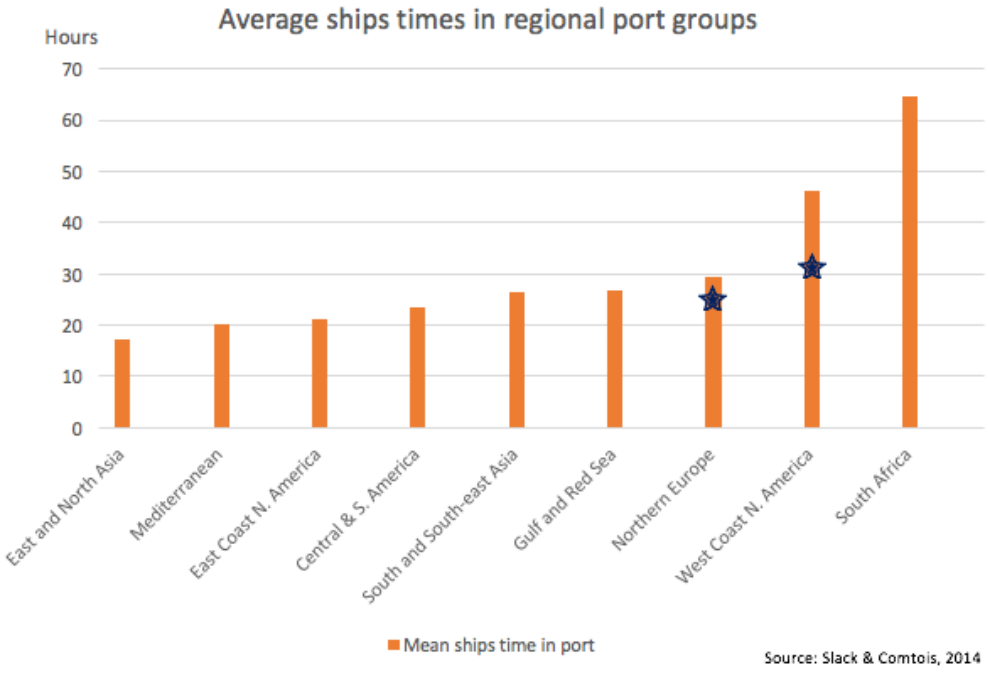
Average berth time in the table above equates to the ship turn-round time in the Vancouver data. 26 hours for this European port compares favourably with its Canadian counterpart, whose 2013 data shows an average turnaround time of 31 hours[x]. Where the big difference lies is in the lack of targets and the variability in turnaround time, where in Europe ***performance drops threefold for "Tramp" over "Line"***:



The difference in On Time performance between RoRos, container vessels and the tankers is stark. Our discussions with port management revealed, however, that the variability of timings for bulk and chemical tankers can be due to the refinery prioritising ships by the type and price of their cargo, rather than any inefficiency in port operations. Nonethless all ships have to use the same tidally constrained pilotage channel so we can expect that unpredictability in tanker movements impacts the efficiency of operations at the main port too. Without understanding this via regular measurement, benchmarking and setting targets, how can the port manage its way to greater efficiency and competitiveness?

So What Does Good Look Like?

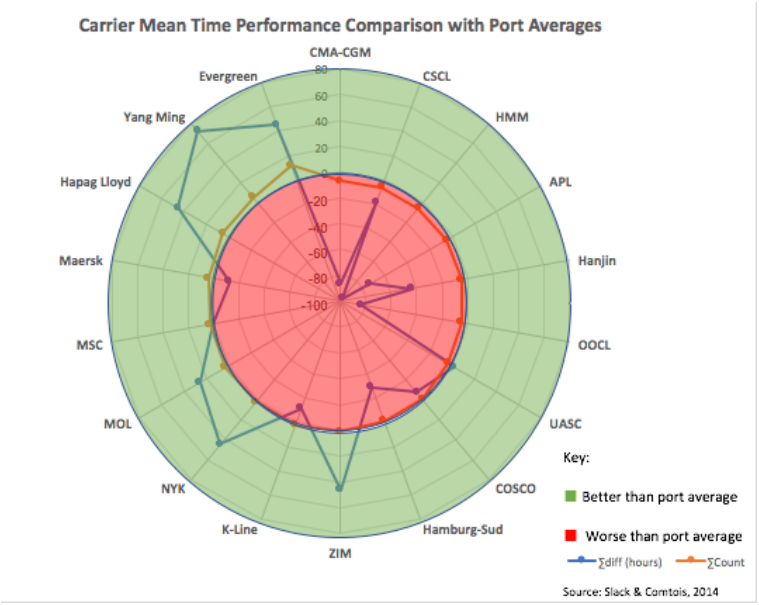
Ship turnaround times vary widely across the globe. Measurement is an important step, but to set realistic and useful targets it is essential to know ***what good looks like***. Research based upon 2013 data from Lloyds List Intelligence showed:



