Vessel Call Optimization

The role of enhanced communication between ship and shore side

Introduction

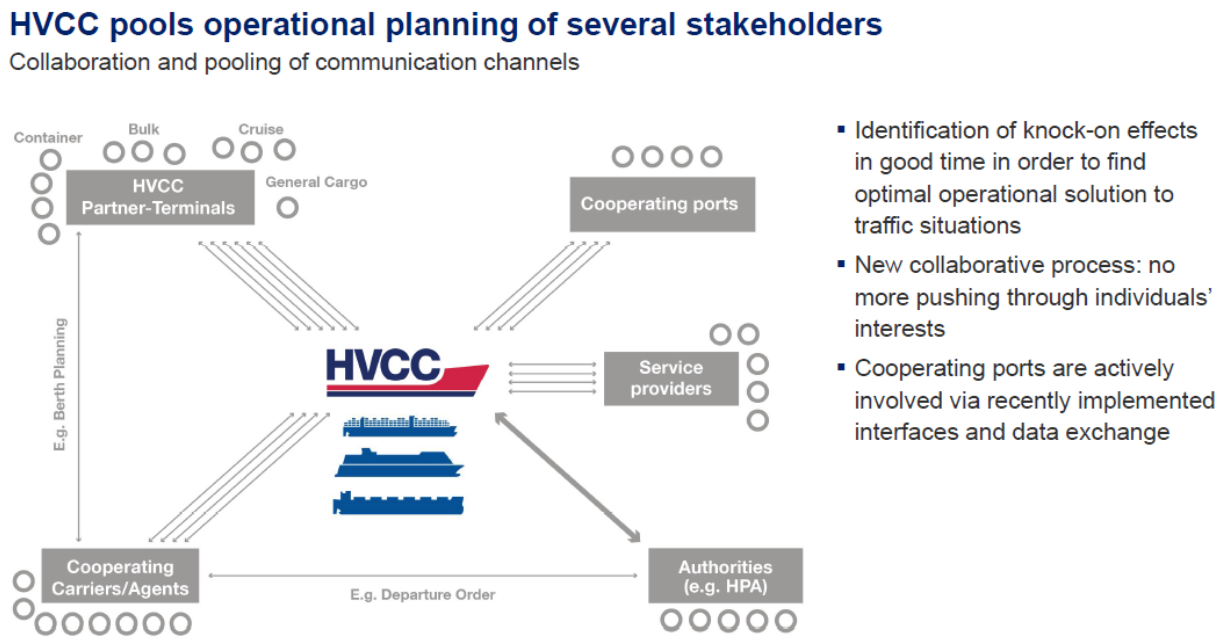
Fast and reliable loading and unloading operations require huge investments in superstructures, intermodal solutions as well as technological and human capacities.

Currently, vessel call optimization focusses on maximising the efficiency of a vessel call to reduce costs. Efficient port calls also allow for a reduction of the quantities of fuel burnt by ships, thereby lowering CO2 emissions.

The present discussion seems to overlook an important aspect which is that vessel call optimization is also about enhancing terminal productivity and capacity utilisation. Efficient port calls also mean the efficient use of terminal resources and a good terminal-ship communication. Vessel schedule reliability is a key success factor for vessel call optimization. Therefore, many seaport terminals and other stakeholders have established systems and platforms that enhance communication to optimise vessel calls.

In many ports, all over the EU, Vessel Coordination Centers are indeed in place to systemize the exchange of information between all stakeholders involved in the vessel call from its approach to the port until its departure for its next destination.

Vessel Coordination Centers have proven their efficiency and their ability to play a role in improving vessel calls and thus reducing a.o. emissions from ships during the calls. As shown in the below example of the Hamburg Vessel Coordination Center, the center pools operational planning of several stakeholders.



To illustrate the above, this paper will explain how communication during vessel calls is currently organized. Then it will refer to the reality of emissions of ships in ports. Finally, it will suggest few recommendations.

