SHIPPAXGUIDE16

Extract from the annual publication Shippax Guide 16. Presentation of ACL's ATLANTIC STAR.

PHOTO: MIKE LOUAGIE

Enter the G4s: the world's biggest and most innovative con-ro ships!

On the next pages you can read all the ins and outs of Atlantic Container Line's (ACL) newest generation of container/ro-ro vessels (con-ros), of which ATLANTIC STAR is the lead vessel in this truly unique five-ship series.

The articles were first published in Shippax Guide 16, the complete register of ferries, cruise and ro-ro ships (including con-ros), but have been bundled here in what is essentially an exclusive ATLANTIC STAR special.

At Shippax we have always hailed trendsetting and innovative ship concepts in the field of ferries, cruise ships and ro-ro vessels. ACL's next generation of con-ros is a case in point, as evidenced by the fact that ATLANTIC STAR received a much-coveted Shippax Award at the occasion of the annual Ferry (and ro-ro) Shipping Conference in April 2016.

ACL's new state-of-the-art con-ros, the likes of which have never been seen before, are only marginally longer and wider than the iconic G3-class they replace. The revolutionary design, however, provides for a 105 per cent increased container capacity, 31 per cent increased car capacity and 45 per cent increased ro-ro capacity, a feat that was only achievable by radically changing the con-ro concept. In fact, the secret lies in putting the bulk of the ro-ro cargo amidships with containers being stowed in cells fore and aft of the central ro-ro section. This results in cargo replacing ballast and much more efficient use of vessel space. Additionally, ACL's new North Atlantic workhorses - dubbed the G4s - are faster, greener and more efficient than their predecessors. Notwithstanding a speed increase of 10 per cent, fuel consumption per TEU has been reduced by no less than 50 per cent!

Now under the full ownership of the Italian Grimaldi Group - the world's premier owner and operator of both deep sea and short sea ro-ro ships - we wish ACL fair winds and following seas with what are arguably the world's biggest and most innovative con-ros!

Enjoy the read!

Philippe Holthof
Shippax

PHOTO: MIKE LOUAGIE

THE WINNER TAKES IT ALL

Onboard report ATLANTIC STAR.

TEXT: JAN SKOGLUND
MOST PHOTOS: MIKE LOUAGIE

When ACL's G3 class were delivered back in the mid eighties, they were rightly considered to be revolutionary, combining ro-ro cargo beneath deck with containers stacked in cells forward of the aft garage which was configured with cardecks. To achieve the best possible cargo handling speeds, the five sisters were equipped with the latest Jumbo type quarter ramp, already in its second stage of evolution. The closed height of the ramp was designed to conform to the vessels maximum air draft. The vessels have served ACL extremely well and their con-ro concept was later adopted by Grimaldi themselves in the design of their con-ros for the West Africa routes.

However, a basic issue with the old Panamax beam con-ro design was the combination of relatively light ro-ro cargo beneath deck with heavier boxes on deck. The stability conundrum limited the number of layers of containers that could be stacked on deck unless compensated with water ballast pumped in the double bottom.

Now part of the Grimaldi Group, the gestation period to select first a design that met all of ACL's requirements and then a shipyard offering the right balance of price and quality was a much longer process than initially anticipated but the end result fully justifies the intense effort contributed by all parties.

The idea for the new G4 started with Danish naval architect firm, International Maritime Advisors (IMA), based in Dragør in Denmark. In general, Chinese shipyards do not have a large enough design team of naval architects and engineers to make anything apart from the production drawings so they rely on 3rd party consultants to perform those functions. In ACL's case, Knud E Hansen were involved from an early stage and once the contract was signed with Hudong Zhonghua Shipyard, they were contracted to provide the initial design.

One of the key elements in the design of the successful G-3 class was the adoption of two-stroke slow speed main engines. In contrast to many other projects which existed at the time, a rather low service 17 knot service speed was chosen for the vessels, a decision which probably saved ACL when others were forced to pay higher bunker costs.

ACL and Grimaldi decided to continue with the same concept on the G4 but also giving the opportunity for a higher service speed of up to 19.7 knots in ballast condition. The possibility to extend the range of ports being served by ACL is considered to be very important, especially on the US East Coast where some Southern Atlantic ports have become key export hubs for US manufactured heavy equipment.

PHOTO: FRANK BEHLING

Right: The container guide system, pioneered successfully on the G3 class, are also incorporated in the G4s, providing a higher level of structural rigidity. Containers are stowed 13 across and up to 14 deep giving a total intake of 2,230 TEU. The semi - open hatch design saves considerable time in port and requires no stevedores to be engaged in securing the containers, a hazardous operation when container stacks are so high.
The Macgregor cell guide system has resulted in no losses of containers overboard during the whole life of the G3 class so ACL had no hesitation to fit an improved system on the G4 class. However, the forces transferred from the stacked containers to the ship in both a transverse and longitudinal direction are significant. Unlike the rather lightweight guides underdeck, Macgregor have needed to make sophisticated finite element (FEM) calculations to check for areas of high stress and deformation. Compared with the original concept drawings, the cell guide system is now significantly heavier and more robust.

THREE DISTINCT PARTS

The layout of the ATLANTIC STAR comprises three distinct parts: two parts for containers, one for ro-ro. The secret of the success of the G4 design is how the three areas are integrated into the whole design concept. In the G3 class the three sections comprised the aft garage, the under-deck ro-ro spaces and the on-deck lo-lo zone for container stowage. On the new design, the three zones are more distinct.

The forward one third of the ship is exclusively reserved for container stowage, both under-deck and on-deck. The vast majority of container bays are for 40ft-long 9ft6"-high containers. These form the largest majority of the containers that ACL ships trans-Atlantic. 8 x 40ft bays and 1 x 20ft bay. Of these, 7 x 40ft bays also extend underdeck in an open-hatch configuration.

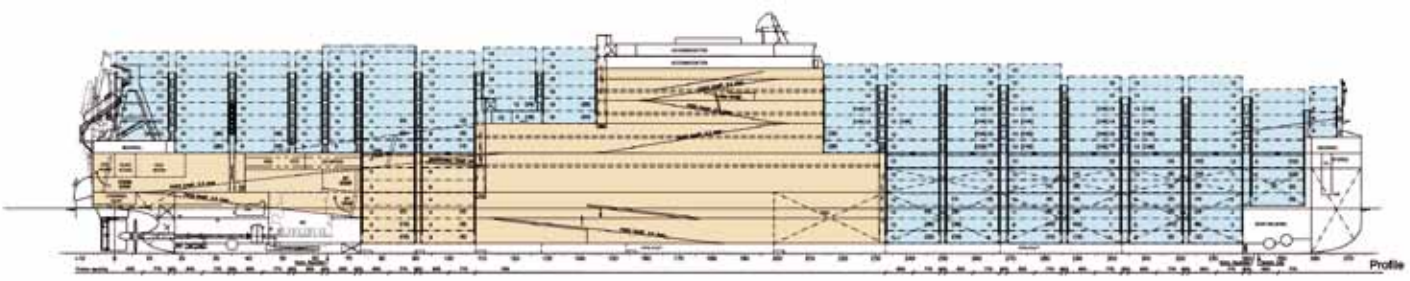
The aft 1/3 of the ship is a mix between on-deck container capacity, a relatively small open hatch area directly forward of the engine room and the stern entrance area from where ro-ro cargo is distributed to the various deck levels. The container stowage aft of the garage comprises 7 x 45ft bays and 2 x 20ft bays with a total intake of 1429 TEU above Deck 4 plus 152 TEU in the two deep bays.

A substantial breakwater prevents green water and spray from entering the container cells and each individual cell can be closed off by a hatch cover flat at the upperdeck level.

The standard interchangeable 40ft long by 8ft wide flat can be lifted on and off by a standard crane spreader. The solid frame of the flat is designed to bear the maximum 210t stack load of 7 containers above it. The corrugated steel top-plate channels rain or spray water to the hold transverse bulkheads. If the hatch cover flat is not used, the stack weight is limited to 330t per 40ft slot.

The container intake has been optimized by incorporating the vertical stem bow and a very compact covered deck machinery area.

"The secret of the success of the G4 design is how the ro-ro area and the two container areas are integrated into the whole design concept"

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CAT

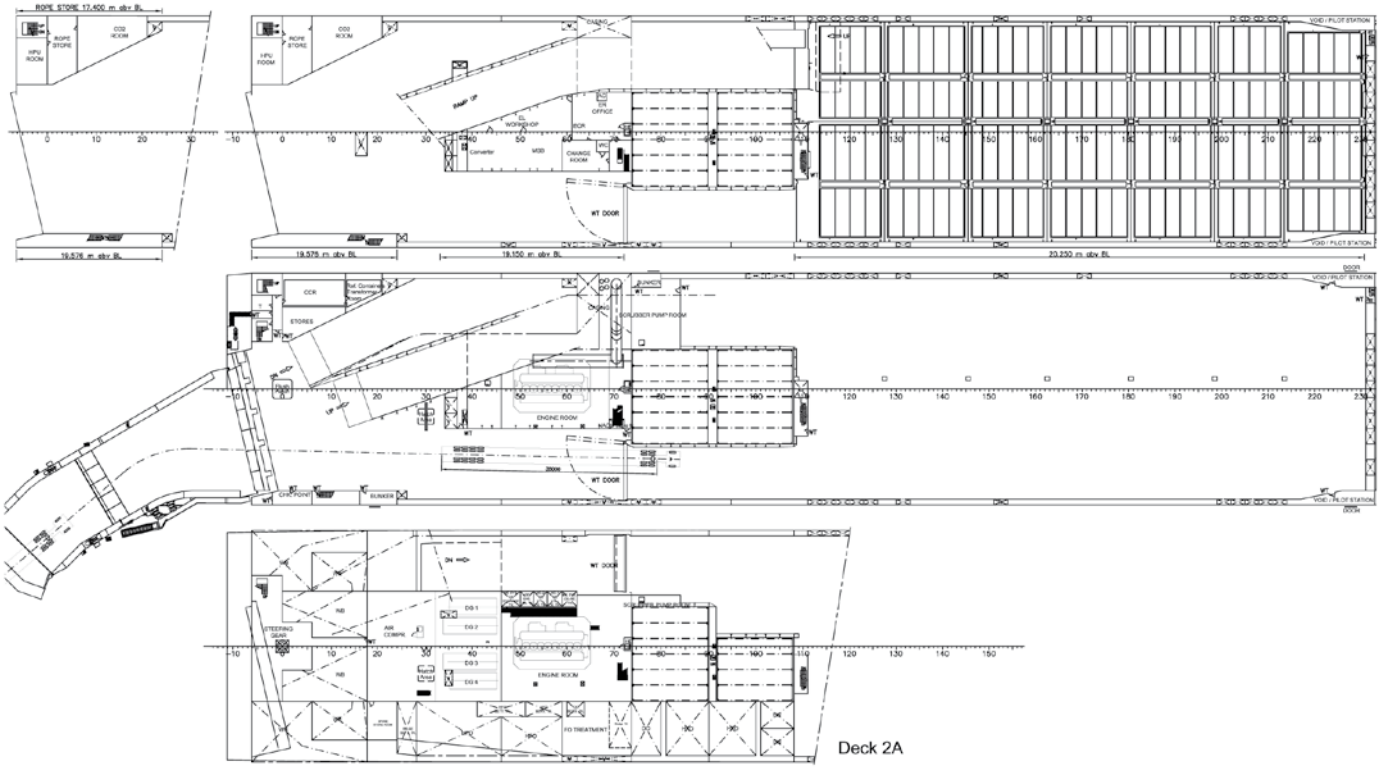
CARGO ON WHEELS

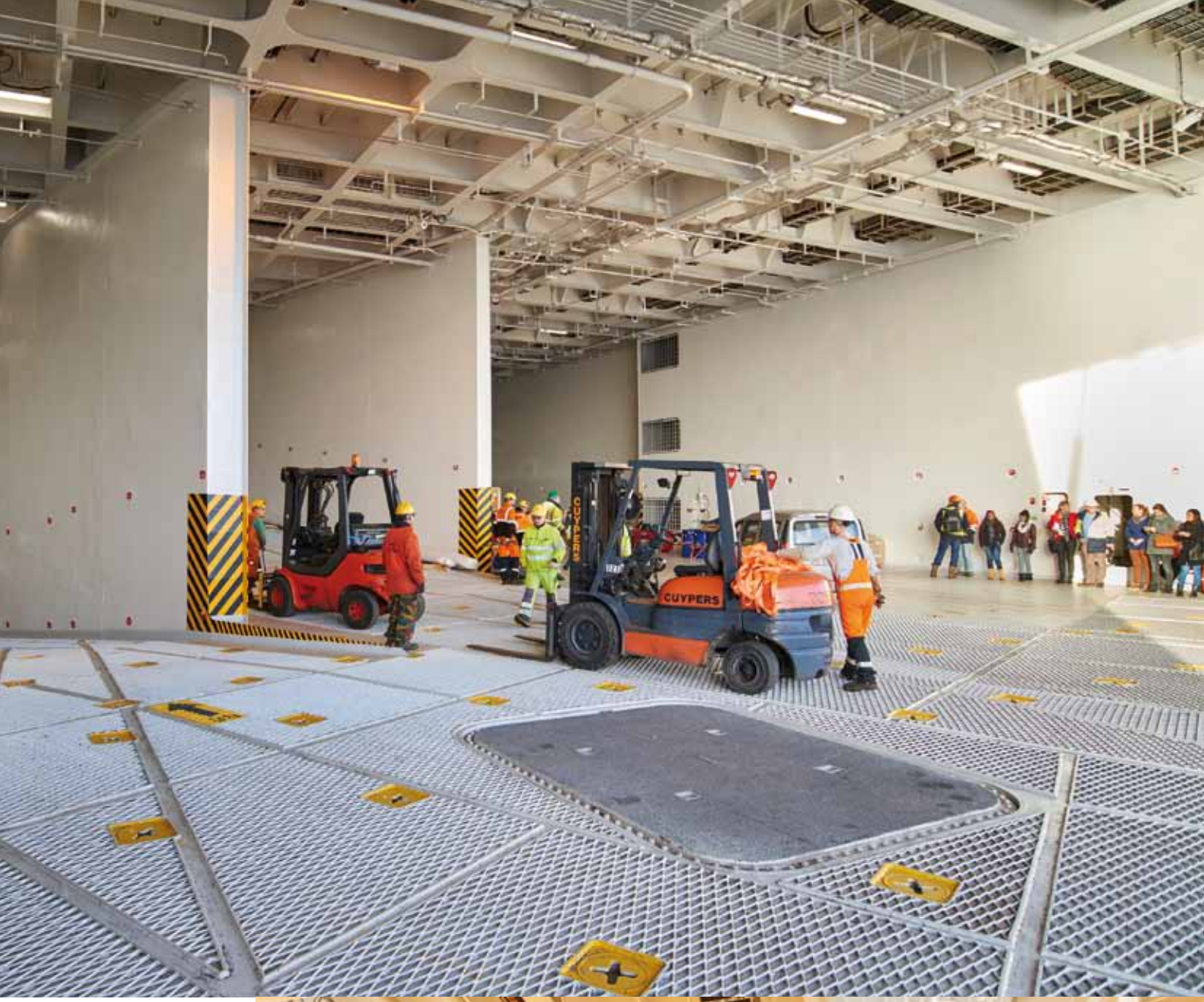
The central Garage area of the ship is where the vast majority of ro-ro cargo is loaded. Typically for any ro-ro space, ventilation fans are installed with a capacity of 25 air changes per hour in port and 10 at sea. Rather than a CO2 fire extinguishing system, a water drencher plant is specified. The ro-ro section extends from frame 108 to 231, a distance of nearly 93m with the uppermost garage having a length of 52m.

A total of six deck levels are dimensioned for ro-ro cargo plus one fixed cardeck and four levels of hoistable decks.

DECK 1 & 2

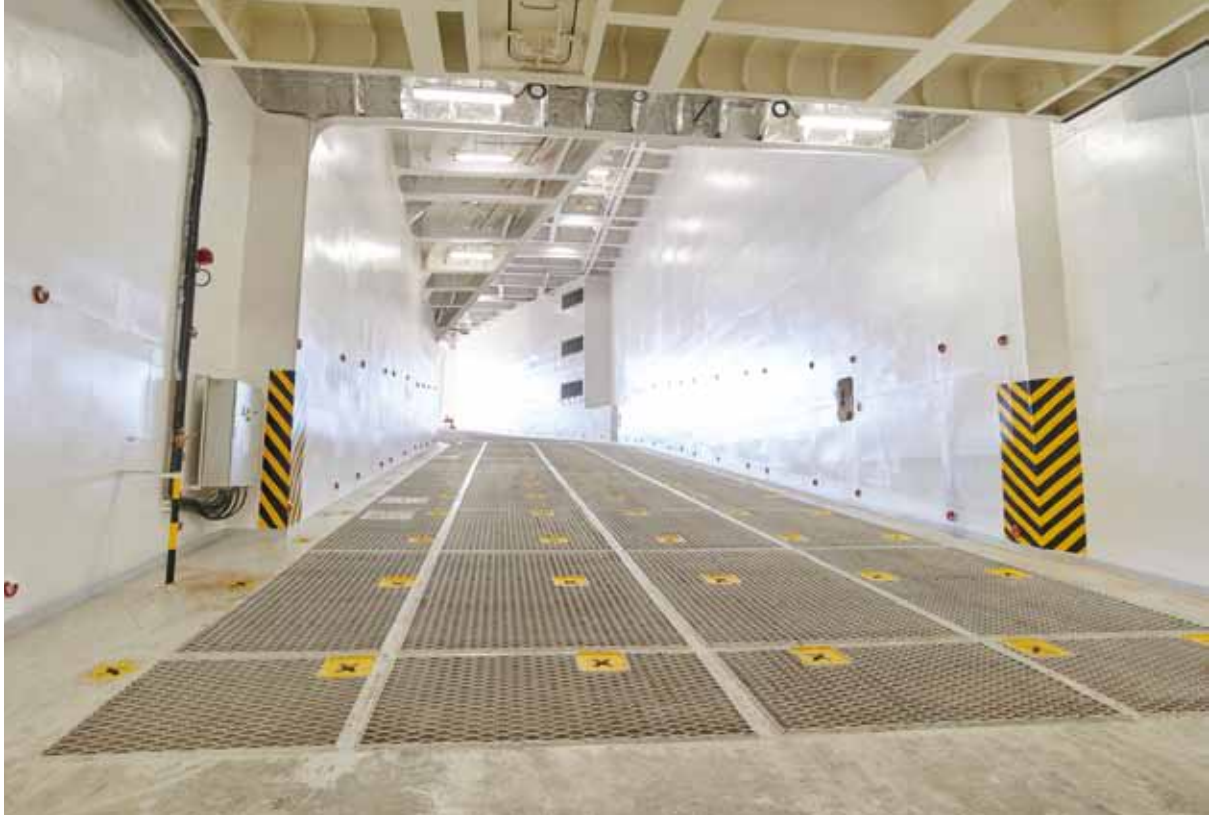
The two lowest decks, Deck 1 and 2 are accessed via a wide dogleg shaped fixed ramp on the portside having a relatively gentle 6.5° inclination.

