



IN FOCUS: SEATRADE'S NEWBUILDING PROGRAMME

With the acquisition of two high-specification reefer container vessels (Colour Class), Seatrade's newbuilding programme was launched in 2014. Since then the newbuilding order has been extended to six firm and six optional vessels. Just recently, Seatrade announced that the company has agreed to order four handy-size reefer new buildings of 300,000 cubic feet with an additional four vessels in option. The latest development covers the order of mv Juice Express, a juice tanker designed for the trade between Costa Rica and the United States.

The Newbuilding department of Seatrade Groningen has been heavily involved in the development of this new generation eco-design reefer vessels. The department joined forces with the chartering, technical and operations departments, to arrive at the most optimal ship design. On top of that, the sea going staff were invited to give practical input in the development process.

The Colour Class is being built by Yangfan Group, formerly known as Zhoushan Shipyard, which was founded in 1952. The group owns five major subsidiary shipyards including Zhejiang East Coast Shipbuilding. The Juice Express and handy-size reefers have been contracted from Guangxin Shipbuilding & Heavy Industry (GSHI) located in the Guangdong province in South China.

Seatrade Colour Class (6 firm and 6 optional vessels)

The 2,200 TEU specialised reefer container vessels currently under construction at Yangfan Shipyard are oceangoing geared container vessels with a two-stroke diesel engine, a fix pitch type propeller, Promas rudder, a bow thruster and three container cranes. All 40-foot 9'6" containers under deck can be connected to the fresh water reefer container cooling system. The hull of the vessel will be blue with a white Seatrade logo on the side.

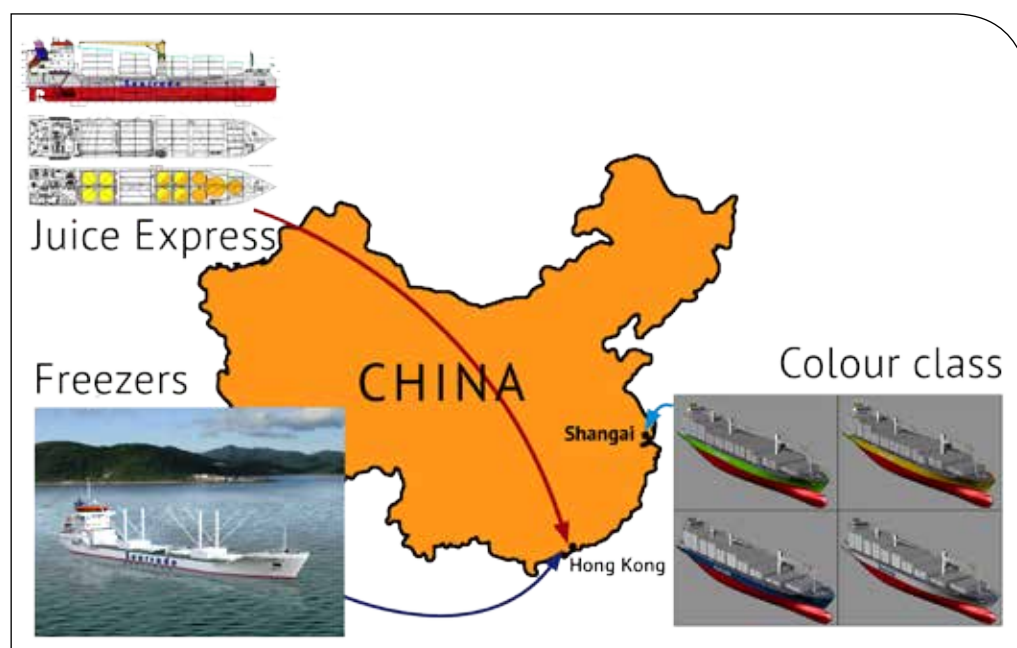
Main dimensions

Length over all	abt.185.00 m
Length between perpendiculars	176.00 m
Breadth (moulded)	30.00 m
Depth to main deck (moulded)	16.50 m
Draft design (moulded)	9.00 m
Draft scantling (moulded)	10.00 m
Deadweight at design draft	abt.22,000mt
Deadweight at scantling draft	abt.26,800mt
Speed at design draft	19 knots

