

Container volumes and terminal capacity in Northern Europe II

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Main container trades, ports and terminals

North Europe-Far East and Transatlantic are the two major trades connecting with North Europe. The services of the eighteen carriers operating in these two trades are calling at a total of seventeen ports in the Gothenburg-Sines range (including the UK). In 2014, these seventeen ports had a total throughput of 53 million TEU, an increase of nearly 5% over 2013. This was a much higher year-on-year growth than was seen in 2013 and 2012 with their 2.2% and 0.2%, respectively. As matters are, the overall prospects for 2015 are looking a bit less rosy.

These seventeen ports comprise 55 different container terminals equipped with ship-to-shore gantry cranes, which are all subject of Dyanmar's recent report 'Container Volumes and Terminal Capacity in North Europe II'. As of 31 December 2014, they had a combined box handling capacity of 86 million TEU. The resulting occupancy, i.e. throughput divided by capacity, of 62% may seem to run counter to congestion having plagued so many ports.

Congestion

The main reason for this congestion phenomenon was and is that demand doesn't come in nice regular identical volumes to be discharged and loaded every day. On the contrary, even the largest ships remain prone to the elements, which are sometimes causing havoc to schedule integrity. Early in the year, nearly a third of more than 9,900 vessel arrivals were off schedule! Delayed ships may bunch up in their next North European port, which will work through further in their schedule.

As such, a certain amount of terminal over-capacity may be considered a requirement to prevent congestion. Terminal capacity is a multiple

interpretable subject, but the general consensus is that congestion kicks in at 75% utilisation. Therefore, this study provides occupancy analyses (overall, by sub-region, per country and per port) at both 100% and at 75% capacity.

That all said, throughout the 24/7 working week a terminal operator has always been facing and handling peaks and troughs in demand as a standard fact of life. However, things have changed and ships have grown excessively within a relative short period of time.

Growing vessel sizes

At the start of this century the world's largest box ship was Maersk Line's "Cornelius Maersk", measuring 8,200 TEU. In April this year, a vessel with nearly 2.5 times that capacity was delivered: UASC's 19,900 TEU "Barzan". The average capacity of ships deployed in the North Europe-Far East trade then was 12,700 TEU and has meanwhile increased by another 900 to 13,600 TEU.

The aforementioned serves to understand the challenges port authorities and terminal operators are facing. Very few container terminals have been purpose-built for ULCS (Ultra Large Container Ships) of over 10,000 TEU, let alone for the 18,000+ TEU monsters. The first one of the latter was only delivered in mid-2013 and including confirmed orders their total number will swell to 100 by 2019. 35 of these will even be larger than 20,000 TEU.

All these ships will invariably be deployed in the North Europe-Far East trade and the amount of ships so big has definitely come as an unpleasant surprise to many of the terminal operators in Dyanmar's report, who generally only hear what hangs over them when the newbuilding order is placed... Yet they realise to have no choice but to quickly invest substantial sums, again, to handle

the monsters, without the certainty that carriers will be prepared to pay for the extra effort.

6,000 moves per day, please

The consensus among big ship carriers nowadays is that terminals should handle 6,000 moves a day on a ULCS; the universal consent among stevedores is that a production of 3,500 moves is a more realistic maximum.

The 2000-built 8,200 TEU ship has a length of 347 metres, counts 21x 40' bays (transverse rows of 40' containers) and can be discharged/loaded with seven ship-to-shore container gantries simultaneously, maximum: such cranes just cannot work adjacent bays; the gantry legs are too wide to allow that.

The 2015-launched 19,900 TEU "Barzan" is 400 metres long and counts 24 bays. Thanks to the "two islands" deck configuration, it can be handled with 9 gantries at the max, just two more than its nearly 2.5 times smaller, fifteen years older predecessor. The difference in capacity between the two ships is not so much in length; it is in breadth: 6 deck rows more, and height: extra tiers under and on deck.