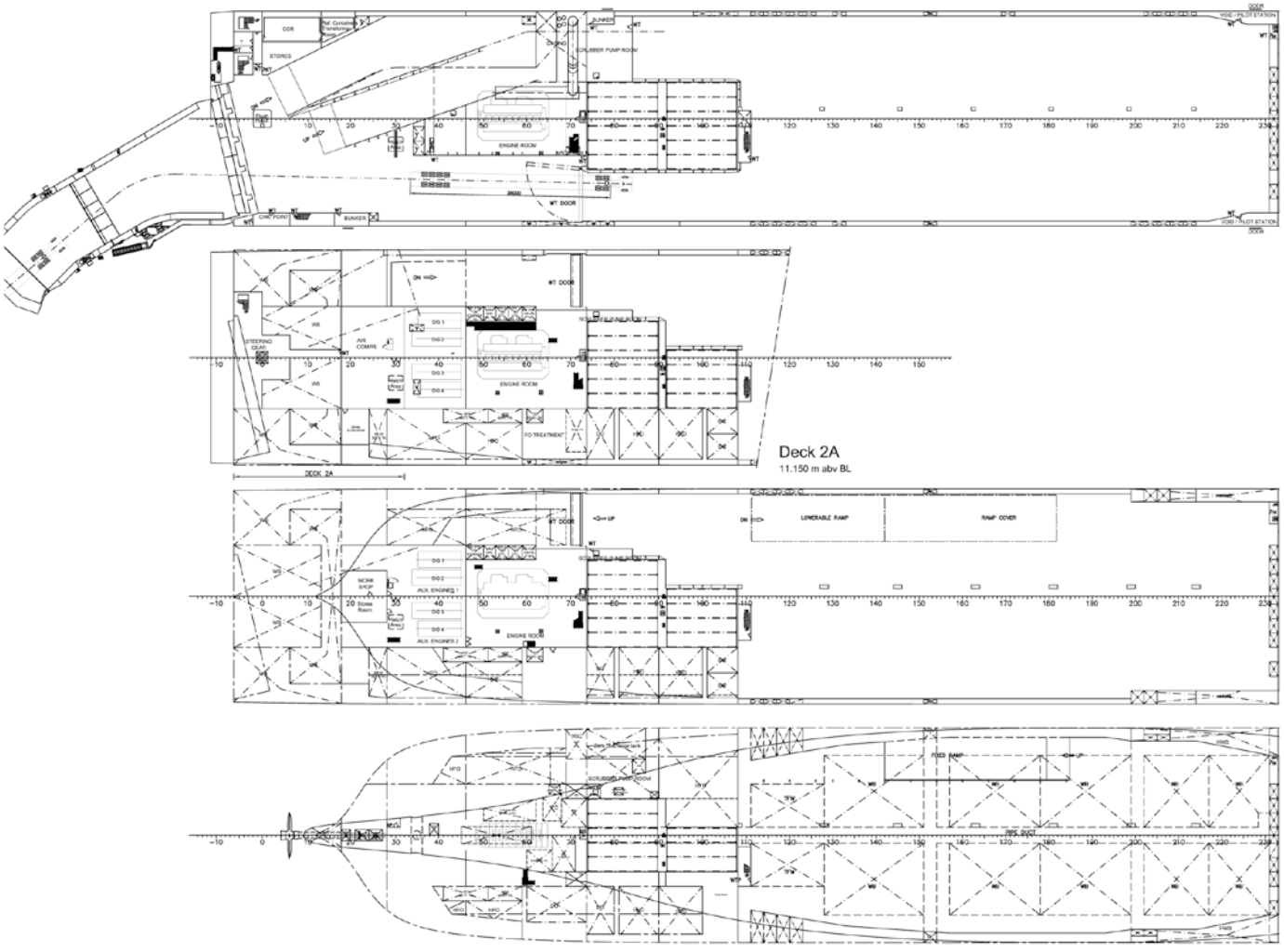




The ramp has no cover on the Maindeck but watertight integrity is maintained by a 9m wide by 4.9m high top hinged watertight door, located at the junction between the ramp and Deck 2.

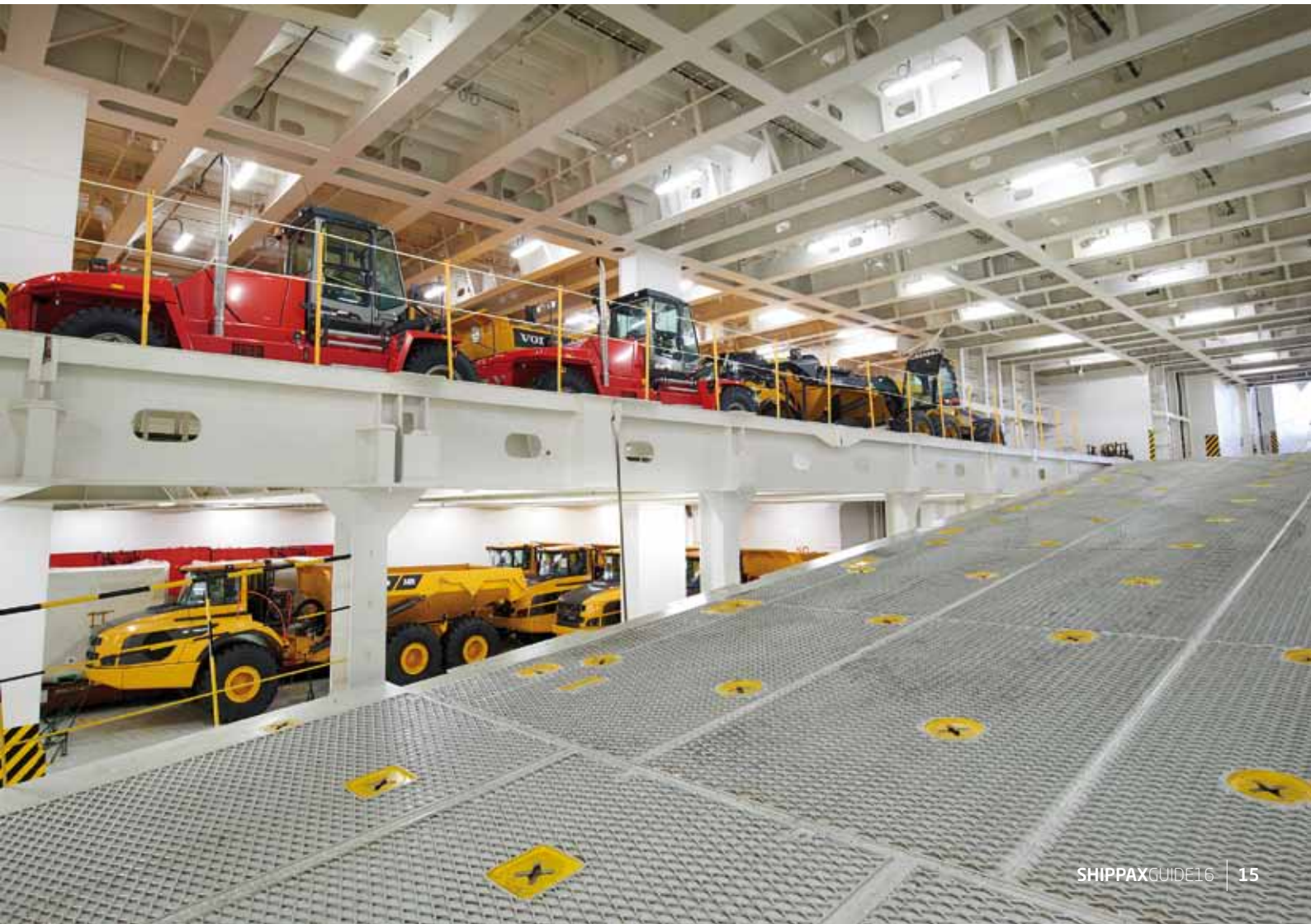
DECK 1 & 2





With a free height of 4.9m, Decks 1 and 2 are dimensioned for any kind of rolling or breakbulk cargo and is typically where ACL would stow trucks, construction and agricultural machinery as well as "sto-ro" cargo such as packaged timber. Despite the vessels 37.6m beam, only a single line of widely spaced pillars supports the structure, offset slightly to the portside. To maximize the area available for parking, the double skin is only 0.9m wide.

The 53.3m long by 7.1m wide fixed ramp between Deck 2 and the tanktop, Deck 1, is located directly in line and is covered with a two-section end-hinged cover. The aft section hinges down and the forward section upwards in a similar arrangement to the ramp covers fitted to many modern PCTCs. The covers are opened or closed by electric winch rather than hydraulic cylinders. Much of the access equipment on board supplied by Macgregor including doors and cardecks are operated either by electric winches or electric screw jacks.



DECK 3

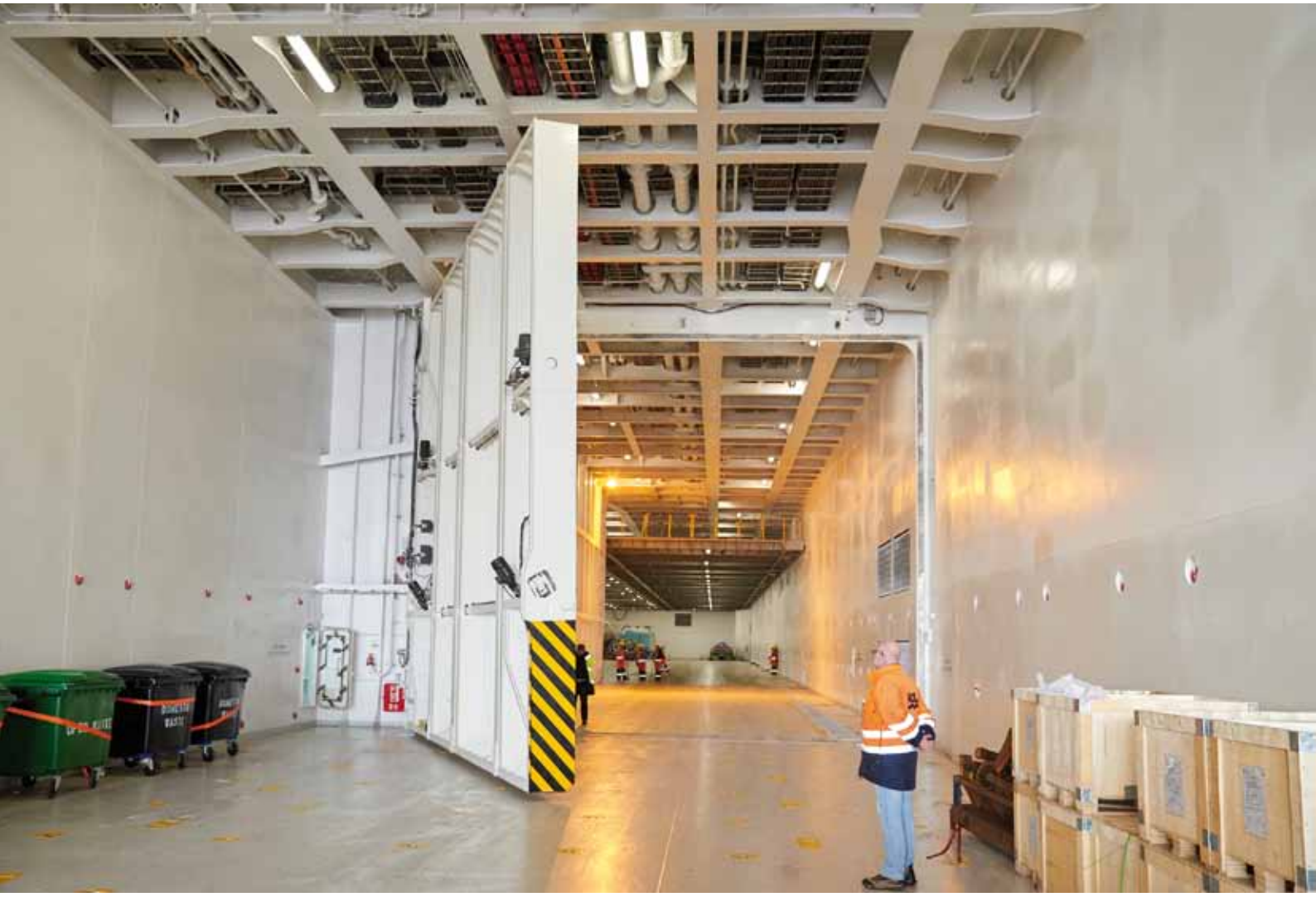
Deck 3 is the "main" horizontal entrance deck where ACL will stow most of the high & heavy pieces of cargo for which it is so well known. Ever since ACL started its transatlantic services in 1967, the line has specialised in the transport of large and heavy pieces of cargo. All the way from helicopters and train carriages to transformers on low loaders and yachts, ACL has transported these indivisible units week-in week out so it is no surprise that ACL have paid a lot of attention as to how the cargo can be handled seamlessly. As these pieces of cargo get ever larger, ACL also wanted to broaden the types of cargo that could be transported.

A major change compared with the G3 class is the height of the entrance deck. A clear headroom of 7.45m is the biggest in the trade – beyond even the most flexible PCTC. As vehicles have to pass on the starboard side of the engine casing, ACL were also very aware of limited turning radius of the largest heavy lift transporters.

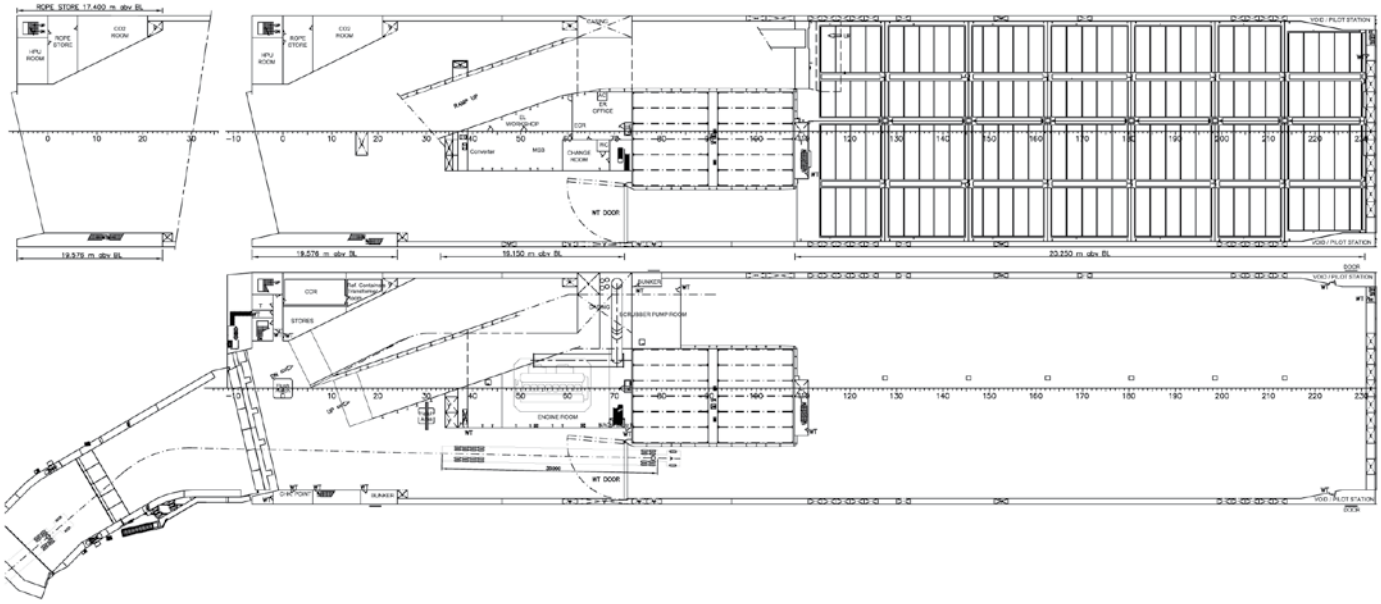
"A clear headroom of 7.45m is the biggest in the trade - beyond even the most flexible PCTC"


ACLU 120014-7
ACL
SWL 120 TONS
ACLU 120014-7

DECK 3



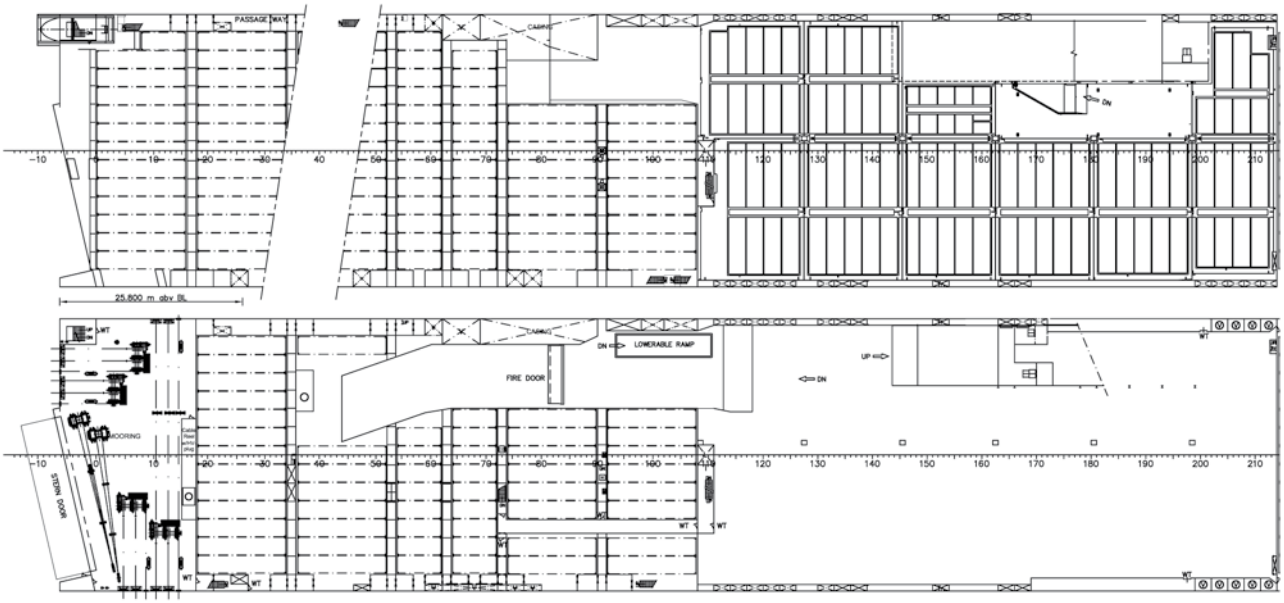
An 8.42m wide side hinged watertight door, separates the main N.3 deck ro-ro garage from the starboard tunnel linking it with the entrance area. The bulkhead is required for damaged stability reasons.



Deck 3a is a 14-panel hoistable cardeck of 3,241m², operated by electric winches. (On the photo the hoistable cardeck is visible above the tugmaster). When lowered, the deck has a 1.9m head-room for cars. While the oversize cargo units are clearly of great importance to ACL, they will only occupy a modest area of the deck so the inclusion of a hoistable cardeck with a large number of panels gives the greatest stowage flexibility. The deck is also laid out with a full complement of flush elephant foot lashing fittings, including flush sockets for containers so containers can be double stacked on the deck by forklift truck, if required.

DECK 4

Deck 4, the upperdeck level, is reached by another dogleg shaped internal ramp from the entrance deck with a relatively easy slope of 6.5°. The rather complex aft structure requires the No.4 deck ramp to pass over the ramp descending to No.2 Deck on the portside with the casing sandwiched between. At the end of the ramp, an electric cylinder operated 8m wide by 5.35m high gastight door gains access into No.4 Deck which has a free height of 5.35m or 3.45m when the 2,421m² hoistable No.4a deck is lowered.