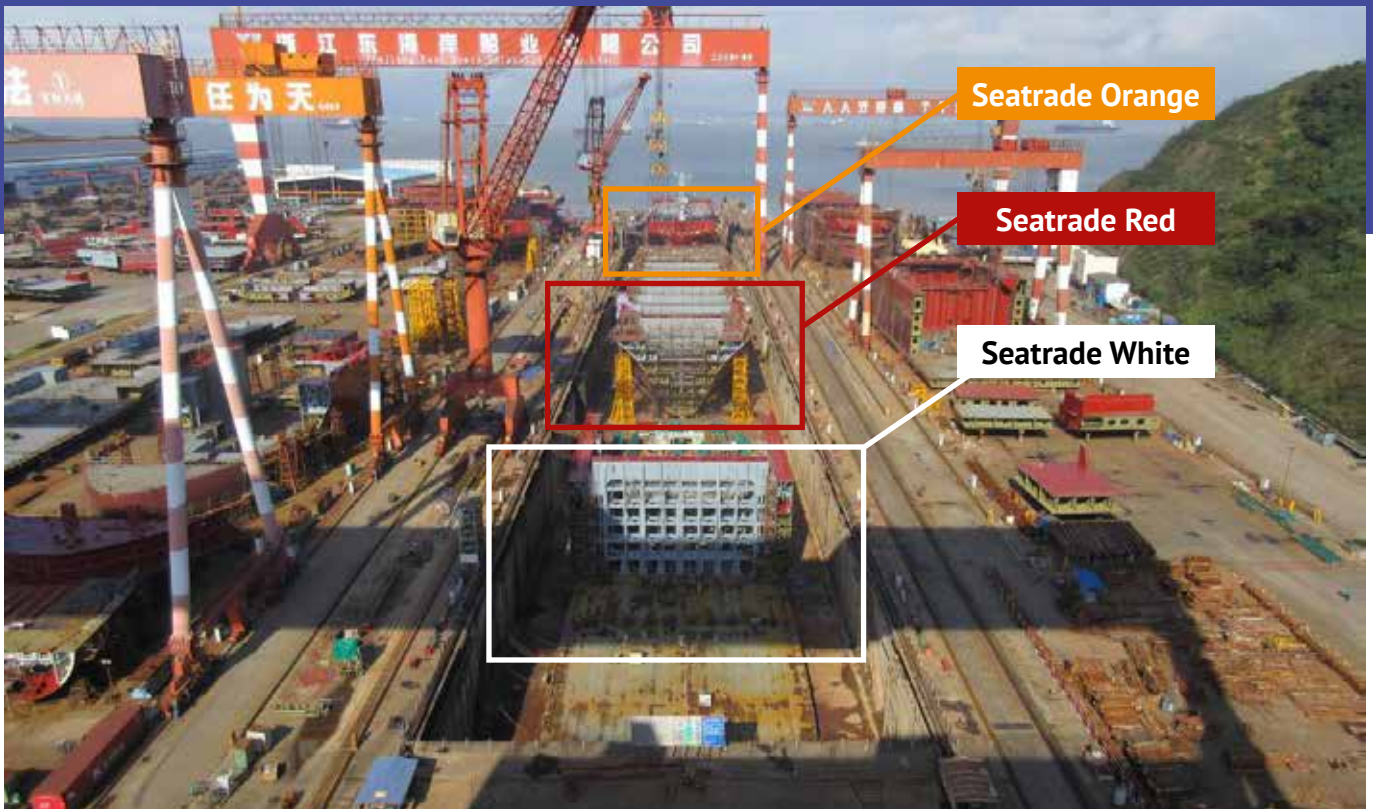
The main engine is of the make MAN B&W G60ME-C9.2 Tier II with part load tuning: two strokes, single acting electrically controlled fuel injection system, crosshead, direct reversible, turbocharger type and fulfilling the IMO NOx Tier II emission limitations.

SMCR	abt. 13,100 kW
CSR	abt. 11,790 kW

The electric generating plant consists of four sets of diesel



Map showing the various newbuilding locations in China

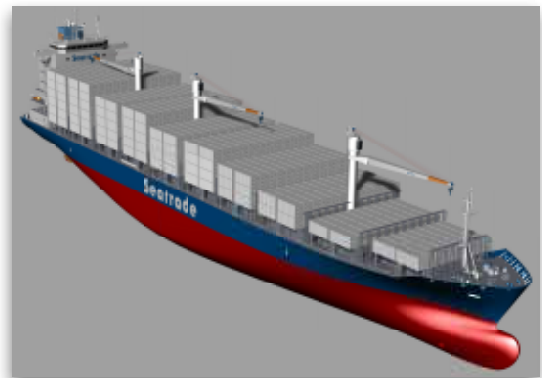


A view of the dry dock in November 2015, showing the progress of the first three Colour class vessels

generators (with 4-stroke engines) and total power of more than 6MW.

The ships are suitable for carriage of different types of containers (20', 40', 45', standard and high cubes) and can be loaded in a flexible way. Containers in the holds are stowed in a cellular guide system in maximum ten rows. Containers on deck and hatches are stowed in maximum twelve rows.