With respect to the ship-to-shore gantries, the differences are much more succinct: on the "Barzan", the crane's spreaders have to travel longer, i.e. wider and deeper. Tandem-spreaders will be used whenever possible and the cranes need to be much taller, minimum 50 metres under the spreader. Thus, they are heavier: some 2,000 tons and therefore require stronger quays.

Purpose-built, expanded, retrofit and coping

In 2014, just three of the 31 container terminals accommodating North Europe-Far East services were purpose-built for the handling of Ultra Large Container Ships, including the current largest afloat:



- EUROGATE Container Terminal Wilhelmshaven/Germany - water depth alongside 18 metres
- Hutchison's Berths 8/9 Terminal in Felixstowe/UK - 16/18 metres
- ECT's Euromax at Maasvlakte 1 in Rotterdam - 19.8 metres
- DP World's London Gateway (17 metres) has definitely been developed for the ULCS purpose from scratch, but is not -yet- structurally handling the relevant ships.

Southampton Container Terminal is an example of a facility expanded with a

custom-built ULCS berth. In Hamburg part of the quays of EUROGATE's Container Terminal Hamburg and HHLA Container Terminal Burchardkai have been retrofit as such and so has APM Terminal Gothenburg (Sweden). ECT has re-equipped to ULCS requirements part of its Delta Terminal at Rotterdam's Maasvlakte 1. And at Bremerhaven's Stromkaje, accommodating three terminals, 29 StS gantries have been upgraded to a 23-boxes wide outreach.

And the others? They are coping, one way or the other! The economies of

scale carriers aim to achieve by operating increasingly larger ships means that mainline terminals have no choice but to invest substantial sums in their facilities. Invest in deeper water, in longer and stronger quays, in taller ship-to-shore gantries with a longer outreach, in yard space and equipment, in... and so on.

All these investments should, but do not necessarily translate into higher stevedoring prices; shipping lines rather pass their economy of scale savings on to shippers in the form of lower freight rates instead...

New 2015 facilities

This year, three more new, tailor-made ULCS facilities are joining the inventory:

- April: APM Terminal Rotterdam II at Rotterdam's reclaimed Maasvlakte 2. Fully automated including the absolute novelty of (eight) remotely controlled ship-to-shore gantry cranes
- September: DP World's Rotterdam World Gateway (RWG) in the same area and fully automated and remotely controlled as well: all 14 quay cranes, i.e. including the three barge gantries
- December: Liverpool2 Container Terminal, semi-automated yard with initially five conventionally operated ship-to-shore gantries

These three terminals alone will increase North Europe's handling capacity by minimum 6 million TEU or 7%. It will probably be more once the almost excessive degree of automation of the two new Rotterdam greenfield terminals has been fine tuned.

Automation, the holy grail

Full StS container gantry crane automation is seen as the only means to achieve the carriers' badly wished quay-side production of 6,000 moves per day of 24 hours. Approximately 90% of the crane cycle is automated with only the final lowering of the container guided by the operator. The latter is not in a cabin on the crane but in a remote control centre. Unlike the traditional human crane-driver, a robot crane doesn't suffer from back/neck stress, fatigue or fading concentration and can easily withstand the required faster acceleration and braking.

With remotely-controlled crane automation, APM Terminals expects to make up to 50% more moves per hour, while DP World/RWG anticipates 40 moves an hour. In both cases, it comes down to some 6,000 moves per day working the ULCS with 6 automated quay cranes. Obviously, the stowage plan must allow for a crane intensity of minimum 6 (or up to 9, if available) quay cranes.

Even without crane automation, impressive throughputs are sometimes achieved. ECT Delta Terminal claims the volume palmares: on Evergreen's 13,800 TEU "Thalassa Hellas" it achieved a production of 11,050 moves, almost 50/50 discharged/loaded, equal to some 18.500 TEU. As the ship, using five cranes, was at berth for 81 hours, this comes down to a production of 28 moves per crane/137 per hour/3,270 moves per 24 hours... still far away from the wanted 6,000.

Gate pressures

3,270 or 6,000 moves per 24 hours: the vast majority of all these containers (5,500 or 10,000 TEU) have to be delivered to the consignee or by the shipper. Apart from expanding yard space and equipment, It will increasingly be required to start the delivery of inbound containers while the vessel is still discharging. A fast quay crane production puts tremendous pressure on the terminal's storage capacity.