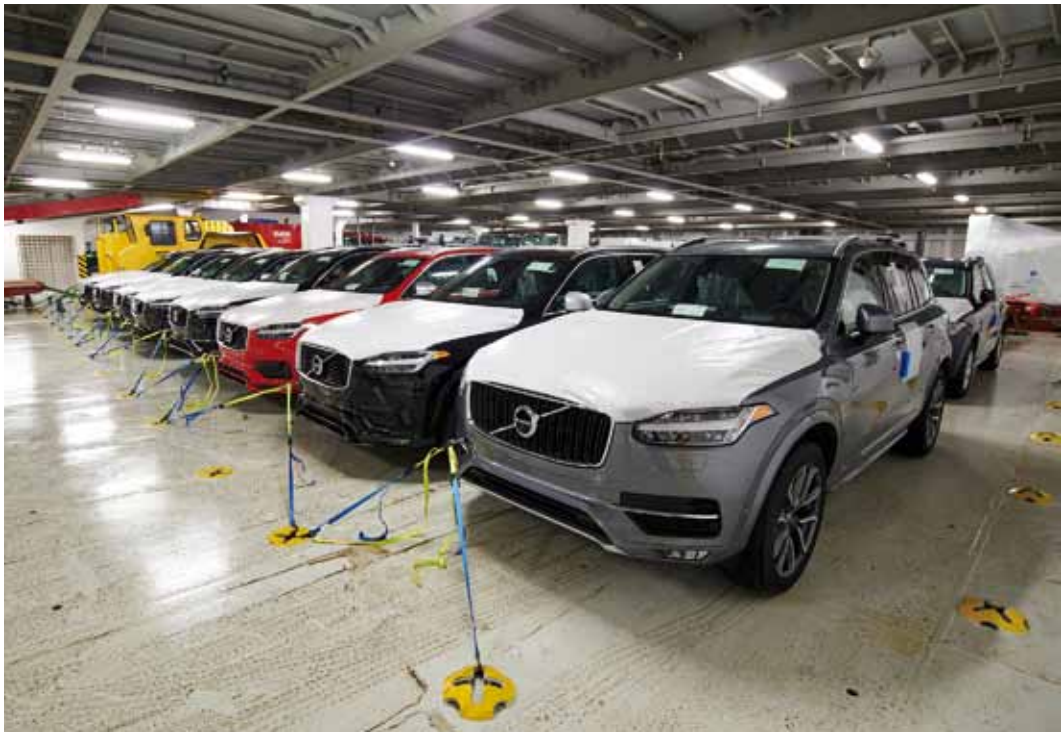



LOW OVERHEAD

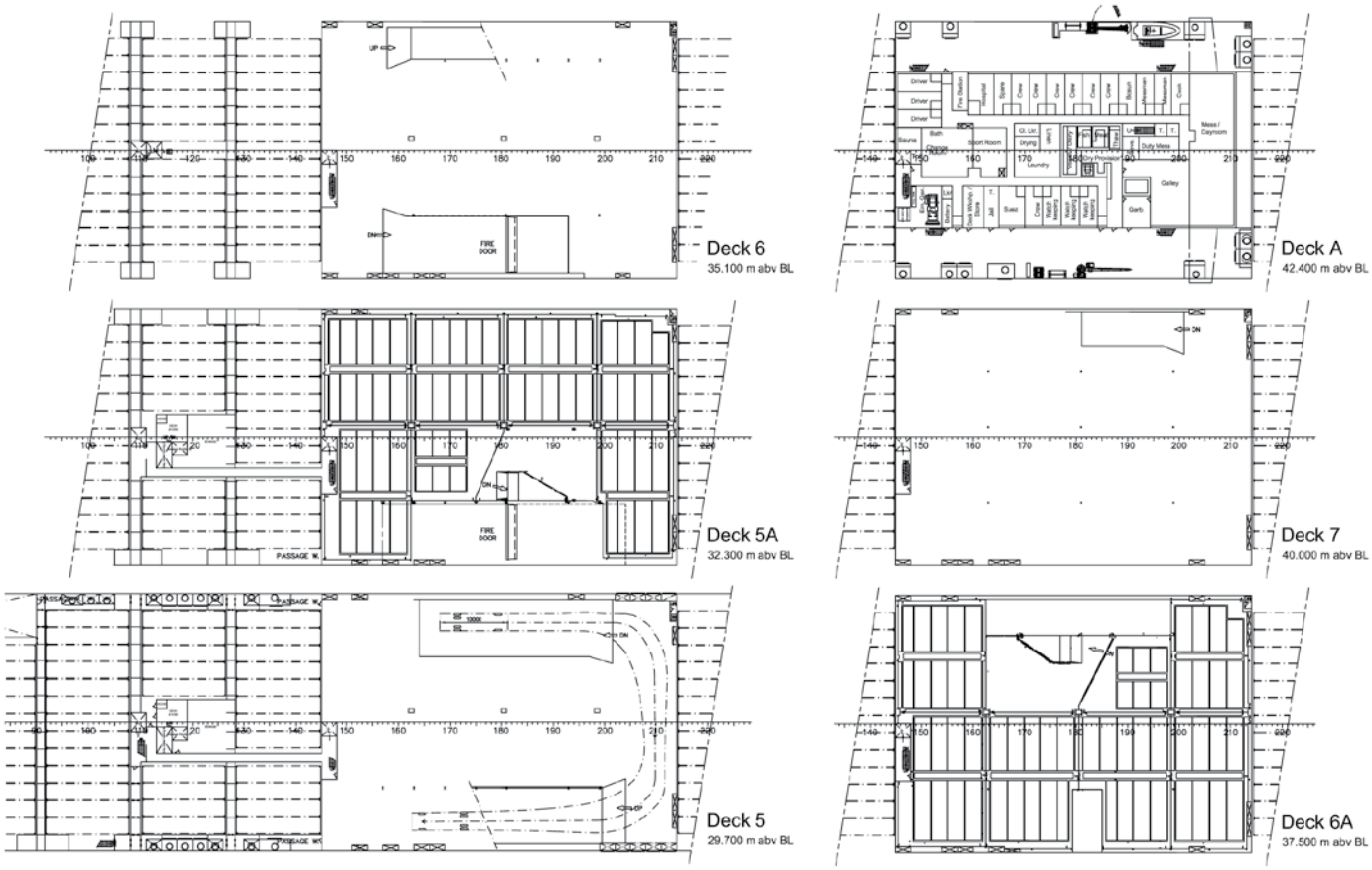
DECK 5, 6, 7

The traffic flow switches to a circulatory system with the ramp up to Deck 6 positioned on the starboard side. The free height is 3.8m or 1.9m on both Decks 6 and 6A when the panels are lowered.

Deck 7 is the only dedicated cardeck with a 1.9m height. In total, the ro-ro decks have a 28,900m² area with the heavy ro-ro decks accounting for an impressive 18,535m², equivalent to approximately 6,000 lane metres of ro-ro cargo.



Continuing upwards in the central garage area via a 9.5° inclined fixed ramp on the portside, Deck 5 has a free height of 4.0m or 2.1m when the 1,572m² 8-panel Deck 5a is deployed. As with Deck 6 above, the layout of the space is most suitable for wheeled vehicles such as agricultural tractors, trucks, vans as well as cars rather than heavy cargo on mafis which require more manoeuvring space. At the time of the Shippax inspection, the decks were filled with new Volvo cars and SUVs, one of ACL's most faithful customers since it's early days.

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PalTank Ltd

Deck and loading information

Name	Deck Area [m²]	Deck Height [m²]	Distrib. Load [t/m²]	Possible Vehicle	CGX [m]	CGY [m]	Height to deck abv. BL [m]	Location Frame
Deck 1	2,751	4.90	3.00/10.00 *2	B, D, E **	131.09	-1.06	2.20	#108 / #231
Deck 2-1	358	4.90	3.00	B, D, E **	71.10	10.84	8.10	#73 / #108
Deck 2-2	3,217	4.90	3.00	B, D, E **	129.05	0.017	8.10	#108 / #231
Deck 3-1	782	7.45	4.00/5.50 *1	A, B ,C, D, E, G, H, I, J, K **	24.68	-9.76	14.00	#-5 / #74
Deck 3-2	583	7.45	4.00/5.50 *1	A, B ,C, D, E, G, H, I, J, K **	72.278	0.99	14.00	#73 / #112
Deck 3-3	3,177	5.75/7.45*	4.00/5.50 *1	A, B ,C, D, E, G, H, I, J, K **	130.74	0.00	14.00	#112 / #231
Deck 3A	3,145	1.70	0.25	F	130.70	-0.25	20.25	#108 / #231
Deck 4	2,508	3.45/5.35*	1.50	E, J, K, F	124.41	-1.36	22.95	#108 / #214
Deck 4A	2,385	1.90	0.25	F	121.87	-2.10	26.90	#108 / #214
Deck 5	1,408	2.10/4.00*	1.50	J, K, F	135.85	-0.62	29.70	#145 / #214
Deck 5A	1,466	1.90	0.25	F	137.01	2.89	32.30	#145 / #214
Deck 6	1,497	1.90/3.80*	1.50	J, F	138.28	1.39	35.10	#145 / #214
Deck 6A	1,610	1.90	0.25	F	137.34	-1.52	37.50	#145 / #214
Deck 7	1,758	1.90	0.25	F	136.90	-0.65	40.00	#145 / #214
Ramp D1-D2	234	1.90	3.00	B, D, E	125.02	13.93	3.82	#142 / #182
Ramp D2-D3	474	4.90	3.00	B, D, E	27.30	11.38	11.05	#14 / #74
Ramp D3-D4	721	5.35	1.50	E, J, K, F	51.97	8.46	18.48	#1 / #119
Ramp D4-D5	371	4.00	1.50	J, K, F	132.70	13.75	27.03	#114 / #202
Ramp D5-D6	298	3.80	1.50	J, F	137.56	-13.64	32.40	#164 / #202
Ramp D6-D7	157	1.90	0.25	F	137.13	15.60	37.55	#158 / #202
Total	**28,900**							

Type of Vehicle

A	80 ton Fork lift
B	60 ton Fork lift
C	100 ton Roll/Mafi trailer
D	80 ton Roll/Mafi trailer
E	40 ton Roll/Mafi trailer
F	2 ton Car
G	120 ton Roll/Mafi trailer
H	Multi axle trailer
I	Double extendible semi-trailer
J	20' Roll/Mafi trailer
K	Dumper

Notes:

(*) When Hoistable Deck is uplifted

(**) Container Lashing Points on Deck

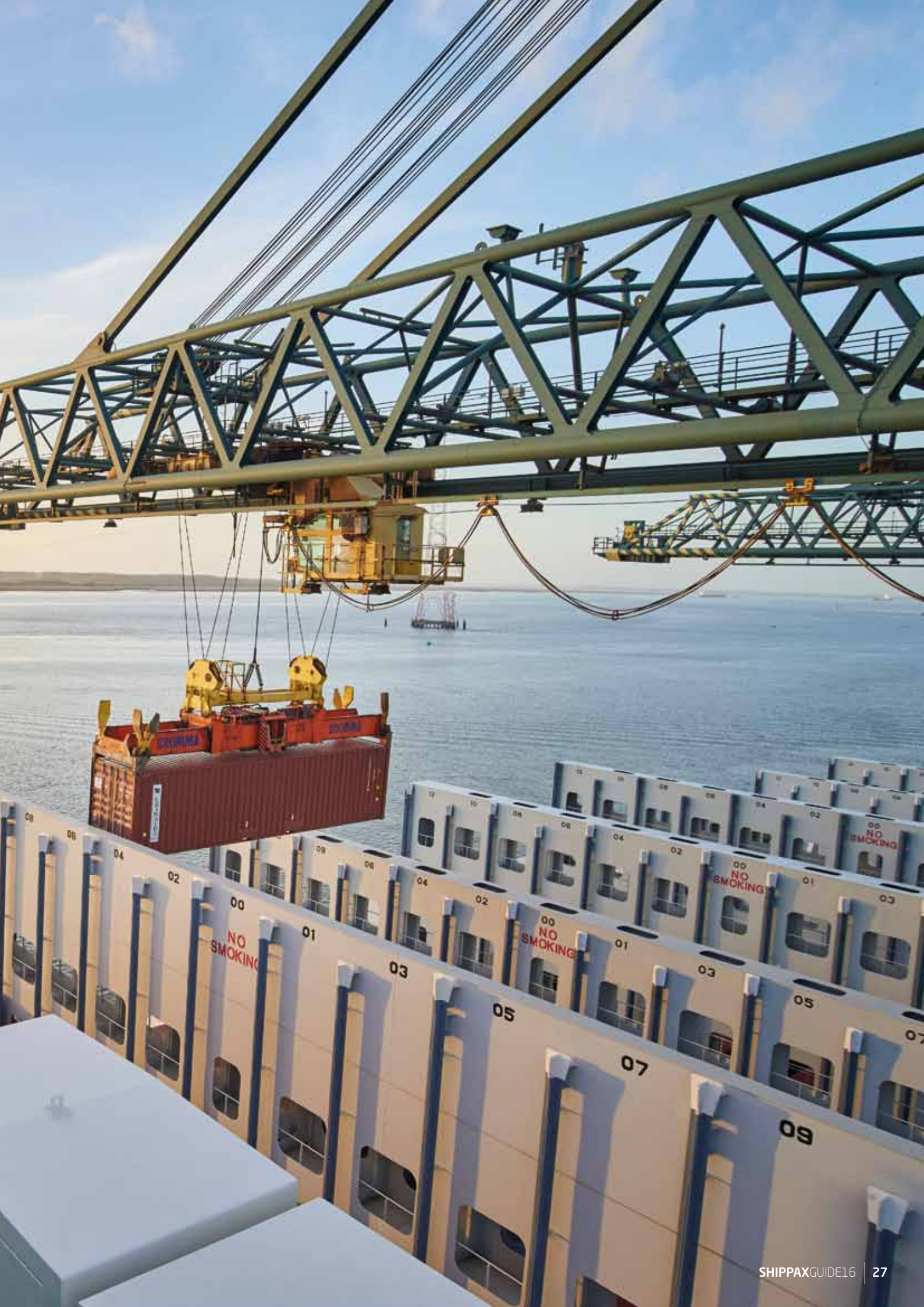
(*1) 5.50 t/m² aft of frame #108

(*2) 3.00 t/m² for grobal strength and 10.00 t/m² for local strength

ON THE HIGHEST LEVEL

Perched on top of the garage, the two-level accommodation exploits the limited air draft to the maximum. Even the radar mast is foldable to ensure access to their key New Jersey/New York harbour facilities. The central location of the crew cabins and facilities is the best compromise as far as forward visibility is concerned, also enjoying lower noise and vibration levels than the far aft configuration of the G3s. The UK flagged ATLANTIC STAR can accommodate a maximum of 47 persons in 35 cabins although the normal crew numbers will be less than 20.

A 47-person freefall lifeboat is provided on the portside aft as well as a 5-person rescue boat and liferafts.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RAMPS

Together with Macgregor, the design of the Jumbo quarter ramp has been optimized radically, resulting in the critical piece of equipment being both lighter and better adapted to ACL's needs than on the G3 class.

The first generation Jumbo ramps as fitted to large deep-sea ro-ro vessels like the BOOGABILLA were both very heavy and required large goalpost structures at the stern. The ramps fitted to the G3 class were already of an improved type. While maintaining their 12m driveway width and high capacity, the folded height of the ramp was minimized to reduce the air draft which allowed the vessels to sail under some bridges, such as the 43m high Bayonne Bridge in New York. The ramp on the G4 class is further optimized while still maintaining the 420t capacity.

The main trapezoidal section of the ramp, which is hinged to the ship at an angle of 13°, has a maximum width of 20.3m, reducing to 12.2m at the point where the intermediate section is attached.

The second section is angled at 30.4° to the centreline and, together with the third flap section, has an overall length of 48.9m plus 1.9m long end finger flaps.

The ramp is operated by means of hydraulic winches which take 20 minutes to lower or raise the ramp. The stern door, slightly narrower than on previous versions, is still impressively large with a clear opening width of 21.6m by 8.0m clear height. The top hinged door is operated by direct acting cylinders.

Unlike many modern ro-ro vessels, ACL has opted for the tried and tested expanded metal anti-slip solution for both the quarter ramp and internal ramps. These are separated into convenient sections. If damaged, a section can easily be replaced. However, expanded metal is not universally appreciated, as it tends to damage car tyres.

PHOTO: PHILIPPE HOLTHOF

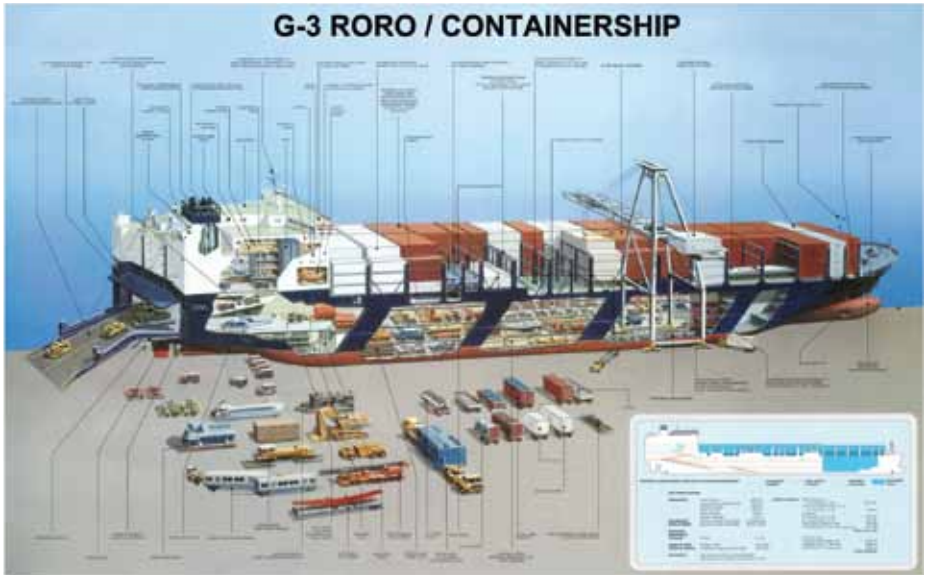
VERTICAL STEM BOW

As part of the design process, Knud E Hansen in conjunction with the shipbuilder Hudong Zhonghua Shipyard, conducted extensive model tests to confirm their CFD predictions. The excellent hullform that was chosen requires only marginally more power than the Panamax beam G3 class, despite the considerably larger displacement of the G4s. To maintain the best possible service speed in North Atlantic weather conditions, a vertical stem bow was chosen, harking back to the bow forms last seen on the North Atlantic liners of 100 years ago. While a typical bulbous bow might offer a slight powering advantage in flat seas at one particular draft, over the typical range of operating drafts and frequent heavy weather, the vertical stem bow showed a clear economic improvement. The hull also incorporates a trim wedge extending aft beyond the transom.

PHOTO: FRANK BEHLING

	G3	G4
Lane metres	3,372	5,270
TEU	2,911	3,807
Cars	1,000	1,307
Length o.a. (m)	292.00	296.00
Length p.p. (m)	276.12	287.00
Breadth moulded	32.26	37.60
Depth moulded	20.24	22.95
Design draught moulded	9.75	10.25
Depth to Main Deck	14.00	12.70
Draft	11.50	11.60
Gross tonnage	57,255	100,430
Net tonnage	21,175	30,295
TDW	51,648	55,649
Service speed	17.50	19.25
Eco Speed		18.00
Eco consumption tonnes / 24H		70.00

SHIPPAXDATABASE



Classification G4

RINA C+ CONTAINER SHIP, RO-RO CARGO SHIP, AUT-UMS, ICE CLASS IC, STAR-HULL, GREEN PLUS, MON-SHAFT, PMS.

