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A hybrid heuristic for the Flexible Ship Loading Problem

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The emergence of the mega-container vessels puts container terminals at an increased pressure. Bigger vessels require more crane moves per vessel, and terminals are under pressure to minimise the turnaround time for the vessels. Minimizing the turnaround time makes it possible for the carriers to realise more of the savings potential that comes with the bigger vessels, as they will not have to catch-up on the sea to stay on schedule because of port delays. For the terminal, improving productivity and minimising turnaround times helps to free up berth positions, and clears up capacity for another vessel.

Acknowledging that improving terminal productivity is a shared goal between the carrier and the terminal, the Flexible Ship Loading Problem investigates a collaboration between the terminal and liner shipping companies. The liner provides the terminal with a stowage plan based on container classes. The terminal then has the flexibility of determining the position of the specific containers, as long as it adheres to the provided stowage plan, while also scheduling transfer vehicles to retrieve the container from the yard and deliver it in front of the crane. Doing so will give the terminal better conditions for minimising the turnaround time for the vessel.

In this talk, we wish to present a new mathematical model for the Flexible Ship Loading Problem, and a hybrid heuristic to solve the problem. Both of which improves the state-of-the-art.

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