Reefer container plugs	First 4 vessels	Following 2 vessels and 6 options
In hold (5 tiers)	312	312
On deck (3/4 tiers)	358	460
Total	670	772



3D model of the 2,200 TEU reefer container vessels, the Seatrade Colour class

On 10 March 2015, steel cutting ceremonies were held at Yangfan Group to kick off the construction of mv Seatrade Blue. The steel cutting ceremony was attended by the Seatrade management: Yntze Buitenwerf (Seatrade CEO), Mads Ellefsen (Seatrade COO), Mark Jansen (Managing Director of Seatrade Groningen), ICBC Bank representatives, site team, classification society (Lloyd's Register) and shipyard representatives and broker. Mr Hu Jianjiang, Managing Director and Head of the Credit Committee of ICBC, was given the honour to push the start button to flash up the cutting torch and start the cutting of the first steel plate for the vessel.



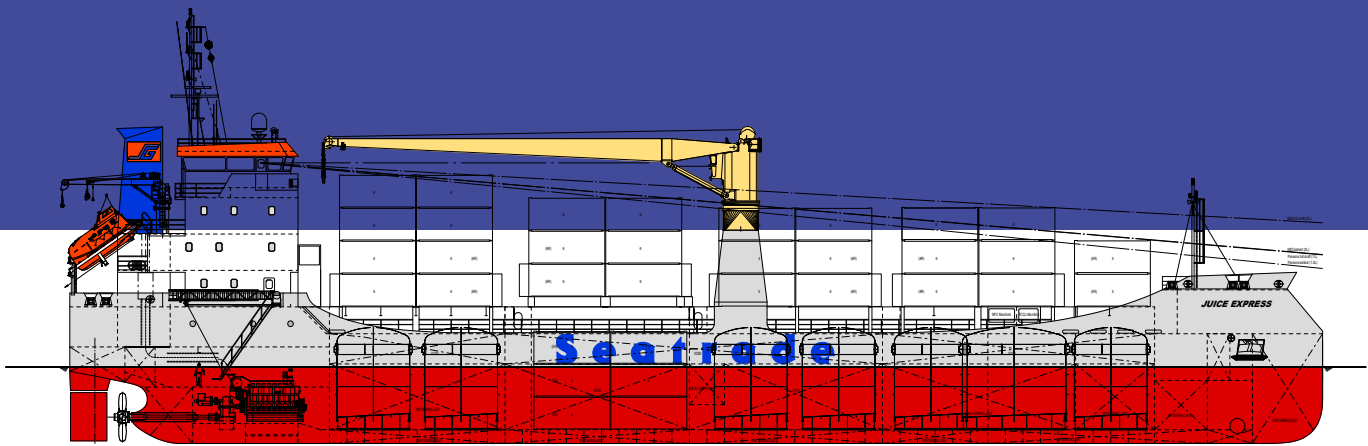
Steel cutting ceremony of Seatrade Blue

In July, September and October, traditional coin ceremonies for the first three vessels were carried out, bringing luck and good economical prosperity to the vessels, crews and shipyard. One Euro and one Yuan crispy shining coin (2015) secured between the two brass plates were placed under her steel block and then nailed with eight nails by the Seatrade representatives (including Seatrade Groningen Technical Director, Vincent Peeters), shipyard representatives and Class Society representative.

Andrew Murawski is the Seatrade lead representative taking care of the smooth progress of the newbuilding projects. It is expected that on 27 November, Seatrade Orange, the first of the Seatrade Colour Class ships, will be launched, while the first delivery is expected in April 2016.



Keel laying ceremony of Seatrade Orange



Profile view of the Juice Express

Juice Express

The Juice Express project has been developed to replace our well known Joint Frost. The vessel will be able to transport Frozen Concentrated Orange Juice (FCOJ) and Not From Concentrate (NFC) Juice. In close cooperation with chartering partners and the design company the newbuilding department developed the new juice tanker with these requirements in mind. The ambitious target of this project is to design a vessel which can carry the double amount of cargo compared to mv Joint Frost but with the same vessel's speed and main engine fuel consumption.

The vessel has four cargo holds. Hold numbers 1, 2 and 4 are insulated and fitted with juice tanks, hold 2 is divided with an insulated bulkhead (2Aft + 2Fwd) and hold no. 3 is a box-shaped dry cargo hold with possibilities for reefer containers. Hold no. 1 will accommodate four tanks appropriate for FCOJ only. Hold no. 2A and 2B will accommodate four tanks appropriate for FCOJ / NFC and hold no. 4, will accommodate four tanks appropriate for NFC only.

The propulsion and powering of the vessel is carried out by engines and installations in accordance with IMO NOx Tier 2. The main engine and three auxiliary engines are designed for use of HFO, ULSHFO and MGO.

One deck crane on starboard side serves all container slots below and above deck.

