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Dressing up for a better CII

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On 1st January 2023 the statutory requirement for the CII certification entered into force. It applies to ships of 5.000 GT and above. Based on a ship's CII, its carbon intensity will be rated A, B, C, D or E (whereby A is the best). The rating indicates a major superior, minor superior, moderate, minor inferior, or inferior performance level. The performance level will be recorded in a "Statement of Compliance" to be further elaborated in the ship's Ship Energy Efficiency Management Plan (SEEMP).

For a container vessel "annual efficiency ratio (AER)" must be used as CII, seen in the following simplified formula:

$$AER_{attained} = \frac{\text{Total annual CO}_2 - \text{emissions}}{\text{Deadweight} * \text{Total annual distance sailed over ground}}$$

(based on annual fuel oil consumption and defined conversion factor per fuel type)

The achievable CII rating for a vessel is mainly influenced by the operator of the tonnage, as he gives the voyage/speed orders, which is directly linked to the fuel consumption/emissions of the vessel's main engine. In our fleet of container vessels, the average share of fuel consumption of the main engine vs. auxiliary engines and boilers stands at about 82%.

Older container vessels had been especially designed for high speed and seldom realistic operational profiles (time at sea, the vessel has spent under certain speeds and certain draughts). In the past this led already to quite some vessels modifications towards slow steaming. Meanwhile, the knowledge of the liner companies about the operational profile of a certain vessels is owing to more data being available, much more detailed. Therefore, it makes sense – especially for longer charter contracts and for dedicated routes – to evaluate the possible fuel savings of the operational profile compared to the initial vessel configuration and the cost of the vessel's upgrade.

Additionally the remaining 18% consumption caused by the diesel generators and boiler requires as well an analysis. The carriage of reefer containers for the operator of the tonnage is included in this share.

The starting point of this approach is not new, at least speaking for our company, as all of our owned vessel's have been upgraded over time of their longterm charter commitments. We asked ourselves now, as well, as for 3rd party vessels in our fleet, which are employed in shorter charter contracts and went into talks with the owner and the liner company. The pressure of the CII regulation on lowering emissions surely helped and likewise the available basket of possible upgrade solutions with short payback times.

We'd like to share the project of upgrading a 3.500 TEU vessel which covered the following modification during her recent dry-docking:

- Installation of a new bulbous bow
- Propeller re-shaping.
- Installation of "Hub Vortex Absorbed Fins" (HVAF)
- Installation of "Pre Shrouded Vanes" (PSV)
- Application of silicon paint
- Draft increase
- Autopilot eco tuning
- Loading computer
- Frequency Converter Installations for engine room fans, seawater pumps and LT cooling water pumps
- Installation of LED lighting

and we'd like to add some further modification that we are planning for the same customers on a different vessel for a dry-docking which was just finished:

- Waste heat recovery system
- Use of special filters for main engine and auxiliary engines lub oil instead of purifiers

The Offen Group is a Hamburg-based shipping company and the biggest German tramp owner for Post-Panamax container ships. The group has about 1.500 employees at sea and 115 employees based in the head office. We offer high quality service to our charter clients and professional ship management for own and third-party ships.