The following examples show how immensely the pressure on terminal gates must have increased over a period of ten years: many more containers on much fewer ships sailing on a substantially lower frequency:

- In 2005, 272 ships of 5,700 TEU average operating 32 dedicated weekly North Europe-Far East services carried 6,732,000 full TEU both ways
- In 2014, 235 ships of average 12,700 TEU operating 21 dedicated weekly North Europe-Far East services carried 14,091,000 full TEU both ways

To prevent capacity constraints, ports and terminal operators have to try and stay ahead of demand. And so are they planning to: if all intended expansions and totally new terminals are commissioned as planned, the 2014 overall capacity of 86 million TEU may increase by a Compound Average Growth Rate (CAGR) of 5.2% to 143 million TEU by 2024.

Regional highlights

The extensive core Ports/Terminals section of Dynamar's "Container Volumes & Terminal Capacity in North Europe II" is split into four areas: Baltic/Scandinavia, UK/Eire, Europe North West and Europe Atlantic. Unavoidably of a somewhat unequal size, highlights of each of these sections include:

Baltic/Scandinavia - 18 terminals, 777-ha, 13.7-kilometre quay line, 85 quay cranes

Normally, Russia is the most important feeder destination/origin of boxes transhipped in the various North Continental (and one Baltic) hubs. Hence, there is an extensive analysis of container terminal capacity in three Russian Baltic container ports: St Petersburg, Ust-Luga and Kaliningrad, which comprise 10 box facilities. Their combined handling capacity is 4.5 million TEU, of which 80% comes for the account of St Petersburg. The current seven facilities large and small here offer more than 9,900 reefer plugs. An eighth terminal to be capable of accommodating up to 8,100 TEU ships, more than three times the present maximum container vessel size of 2,600 TEU, will open for business in September.

Gdansk (Poland), Aarhus (Denmark) and Gothenburg (Sweden) are the three ports in this section handling direct North Europe-Far East and (the Swedish port) Transatlantic services. Gdansk is the relatively new kid on the block here. DCT Gdansk is on the Maersk Line schedule since early 2010, still handling this carrier's largest, 18,000 TEU, ships with 18-wide ship-to-shore cranes. That will change when a new terminal opens by late 2016, which will be equipped with mega cranes of a 25-boxes across deck outreach.

UK/Eire - 11 terminals, 575-ha, 11.1-kilometre quay line, 91 quay cranes

The Irish Republic is a pure feeder destination. During the last few years, the dialogue in the UK has been dominated by the development of brownfield London Gateway and more in particular the reaction it has provoked by established terminals, afraid that the new facility would go after their customers. With the dust settled, for now, it appears that Tilbury has lost part of its North-South business while Thamesport got rid of all of its deepsea services. However, Felixstowe and Southampton have fast-tracked the building of brand new ULCS berths through which they have managed, as matters are, to keep their big ship patronage.

A somewhat different animal with high aspirations is Liverpool, determined to gain back its historical 18% share of all UK seaborne imports. Hence it is building a new deepsea terminal capable of accommodating up to 13,500 TEU ships or bigger, anyway, considerably larger than the ones operating in the Transatlantic trade currently calling the Merseyside port. Liverpool2 will be commissioned by the end of this year.

Europe North West - 43 terminals, 2,716-ha, 51.7-kilometre quay line, 386 quay cranes

This is by far the largest area with a total of eight German, Dutch, Belgian and French main ports accommodating 24 terminals handling North Europe-Far East or Transatlantic services. In addition, 17 other existing container terminals plus 12 projects are being profiled here. The existing terminals are equipped with 82 ship-to-shore cranes capable of handling the 18,000+ TEU monsters requiring an outreach of 23 rows across deck. The projects will add another estimated 125 of such devices.