Propulsion G4

Main Engine Wärtsila 8RTfl ex68D
Installed power 22,000 kW
Auxiliary Engine power 2 x 1,990 kW/2 x 2635 kW
Bow thrusters 2 x 1,750 kW
Stern Thruster 1 x 1,750 kW

Architecture Timeline

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	June 2008 IMA of Denmark completes the new ACL con-ro design.				**July 2012** ACL signs contract with Hudong Zhonghua Shipbuilding.	**Sep 2013** Steel cutting first ship begins.	**Nov 2014** ATLANTIC STAR is launched.	**Fall 2015** ATLANTIC STAR enters service.	**Summer 2016** Last ship of five, ATLANTIC SUN, enters service.

MACHINERY

A Wärtsilä 8RTflex 68-D main engine type has been chosen, built by Hyundai, with an output of 22,000kW at 95 rpm. The engine drives a fixed pitch Wärtsilä propeller with integrated Energopac hubcap and rudder bulb.

A SAM shaft generator is fitted directly on the shaft with an output of 2,000kW. This is dimensioned to take care of all hotel and reefer loads while at sea in the most economic way possible.

The main engine room is remarkably compact for a ro-ro. The designers have had more freedom to locate the tall two-stroke main engine by virtue of the unique aft ramp arrangement. The engine room is bounded on the portside by the ramp which descends from the stern entrance to the tanktop.

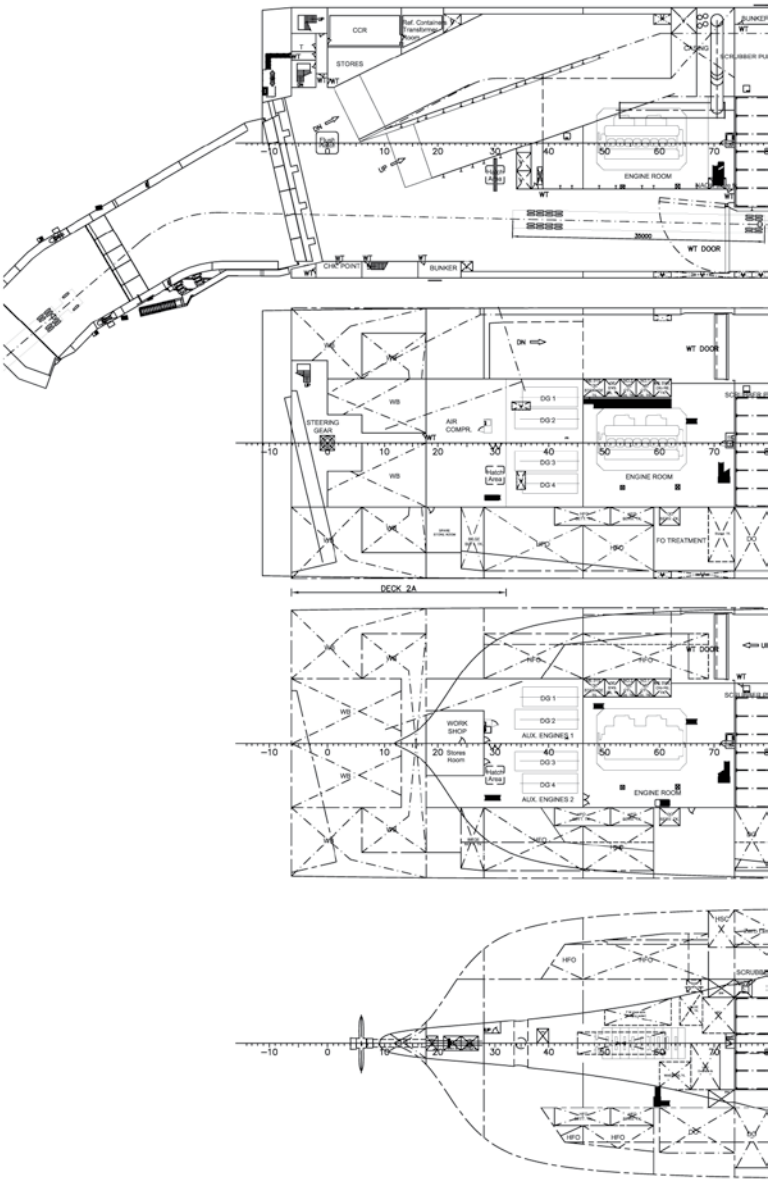
On the starboard side, HFO tanks are arranged leaving only the central section for the main engine. The exhaust line is neatly sandwiched between the lower hold ramp and the ramp going up to the garage decks, proceeding to the portside funnel casing via the scrubber room.

The genset room, housing 2 x 2,300kW and 2 x 2,075kW Yanmar gensets, is located aft of the main engine room above the shaftline and shaft generator.

While the size of the G4 class would normally require the use of tugs, good manoeuvrability has been achieved by specifying two 1,750kW bow thrusters and one 1,750kW aft thruster, all supplied by Wärtsilä. The stern thruster is located beneath the shaftline for the maximum effectiveness. The Becker rudder can turn through +/-45 degrees and is of a high lift design incorporating a flap.

In ACL's port rotation, there are several ports that require a high level of manoeuvrability. Despite enlarging the locks specifically for the new G4 class, getting the ships into Liverpool's Royal Seaforth Dock is far from easy. ACL will also be calling at Grimaldi's terminal in Antwerp and Hamburg, all of which feature long river transits

As ACL vessels operate for a large proportion of their sailing time within the European and North American SECA area, the fitting of a scrubber could be justified economically. Alfa Laval have a supplied a PureSox single-inlet hybrid scrubber with a capacity of 151,000kg/hour. As in all scrubber installations, the size is quite daunting. The main reactor unit has a 3.9m diameter and 11.5m height. While the Alfa Laval unit is now well proven to reduce sulphur emissions to below the required level, the operating cost is significant. The power required by the water pumps and cleaning equipment can add up to 5% to the operating costs but, compared with the saving that can be made in fuel costs, the scrubber installation can pay for itself in a few years.



CONCLUSION

Shipping is full of highly conservative "followers" and it is rare to find an operator that is sufficiently confident to break the design mould. ACL, under the guidance and support of its parent – Grimaldi, is one of those. Just as they have done on each succeeding generation, the new vessels are revolutionary. Not that the concept necessarily fits other trade areas but ACL has single-mindedly pursued their objectives with the initial eureka moment provided by IMP and honed in its development by Knud E Hansen.

The resulting ATLANTIC STAR and her sisters brings huge benefits in terms of flexibility, economy and an environmental adaptation. Not that the project has been without its downsides. The novel internal arrangement is structurally complex and has resulted in a higher lightship weight than anticipated. The cell guides have also turned out to be more substantial and robust structures than on the G3 class, also having the unintended effect of ballooning the GT from an estimated initial 78,500 GT to an unprecedented 100,430 GT, making the ships by far the largest ro-ro ships in the World. ■

"The largest ro-ro ships in the World, by far"

ACL IS BEAMING WITH CONFIDENCE AS THE G4S ENTER THE COMPANY'S NICHE MARKET ON THE NORTH ATLANTIC

ACL has successfully carved a niche in a market that has traditionally been dominated by the big container carriers. Overcapacity in the box ship industry, especially in the Far East trade, has pushed tariffs in a downward spiral with a continued cascading of tonnage as a consequence. But in stark contrast to the doom and gloom in the traditional container shipping business, ACL has set its mind on further growth following the introduction of its G4-class vessels, the world's largest multipurpose container/ro-ro ships (con-ros), that have twice the container capacity and more than 55 per cent additional ro-ro space than their predecessors, the iconic G3s.

TEXT: PHILIPPE HOLTHOF

PHOTO: FRANK BEHLING

Sitting in a deep comfy sofa, Andrew 'Andy' Abbott, ACL's President and CEO, was an open book when we met for an interview in the lounge of a hotel situated near the Grimaldi Group's office on St. James Square in London (the Grimaldi Group of Naples, Italy is ACL's parent company). A 39-year veteran in the industry, Mr Abbott probably knows the transatlantic trade better than anyone else. He belongs to a dying breed of old-school supremos, making a point of visiting ACL's top 100 customers at least once per year. Immediately after the interview, he would meet with Airbus and the British MOD. "The ATLANTIC STAR flies the UK flag, and this helps when you're dealing with the British MOD," Mr Abbott admitted. ACL has many loyal customers and Airbus is one of them. "Airbus has been using us virtually exclusively and we have never had a claim from them since the early eighties," Mr Abbott said proudly, further explaining that Airbus ships aircraft components with ACL both ways across the Atlantic. "We start off bringing raw aluminium from France via Antwerp to the US. We then ship the fabricated wing spars back to Liverpool stowed in special extra-long trailers that we specifically designed for them. This illustrates ACL's unique capabilities on the Atlantic and the cargo mix of both ro-ro and containers has made us one of the five most profitable carriers in the world for more than 20 years now."

Unlike the mainstream container carriers, ACL exclusively operates on the North Atlantic and has therefore not been affected by the turmoil in the Asian market, at least not directly. "The North Atlantic has, however, suffered from the cascading effect as 8,000+ TEU box ships have entered the trade," a somewhat displeased Mr Abbott said. "I'm usually diplomatic and prefer not to sling mud at my competitors, but their irresponsible never-ending race for introducing ever bigger ships between Europe and Asia has had a knock-on effect on the Atlantic with supply largely exceeding demand. The transatlantic has been a flat market for the last 40 years, but container capacity jumped 30 per cent in 2015, resulting in eastbound prices for containers plummeting by 50 per cent. Westbound is the strong leg, but container rates there have dropped by 20 per cent," he added, blaming the big carriers for being obsessed with vessel size and market share instead of profitability. "The situation on the North Atlantic is still a far cry from the Far East trade lanes. Actually, the big carriers consider the North Atlantic a paradise when compared to their core Europe-Asia services."

The G4s have twice the container capacity of the ships they replace. How will you fill that capacity in a market that is saturated?

Mr Abbott: Margins have been under pressure because of lower freight rates, but our carryings haven't dropped at all. Actually, due to the limited capacity of the G3s with container slots for only about 1,850 TEUs, we still turn customers away. Not content with the service offered by the mainstream carriers, they wanted to give us more, but we couldn't take it because of capacity constraints. So the G4s don't come a moment too soon and we will carry more because we can offer more. I'm pretty confident that we will grow from 1,850 TEUs today to about 3,500 TEUs by mid-2017. 60 per cent of this growth will come from our current customer base and 40 per cent from new customers. I have good reason to believe that we will easily attract new business, because we're one of the only alternatives left to the mega consortia. We will also build on our long-standing slot exchange agreement with Hapag-Lloyd, which will grow from 500 to 1,000 TEUs.

Already during her maiden voyage, ATLANTIC STAR showed the way ahead; she crossed the Atlantic from Liverpool with an equivalent of 2,400 TEUs and 100 per cent ro-ro with every nook and corner of the ro-ro decks being filled. This was during the

PHOTO: ACL

Christmas week which is traditionally a 'dead' week for cargo, but it was the best carriage in ACL's history. No doubt, this was a promising debut!

On the one hand you're opposing the mega alliances, but on the other you have a slot swap agreement with G6 alliance partner Hapag-Lloyd which could be regarded as a micro alliance.

Mr Abbott: Our slot swap agreement with Hapag-Lloyd goes back to the mid-eighties when the G3s were introduced. It was the first vessel-sharing agreement of its kind; we get slots on their ships and they get slots on ours. This is a container-only affair and ro-ro is not included. It's very simple and does not contain all the terminal, scheduling,

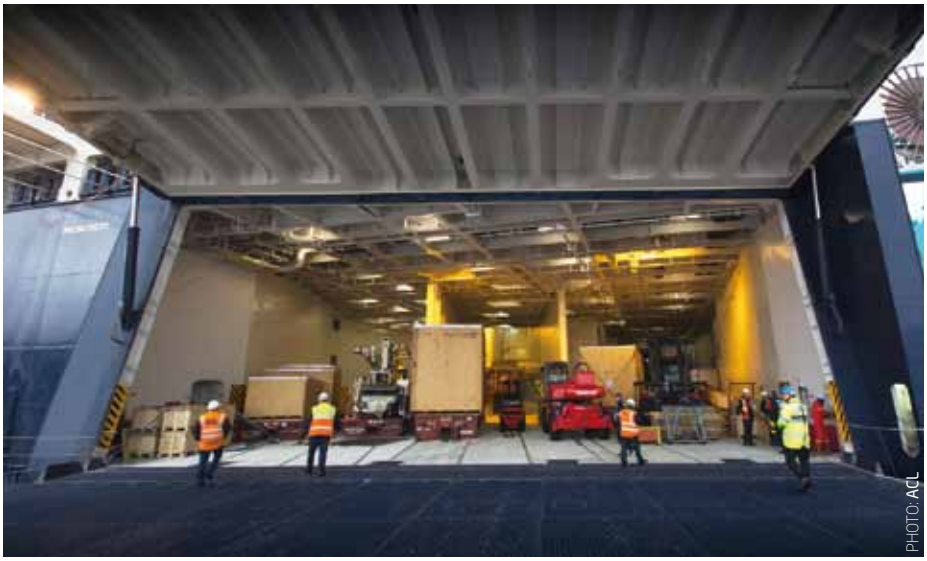


PHOTO: ACL

Already during her maiden voyage, ATLANTIC STAR crossed the Atlantic with an equivalent of 2,400 TEUs and 100 per cent ro-ro, with every nook and corner of the ro-ro decks being filled.

equipment, etc. agreements contained in the big alliances such as G6 or 2M. This allows ACL to maintain its true independence.

Because of your partnership with Hapag-Lloyd, you could maybe benefit from joining the G6 alliance as a kind of 'associate' on the North Atlantic trade only?

Mr Abbott: I don't think so; why should we give away our niche? We have an exclusive agreement with Hapag-Lloyd and this relationship will stay. They treat us like their best customer and we treat them the same way.

From day one, the slot exchanges were close to the 500 TEU mark. The ACL attraction of this slot swap partnership was Hapag-Lloyd's strong presence in the South Atlantic and the US Gulf together with a fast westbound service from German ports, whereas Hapag-Lloyd could benefit from our ➤

The ATLANTIC STAR (below) has twice the container capacity of the G3-class ships, such as the ATLANTIC COMPASS (top). The G4 ships also have 55 per cent more ro-ro space.

PHOTO: MARKO STAMPEHL

PHOTO: FRANK BEHLING

unique calls in Gothenburg, Liverpool and Baltimore. We both had niches and it was - and still is - a win-win game for the both of us.

As pointed out before, we will grow from 500 TEUs to 1,000 TEUs per week with the new ships. The additional 500 slots that we will get on the box ships of Hapag-Lloyd, will mainly be geared to the South Atlantic and US Gulf where we only have a market share of one per cent. It's easier to grow from one per cent to two; nobody will notice this.

Growing from four to eight per cent on the North Atlantic would be a tough job, but by spreading the volumes over a wide geographical area, one can increase his market share more easily without disrupting the market. We look for small pieces in a lot of different places.

In the run-up to the commissioning of the G4s, you were considering to grow the container business by buying container slots from other carriers in order to not have to doubly fill the new ships overnight. This eventually didn't happen, why?

Mr Abbott: We initially expected to have the first ship ready in January 2015 and the last one in December of the same year. Because of the design and construction delays, we decided to await the delivery of the ships before doing anything. Originally I was worried to build up loads, but along the way I learned that there was nothing to worry about as our existing customers were actually begging for more space.

The big customers usually don't want to put their eggs in one basket and mostly ship their goods with different carriers and alliances. You must have the same experience?

Mr Abbott: The big multinational shippers have big volumes and are less concerned about the whereabouts of an individual container. As a niche player, we excel in focusing on the smaller shippers. These are usually the entrepreneurial type of people who demand high levels of good service. They are extremely loyal and watch every step of the transportation of their cargo. Because of our smaller capacity we can 'babysit' their boxes each week. This is so different from the big boys, who move tens of thousands of boxes each week around the world and who can't offer such a personalized service simply because they are way too big to do that.

We also approach our customers differently by keeping our face in front of them. Our marketing approach is built around service differentiation, style and quality. Everything we do is geared around making ourselves different than our competitors. For ACL, personalized service and the little details make the difference. For instance, we do all of our documentation, collections and logistics in Liverpool, whereas the others do it in India, China or Central America, which is another service level. Actually, our business has picked up since we have centralized our documentation and back office services in Liverpool; our North American customers love the British accent.

So you have a different customer base than the 'Maersks' and 'MSCs' of this world?

Mr Abbott: Yes, for the simple reason that we don't focus on the big volume customers.

What's so special about the Atlantic trade?

Mr Abbott: The Atlantic is a flat growth trade with a small spot market. The container trade is primarily an industrial one with smaller quantities of consumer goods being shipped, except for alcoholic beverages. The manufacturers of industrial products want to keep their assembly lines going and therefore ship similar volumes throughout the year. The contracts we have with producers like e.g. Caterpillar, Volvo and Cummins are based on the capacity of the G3s. With our increased intake, these bigger clients can now give us more.

You mentioned the imbalance between westbound and eastbound carryings. What are the load factors in either direction?

Mr Abbott: For many years we have enjoyed a much higher load factor in the westbound direction. In 2015 the USD jumped versus the EUR with exports out of the US going down. In the meantime 30 per cent more capacity was added by the big guys which put further pressure on rates. This came amid sluggish demand from Europe for construction and agricultural machinery as Europe has been in an austerity mode for the last seven years with no major infrastructure work to speak of. Last year, we had a utilization of 95 per cent for containers and 85 per cent for ro-ro westbound, as opposed to 80

and 40 per cent, respectively on the eastbound leg.

Back in 2011, ACL was connected to the Finnlines network to Finland and Russia with a through B/L. It was initially only aimed at rolling cargo, but containers would follow. How has this connection developed?
Mr Abbott: As we all know, the Russian market has dropped off significantly due to well-known political reasons. We have always stayed away from the containers because the rates to and from Russia were never good. With the turmoil in Ukraine, our US traffic to Russia has dropped by more than 75 per cent. We still do bits and pieces. We used to do 25 to 30 machines and vehicles per week in the 2011-13 period, but this has now been reduced to one or two.

Besides the slot swap agreement with Hapag-Lloyd, you have a long-standing relationship with WWL to whom you charter out car space. This would be reviewed upon the introduction of the G4s. What's today's situation?
Mr Abbott: Our ties with WWL can be traced back to the very start of ACL by virtue of Wallenius being one of ACL's founding partners. WWL still moves cars from Sweden and the UK on the ACL ships on a WWL B/L to both New York and Baltimore. The partnership in the eastbound direction, however, ended on 1 January. We will require the eastbound car space ourselves once we move our calls in Antwerp from the PSA terminal to Grimaldi's AET terminal.

This sounds like an interesting development. Could you give more details?
Mr Abbott: The Grimaldi Group's Fiat Chrysler Automobiles (FCA) contract led to the inauguration of a new Mediterranean-US East Coast-Antwerp service early last year. Grimaldi's PCTCs carry Chryslers from Baltimore to Antwerp. When ACL moves to the Antwerp AET terminal this year, our weekly day-of-the-week sailings will supplement the Grimaldi vessels, offering FCA unparalleled service. Through Grimaldi, we're also carrying cargo from the US East Coast to the Mediterranean and are carrying all kinds of rolling equipment such as construction and agricultural material. Another big chunk is the transport of used cars to the Eastern Mediterranean.