So ports in east and north Asia look good. The stars show the performance of the two ports discussed above. As the authors noted:

"Late arrival of a vessel may result in the terminal being unprepared to handle containers in an optimal fashion: the berth may be already allocated to another ship, cranes may have been deployed elsewhere, and required gangs of labour may not be available. As mentioned above the deployment of ever larger vessels compounds this problem because of the length of berthing space they require."

As well as looking at performance by port this approach enables a comparison with performance by shipping line. So can we say that turnaround times are dictated entirely by the port's local characteristics, or are some shipping lines always faster on average, as Alexis de Tocqueville noted?



Names of shipping lines are shown around the outline of the circle, with performance plotted in the green 'better than average' or red 'worse than average' sectors.
The two measures are:

- Blue - the difference in average turnaround time for the shipping line in comparison with the port average
- Orange - the number of times the shipping line was better or worse than the port average

Not surprisingly some shipping lines do much better than others, in the same way as some ports do. Of course these data are now four years old and things have changed – but it is interesting to note that Hanjin Line, shown as a poor performer here, subsequently went out of business, while Hamburg Süd has also been acquired. Is that just sheer coincidence? How can we help ports and ship operators understand their performance in comparison with regional and global standards? And most importantly how can we enable them to show their customers that they are more efficient and a better place to send their business?

From Measurement to Good Management

The data discussed in this paper were collected by a range of different means, some of them done automatically, many processed laboriously by hand. Yet ships produce vast amounts of real time data which is available via AIS. By collating and processing these data it is possible to determine port arrival and departure times: not just reported end of voyage, but pilot on or off, bunkering, arrival at berth and loading or unloading times, to name but a few.

Organising and making this data widely available, measured on the same basis world-wide, and compared like with like, will enable all actors in the supply chain to see how efficient they are. Mapping On Time performance to the cost of delays will then empower them to set targets and measure improvement against them. This in turn can unlock investment in the more intangible business cases which often surround data driven services, rather than port infrastructure.

It will also enable the measurement and calculation of secondary statistics, such as CO_2 and other polluting or Greenhouse Gas emissions. Determining the carbon footprint of individual consignments as they move down the supply chain across land and maritime links should be an essential part of achieving the hard targets the industry needs to adopt. But that's a topic for a further paper which we hope you will be able to read in a few weeks' time.

References:

[i] https://www.xeneta.com/blog/maersk-loss-short-lived-higher-q2-container-rates

[ii] Platts, 'Tackling 2020: the impact of the IMO and how shipowners can deal with tighter sulfur limits', www.platts.com/shipping, May 17.

[iii] Journal of Commerce, 'Canada a model for US port productivity metric creation', 20 Feb 17.

[iv] A. de Tocqueville, Journey to America (New Haven, Connecticut: Yale University Press, 1959).

[v] UNCTAD Review of Maritime Transport, 2016.

[vi] Slack, B and Comtois C. (2014), 'Ships Time in Port, an international comparison', Hellenic Institute of Transport

[vii] Journal of Commerce, 'US Commerce Report Stresses Port Metrics Importance', Jan 17

[viii] Hamilton, C, 'Measuring Container Port Productivity The Australian Experience', The Australia Institute Background Paper No 17, March 1999

[ix] Port of Vancouver website: https://www.portvancouver.com/port-dashboard/supply-chain-performance/

[x] Slack, B and Comtois C. (2014), 'Ships Time in Port, an international comparison', Hellenic Institute of Transport