Deep water in the port directly on the North Sea is Rotterdam's trump card. Antwerp and Hamburg continue to amaze the trade by their apparent cargo generating capability inducing

Parameters	Surface	Quay	Berths	Reefer	StS		Capacity	Throughput
Units	ha	meters	no.	points	MHC	Gantries	2014	(Port) 2014
Baltic/Scandinavia	185.7	3,807	19	1,985	1	24	3.9	2,465,000
UK/Eire	467	9,016	27	5,525	0	74	11.8	7,071,000
Europe North West	2,631	50,509	170	32,006	19	362	68	41,743,000
Europe Atlantic	52	2,202	9	618	1	15	2	1,748,000
Grand total	3,336	65,534	225	40,134	21	475	85.6	53,027,000

TEU *1 million

Source: "CONTAINER VOLUMES & TERMINAL CAPACITY in North Europe II", published by Dynamar B.V.

More tables can be made available upon request.

the carriers' very largest ships to sail the windy and winding Westerscheldt or the relatively shallow Elbe. Le Havre may have misjudged vessel size development by opting for 22-wide ship-to-shore container gantries along its massive Port 2000 project, nearing completion. A solution may be to slightly list the 18,000+ TEU ship to reach the 23rd row, or otherwise to turn her from port to starboard (or the other way round).

Europe Atlantic - 3 terminals, 52-ha, 2.2-kilometre quay line, 16 quay cranes

The Portuguese ports of Lisbon and Sines are both called by Transatlantic services operating out of North Europe and the Mediterranean. Sines also serves as an Atlantic transshipment port for MSC and accommodates one of the 2M alliance's North Europe-Far East services, deploying ships of up to 14,000 TEU. Lisbon's current two terminals may -ultimately- be replaced by a new, 2 million TEU facility.

Features of **CONTAINER VOLUMES & TERMINAL CAPACITY** in North Europe II include:

- Identical, compact profiles and overviews of 75 existing terminals
 - 20 expansions and 20 new projects
 - in 26 different ports/11 countries across North Europe
- Profiled data: Terminal name - operator - owners - location - surface - quay length - depth alongside - number and outreach category of Ship-to-Shore container gantries - mobile harbour cranes - reefer points - TOS - annualised TEU capacity - 2013/14 TEU throughput - notes - expansion plans
 - 2015/2024 status, annual development and forecast of terminal capacity
 - 2005/2024 historic and forecast port container throughput

- 5-year TEU throughput of all North European ports (more than 66 million TEU in 2014!)

- 5-year full TEU volumes North Europe-Far East trade (country/country)

- 5-year full TEU volumes Mediterranean-North America trade (country/country)

- All (early year) North Europe-Far East and North America container services

- Profiled data: Trade name - carrier(s) - frequency - full port roundtrip - number and TEU capacity of ships - notes, if any
 - North European ports of call analyses for both main East-West trades
 - Transshipment shares of the 4 main hubs (handling over 50%) and 6 potentials with the associated feeder volumes
 - Overview of all 20 new terminal projects an intentions
 - Eleven International and Global Terminal Operators' North European presence assessment
 - Historic and forecast GDP growth and population per country

Table Existing 2014 North Europe Container Terminal capacity (of ports handling Far East and North America services)

CONTAINER THROUGHPUT & TERMINAL CAPACITY in North Europe II is immediately available and can be ordered for direct download at www.dynamar.com/publications/140 or by contacting Dynamar B.V.

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- PDF: EUR 670
- Printed/bound by priority surface mail: EUR 690
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About the organisation



Since 1981, Dynamar B.V. (Alkmaar, The Netherlands) has provided Transport and Shipping Information and Consultancy services for the Marine, Energy and Financial sectors. Dynamar today is world's leading container sector credit risk analyst and a major provider of analytical container shipping news and commentary.

Whilst Credit Risk Assessment has remained its core business, Dynamar also specialises in:

- Marine Intelligence, including Cargo and Vessel Tracking
- Consultancy for the Container Liner, Multipurpose and Container Port/Terminals industry
- Shipping Publications

The publications activity is spearheaded by the well known DynaLiners portfolio of daily, weekly, monthly and annual analytical news and commentary on the worldwide (container) liner trade.

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