It appears that ACL is also heavily involved in Grimaldi's North American business.
Mr Abbott: As a wholly owned subsidiary of Grimaldi, we handle their business on the US side. In addition to the Med connections, Grimaldi also has frequent sailings from the US to West Africa, the success of which has been phenomenal.

It's so nice to belong to a big family and take full advantage of the synergies. Take this Fiat Chrysler story as an example; it clearly illustrates how much we will benefit from centralizing all of the Group's activities on our AET terminal.

Will the move to the AET terminal really be a change for the better from a container handling point of view? After all, this is not a dedicated container terminal with slower handling by reach stackers rather than straddle carriers?
Mr Abbott: It absolutely makes sense because we will grow our business considerably thanks to a direct, hassle-free connection to the Grimaldi network instead of transferring oversized cargo over bridges like we have to do today. Don't get me wrong; we never had any issues with PSA and they did an excellent job for us for many years. But I'm convinced that we will have a great service from AET. They are professionals and they made us feel at home right away.

I'm not worried about the logistics on the terminal side. AET will gradually build up volumes as the new ACL ships enter service and that experience will dictate how they handle us in a full ship situation in mid-2017. We both have time to get it right.

Because of the extra speed and bigger capacities the G4s have, you were keen to add a South Atlantic port such as Charleston, Savannah or Jacksonville. This would have come at the expense of existing port calls with certain double port calls being reduced to a single one. I understood that the sailing schedule will remain untouched with the review of the port rotations being put on hold.
Mr Abbott: We don't want to make fast decisions. Adding a South Atlantic port still makes sense. But we have decided to wait until the G4s have settled down before taking the next step; we're keeping all options open and don't rule out anything. ➤

PHOTO: BJÖRN KILS

ACL: a brief history

The seeds of what would become ACL were planted in the mid-sixties by deep-sea ro-ro pioneer Olaf Wallenius who presented a revolutionary ro-ro design that combined rolling cargo under deck with containerized cargo on deck. Containerization was still in its infancy and shipowners were rather hesitant to step into such a risky project. Even so, ACL was eventually created in 1965 when Wallenius joined forces with Transatlantic, Swedish America Line and Holland America Line. To spread the risk, each partner ordered just one vessel, with the lead ship, ATLANTIC SPAN, being delivered to Transatlantic in July 1967. Her near sisters, ATLANTIC SAGA, ATLANTIC SONG and ATLANTIC STAR followed during the fall of 1967. In 1976 all four vessels were lengthened by 26 m, giving them a total length of about 223 m with the existing forebody being converted into a cellular hold.

The four founding partners were soon joined by Cie Générale Transatlantique and Cunard, with all six partners ordering a second con-ro generation, dubbed the G2s. As with the G1s (and later the G3s), these steam turbine-powered ships were built by different yards and delivered in 1969 and 1970, respectively.

In the mid-seventies ACL further expanded its business on the North Atlantic through the acquisition of Care Lines that operated fairly compact ro-ros between North Europe (including Rotterdam and Le Havre) and Canada. Following the acquisition of Care Lines, a pair of Stena's highly-flexible Searunner ro-ro freighters were chartered in 1978. They entered into ACL service straight from the yard and to permit stacking of containers three high on the open weather deck, sponsons were added in 1979.

Because of their fuel consuming turbine engines, the G2s were costly vessels and ACL's first intention was to refit them with diesels. However, it soon became apparent that the best answer was to build anew with 20 different designs being scrutinized. The basic design of the G3s embodied many of the innovative concepts first used in the 1978-built BOOGABILLA of ACL partner Transatlantic (the BOOGABILLA itself, however, was introduced on the North Europe-Australasia service of ScanCarriers). The ground-breaking G3s - five in total - entered service in 1984-85 but were lengthened in 1987 with the G1s and G2s gradually being phased out. After more than 30 years of sterling service, ACL bids farewell to its beloved G3s and welcomes a totally new generation of workhorses: the G4s. The world's largest con-ros, the G4s are bigger, greener and more efficient than their predecessors. Their innovative design increases capacity without significantly changing the dimensions of the vessel; they are only marginally longer than the G3s (296 m vs 292 m), but are wider (37.6 m vs 32.3 m).

During all these years, there have been several changes in ownership along the road and in 1994, ACL even went public when being listed on the Norwegian Stock Exchange, only to be brought back into private hands when Grimaldi became the leading shareholder and eventually gained full control in 2001.

Next year ACL will celebrate its 50th anniversary of trans-Atlantic ro-ro and container transportation. Since its inception, ACL vessels have sailed over 25 million miles and have carried more than 100 million tonnes of cargo across the Atlantic.

PHOTO: FRANK BEHLING

The first ATLANTIC STAR was built in 1967 in Dunkerque, France. The photo shows her after lengthening in 1976.

PHOTO: MARKO STAMPEHL

After more than 30 years of sterling service, ACL bids farewell to its beloved G3s. ATLANTIC COMPANION was the first G3 to be sold for demolition.

➤ Reviewing our port rotations is one thing, but longer port stays because of the G4s' bigger size is another. As volumes will go up, port times will go up. In Baltimore we're currently using the state-of-the-art Seagirt container terminal together with the Dundalk multipurpose facility where we discharge Volvos. Due to the Chrysler contract, we'll go to a third terminal: the Fairfield Marine Automobile Terminal on the other side of the bay. It's a time-consuming and, hence, costly exercise, but one that will benefit the Group. The move to AET in Antwerp requires a lock transit and will add more time to the schedule. For all the right reasons, we must wait and see how things will work out before making a big move like changing ports.

Probably the easiest way for taking in a South Atlantic port is to drop Gothenburg?

Mr Abbott: We're still big in Sweden and have a market share of about 50 per cent both for containers and ro-ro. We ship Volvo cars together with the well-known names from Sweden such as IKEA and Absolut Vodka. We have a wide range of Swedish customers, but none of them are high volume guys. The Swedish transatlantic markets for containers, cars and oversized cargo are individually small, but taken together they make the call worthwhile. But, on the other hand, Gothenburg is a long detour and requires an extra five days that we could otherwise spend to go to the US South Atlantic. Bypassing Gothenburg doesn't necessarily mean that we have to turn our back on the Swedish market. For our containers we could employ our own feeder, or use the G6 feeder or a third party feeder. But that ship would have to go to an ACL terminal. Hamburg would be the most likely candidate given its proximity to Gothenburg and easy access without locks. Ro-ro could be re-routed via our Euro-Med service between Wallhamn, just north of Gothenburg, and Antwerp. With a feeder service for containers in combination with Wallhamn for ro-ro, we could keep our Sweden traffic, but in a different way. As it stands now, this is still a very hypothetical scenario though.

Antwerp is the Grimaldi Group's main hub and is there to stay. Are

there any other ports that you'll never touch?
Mr Abbott: In Europe, our growth will come from Antwerp and Hamburg; these places are definite. In Antwerp alone, we expect over 1,000 lifts each way once all five G4s are in service. We have also made our bed in Liverpool and it's our largest port today. In the US, New York and Baltimore are big for us. Baltimore is also the continent's premier ro-ro port thanks to its location: it's closer to the Midwest than any other East Coast port. Similarly, Halifax enjoys a big container throughput owing to its Gateway connection to the Midwest operated by the Canadian National Railway Company (CN). Halifax is our first port in on that side of the Atlantic and the containers are already delivered in the Midwest before the ship hits Baltimore. The other way around, Halifax is the last port out with customers delivering their containers to us in places like Chicago and Detroit on Friday night and they arrive at our ocean terminal by CN railroad before the ship loads on Monday.

On a totally different subject, you were in praise of Hudong-Zhonghua Shipbuilding when ordering the G4s in 2012. Did they eventually meet your expectations?
Mr Abbott: Back in 2012, we found very few shipyards willing to embark on a project to build only five very unique vessels with a design that had never been built before. Hudong-Zhonghua was deemed to be the best of the yards submitting offers. They had lots of experience building very complicated LPG and LNG vessels as well as Chinese navy vessels, so we selected them for the G4s.

"The G4s will live up to our expectations: they have a high cargo intake, are extremely fuel efficient and cheaper to operate than the G3s"

With the first ship already in service, the second on her way to Europe and the other three ships soon to follow, I can confirm that we have had more than our share of 'teething' problems. But this is something we expected with a radically new ship design. All the big items like the hull were constructed by Hudong-Zhonghua with great workmanship, and we're quite satisfied. The smaller and more detailed jobs like cabling and painting needed to be redone a few times by the shipyard or component supplier before they got it right. But the shipyard is gaining G4 experience and learning the peculiarities of these ships as they go along, and I'm sure that the last three vessels of the new fleet will phase into service much more smoothly.

The one aspect of the ships that we're extremely pleased with is the ease of cargo handling. Compared to the G3s they are replacing, the G4s can load and discharge both containers and ro-ro cargo much faster and easier. With shallower ramps and only one row of support columns, the ro-ro decks look like broad, covered football fields, making stowage of oversized cargo much easier to do. The higher car decks can accommodate a shipload of SUVs in one direction and then be raised to carry tractors and bulldozers in the other direction. Our terminal people are finding new efficiencies every day, which means that doubling the volume will only require a small per centage increase in port time.

I am convinced that the G4s will live up to our expectations: they have a high cargo intake, are extremely fuel efficient and cheaper to operate than the G3s.

What's the delivery schedule for ship numbers three to five?
Mr Abbott: We expect ATLANTIC SAIL in Europe during the second half of April. She will be joined by ATLANTIC SEA in June. ATLANTIC SKY and ATLANTIC SUN will then follow with two month intervals each. Once ATLANTIC SEA will have taken up service, we'll have a big ship every second week and our volume growth will accelerate. With only one or two G4s, we can't rely on regular volumes from the larger customers and must focus on spot cargo.

On the G3s Bibby Ship Management was in charge of both the crew and technical management, but on the G4s their role will be reduced to crewing only. Why?
Mr Abbott: With our new revolutionary G4-class vessels, it's important that we learn the details ourselves about the ship's characteristics and how to operate them instead of leaving it to a third party. Grimaldi, who has their own ship management department, will take ➤

Typical 35-day ACL rotation

Port of call	Day	Day #
Hamburg	Saturday	1
Gothenburg	Monday	3
Antwerp	Wednesday	5
Liverpool	Friday	7
Halifax	Sunday	16
New York APM	Tuesday	18
New York FAPS (*)	Tuesday	18
Baltimore	Thursday	20
Norfolk	Friday	21
New York APM	Saturday	22
Halifax	Monday	24
Liverpool	Tuesday	32
Antwerp	Thursday	34
Hamburg (**)	Saturday	36

(*) New York FAPS = discharging ro-ro only
(**) Start of second rotation, hence 36th day

over the ship management of the G4s. They will base the superintendents in Liverpool, since it's called twice in our schedule - first port in and the last port out in Europe.

With the introduction of the G4s, the Swedish flag is being exchanged for the much cheaper UK flag due to the fact that the UK has implemented a tonnage tax regime and Sweden hasn't yet. Is this the end of an era?
Mr Abbott: The British registry is really flexible and cost competitive. Conversely, Sweden has one of the most expensive flags in the world, and no tonnage tax system like the rest of Europe.

Having said that, our Swedish seafarers are top-notch, professional people. They have loads of experience; they know the waters we're sailing on, the ports we call at and the cargo we carry. Because of their enviable experience and skill, we want to keep as many as we can.

Sweden has been talking about launching a tonnage tax regime for as long as I can remember, but it has never gone anywhere. We understand that the government will vote in June whether or not they will introduce a tonnage tax. If it's competitive with the rest of Europe, we should be able to keep part of our fleet in Sweden. .

Last question; despite their age the G3s were likely candidates for the US Military Sealift Command. Instead, their fate seems to be the scrapyard with the ATLANTIC COMPANION already having been sold for recycling last summer.
Mr Abbott: The Pentagon desperately wanted our G3s. These are perfectly suited to carry any military cargo in the US arsenal – from MRAP mine resistant vehicles to Blackhawk and Chinook helicopters. Our five ships could have replaced more than 12 smaller, less flexible, less fuel efficient ships in the Military Sealift Command fleet. Based on fuel and crew efficiency alone, the government would have gotten all their money back after only 18 months or so. But the ships were not US-built and it was a mission impossible to convince the senior people in the administration. Financial logic lost out to politics.

A sad end for ships that are still very advanced 30 years on! ■

Andrew Abbott: the man at the helm

Andrew Abbott joined ACL in 1977 but left the company in 1979 to take up a management position at Waterman Steamship Corporation followed by Orient Overseas Container Line. He returned to ACL, his 'first love,' in 1983, working in the USA and UK. Shortly after Grimaldi took over, he assumed his current position of President and CEO in January 2003 when he succeeded Olav Rakkenes, the one-time President and CEO of Transatlantic who is still on the boards of Finnlines and ACL.

Mr Abbott has a degree from Georgetown University and studied economics at the Universität Heidelberg and the Humboldt Universität in East Berlin. He also holds an MBA from Columbia University in New York.

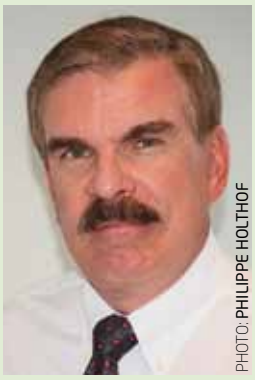


PHOTO: PHILIPPE HOLTHOF

PHOTO: BJÖRN KILS / ACL

PHOTO: MIKE LOUAGIE

MASTERMINDS:
DR. GIANLUCA AND DR. EMANUELE GRIMALDI

ACL is a wholly owned subsidiary of the Grimaldi Group, the world's leading owner and operator of deep sea and short sea ro-ro ships that is headquartered in Naples, Italy. The Group's deep sea department - including ACL - is headed by Dr. Gianluca Grimaldi, whereas his somewhat younger brother, Dr. Emanuele, controls the rapidly expanding short sea division that also includes Finnlines and Minoan Lines.
In a fairly unique double interview held in early March, Shippax discussed the latest developments with the Group's Managing Directors.

TEXT: PHILIPPE HOLTHOF

PHOTO: MIKE LOUAGIE

Gianluca and Emanuele Grimaldi with a bust of the company's founding father, Guido Grimaldi.

PHOTO: PHILIPPE HOLTHOF

Over the last two decades, the Grimaldi Group has grown rapidly through organic growth and acquisitions, with both Gianluca and Emanuele firmly holding the helm – flanked by their brother-in-law Diego Pacella. The family's ties with the sea can be traced back as far as 1348; its modern history, however, started six centuries later when, in 1947, the late Guido Grimaldi, together with his brothers Luigi, Mario, Aldo and Ugo, bought their first Liberty freighter. The spirit of Guido Grimaldi still lives on at the Grimaldi headquarters and the one-time desk, settees and a bust of the company's founding father take pride of place in the brand new board room on the first floor.

When visiting the Naples headquarters in early March for this interview, Paul Kyprianou, the Group's External Relations Manager and 'jack-of-all-trades', first welcomed me on the 'corporate' seventh floor but then accompanied me down to the new board room. This attractive grand room with its minimalist design still smelt like fresh paint and boasted all kinds of memorabilia, an array of award trophies and the obligatory scale models. It was a real showpiece of the Group and a far cry from the former, somewhat austere board room on the seventh floor. No less than five minutes after Paul Kyprianou had showed me around, Emanuele and Gianluca entered the room. "This is exactly the corner where my father used to sit until his death," Emanuele Grimaldi said proudly while pointing to his father's dark mahogany desk. Clearly, there are very few shipowners who show such a deep respect for family values as Grimaldi does. It is almost like a mantra that is passed down from father to son. This is also cherished by the third generation who, slowly but surely, is getting more power.

Before we set off for the interview, I first followed Gianluca and Emanuele for lunch. As befits a family-owned business, decisions are usually taken very quickly and - in the case of Grimaldi - over lunch. Lunches are regarded as a type of informal board meeting. The Grimaldis have their dedicated 'family table' tucked away in the corner of a typical Neapolitan trattoria just across the street. We were joined for lunch by Diego Pacella, together with the sons of Gianluca and Emanuele and nephew Mario Fuduli. Emanuele's eldest son, Guido, was absent. "Guido is commercially very strong," Gianluca said, "He's often on the road to meet customers with whom he keeps very close ties. He even invites them at home."

After lunch it was time to talk business...

DR. EMANUELE ON THE GROUP'S RECENT SHORT SEA ACHIEVEMENTS

How did the Group perform in 2015 and what are the prospects for 2016?
Emanuele: Last year's consolidated Group result was the best in our history. Remarkably, it also proved to be a very good year for both Finnlines and Minoan Lines, our daughter companies that suffered the most from the crisis. They were financially unhealthy during the crisis, but we have succeeded in turning the tide dramatically and 2016 looks even more promising for them. Last year, Finnlines' superior achievement was acknowledged by Marine Money International in their 2014 rankings of publicly traded shipping companies. In the 'total return to shareholders' category, which may be considered the most important one in the ranking, Finnlines outperformed all other companies and reached the first place with a total return to shareholders of 113.3 per cent! Actually, the turning point for ➤

"It has cost me blood, sweat and tears to get Finnlines back in the black"

Dr Emanuele Grimaldi

PHOTO: MIKE LOUAGIE

PHOTO: FRANK LOSE

Minoan Lines has a good profitability and recorded the best results in the Greek ferry market.

PHOTO: MIKE LOUAGIE

According to Emanuele Grimaldi, Hellenic Seaways deserves a strong financial muscle and has therefore been put high on the agenda.

➤ Finnlines came when I took the presidency of the company. I don't like to make someone redundant and therefore I only implemented some changes at the very top; the 'front row' changed as I also took over as CFO and COO. It has cost me blood, sweat and tears to get Finnlines back in the black and initially I spent two weeks per month in Finland, but this has now been reduced to just one week.

Minoan Lines recorded the best results in the Greek ferry market and has a good profitability and the same goes for ACL.

Our short sea services, operated under the Grimaldi Lines banner, are also performing extremely well with good load factors and satisfactory financial results.

A full control of Finnlines is just around the corner, when will that be finalized?

Emanuele: Indeed, we are now in the final sprint of full control. We possess 98.03 per cent of all the shares as we speak. Based on Chapter 18, Section 1 of the Finnish Companies Act, we have the right to redeem the shares held by the remaining shareholders at fair value, a process that will be finalized soon.

When you became the principal shareholder in Minoan Lines eight years ago, you were reluctant to increase Minoan Lines' share in Hellenic Seaways. Back then you were even considering to turn your back on Hellenic Seaways simply because you didn't believe in its future. However, you have done a complete U-turn and have openly declared your interest in Hellenic Seaways. How come?

Emanuele: The first priority was to

help Minoan Lines ride out the crisis in which we wonderfully succeeded. We have now put Hellenic Seaways high on the agenda, because I believe that it deserves a strong financial muscle. Hellenic Seaways is performing well today and recorded a EUR 4.3 million profit in 2015. So it's no longer a disaster, but there is no room for euphoria since the company has been driven into debt and needs a financial lifeline. Some of their ships, especially the Russian-built hydrofoils, are obsolete and in dire need of replacement. Consequently, Hellenic Seaways can only survive provided that a strong, cash-rich owner steps in. But the Greek shareholders, especially Piraeus Bank, are hesitant to sell their share.

This must be a thorn in your side.
Emanuele: Absolutely! I really don't understand the Greek patriotism when economic globalization is the order of the day. They're fighting a losing battle. To put it frankly, the fragmented Greek ferry market with its many small players as we know it today is senseless. I therefore call for a market that is controlled by two strong, professional players that offer a first-class service: Attica with ANEK on the one hand and us with Minoan Lines and Hellenic Seaways on the other. I'm pretty sure that the Greek population and the tourists would actually benefit from such a market shakeup. In a complex world full of regulations, you need champions to run the business. Don't forget that a 0.5 per cent sulphur limit and other regulatory issues are looming on the horizon. How will the small companies with their ageing and sometimes diminutive ferries cope with that? After all, it will require huge investments. They simply lack the resources to do so.