1. Current practices of communication between a container terminal and a shipping line

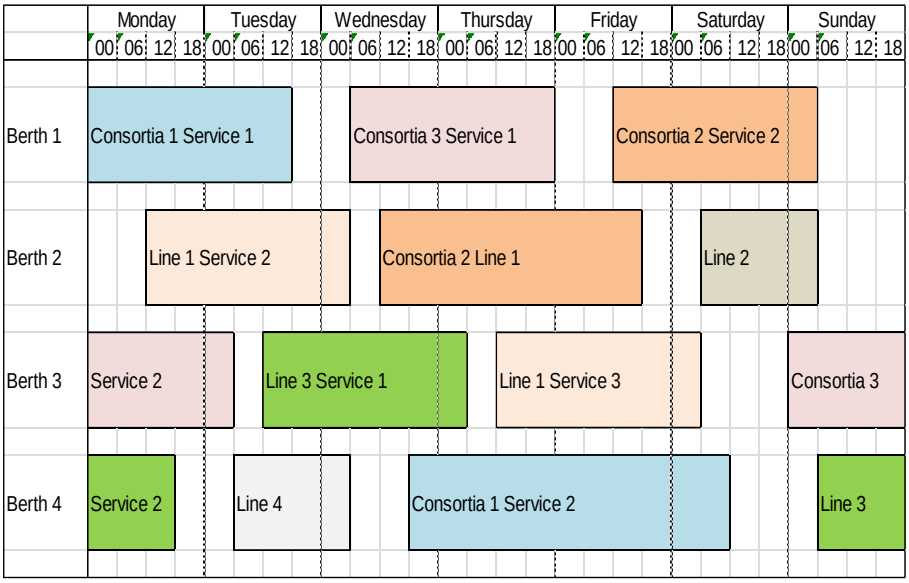
Although ships' emissions at ports only constitute a small percentage of total emissions, terminals are incentivized for multiple reasons to make the best use of their assets, optimize vessel calls and handle cargo as fast and efficient as possible.

1.1 Terminal-shipping line communication and the terminal's berth plan

Container liner services run fixed schedules. These services are mostly on a fixed-day weekly basis, meaning the ship of a certain liner service will call at a port at the same time on the same day every week.

The day and time of arrival are specified in the contract between the shipping line and the terminal operator. Usually, the contracts between terminal and shipping line guarantee a berth upon arrival for ships that arrive on schedule. Often, penalty payments can be incurred by the terminal operator if he cannot provide a berth to a vessel that arrives within its window. The opposite is not the case for ships which arrive late beyond the window and which do not pay penalties.

Terminal operators have berth plans including all the liner services expected to call at their facility each week. A simplified example of a berth plan is shown below. It is in the terminal operator's own best commercial interest to optimize the use of its berth facilities because also feeders and – if applicable – barges must be included in its schedule. The same goes for port productivity – usually measured as the number of containers handled per hour.



