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A computer-based decision support system for vessel fleet scheduling—experience and future research

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Abstract

Most ocean shipping companies do the planning of fleet schedules manually based on their experience. Only a few use optimization-based decision support systems (DSS). This paper presents TurboRouter, a decision support system for vessel fleet scheduling, as well as some of the experience gathered from a research project to develop commercial software that is now used by several shipping companies. Perhaps the most important experience is that when designing such systems, the focus should be directed more to the interaction between the user and the system than the optimization algorithm, which has often been the case. © 2004 Elsevier B.V. All rights reserved.

Keywords: Decision support systems; Vessel scheduling; Optimization

1. Introduction

As in almost all business environments with dynamic markets, complex organizational structures and advanced technical systems information technology have become absolutely necessary to keep operations going. In a historical perspective, computer and communication systems are new technologies and have experienced, for the last few decades, rapid development. It is not very provocative to postulate that we have not yet seen the full potential of information technology. Probably, minor parts of all opportunities have been discovered and even less have been realized. the systems for vessel fleet scheduling. Ocean shipping is the major transportation mode of international trade. Each year, more than 5 billion tonnes of cargo are shipped by a large number of vessels and the trends indicate that this volume will increase in the future [9]. A ship involves a major capital investment, and its daily operating cost often amounts to several thousands of dollars. Proper planning of vessel fleet schedules may therefore give significant improvements in economic performance, which may be crucial for survival in an increasingly competitive market.

One area with obvious potential for improvement is

An important and complex challenge in vessel fleet scheduling is to optimally assign available cargoes to the vessels in the fleet, while satisfying a number of practical constraints. Typical constraints can be cargo time windows, vessel capacity, compatibility between ports and vessels due to draft and vessel length, just to mention a few. Today, shipping

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