



LONG-TERM CREW SCHEDULING WITH CREW SCHEDULING OPTIMIZER (CSO)

Current challenges

- **Compliance requirements:**
Ship owners, flag states and ship managers increasingly demand minimum standards not only for short-term working time regulations but also for the long-term composition of the crew.
- **Manning costs:**
Manning costs represent the largest amount (30-50%) of ship operating costs. Therefore an effective crew planning is essential for competitiveness from a cost perspective.
- **Seafarers satisfaction:**
A reliable long-term planning as well as consideration of specific needs of seafarers is essential for employee motivation and a high retention rate.

- **Complexity of crew scheduling:**
There are several scheduling rules and assessment criteria for a crew schedule which are dependent on each other in a complex way.

Functionalities of the CSO

The CSO is a software application which creates a long-term and optimized crew schedule for the whole fleet (in general for one year). As a result the contract periods for all positions are calculated and assignments of seafarers to these contract periods are made. Thereby the CSO provides the following main functionalities:

- **Adjustability of planning parameters:**
This includes the individual setting of specific planning parameters, the activa-

tion of scheduling rules as well as the weighting of assessment criteria for a crew schedule.

- **Visualization:**
Main elements of the visualization are relief plans (position and seafarer view) and views on the fulfillment of experience requirements (i.e. rank, company, ship type).

- **Different analysis options:**
The assessment criteria for a plan (i.e. experience times, crew change costs) can be analyzed in different aggregation levels (whole fleet, ship type, ship class).

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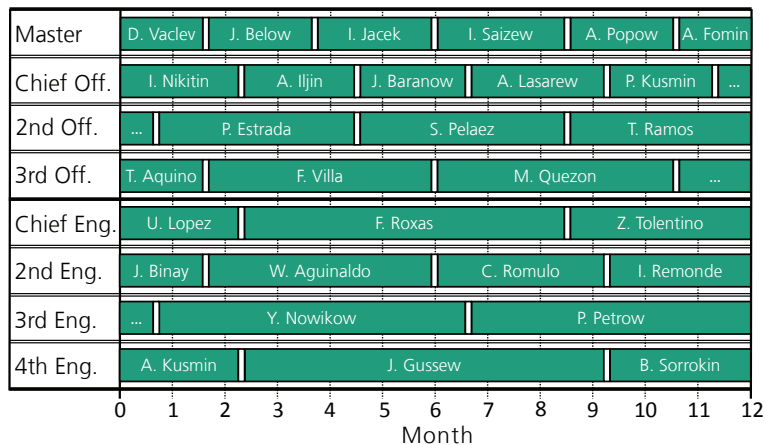
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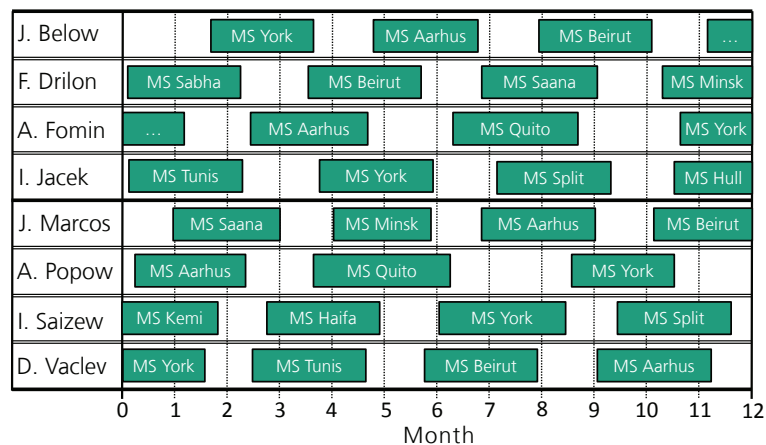
IMPRESSUM

MS York



Relief Plan - Position View

A selection of seafarers



Relief Plan - Seafarer View

Implementation of the CSO

The individual crew scheduling requirements in your company are jointly determined in workshops to customize the software application to your specific requirements. The CSO is based on a pre-defined input data structure and provides the planning results as an output which can be used in your existing systems.

Your benefits of using the CSO

1. Consideration of compliance requirements and scheduling rules

The CSO ensures the fulfillment of all requirements in this field if the input data allows a mathematical feasible solution. For instance, an experience time threshold, which has to be exceeded by the seafarers of two defined positions (i.e. Master and Chief Officer), could represent a specific compliance requirement.

2. Mathematical optimized crew schedule

Methods of mathematical optimization are used to solve the complex planning problem under consideration of scheduling rules and assessment criteria for a crew schedule. Due to the many options to create a crew schedule and the existence of several scheduling rules the use of mathematical optimization methods leads to a better crew schedule than a manually constructed one.

3. Whole fleet optimization

The CSO processes and optimizes the crew scheduling problem for the whole fleet. This is an advantage over the common use of ship pools (and associated seafarer pools) which are planned independently.

4. Long-term crew schedule

Due to the possibility to communicate the contract periods at an early stage to the seafarers the long-term schedule constructed by the CSO can improve the reliability and the retention rate of seafarers. This represents an improvement over the short-term scheduling for every position some weeks before the end of the current contract.







5. Increase of seafarer satisfaction

Beside compliance and cost aspects the CSO can consider aspects of seafarer satisfaction. This includes for example the consideration of individual leave times and provided availability dates of the seafarers. The seafarer satisfaction will become more important in the future because of increased competition for well qualified seafarers.

6. Well-founded decision for a planning policy

It is possible to calculate different scenarios for the same planning horizon by changing the weighting factors of the assessment criteria for a crew schedule. This enables the planner to identify the impact of a specific planning policy. For example, change in costs can be quantified if the seafarer satisfaction rises by a certain level.

Benefits of the CSO

-  1. Consideration of compliance requirements and scheduling rules
-  2. Mathematical optimized crew schedule
-  3. Whole fleet optimization
-  4. Long-term crew schedule
-  5. Increase of seafarer satisfaction
-  6. Well-founded decision for a planning policy