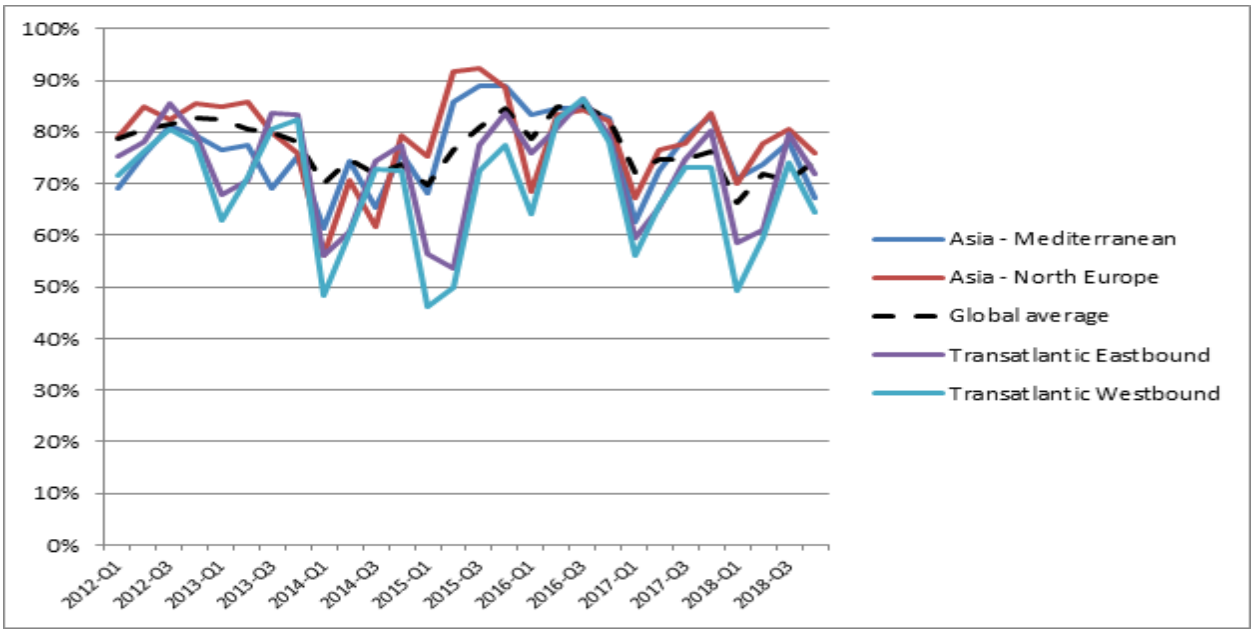
As shown above, vessel calls and port productivity are already optimized in many ports, as otherwise terminals' activities would not be profitable.

1.2 managing blank sailings and ships arriving off-schedule

In case ships are waiting, this usually is because they arrive late, i.e. outside of the window agreed upon with the terminal. Ships arriving late can strongly disrupt a terminal's berth plan. In practice, some members reported, that late arrivals occur in two-thirds of all cases for liner shipping companies.

Official numbers, as shown in the below chart, also indicate that schedule reliability can be improved. According to ITF figures, schedule reliability, defined as the share of ships arriving within one day[1] of the scheduled arrival time, oscillated between 65 and 75 percent as of May 2018 depending on which trade lane was measured. It is to be noted that the situation deteriorated during the COVID-19 crisis, with schedule reliability dropping to an historic low of 44.6% in December 2020, despite increased freight rates and shipping lines' profits.[2]

[1] Although windows for arrivals are much tighter that one day
[2] *Sea-Intelligence,* NEW Record-low Global Schedule Reliability of 44.6% in December 2020, *accessed through:* Sea-Intelligence - NEW Record-low Global Schedule Reliability of 44.6% in December 2020 (sea-intelligence.com)

