

**Brouer, Berit D.; Dirksen, Jakob; Pisinger, David; Plum, Christian E. M.; Vaaben, Bo**  
**The vessel schedule recovery problem (VSRP) – a MIP model for handling disruptions in liner shipping.** (English) [Zbl 1292.90182](#)  
Eur. J. Oper. Res. 224, No. 2, 362-374 (2013).

Summary: Containerized transport by liner shipping companies is a multi billion dollar industry carrying a major part of the world trade between suppliers and customers. The liner shipping industry has come under stress in the last few years due to the economic crisis, increasing fuel costs, and capacity outgrowing demand. The push to reduce CO<sub>2</sub> emissions and costs have increasingly committed liner shipping to slow-steaming policies. This increased focus on fuel consumption, has illuminated the huge impacts of operational disruptions in liner shipping on both costs and delayed cargo. Disruptions can occur due to adverse weather conditions, port contingencies, and many other issues. A common scenario for recovering a schedule is to either increase the speed at the cost of a significant increase in the fuel consumption or delaying cargo. Advanced recovery options might exist by swapping two port calls or even omitting one. We present the Vessel Schedule Recovery Problem (VSRP) to evaluate a given disruption scenario and to select a recovery action balancing the trade off between increased bunker consumption and the impact on cargo in the remaining network and the customer service level. It is proven that the VSRP is NP-hard. The model is applied to four real life cases from Maersk Line and results are achieved in less than 5 seconds with solutions comparable or superior to those chosen by operations managers in real life. Cost savings of up to 58% may be achieved by the suggested solutions compared to realized recoveries of the real life cases.

**MSC:**

- 90B90 Case-oriented studies in operations research
- 90C11 Mixed integer programming
- 90C60 Abstract computational complexity for mathematical programming problems
- 90C90 Applications of mathematical programming

Cited in 11 Documents

**Keywords:**

disruption management; liner shipping; mathematical programming; recovery

**Full Text:** [DOI](#)