

Safety aspects of Rauma Brattvaag low pressure hydraulic deck machinery that make it attractive to LNG carriers and VLCCs include reliability, availability, reduced risk to the crew working on deck, and low maintenance.

Rolls-Royce is an established supplier of anchoring windlasses and mooring winches for large merchant vessels. Because all the normal drive systems are offered, dispassionate advice can be given to shipowners and yards about the best solution for a particular ship. The choice is between low pressure or high pressure hydraulics, and electric systems using either pole-changing or variable frequency for speed control.

The system that is proving popular for the next generation of liquefied natural gas (LNG) carriers now on order is the low pressure hydraulic system operating at 64 bar working pressure. A long list of vessels has already been equipped with this type of Rauma Brattvaag deck machinery.

The Rolls-Royce 'safety first' approach fits in well with LNG carrier operation philosophy. It works in a number of practical ways.

LP hydraulic deck machinery has a good reputation for reliability and availability. "We experience that the LPH system is more reliable and has less down time than other systems because of its simple and less-complicated design and system solutions," reports Captain Klaus Helle of the 138,000m³ LNG carrier *Berge Boston*. Work on winches is not permitted



FAR LEFT
Arctic Lady and
LEFT & BOTTOM
Berge Boston,
two LNG carriers
equipped with
Rauma Brattvaag
LP hydraulic deck
machinery.

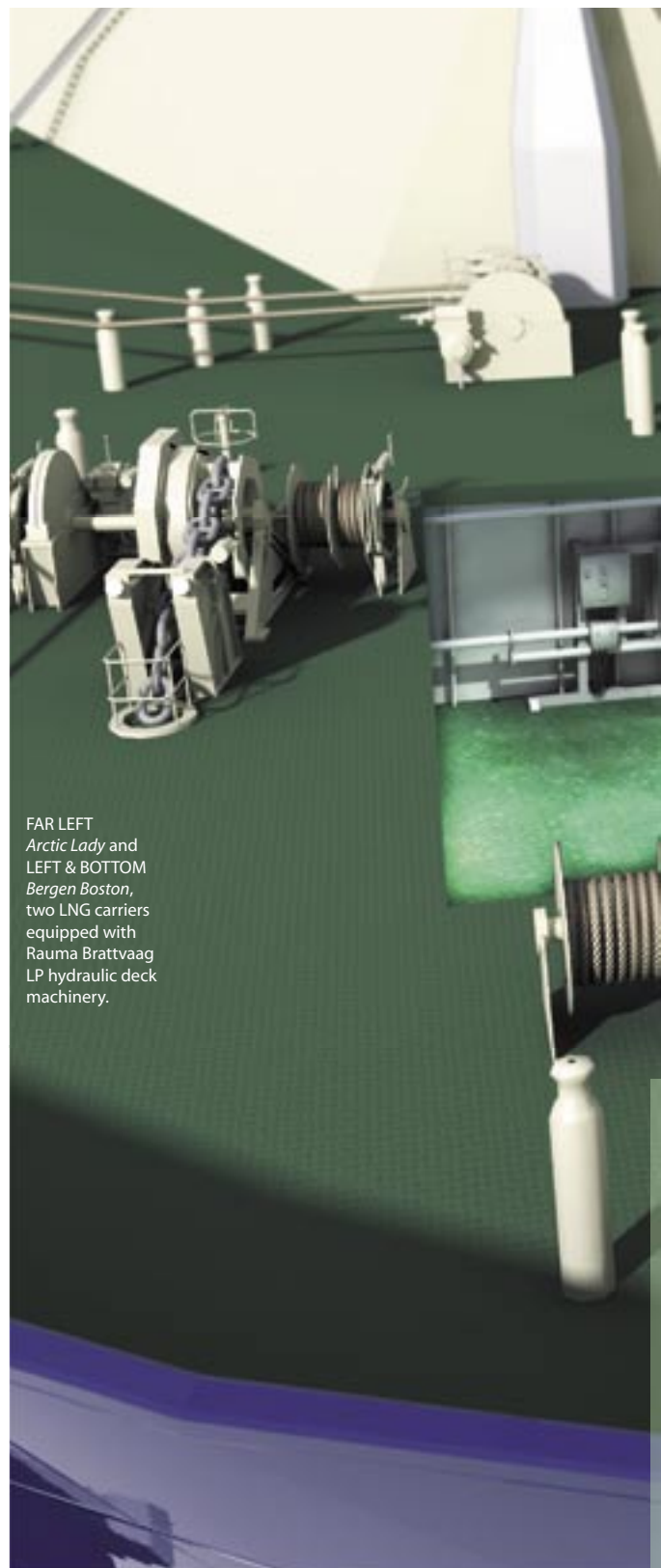
while alongside at LNG terminals so vessels need to present themselves at the terminal with a full complement of working deck machinery.

Another element of safety is reducing risk to the crew working on deck. The high motor torque of 64 bar hydraulic systems means that motor and gear cases can be compact, and a control station arranged so that the crew have a clear view of all the operations. This is important where anchors are being raised and lowered and where the crew is working near wires and ropes under high tension.

A third element is that this Rauma Brattvaag hydraulic deck machinery is designed for low maintenance despite operating in a tough environment. Pumps, valves, filters and other items requiring maintenance and inspection can be housed under the deck where working conditions are better than trying to maintain systems on an open deck.

For anchor windlasses the low pressure hydraulic system has a number of advantages. The most important one is that high speed dynamic lowering of the anchor is available. LNG carriers and VLCCs will have anchors weighing in the region of 20 to 30 tonnes, accompanied by a hundred or more tonnes of chain, and it is important that this is kept under control at all times. Many other systems rely on the brake for control when dropping the anchor. This places a high premium on brake maintenance and failure can have severe consequences. With the Rauma Brattvaag system, the anchor can be lowered under full control using the motor at up to 40m/min. The brake is a back-up. Some other systems have, in theory, dynamic lowering capability but this is often too slow to be of practical use.

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THE ROLLS-ROYCE COMMITMENT TO SAFETY FITS IN WELL WITH LNG CARRIER OPERATION PHILOSOPHY

With low pressure hydraulics much of the equipment can be installed below deck.

LARGE SHIPS

Safely Secured

Winch outfit suits VLCCs

A good example of LP hydraulic deck machinery applied to very large tankers is the Rauma Brattvaag winch outfit ordered for seven VLCCs to be built for National Iranian Tanker Co by Hyundai in Korea.

There are two groups of winches located on the foredeck and aft, each group served by an electro-hydraulic power pack. On the foredeck are two combined winches designed to handle 117mm, U3 grade anchor chain, based on anchoring depth of 110m. Anchors can be lowered under full control at up to 35m/min using built-in dynamic

features of the hydraulic motors, with the mechanical brakes in reserve.

A total of eight winches, four in each group, take care of mooring requirements. They are of the two drum plus warping end type; one drum for 280m of 42mm wire, the other holding the same amount of wire plus 150m of pick up rope. Winches and windlasses can be controlled locally or remotely, and everything is designed for service worldwide in temperatures ranging from -20 to +50 degrees Celsius.