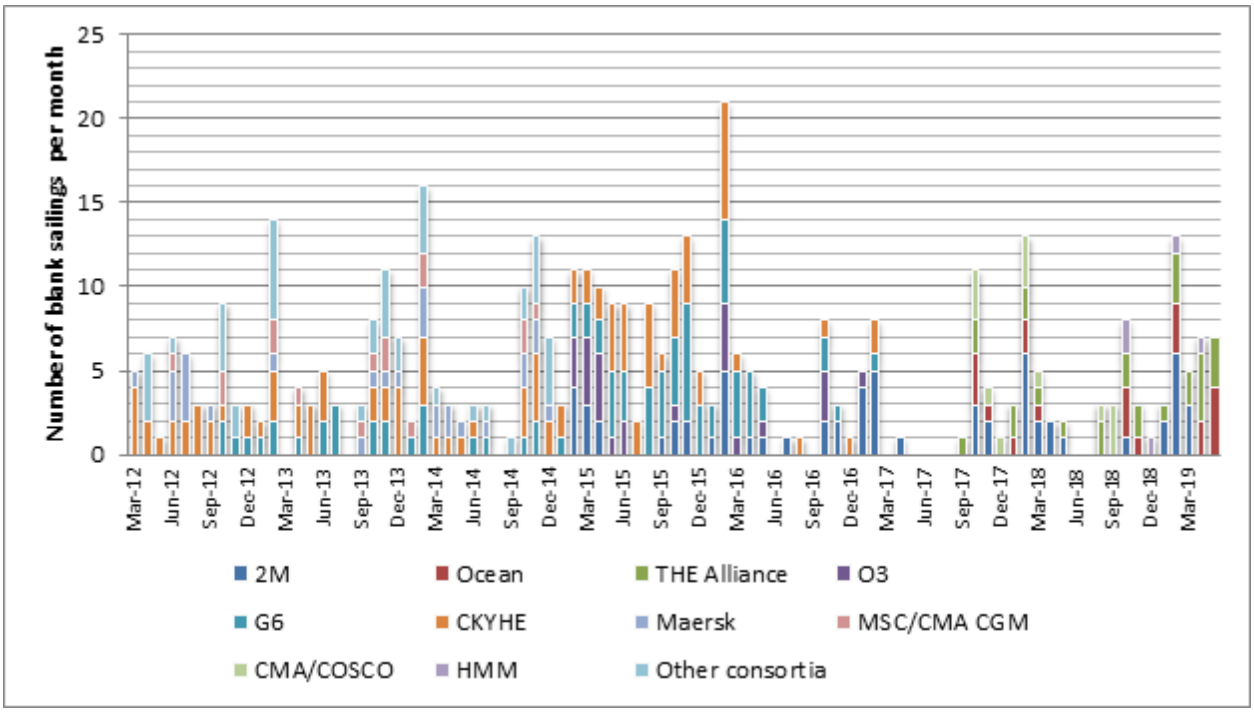


Source: ITF

Another issue disturbing terminals' planning processes are blank sailings, that is, the cancellation by a liner company of its weekly service. As shown in the below figure, this is often done at the same time by different consortia and alliances and has tremendous effects on ports.

The high fluctuation of blank sailings per month also makes it difficult for terminals to account for this in their planning process. This has been particularly the case since the beginning of the COVID-19 crisis where blank sailings have concerned most of the European ports in a significant manner. To give an indication, following sources from August 2020, 468 blanked departures took place on the East-West Trades.[3]

[3] *Gcaptain,* Container Costs Risk Spiralling Out of Control, *accessed through:* https://gcaptain.com/container-costs-covid/



Source: ITF

Ships arriving late can still berth, if space is available due to other vessels also arriving late. This results in a complex planning process; terminals need to meet contractual obligations towards vessels arriving on time, while minimizing delays for those vessels arriving off-schedule. To manage this complex planning process, terminals are already in constant contact with shipping lines to receive updates about their estimated time of arrival (ETA) and change their berth plan accordingly.

Vessels arriving off-schedule also affect the terminal operator's employment practices. Terminal operators need to ensure sufficient work force is available to meet the expected pattern of arrivals. However, vessels arriving off-schedule will reduce the need of labor at the initial estimated time of arrival. Usually, this surplus labor cannot be allocated elsewhere. Moreover, terminals may need to incur costs to contract additional work force at the actual time of arrival.

As mentioned above, it is in the terminal's best interest to optimize vessel calls but this remains difficult when shipping companies do not improve their schedule reliability.

While the above examples focus on the reality of ship-shore communication during the calls of container vessels, it is important to underline that schedule reliability is also important in the case of bulk carriers as highlighted in the recently published IMO Just-In-Time Arrival Guide. The bulk sector is one of the key segments to be targeted with priority, after the container sector.[4]

[4] Just-In-Time Arrival Guide: Barriers and Potential Solutions, p.1, Published in 2020 by the GloMEEP Project Coordination Unit International Maritime Organization

2. Areas of improvements of the guide on "Just-In-Time Arrival"

The need for improved communication between the ship and the shore-side is acknowledged by many actors including those who contributed to the guide on "Just in Time Arrival" published in August 2020[5].

