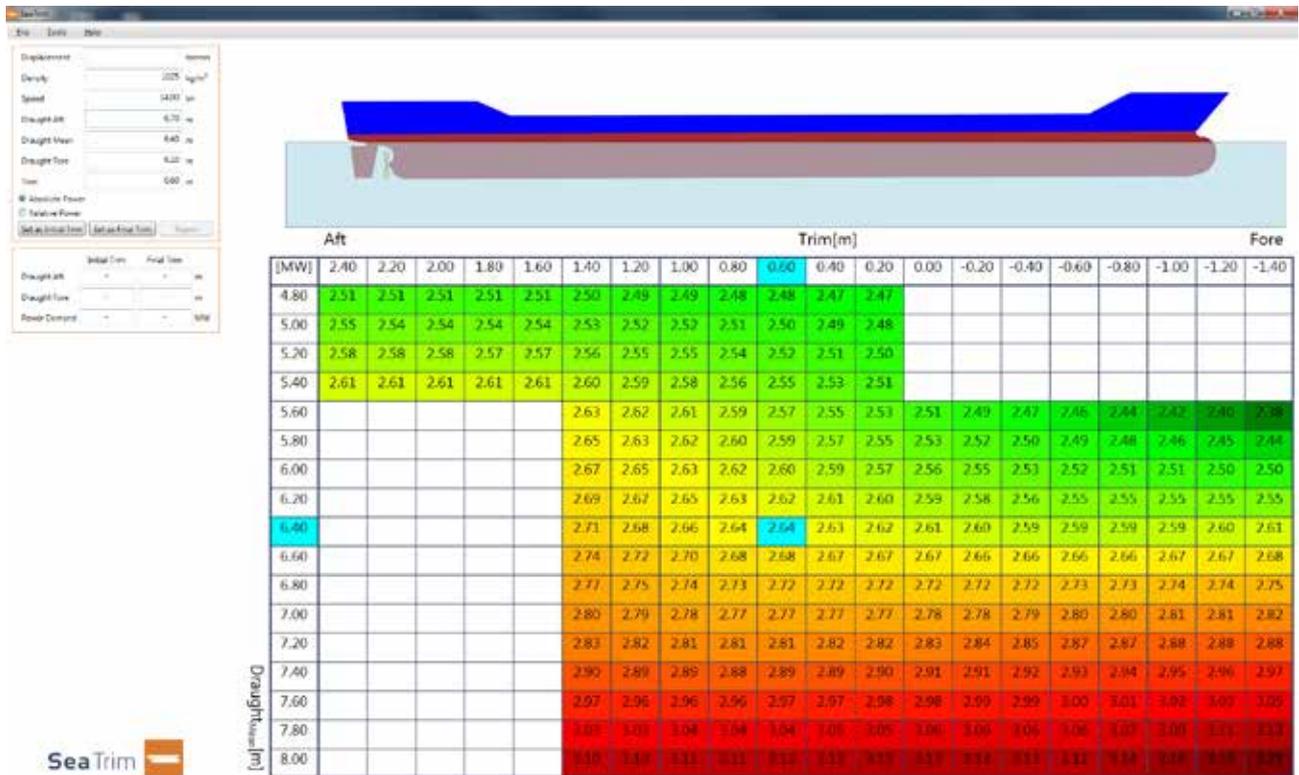


Optimum Trim Guidance



SeaTrim 3 from FORCE Technology makes it possible to determine the optimum trim for a given combination of speed and displacement within seconds.

The SeaTrim 3 decision support tool is designed to provide a quick and safe guidance in selection of the right trim in relation to the loading condition and planned speed.

SeaTrim 3 offers large fuel savings and reduction of air emissions on all types of vessels. Especially vessels with large bulbous bows operating at light loading conditions can obtain large fuel savings. But significant savings has also been documented for smaller vessels with less pronounced bulbous bows.

The tool is used both in the overall cargo planning and on-board the vessel during daily operation.

SeaTrim is a simple and userfriendly tool which is delivered in combination with trim tests or trim calculations performed by FORCE Technology.

Fuel savings with SeaTrim

At FORCE Technology, we have performed trim test of numerous vessels, covering tankers, container vessels, LNG carriers, ro-ro vessels etc., and today more than 400 vessels are sailing with trim guidance delivered by FORCE Technology. Our tests show possible fuel savings of 3-15% at specific conditions. In overall fleet operations, savings is typical between 3-4%.

Typical Return on Investment (ROI) for a trim assignment is in range of 1-6 months depending on vessel type, operation and number of vessels in the series.

Behind SeaTrim

SeaTrim 3 is based on either scale model tests or advanced RANS CFD calculations where the influence of trim is investigated for a range of combinations of loading conditions and speeds.



1.00 AFT TRIM
FUEL OIL CONSUMPTION
129 MT/DAY

POTENTIAL SAVINGS
11 MT/DAY



1.25 FWD TRIM
FUEL OIL CONSUMPTION
=
118 MT/DAY

The pictures show a Post Panamax sailing at 20 knots. By sailing with a 1.25 fwd trim, the Fuel Oil Consumption is 8.5 % lower than by sailing with 1.00 aft trim. This equals \$ 6,160 saved per day of operation at a fuel oil price of \$ 560 USD/ton IFO380 (August 2014).

Typically 100 to 150 combinations are investigated.

For the scale model testing, we have developed a fast and efficient procedure to perform the many speeds and loading conditions necessary to cover the typical conditions of operation.

Using SeaTrim

SeaTrim 3 is easy to use and only requires limited input by the user.

Three parameters are necessary to evaluate the optimal trim of your vessel, namely draught forward and aft (typically taken from ship loading computer) and the planned vessel speed (from vessel route planning or the actual vessel speed).

SeaTrim 3 displays and advise the user through simple colour codes on the best obtainable trim condition in relation to speed and displacement.

Should the selected trim not be optimal, the tool gives an intuitive and quick guidance to where the optimum trim can be found. The user can then use his cargo or ballast water to obtain the best possible trim.

On many vessels it is also possible to take on board additional ballast water in order to find the best

obtainable condition within the vessel's operational limitations and still gain fuel savings.

Return of investment

FORCE Technology offers to evaluate the approximate gains on your specific vessel free of charge prior to starting a trim test assignment.

The information we need from our client is ship type, ship size, engine power and the ship's trim in operation. This is sufficient for us to calculate the return of investment.

Green Ship of the Future

The SeaTrim decision support tool is developed as part of the joint industry project Green Ship of the Future. Here SeaTrim has undergone tests on board a series of tanker vessels. For further information, please visit www.greenship.org.

The SeaSuite Family

SeaTrim is a part of the SeaSuite of onboard systems provided by FORCE Technology with focus on fuel efficiency. The SeaSuite include SeaEngine – engine performance monitoring, SeaPlanner – voyage planning, SeaTrend – performance monitoring. The modules in SeaSuite are integrated so data from SeaTrim can be utilized by either SeaTrend or SeaPlanner.

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Subject to change without notice