You have been very critical toward Piraeus Bank because they were not prepared to sell their share. What's today's situation?
Emanuele: Things are moving and through negotiations with top representatives of the Piraeus Bank, I understood that the bank - which still owns more than one third of the shares in Hellenic Seaways - was keen to sell. However, nothing has materialized, so I embarked on a 'plan B' in order to increase my share through Minoan Lines and obtain a controlling interest. I don't want to go too much into detail, but I have just acquired 3.91 per cent that was previously held by the insurance company Interamerican, increasing Minoan Lines' participation in Hellenic Seaways to about 40 per cent. This is the way forward and the eventual outcome will be a merger between Minoan Lines and Hellenic Seaways.

Back in your home waters, the new Livorno-Olbia line that was inaugurated by the ZEUS PALACE in January has made waves, not least because Vincenzo Onorato (Moby/Tirrenia) saw his near monopoly for freight traffic on this route being broken up. Apparently, the new route got off to a flying start since you are about to increase capacity?
Emanuele: I prefer not to comment on all the commotion our move has brought about. All I can say is that I have been very open, both with my Grimaldi and Confitarma hat on (editor's note: Emanuele Grimaldi is President of Confitarma, the Italian Shipowners' Association).

But to answer your question: yes, the new six times weekly Livorno-Olbia service is a super success! It started from scratch but we are already carrying over 500 lorries per week and get 2,000 passenger bookings per day! Can you imagine? Because it has outperformed our wildest expectations, we have meanwhile decided to replace ZEUS PALACE by the slightly larger, ➤

PHOTO: MIKE LOUAGIE

PHOTO: GEORGE GIANNAKIS

ZEUS PALACE will inaugurate a new daily service between Civitavecchia and Olbia.


PHOTO: FRANK BEHLING

Grimaldi acquired the BIMINI SUPERFAST. She will be renamed CRUISE OLBIA and operate on the Livorno-Olbia route.


PHOTO: GEORGE GIANNAKIS

CRUISE ROMA and BONARIA in Civitavecchia. Both ships are owned by Grimaldi, however, BONARIA is chartered out to Tirrenia CIN.

PHOTO: KAI ORTEL

EUROCARGO PATRASSO and EUROCARGO TRIESTE were acquired from Trasmediterranea and inaugurated a new MoS that connects Venice and Ravenna with Bari and Patras.

➤ newly acquired BIMINI SUPERFAST, the ex- SUPERFAST VI which is due to be renamed CRUISE OLBIA. By doing so, we will kill two birds with one stone. With the CRUISE OLBIA we can better adapt supply to demand on the Livorno-Olbia route whereas ZEUS PALACE will inaugurate a new daily service between Civitavecchia and Olbia. The mid-April launch of the latter route has been strongly requested by our Sardinian clientele and will enable us to better serve the traffic of both goods and passengers between the central and southern parts of mainland Italy and the northern part of Sardinia. But the success story does not end here, since I'm poised to add a third and fourth ship on services to Sardinia.

Wow, that sounds really interesting! You have chartered out BONARIA (ex-OLYMPIA PALACE) and AMSICORA (ex-EUROPA PALACE) to Tirrenia/CIN. These former Minoan Lines sisters serve Olbia, Cagliari and Arbatax from Civitavecchia. However, they could be a perfect fit for your plans when their charter expires?

Emanuele: Apparently, you can read my mind! Yes, as soon as they will be handed back to us in February 2018, they will continue to serve Sardinia, but then under the Grimaldi rather than the Tirrenia banner! In addition to the new services to Sardinia, we keep on serving the island with our two Civitavecchia-Barcelona CRUISE-class ships that now make a year-round intermediate stop in Porto Torres, not to mention our wide offering of freight-only services.

Last year, there was a further expansion on the Adriatic Sea with the addition of the MoS that connects Venice and Ravenna with Bari and Patras. This thrice weekly freight-only service is operated by the EUROCARGO TRIESTE and EUROCARGO PATRASSO, 3,465 lanemetre freighters that were acquired from Trasmediterranea. How is the route performing?

Emanuele: As you pointed out, these are high-capacity freighters and they are not yet sailing to full capacity. After all, we only started the service last summer. However, we are on the right track and are growing every week, having meanwhile reached a 50 per cent load factor. We carry between 160 and 170 trailers per week on the coastal sea motorway between Bari and the northern ports and another 600 trailers per week to and from Patras.

The port of Livorno has gained importance in the network with the new ro-pax services to Olbia and Palermo, ➤

PHOTO: GEORGE GIANNAKIS

The Grimaldi Group at a glance

- Number of ships (April 2016): 111 owned and 10 chartered
- Number of employees: about 10,000
- Estimated turnover (2015): EUR 3 billion
- Estimated net profit (2015): EUR 400 million
- Group turnover: 90 per cent freight and logistics related
  10 per cent passenger related, but set to grow

➤ **the latter being operated by the STAR-class EUROPALINK. What is so special about Livorno?**
Emanuele: Location, location, location! If one should choose a port in Italy, then it's Livorno because it's so well-connected. Livorno is a strategic hub for our Group, both for our traffic flows of new vehicles and our expanding MoS network. We are the majority shareholder of our local agent, L.V. Ghianda, and took an interest in the Sintermar terminal in September 2014. We have been active in Livorno since 1968 and in September we revived the Livorno-Palermo route which used to be a traditional line of the family. Long before my father Guido and uncle Aldo split the company in 1995, we operated the Livorno-Palermo route with the famous FRECCIA ROSSA.

The EUROPALINK sails three times per week between Livorno and Palermo and v.v. She has been an immediate success and we are currently carrying 800 freight units per week on average. We have high hopes for the summer since the EUROPALINK is the perfect ship for the route.

EUROPALINK was originally built for Finnlines. The fleets of Grimaldi Lines, Minoan Lines and Finnlines are operating independently, but you have taken advantage of the synergies between the companies by repositioning and swapping ships. Have we already seen the end of it?
Emanuele: I have everything in my fingers and know each and every ship and their capacities. I also exactly know what's going on and I was personally responsible for all the reshuffles. We have an optimal fleet deployment, so I don't estimate any further reshuffles in the short to medium term. All the companies in the Group have the ideal fleet now and should show better results. But, of course, we keep on growing and may develop new trades and add new tonnage or to quote the words of the Greek philosopher Heraclitus: 'panta rhei', meaning that things can change quickly and that one must adapt quickly to new realities.

You have an extensive network in the Med and the Baltic. Save for the long-distance services of Finnlines, you are not really covering the North Sea and the continent-UK market. A company like CLdN is developing its own MoS network on the North Sea. Would you consider entering that market?
Emanuele: The continent-UK market is no option for the simple reason that it's already well-served by big and strong companies that are there to stay. It's a big difference with some parts of the Mediterranean. In my view, there is still a huge fragmentation in the ferry industry, but I'm convinced that the big boys will survive whereas the weak ones will disappear.

You have expressed your interest to start a service from the US to Cuba. What are the expectations?
Emanuele: We have been following Cuba for more than three years now. We have made our homework and obtained a permission from the US government. However, the following question has still remained unanswered so far: Will there be free transport of people and goods to Cuba? This is a *conditio sine qua non* to make such a service successful; there shouldn't be any administrative burden. If you ask me, it's more important to understand the market than being the first one to enter it. With the exception of the typical resort hotels that are used by the tour operators, decent hotel accommodation is currently lacking in Cuba. It only makes sense to develop a passenger service when there are facilities on the land side. Once there are top class hotels in place, we could push the button, but now it's way too early.

What ferry type would you employ?
Emanuele: Our CRUISE-class vessels – including our latest addition, i.e. CRUISE OLBIA – could work there, but only when the facilities on the land side are ready. In a start-up phase, it would be more appropriate to use a typical ro-pax from the Visentini stable. If you think about the replacement of all these vintage cars and the construction materials that will be required, ro-ro capacity will be at a premium. As it stands now, it's hard to predict and plan anything.

TALKING TO DR. GIANLUCA

Let's now talk about the deep sea activities. It appears that the Group's short sea arm fared very well in 2015, but what about the deep sea sector?
Gianluca: Although still showing good results, the deep sea services to West-Africa and South America suffer from the low oil prices as countries such as Angola, Nigeria, Ghana and Gabon rely heavily on oil exports. The Ebola virus has also played havoc and the economies


GRANDE ABIDJAN
PHOTO: ERWIN WILLEMSE

in South America in general and Brazil in particular have disappointed. All this has had a knock-on effect on our carryings and results. Notwithstanding these drawbacks, the results and revenues on Group level were the best ever last year.

Could you also put a figure on it?
Gianluca: It's still early days to give a consolidated turnover, but I would say just below EUR 3 billion with a EUR 400 million net profit.

In the port of Antwerp, which is one of the Group's main hubs, the new 'Kieldrecht lock' will be inaugurated sometime in June. This will allow ACL to finally move from the PSA river berth 'Europa terminal' on the right bank to the AET terminal on the left bank. Although the move is a logical one – all activities will be centralized at one single terminal – you'll risk longer and hence more expensive port stays because of the lock passage and slower handling with only two gantries and mobile Liebherr cranes.
Gianluca: In fact, quite the opposite will be true, since we will make huge savings! We are convinced that AET, in which we have a two thirds interest, will give an excellent service with a good productivity thanks to two new gantry cranes that can be supplemented by two fast mobile cranes. The overall efficiency will be similar to what PSA offered. The ro-ro handling of our ACL ships takes one and a half shift anyway, so we don't expect any delays on the container side. Admittedly, the lock passage will add eight hours per call. However, this is not the end of the world given the 35 days roundtrip and the redundancy of the G4s with a ten per cent faster speed than their predecessors.

Needless to say that the handling rates will be more competitive, not to mention the fact that transhipment cargo no longer needs to be trucked or barged from one side of the river to the other. Because we will concentrate our activities on one terminal, the whole ACL operation will be more competitive and volumes will grow.

ACL carries large volumes of heavy and oversized breakbulk cargoes. This requires professional skill on the land side as good lashing of the flatbed trailers, mafis and bolsters is paramount. In Antwerp this was largely handled by PSA subsidiary Borealis, which offered a service that was second to none. Does AET have a similar team in place?
Gianluca: We are in the process of hiring specialized dockers to do this job for us. I really expect a very smooth transition from PSA to AET. Everyone has put their shoulder to the wheel. AET has been instrumental in the expansion of Grimaldi. We started with 200,000 m² of hardstanding and a quay length of 400 m in 2001 and have grown to a huge terminal with a surface area of 1.5 million m² and over two kilometres of quay today.

The sixth and last ship in the GRANDE LAGOS-series, the GRANDE LUANDA, has recently taken up service. These post-Panamax vessels are the 'biggest and best' and were built with further growth in mind. The oldest unit of the much smaller 'GRANDE MK-I' generation, however, has meanwhile been around for almost 19 years. Are there any replacement plans?
Gianluca: The GRANDE LUANDA, which is Grimaldi's own G4-class, has joined her sisters on the Central Express Line from Northern Europe to West Africa. With six identical ships on this 'backbone' service, we can offer a weekly service because a roundtrip takes 42 days. This includes four days of margin for unexpected setbacks en route. With their extra speed, we could employ just five ships, but for reasons of reliability and to guarantee departures on fixed days, we preferred to use six. Admittedly, it's a luxury solution.

Back to your question: the average age of the first GRANDE-con-ros is 17 years. It will take at least another seven to eight years before we will introduce our next GRANDE-generation.

The GRANDE-versions have evolved over the years. Grimaldi's latest G4 and ACL's G4 are two worlds apart. Could the next GRANDE-generation ➤

"The Antwerp AET Terminal has been instrumental in the expansion of Grimaldi"

GRANDE NAPOLI alongside the AET terminal in Antwerp.

PHOTO: MIKE LOUAGIE

➤ have more in common with ACL's G4s, albeit on a smaller scale?
Gianluca: It's difficult to establish how the ideal GRANDE-ship should look like. It could be a compromise between a downscaled G4 of ACL and the GRANDE LAGOS-class. However, the container volumes to West Africa don't grow, so extra container capacity is not a prerequisite. Because of their size, the GRANDE LAGOS and sisters are also somewhat less flexible than their smaller predecessors. They are not well-suited for our South American services as they are simply too big for the Brazilian port of Vitoria, which represents 60 per cent of our car throughput in South America. We have to find a compromise for a new concept, but we are not working on it yet since the lifetime of our cargo ships is between 25 and 30 years.

PHOTO: GRIMALDI GROUP
GRANDE GHANA is one of four ships linking the Med with West Africa through the Mediterranean Express Service (MEX).

The MEX service had a modest start. Initially operated in conjunction with Navitrans of France, you took full control six months after its October 2010 inception. It has meanwhile gone from strength to strength. When do you expect to further increase the frequency by adding a fifth ship?
Gianluca: In five years time, the MEX operation has grown from two chartered ships to four owned ships with a frequency every ten days. A fifth ship may be added later this year, but we have to monitor the situation carefully because West Africa is not growing due to less imports because of the low fuel prices.

It's good to know that our multiple West African services now cover all the ports within the Casablanca-Luanda range, with the recent addition of Nouakchott (Mauretania), Bata and Malabo (both Equatorial Guinea).

Could you give more details about your ambitious plans with the Mediterranean-US East Coast pure ro-ro service that was started early last year on the back of a major contract with Fiat Chrysler Automobiles (FCA)?
Gianluca: The vessels call at Gemlik, Civitavecchia, Baltimore, Halifax and return via our hub in Antwerp on their way back to the Med. Baltimore is our main port for vehicles in the US, both for imports and exports. In addition to the new Med-US Coast service, it's also served by ACL and our West Africa-North America service. On a separate note, we have recently added Galveston

and nearby Houston to the schedule of this latter service.

Our new Mediterranean-US Coast service is not dedicated exclusively to FCA, but for confidentially reasons I prefer not to comment on the volumes FCA represent. It's operated by five ships – both owned and chartered tonnage – with a weekly frequency. The chartered tonnage will be replaced by new PCTCs that we ordered in China. Seven ships with an option for two more were ordered at Yangfan, one of the most prolific builders of PCTCs. A contract for three somewhat smaller PCTCs was signed with Jinling. All newbuildings are earmarked to replace our chartered PCTC fleet.

The new ships from Yangfan have been dubbed the 'Green PCTCs' because of their low fuel consumption. Could you give more details about their green credentials?
Gianluca: As with the ACL ships and the GRANDE LAGOS-class, they will have roughly the same fuel consumption as their much smaller predecessors that were built at Uljanik more than a decade ago. The Jinling-type will have a capacity of 6,700 cars, and the larger Yangfan-type will carry up to 7,800 cars as opposed to a total of 4,300 to 5,400 cars on the Uljanik ships. The emissions per Car Equivalent Unit (CEU) will therefore be much lower. The post-Panamax vessels of Yangfan will be the greenest vessels in our fleet. They will be equipped with scrubbers and exhaust gas recirculation to reduce NOx emissions.

When Hudong-Zhonghua Shipbuilding offered you a really competitive price for the ACL quintet back in 2012, they were probably hoping that more orders from the Grimaldi powerhouse would come their way. Eventually Yangfan and Jinling ran away with the PCTC order spree.
Gianluca: Admittedly, back in 2012 Hudong-Zhonghua won on price. But I felt that their good price mainly had to do with filling up their slots. We gave them a chance, just like we had done before with Uljanik for our deep sea con-ros and PCTCs and Jinling for our ro-ros for Finnlines. Jingling and Yangfan had a rich PCTC history and offered an attractive price, something Hudong-Zhonghua couldn't match. Sometimes you win, sometimes you lose.

Hudong-Zhonghua had never built complex con-ros. Do ACL's G4s meet your expectations, despite their late delivery?
Gianluca: Delays are nothing uncommon when we are talking about such a daring new design. During the building process we also decided to add scrubbers, so we can live with the late delivery. Notwithstanding some teething problems, which I consider to be normal, ATLANTIC STAR exceeded our expectations when it comes to speed, stability, efficiency, deadweight tonnage and intake. The next four ships will be simply perfect.

When the ships were ordered, ACL announced that the port rotations ➤

PHOTO: GEORGE GIANNAKIS

would be reviewed. One or two traditional ACL port calls would be dropped in favour of a South Atlantic port. Is this still the plan?
Gianluca: No, at least not for the time being! Although we have enough redundancy in the form of speed, adding ports like Savannah or Jacksonville would ultimately have come at the expense of Gothenburg which we still regard as a very important port, not only because of Volvo. The double calls in Antwerp, Liverpool, Halifax and New York city will also remain untouched.

All five G3s flew the Swedish flag, a remnant of ACLs history. The first three G4s are registered in the UK. What about the last two ships in the series?
Gianluca: Our Swedish officers were very experienced but expensive. We have to find a solution to keep some of them. Bringing the last or the last two ships under the Swedish flag could be an option, but an unlikely one as long as Sweden doesn't implement a tonnage tax system.

We have taken full control of the technical management on the G4s, whereas the crewing remains in the hands of Bibby Ship Management. As part of the Grimaldi philosophy to own its offices, we are building a new 3,800 m² office on Duke Street in Liverpool. We will occupy two floors and hope to let two further floors. ACL's head office will remain in Westfield, New Jersey, but we are centralizing activities in Liverpool, including the technical management and back office. The company's DPA has also moved to Liverpool.