The controllable pitch propeller has an optimum diameter ensuring, in combination with optimised hull lines, best possible efficiency and lowest possible fuel consumption. The shaft of the propeller is mounted to a reduction gearbox aft of the main engine.

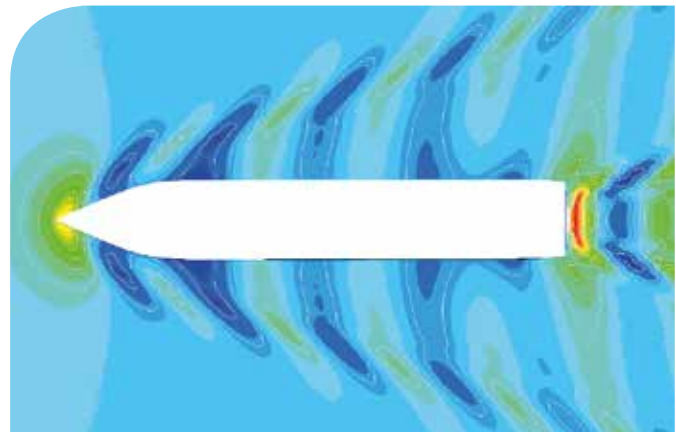
Main dimensions:

Length over all	99.90 m
Breadth moulded	15.40 m
Depth to main deck	8.75 m
Draught summer	6.10 m
Deadweight at summer draught	4,600 ton (approx.)

Prior to the model tests, the optimisation process of the hull lines took place using a combination of potential flow and viscous flow CFD (Computational fluid dynamics) codes.

In order to have optimal operational performance, the special Groot Cross-Bow® was chosen. The hull lines resulting from this optimisation process have been the starting point of the model manufacturing.

On 29 and 30 October 2015, model tests of the Juice Express were carried out in a tank towing centre at MARIN (Maritime Research Institute Netherlands) in Wageningen, The Netherlands. We were very pleased to see results of the tank towing tests exceeding our expectations. In December 2015, the keel block ceremony of the Juice Express will take place. The vessel is scheduled to be delivered in June 2017.



CFD optimisation of the hull shape



Model test at sea trial condition and a speed of 11 knots



Artist's impression of the 300,000 cbft freezer



Artist's impression of a high seas transshipment

300,000 cubic feet handy-size reefer

The Newbuilding, Operations and Technical departments teamed up with Hans Mol from GreenSea Chartering (the shipping pool established by Green Reefers and Seatrade Group) to deliver an optimum design in the range of 300,000 cubic feet.

The design has a length of 114.90 m length over all with a maximum intake of frozen and cooled products. Same includes cooling and ventilation for the transportation and transshipment of frozen fish, transportation of citrus fruits and potatoes.

The vessel has four cargo holds divided by two tween decks with a hatch cover arrangement on the main deck and tween decks enabling flexible loading / discharge ensuring short port operation times. Between the cargo holds 1-2 and 3-4, four sets of derricks are located, together covering all cargo hatches and most deck areas.

The fix pitch propeller has an optimum diameter in combination with optimised hull lines ensuring the best possible efficiency and lowest possible fuel consumption. The shaft of the propeller is mounted directly to the main engine.

For optimum manoeuvring a spade type rudder is installed, operated by a cylinder type steering gear and a tunnel type bow thruster installed in the fore ship. The manoeuvring configuration and equipment are designed for low speeds and transshipment operations.

A heat recovery system from the main engine/ auxiliary engines cooling water systems and main engine exhaust system will be installed.

The propulsion main engine is a two-stroke, five-cylinder line engine, air started, turbocharged and equipped with an air cooler.

Engine data	
Make	MAN B&W (or alternative make)
Type	5S35ME-B9.5-TII (or equal) with high efficiency turbocharger type
Specified MCR (SMCR)	3,325 kW
Engine speed	127 rpm
No. of cylinders	5
Cylinder bore	350 mm

Main dimensions:

Length over all	114.90 m (approx.)
Breadth moulded	18.00 m
Depth to freeboard deck	10.30 m
Draught summer	7.50 m
Design draft	6.30 m
Deadweight at summer draught	8,140 tons (approx.)
Deadweight at design draft	6,000 tons (approx.)

The design is currently undergoing hull lines optimisation by means of CFD. On 16 and 17 November 2015, a model test will be carried out in the tank towing centre of MARIN (Maritime Research Institute Netherlands) in Wageningen, The Netherlands. The delivery of the first 300,000 cubic feet reefer is scheduled in the fourth quarter of 2017.

Chief Engineer Keesjan Keus and Captain Rob Schenkeveld (temporary assistants of Newbuilding Department)
Bert de Boer (Project Manager)
Jarek Cisek (Head of Newbuilding Department)
Seatrade Groningen