

Defining a ship's true cargo system requirements through data analysis



CARGO SYSTEM ANALYSIS FOR CONTAINER SHIPS

We can calculate a ship's lifetime earnings based on its actual cargo profile

The cost of a shipboard cargo handling system is modest in comparison with the whole ship investment. But its efficiency has an immediate effect on the ship's earning potential and on the return on the investment throughout the ship's lifetime. It therefore makes good economic sense to invest in a system that provides a competitive edge and takes full advantage of a ship's earning potential from day one.

This is why MacGregor uses a vessel's earning potential as the starting point for the ship design process and its container stowage arrangement. As a result, the final cargo system brings a return on the investment sooner because its cost efficiency is higher than a system based on 'best guess' estimations.

An integral part of this design process is an accurate analysis of the cargo profile of a newbuild or an existing ship. This is achieved by sampling the cargo profile of the operator's existing fleet along with an analysis of the planned cargo, and uniformly distributing that cargo profile over the analysis period. By factoring in vessel characteristics and port details, MacGregor is able to simulate the vessel's operational costs and revenue earned, and therefore establish the feasibility of the investment

A statistical review of the cargo profile enables the productivity of different cargo systems and ship concepts to be compared. Therefore, MacGregor has developed a validation process for comparing the utilisation rates of container vessels equipped with various cargo handling and stowage arrangements.

As result, we can offer two different analysis models, the utilisation model and the cost model, and together these produce the individual lifecycle earning report (TIERreport 2.0).

TIERreport 2.0 - Utilisation model

In the TIERreport 2.0 *Utilisation model*, the investment efficiency between the different cargo systems is evaluated based on the ship's 'utilisation rate' and 'carried rate' over the simulation period.

The utilisation rate indicates how well the vessel's cargo capacity is utilised throughout the simulation. The carried rate indicates how many containers of the generated cargo profile could actually be carried by the vessel on the defined service route.

To be able to make a reliable container stowage plan for each leg and to maintain a safe metacentric height (GM) and trim values, hydrostatic information about the vessel is also required

TIERreport 2.0 - Cost model

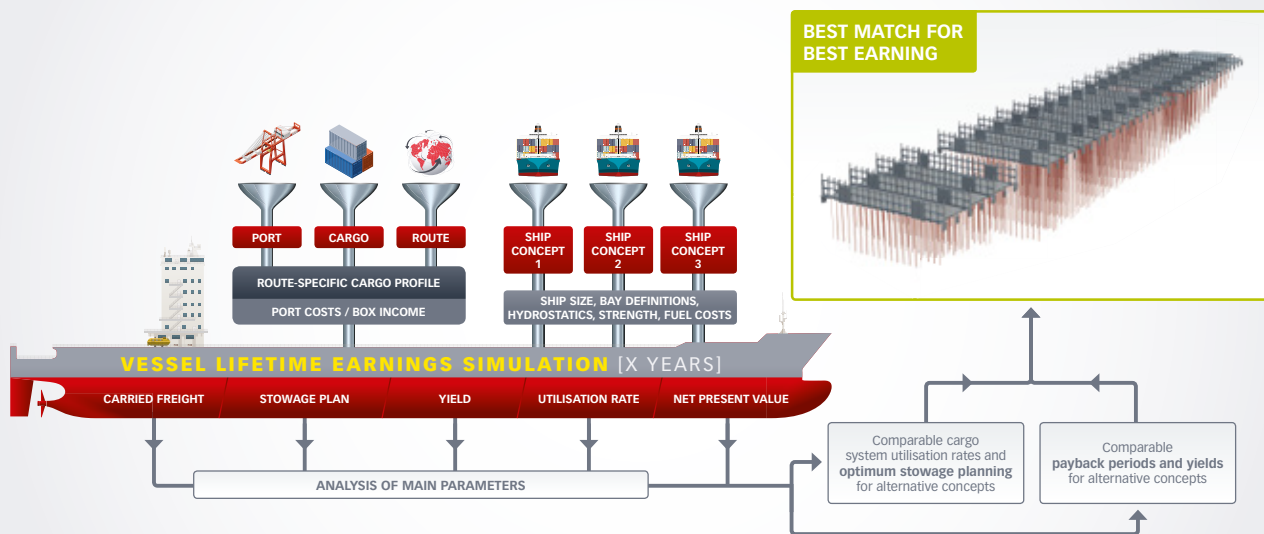
The main purpose of the TIERreport 2.0 *Cost model* is to compare and contrast the earning capacity vs. the operating costs of container ships equipped with different cargo systems. Cost modelling completes the validation process and as a result, the individual lifecycle earning report of the vessel can be produced.

This report includes comparative information where, for example, the current cargo system is compared with the proposed cargo system. This approach makes it possible to optimise the vessel's cargo system to match the service in question. The report can be produced to cover any given number of years. The TIERreport 2.0, for example, includes the following:

- Utilisation rates of the vessel based on the existing cargo profile and cargo system
- Increased utilisation rate potential based on alternative cargo systems
- Comparative net present value between alternative cargo systems
- LashMate™ checked load plans for all alternative cargo systems for each port and for each rotation
- Outline of extra revenue potential that can be achieved with alternative lashing systems.

The prerequisite for an accurate report is access to all relevant data and information needed for validating the cargo system. Such data includes all information that affects the earning potential of a vessel.

All information is considered confidential, and therefore a non-disclosure agreement can be signed between the parties.



Utilisation model report

Input

- Cargo profile: the number and weight of containers that will be carried at each port of loading (POL) to each port of discharge (POD), i.e. cargo transportation demand.
- Hydrostatics: a basic check is carried out using a container stowage simulation tool (CONSORT) to calculate the required ballast water for a given cargo load and required arrival and departure conditions.
- Cargo space layout: this is used to secure feasible loading conditions for container stacks.
- Route: sequence of ports in order of call.

Output

- TIEReport 2.0 based on payload capacity increase per year
- Utilisation rate and carried rate of containers
- Lashmate™ checked stowage plans for each leg of the service
- A comparison of two or more vessels equipped with different cargo systems

Cost model report

Input

- Investment costs: cost of investment for each comparable system
- Port characteristics: including timings (berthing, quay time), fees and the crane information of individual ports
- Freight rates: these are required to generate revenue varied freight rates from each POL to POD
- Vessel expenditures: for example, fuel consumption in port and in transit per hour

Output

- As per utilisation model outputs, and in addition include:
- a TIEReport 2.0 based on capital expenditure (Capex), operating expenditure (Opex) and revenue accumulated during the investment cycle of each alternative cargo system
- principles for a final cargo system investment decision

The efficiency of a container ship's cargo system has an immediate effect on the ship's earning potential and on the return on the investment throughout the ship's lifetime. Through statistical analysis of the cargo profile, MacGregor is able to assess the productivity of different cargo systems and ship concepts. It can help customers make the best decisions at the investment phase, for both a newbuild and refit, and deliver maximum profitability from a ship's 'earning machinery'.



Lloyd's Register Quality Assurance certifies that the Quality Management System for Cargotec Marine is ISO 9001:2008 compliant.

MacGregor is the world's leading brand of engineering solutions and services for handling marine cargoes and offshore loads. MacGregor products serve the maritime transportation, offshore and naval logistics markets, in ports and terminals as well as on board ships. Our cargo flow solutions integrate cargo access, stowage, care and handling functions to suit a particular ship's cargo profile. This benefits its productivity, environmental impact and profitable service lifetime. MacGregor is part of Cargotec. Cargotec's class B shares are quoted on NASDAQ OMX Helsinki.

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