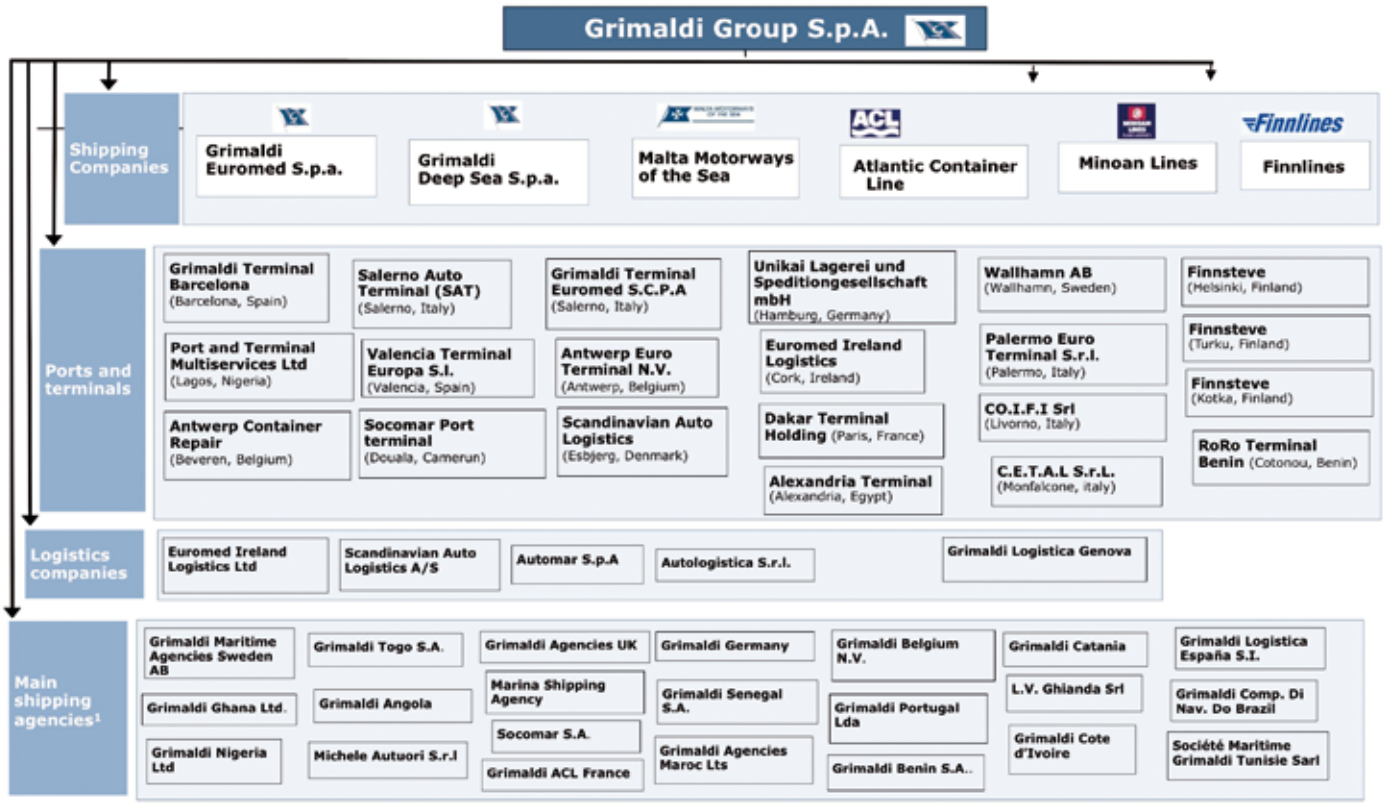
SOME LAST QUESTIONS FOR DR. EMANUELE

Dr. Emanuele, you were initially very sceptical toward scrubber technology, but eventually you installed them on your Finnlines fleet. Why did you change your view?
Emanuele: Let's hope that with the whole SOx saga, the EC has learned its lesson. They should never again legislate in the dark! It's outrageous to make rules without having a toolbox or remedy in place. As a shipowner there are things that you don't control; technology is one of them. The first scrubber models were totally unreliable and suffered from fires and corrosion. Because it was far from a success, I was very sceptical indeed. But, luckily, the technology has improved a lot and so I took the best providers to install 46 scrubbers on 25 ships.

During the last three years we have seen the emergence of large cruise-ferries that are powered by LNG. It appears that you are not a supporter of LNG propulsion, correct?
Emanuele: Yes! I don't see it as a solution to meet the strict emission limits. The availability, or better still, the delivery of LNG remains a big stumble block. I'm not talking about the virtual delivery, but the physical delivery to the ship. Especially in the Med this is problematic.

An LNG installation also occupies the double amount of engine space which comes at the expense of payload. Last but not least, there is also the price factor: in Europe LNG is currently more expensive than the fuel we are burning! In short: there is no incentive at all to switch to LNG propulsion.

Stena Line has been experimenting with methanol as an alternative fuel. However, they don't have a large fol-



GRIMALDI GROUP 1) The total number of agencies is 70

PHOTO: FRANK LOSE

Dr Emanuele Grimaldi is convinced that the European yards are in the best position to build sophisticated cruise ferries, because of the expertise.

lowing. What's your view on methanol?
Emanuele: I have great respect for Dan Sten Olsson: he's a purebred entrepreneur and he made a brave move with the methanol experiment. I have my doubts, however. Stena Line still has it on one ship only. Maybe it works well in Sweden, but I don't see it as the ultimate solution for the world fleet.

If you would build new cruise-ferries today, would you order them in Europe or in Asia?
Emanuele: In Europe we have all the expertise and experience to build sophisticated cruise-ferries. Vibrations are an important issue and the accommodation should be of a superior quality. For all these reasons, I would build in Europe, providing the price would allow us to do so. South Korean yards could be an alternative. When we are talking about pure ro-ro or even ro-pax, then South Korea and China is the answer.

You have always respected the brand names of your daughter companies. Although they belong to the Group, they have kept their own identity. ATLANTIC STAR, however, has emerged with a Grimaldi funnel. Will the respective company names ultimately be replaced by the Grimaldi brand name?
Emanuele: The excellent reputation of all our subsidiaries, be it Finnlines, Minoan Lines or ACL, is undisputed, so these brand names will be retained. But they have a Christian name, followed by the Grimaldi family name. I try to create value: five plus five should become eleven, not eight! The day-to-day management also remains in the hands of the local people who grew up with these companies. However, they benefit from belonging to a big family and take advantage of the Group when it comes to innovation, research & development and economies of scale.

Finnlines and Minoan Lines were playing in second division, but they are now in the champions league with more than ten per cent bottom line profit.

It's always nice to end an interview with a metaphor, thank you gentlemen! ■

PHOTO: FLOR VAN OTTERDYK

Philippe Holthof has been writing for 25 years but has followed the ferry industry since childhood. Born and raised in Oostende, Belgium - a bustling ferry port in the seventies and eighties - he spent most of his teenage spare time collecting information and data about ferries, sailing with them to Dover (which was easy because his father was a captain on the Ostend-Dover line), making sketches and GA plans of ferries or watching loading operations of the Schiaffino ro-ro freighters in the inner port of Oostende. This was long before ISPS and the digital age with today's teenagers actually spending a sizeable chunk of their spare time with their smartphone or Tablet. These devices are a far cry from Philippe's first camera, an early example of the Kodak 110 series complete with disposable flashcubes...

Philippe lives with his wife and three children in Antwerp, whose port is a major hub for the Grimaldi Group, including ACL.

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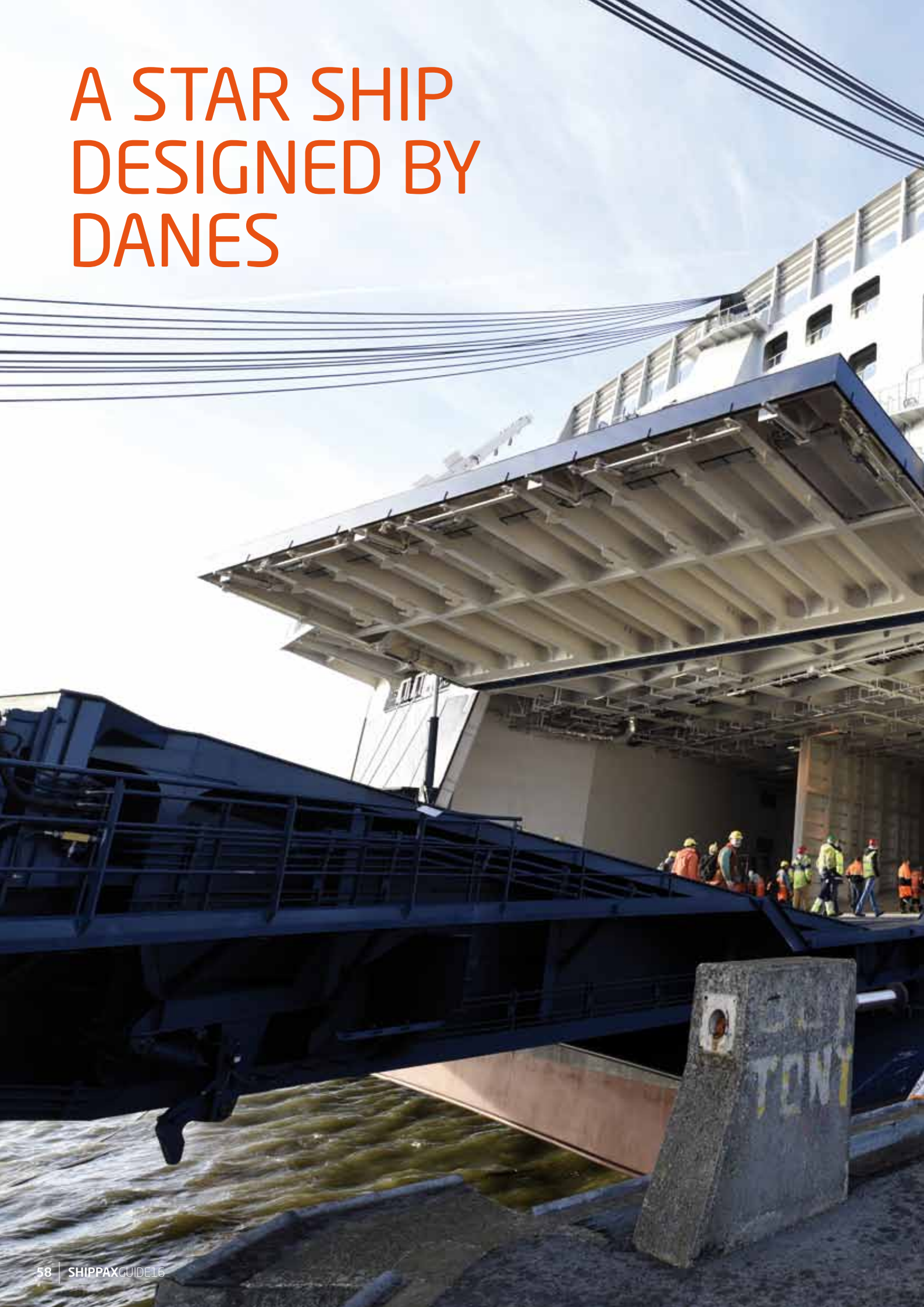
A STAR SHIP DESIGNED BY DANES



The innovative design of ATLANTIC STAR takes a radical step away from the tried and tested multipurpose con-ro concept of which ACL's G3-class was probably the epitome. ATLANTIC STAR, the lead ship of the G4-class quintet, effectively combines two different ship types within a single hull, making the series truly unique. Masterminded by Jens Nielsen of International Maritime Advisers, the project was taken to a new level by KNUD E. HANSEN who further developed and adapted the concept to ACL's requirements on behalf of Hudong-Zhonghua Shipbuilding. This revolutionary concept is an industry first, but there were many challenges along the way though.

TEXT: PHILIPPE HOLTHOF

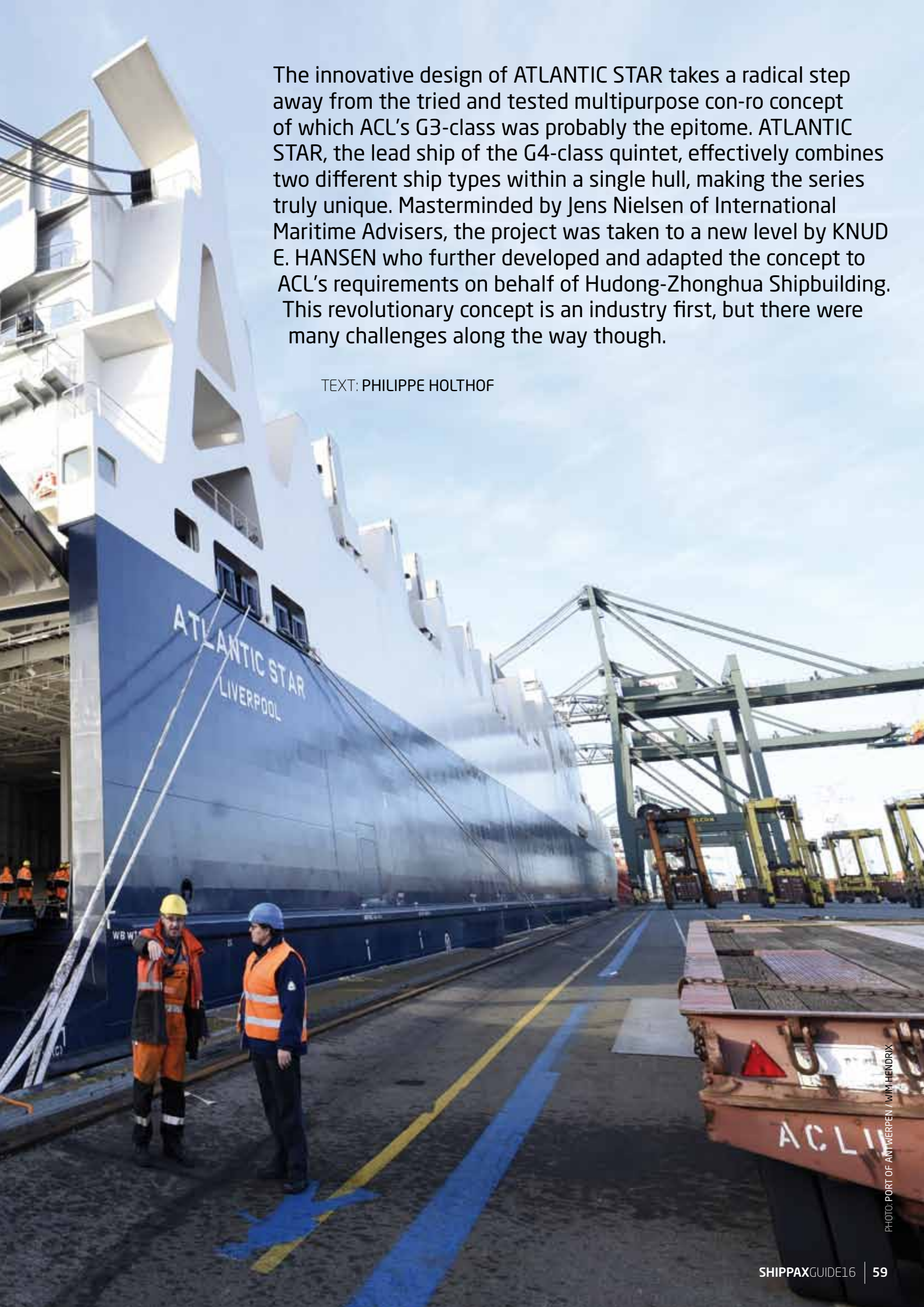


PHOTO: PORT OF ANTWERPEN / WM HENDRIX

The con-ro concept was pioneered by ACL in 1967 following the delivery of their first generation of combined container/ro-ro carriers. Although really futuristic at the time when containerization was just taking off, the principle was fairly simple: all types of (wheeled) cargo could be stowed on the enclosed ro-ro decks, whereas the weather deck was a dedicated container deck. Such was their success, that ACL's G1s were lengthened by 26 m in 1976 with the existing forebody being converted into a lift on-lift off part, complete with a cellular hold. The G2s, which entered service in the 1969-1970 period, were conceptually similar to the G1s, but boasted container holds in the forward end from the outset, flanked by car decks on both sides. The G3s incorporated all the lessons learned from the earlier generations and took full advantage of the evolution through which the con-ro had gone during the seventies. Completed in 1984-85, these giant Panamax con-ros represented a quantum leap in terms of payload and were lengthened by 42.5 m in 1987. As built, the G1s and G2s were equipped with a straight axial stern ramp which was replaced by a stern quarter ramp on the G3s – in the case of the G3s it was actually a Jumbo ramp. A stern quarter ramp was first installed on the 1970-built PARALLA. It was a big step forward as it enabled the vessels to berth at any quay and drop their ramp on the starboard side.

The G3s were a further development of the trendsetting BOOGABILLA and both concepts emanated from the design stable of the Swedish naval architects TransConsultants AB. BOOGABILLA, however, had full-length ro-ro decks and thus did not have dedicated container holds. Both containerized and wheeled cargo could be stowed on the weather deck with direct access from the stern ramp through a guillotine door. The G3s, for their part, followed ACL's proven 'ro-ro aft and container holds forward' arrangement with the superstructure block aft holding multiple car decks reminiscent of a car carrier. Unlike on BOOGABILLA, all open deck space on the G3s was allocated to containers that were placed in a cell guide system developed by MacGregor-Navire. First tested on a small scale on ATLANTIC SPAN with three different configurations of on-deck bays, these container cell guides improved cargo turnaround times by eliminating the need for lashing. Additionally, ACL has not lost a single container over the side ever since the on-deck cell system was introduced.

"The secret of the design lies in putting ro-ro cargo amidships"

The 'containers on deck, ro-ro cargo under deck' principle has been applied on virtually all con-ros. Although it has proved very popular, there is also the flipside to the coin, especially when large volumes of containers are carried on deck. The denser stowage of containers on deck in combination with the 'air-filled' ro-ro decks with relatively lighter-weight cargo, contributes to the fact that most of the weight rides high on a standard con-ro vessel. This imbalance is actually the Achilles' heel of the traditional con-ro configuration and requires thousands of tonnes of ballast which comes at the expense of deadweight. The G3s equally suffered from this drawback; even with a full load they had to take 13 to 14,000 tonnes of ballast.

THE EGG OF COLUMBUS

The G4 project started with a clean sheet of paper and its radical new layout departed from the typical horizontal and partial vertical division between containers and ro-ro space adopted by ACL hitherto. The secret of the design lies in putting ro-ro cargo amidships with containers being stowed in cells fore and aft of the ro-ro section. This effectively results in cargo replacing ballast with a much more efficient use of vessel space. The ballast requirement on full sailings is close to zero. The brainchild of Jens Nielsen, the configuration allows for a container intake double that of the G3s and an increase in ro-ro space of 55 per cent within almost the same footprint. Jens Nielsen, a Danish naval architect who became a consultant and set up International Maritime Advisers (IMA) after retiring from KNUD E. HANSEN, first presented his unconventional design to ACL in 2008. With over 40 years' experience in operating con-ros on the North Atlantic, ACL was initially sceptical about Mr Nielsen's weird idea. However, they were soon hooked on the better utilization of the hull envelope. ACL, together with Jens Nielsen, further fine-tuned the design in order to get the right mix between containers and ro-ro, subsequently presenting it to shipyards in 2008-9. Given their full order books the price the shipyards gave was initially way too high, resulting in the project being put on hold. When the shipbuilding market collapsed in the aftermath of the financial crisis, order books were drying up and ACL went out to the shipyards again for a second round of quotes in early 2011. Several shipyards declined to quote and many of those who quoted were still too expensive. ACL eventually came down to a shortlist of five yards that were

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From left to right: Senior Naval Architect Niels Georg Larsen, G4's Project Manager during the basic design, Finn Wollesen (Managing Director) and Senior Naval Architect Christian G. Damsgaard, G4's Project Manager during the contract design. During the period of the basic design, 10-15 people were continuously involved in the project, peaking to up to 30 pesons at times.

PHOTO: PHILIPPE HOUTHOF

really interested (see separate sidebar), with the five-ship contract ultimately being awarded to Hudong-Zhonghua Shipbuilding (HZS) in July 2012.