Although, the guide focuses only on ships that sometimes wait due to the lack of updates from port stakeholders, it is important to remind that cooperation between shipping lines and port terminals is a reality in many ports of the EU. It is indeed in the best commercial interest of shipping lines and port operators and terminals to optimize the calls while reducing shipping emissions in ports. Whether current good practices in this respect could be further encouraged and promoted, the answer is clearly yes.

It would have been also very informative to refer in the above-mentioned guide to the issue of ships' schedule reliability which is, according to many sources, far from being optimal. Ships which arrive late beyond the allocated window or which skip the call provoke real disruptions in the organization of port activities, be it with respect to the use of the berthing space, to the optimization of the moves on the terminals' yards or to the use of the labour force.

As mentioned above, very often when ships are waiting, this is because they arrive late. These late arrivals have a tremendous effect on terminals' organization and activities. Another issue disturbing terminals' planning process are blank sailings. While blank sailings and capacity adjustments represent good solutions for shipping lines, the decisions to cancel calls have huge implications for port stakeholders.

3. Optimizing hinterland logistics

Another key factor the JITA-guide overlooks is the influence of vessel call optimization (or the lack thereof) on hinterland logistics. A vessel's arrival time influences the terminal's estimated time of completion (ETC i.e. when the terminal has finished the handling of the vessel) and by consequence affects the moment when trucks, trains and barges can collect their cargo.

In other words, vessels' arrival time impacts the second modality be it feeder vessel, train, barge or truck. It can even have repercussions on road congestion. If vessels do not arrive evenly spread out across the week, but arrive by majority on one or more peak days, this means that also trucks need to present themselves at the port on those peak days. In such a scenario, the roads will clog on those days with the majority of vessels arriving.

It is hence crucial to also include improving hinterland logistics in any vessel call optimization effort, as vessels' schedule reliability in part determines the sustainability and cost efficiency of the second modality.

[5] Just-In-Time Arrival Guide: Barriers and Potential Solutions, p.1, Published in 2020 by the GloMEEP Project Coordination Unit International Maritime Organization

4. Shipping emissions in ports: the numbers

While Shipping accounts for over 3% of worldwide GHG emissions[6], only 6% of ships GHG emissions are emitted at ports, according to the MRV data of 2019.[7] Moreover, a European Commission study has found that better ship-shore communication/ vessel call communication can only bring about a 1% emission reduction by 2030.[8]

The above-mentioned numbers indicate that while vessel call optimization is sought, it is not the magical solution to reduce shipping emissions, as only a small portion of those GHG emissions take place in and around ports. Better ship-shore communication will have a relevant but relatively limited impact on the reduction of shipping emissions.

5. Concluding remarks

Although emissions at ports account for only a small part of total shipping emissions, this problem should not be neglected because every measure to decarbonize the maritime logistics is welcome.

Policy makers should support existing good practices initiated by different Vessel Call Coordination Centers in several EU ports as well as initiatives aiming at aligning standards and data-sharing that enhance port call processes.

Moreover, in view of the significant number of vessels arriving late, schedule reliability should become a priority to make the best sustainable use of port capacities.

[6] 2019 Annual Report from the European Commission on CO_2 Emissions from Maritime Transport, p.3, May 2020
[7] 2019 Annual Report from the European Commission on CO_2 Emissions from Maritime Transport, pp.40-41, May 2020
Note: the fleet monitored under the MRV consists of bulk carriers, oil tankers, containerships, chemical tankers, general cargo ships and "other" ship types (e.g. LNG carriers, passenger ships, ro-pax ships etc.)
[8] "Study on methods and considerations for the determination of greenhouse gas emission reduction targets for international shipping", Final Report: Short-term Measures, pp.55-56, April2018