KNUD E. HANSEN PLAYING AN INSTRUMENTAL ROLE

The IMA proposal represented a ship type the like of which had never been built before. It was an ACL requirement for the potential builders to have the complex design further developed by a European naval architectural firm. HZS teamed up with KNUD E. HANSEN (KEH) of Helsingør, Denmark for the contract and basic design. In case HZS would not have won the contract, the project for KEH would have stopped with the contract design, so it was a matter of 'winning or losing together'. A household name in naval architecture, KEH are arguably the most prominent naval architects in the world, having been established in 1937. Shortly before the G4 project took off, KEH had completed the concept and tender design for a series of con-ro vessels for Bahri, ➤

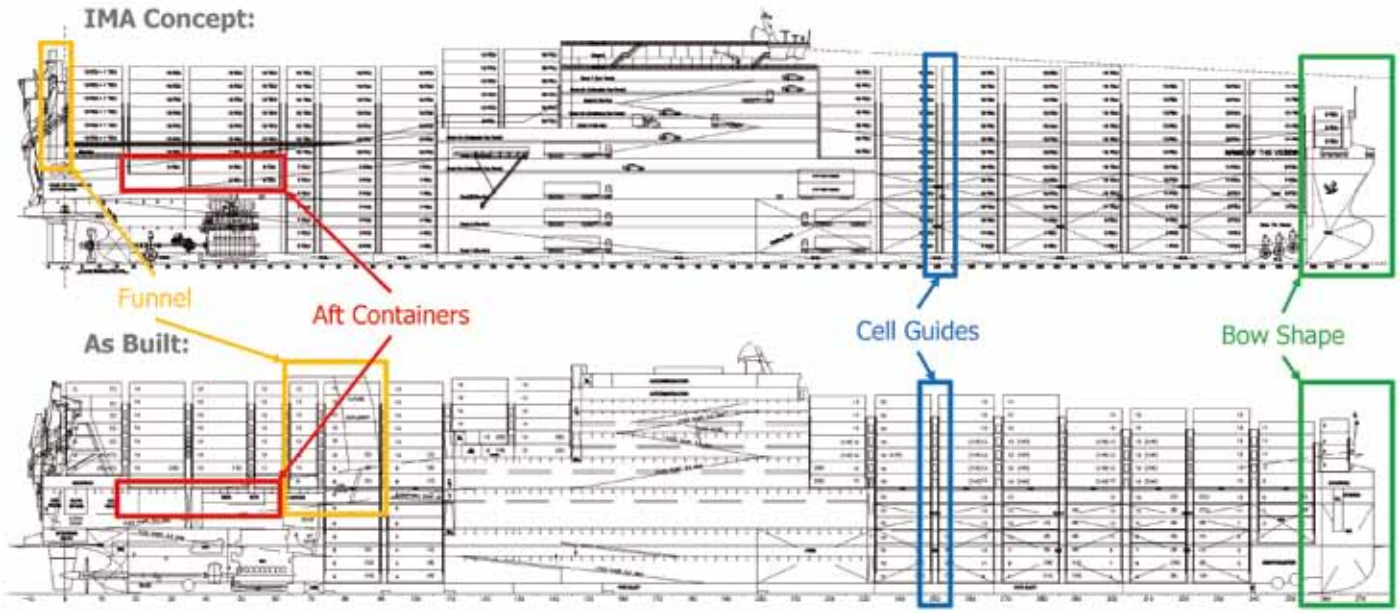

PHOTO: FLOR VAN OTTERDYK

G4: Scope of work:

The contract and basic design carried out by KNUD E. HANSEN included:

- GA and technical specification for contract
- GA and statutory documents
- Lines plan, CFD and model test assistance
- Intact and damage stability
- Noise and vibration
- Cargo Securing Manual
- Hull structure design
- FEM verification of hull structure, global and local
- Deck outfitting
- Machinery – engine room design
- Machinery – system design
- Hull engineering
- HVAC (heating, ventilation and air conditioning)
- Electric, instrumentation and automation

➤ the last in a long list of ro-ro ships and ro-pax ferries that were designed by the prolific Danish naval architects.

As pointed out, KEH's scope of work was twofold; first there was the contract design and once ACL had signed the contract with HZS, KEH was commissioned to complete the basic design. The contract design - which included the GA and all the technical specifications for the contract - proved to be a long process because the order was postponed several times. The basic design covered, amongst others, class drawings, hull structure design, machinery plant arrangement, HVAC, electrical and automation design, CFD and model test assistance, intact and damage stability and noise and vibration analyses. Following completion of this package, the project was handed back to HZS, the detailed design being outside KEH's scope of work. Engineers from HZS joined the KEH team in Denmark during the period of the basic design. This led to a smooth transition when HZS took over and KEH always remained on hand when there were issues.

While KEH had a contract with the yard - and not with ACL - there was always a very good understanding between ACL as end customer and KEH. Back then, ACL's technical staff was still based in Gothenburg which, after all, was not that far away from Helsingør. This made things easy, KEH acting as 'the glue' between HZS and ACL.

Although KEH had been tasked with adapting IMA's concept to ACL's requirements, there was only little room for compromises since ACL focused on keeping the maximum capacity that IMA had promised. "There was almost zero tolerance on payload reduction," Christian G. Damsgaard, KEH's Head of Naval Architecture explained. "In practice it was, however, hard to fully achieve the IMA concept design," he added. "It was a tough task to make it happen and we really had to convince ACL that the boundaries were too tight with modifications being unavoidable."

KEH further developed and optimized the IMA design with all the changes being made for the better. The

Innovative expedition ship

To meet ever-increasing demand for small-scale expedition cruises, KNUD E. HANSEN has recently developed a luxury 300-passenger expedition cruise vessel specifically designed for worldwide operation, including the Arctic and Antarctic regions. Special attention has been paid to seakeeping capabilities. The ship copes extremely well in rough weather and thanks to its compact dimensions (139.4 m x 20.5 m) can operate in confined waters. It is therefore able to call at small ports with narrow fairways. Propulsion and exceptional manoeuvrability is provided by two Azipod units and two bow thrusters. The diesel-electric power plant includes four medium-speed diesel generators in two separate engine rooms in compliance with SRtP rules. The concept ship has an ice strengthened hull (Ice Class 1A), the machinery and service spaces having a double hull.

All public facilities are concentrated on two decks, including an observation lounge with full 360° views. The ship follows the All Outside Cabin concept with 150 standard passenger cabins being spread over three decks. The cabins on the bridge deck come with balconies and a number of standard cabins can be transformed to luxurious suites by applying the newly developed 'FlexCabin system'.

A large sea garage with retractable overhead davit is arranged at the transom for easy launching and retrieval of up to 15 Zodiac type boats and jet-skis.

Clean and green is key; solar cells help offset the vessel's electrical load with space being reserved for battery systems to provide true emission free and silent sailing in extra sensitive areas.

According to Finn Wollesen, KNUD E. HANSEN's Managing Director, several parties have already shown their interest in this next generation expedition cruise ship.


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concept ship featured a bulbous bow. Because this is less effective on ships with a low Froude number, a knife-edge stem was favoured by KEH. The flare in the forebody was also reduced to guarantee better seakeeping capabilities with less slamming, something which is appreciated on the North Atlantic. Another major improvement made by KEH concerned the cell guides. To further increase the container intake, the cell guide supporting structure was extended in height in front of the accommodation. Not using lashings, the cell guide structure shall withstand particular horizontal forces as a cantilever beam. As a result, odd-looking triangular structures were added on the sides. Effectively acting as stiffeners, these were not included on the concept drawings of the vessel. The aft bodies on con-ros are usually very complicated and this was no exception on the G4s. This part of the ship required further surgery by KEH. The original structure was simplified as much as possible which, among others, resulted in removing a few 'single container bay' recesses above the engine room. The funnel had to be relocated too as the original concept did not allow sufficient space. This relocation further led to a more simple structure.

Worth mentioning is that the typical propeller/flap rudder arrangement was replaced by a Wärtsilä Energopac integrated rudder propeller system, offering increased propulsive efficiency and improved manoeuvrability.

STRUCTURAL AND STABILITY CHALLENGES

Probably the most difficult aspect from a naval architectural point of view was the task to combine the dissimilar structural layout of a container and a ro-ro ship, respectively, into a single hull. The area forward of the superstructure is a fully fledged open top containership. The container section with its transverse divisions abruptly stops at frame 231. This is where the ro-ro decks with their longitudinal division start, continuing all the way to the stern. However, there is a small hatchless hold aft of ro-ro Deck 4, with ro-ro space being wrapped around it. Abaft the superstructure, on top of the ro-ro decks, there are container bays extending to the stern. The structural continuity, or better the transition from the 'shoebox-like' forward end to the ro-ro decks, was a really big challenge. The ro-ro section is a very rigid part that is ➤

CELEBRATING NEARLY 80 YEARS OF EXCELLENCE

Mr Knud E. Hansen established his namesake company in 1937. Born in Espergærde (near Helsingør) the son of a skipper who commanded coastal sailing ships, Knud E. Hansen graduated as naval architect in 1925. Prior to starting his own company, Mr Hansen gained experience in shipbuilding by working in a number of yards in Denmark and abroad.

Especially during the sixties and seventies, the company received great acclaim for designing efficient passenger ships - including ferries and the first generation cruise ships - with elegant lines. A very talented man called Tage Wandborg played a key role in the great successes that were booked.

KNUD E. HANSEN has put its stamp on thousands of vessels since it was founded almost 80 years ago. More than 700 vessels were built to a KNUD E. HANSEN design, with 450 hulls being developed and model tested. Additionally, KNUD E. HANSEN designs served 300 conversions and the company also undertook more than 1,000 surveys, onsite supervisions as well as feasibility and R&D studies.

Under the leadership of Finn Wollesen, who was appointed as the company's new Managing Director in 2003, additional subsidiary offices around the globe were opened aimed at bringing KNUD E. HANSEN closer to its clients. Besides the Helsingør headquarter and an office in Odense, there are branches in the UK, Greece, USA, Australia and the Faroe Islands with a total workforce of more than 75 highly trained staff from over 20 different countries.

A selection of some significant ro-pax ferries, pure ro-ro ferries and con-ro ships designed by KNUD E. HANSEN during the past 25 years (the dates mentioned are the respective delivery dates):

1992: PRINS FILIP
1993: SPIRIT OF BRITISH COLUMBIA, SPIRIT OF VANCOUVER ISLAND
1996: GOTLAND
1998: SKÅNE, TOR SELANDIA, SEA CENTURION
1999: TOR SUECIA
2000: TOR BRITANNIA, EUROPEAN CAUSEWAY, EUROPEAN AMBASSADOR
2001: OCEANUS, PROMETHEUS, MOBY WONDER, MOBY FREEDOM, SUPERFAST V, SUPERFAST VI, SUPERFAST VII, SUPERFAST VIII
2002: EUROPEAN HIGHLANDER, ARIADNE PALACE, SUPERFAST IX, SUPERFAST X, SUPERFAST XI, SUPERFAST XII, STENA FORETELLER
2003: STENA FORECASTER, STENA FORERUNNER, NORRÖNA, VISBY, GOTLAND
2004: STENA FREIGHTER, STENA CARRIER II
2005: SMYRIL
2008: CLIPPER POINT
2009: CLIPPER PANORAMA, CLIPPER PACE, CLIPPER PENNANT
2011: BLUE STAR DELOS
2012: BLUE STAR PATMOS, URANIBORG
2013: BAHRI ABHA, BAHRI HOFUF, BAHRI TABUK, BAHRI JAZAN, MN CALAO, MN TANGARA
2014: BAHRI JEDDAH, BAHRI YANBU, SAN SHA 1 HAO
2015: VETERAN, ATLANTIC STAR
2016: LEGIONNAIRE, ATLANTIC SAIL, ATLANTIC SEA, ATLANTIC SKY, ATLANTIC SUN

➤ basically only connected on the sides to the not-so-rigid 'torsion box' front part. This transition zone between the ship's container shape and the ro-ro shape required Finite Element (FEM) calculations that were all part of the package.

Stability, notably damage stability, proved to be another big challenge, once again owing to the vast horizontal ro-ro spaces versus the vertical 'holes' for containers. The SOLAS 2009 probabilistic damage stability had to be combined with the IMO guidelines for open top containerships (MSC/Circ. 608). The G4s have rain convers for comfort's sake, but these are not watertight, the ships essentially being hatchless or open top from a regulatory point of view.

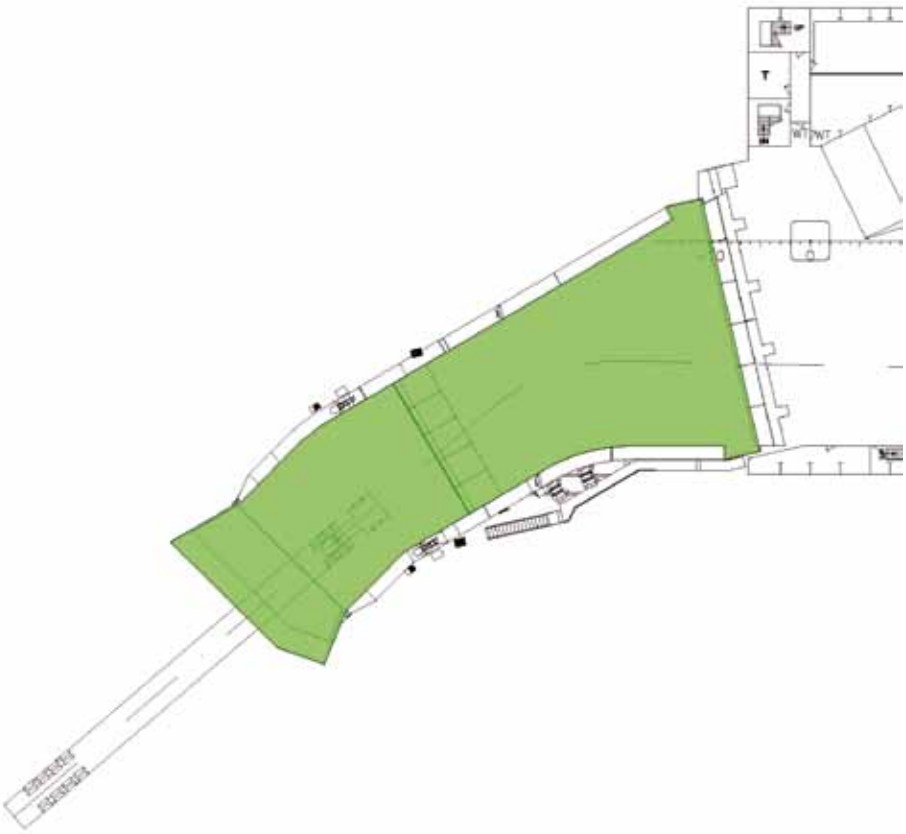
The open top principle only had a short-lived success on large deep sea containerships, but has been successfully applied on short sea container feeders, the 868 TEU 'Sietas 168-type' being one of the most famous examples. KEH already had some experience with the open top phenomenon since they were involved in the design of hatchless containerships that were built for Norasia Line in the early nineties.

To determine whether the vessel complied with the MSC/Circ. 608 guidelines for open top containerships, additional model tests were carried out at MARIN, the Netherlands. These seakeeping tests were done for a significant wave height of 8.5 m at a maximum loaded draught. It was also simulated in combination with tropical rain and all tests were extremely successful with only a minimum amount of green water entering the foremost hold in a worst-case scenario (the IMO guidelines state that the maximum water ingress should not exceed the hatch opening area multiplied by 400 mm/hour).

Another requirement concerned the ship's longitudinal strength. Nine different loading conditions typically suffice to assess a containership's longitudinal strength in flooded condition (MSC/Circ. 608 only mentions that the general and local strength of the hull should be 'sufficient'). Not content with 'only' nine different loading conditions, RINA, the ship's classification society, called for all 31 possible combinations of flooded cargo holds to be calculated, meaning that 279 different scenarios had to be investigated by KEH. Conclusion? The G4s have well exploited stability and strength margins!

UNCONVENTIONAL ARRANGEMENT OF THE RAMPS

KEH also played an important role in making the ro-ro side better. Angles of deck ramps, for instance, were adjusted and instead of two rows of pillars, there is only one set on the centreline, further easing handling of vehicles and break-



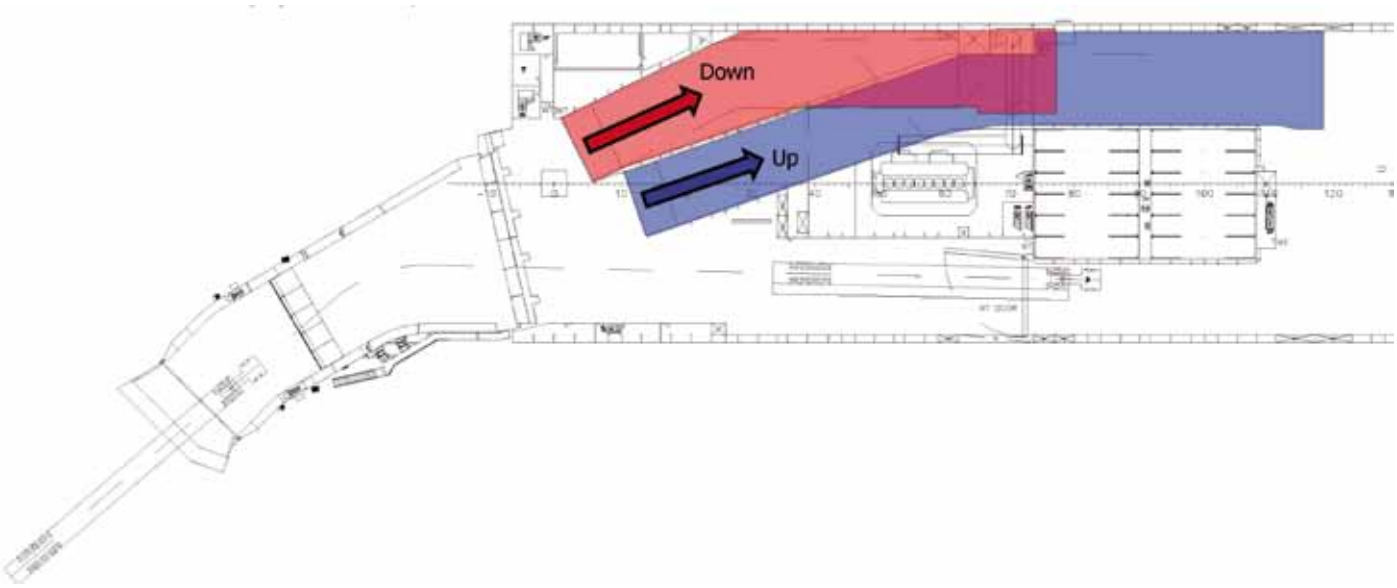


PHOTO: ACL

bulk cargo as well as increasing storage capacity.

However, there were also some design challenges, the curved internal ramps that are located close to the stern being one of them. Ramps are typically longitudinally oriented, but due to the aft container hold, the internal ramps had to be curved with both ramps being positioned to the port side.

The arrangement of the Jumbo stern quarter ramp is equally unconventional. With the container bays extending to the stern, the king posts together with the ramp they hold, had to be positioned in such a way that no container space would be lost. This could only be achieved by reducing the angle at the stern. To compensate for the softly angled connection to the main deck, the ramp sections needed to be curved, taking into account that it should be flush when in a stowed condition.

Notwithstanding all the challenges encountered during the design process, KEH wonderfully succeeded in improving the G4's capabilities without really affecting the capacities. What started out as a concept first deemed unrealistic has become a real game changer. ■

Hudong-Zhonghua Shipbuilding

Following final-round bidding against Yangfan Shipbuilding, Jinling Shipyard and South Korean contenders DSME and Hyundai Mipo Dockyard, ACL awarded the contract for its five G4s to Hudong-Zhonghua Shipbuilding. Construction was entrusted to the company's new yard on Changxing Island, near Shanghai.

State-owned Hudong-Zhonghua Shipbuilding, the result of a merger between Hudong Shipbuilding and Zhonghua Shipyard, is one of China's major shipbuilding enterprises. Part of the China Shipbuilding Group Corporation (CSSC), the yard has a reputation as one of the highest quality shipyards in China with complicated special-purpose vessels and naval ships figuring in its prolific output.

PHOTO: ACL

A NEW STAR IS BORN

G4

In 1967, Atlantic Container Line began service with the *Atlantic Star* and her G1 sister ships. Now, 48 years later, a new *Atlantic Star* enters the maritime universe! Much larger and greener than their predecessors, ACL's new G4 RORO/Containerships can carry just about any cargo you want to move. Space for 3,800 containers and 28,900 square meters of roll-on/roll-off cargo. Give your shipments an out of this world experience.

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