

Abstract

More than 80% of the world's freight is transported by sea, as it is a low consumption means of transport.

Too many research projects have been carried out to optimize maritime transport problems. However, little research has been done to explore deeply the operations of transport of goods, and the service concerned in receipt, delivery and handling of goods in a Port. This paper is mainly focused to study the physical organization and equipment of a maritime container terminal.

Specially, it will present and discuss 3 real problems in the port management of containers, Loading and unloading of ships and barges (The area of port operations), Storage and handling of containers in the yard (The storage area of the terminal) and The transfer of containers to land transport modes (The area of land operations), with the aim of improving the performance of containers management at the level of the terminal, Reducing times and costs associated with the movement and temporary storage of containers at the port and Optimizing of the position of each container in both the port and the ships to minimize subsequent movements.

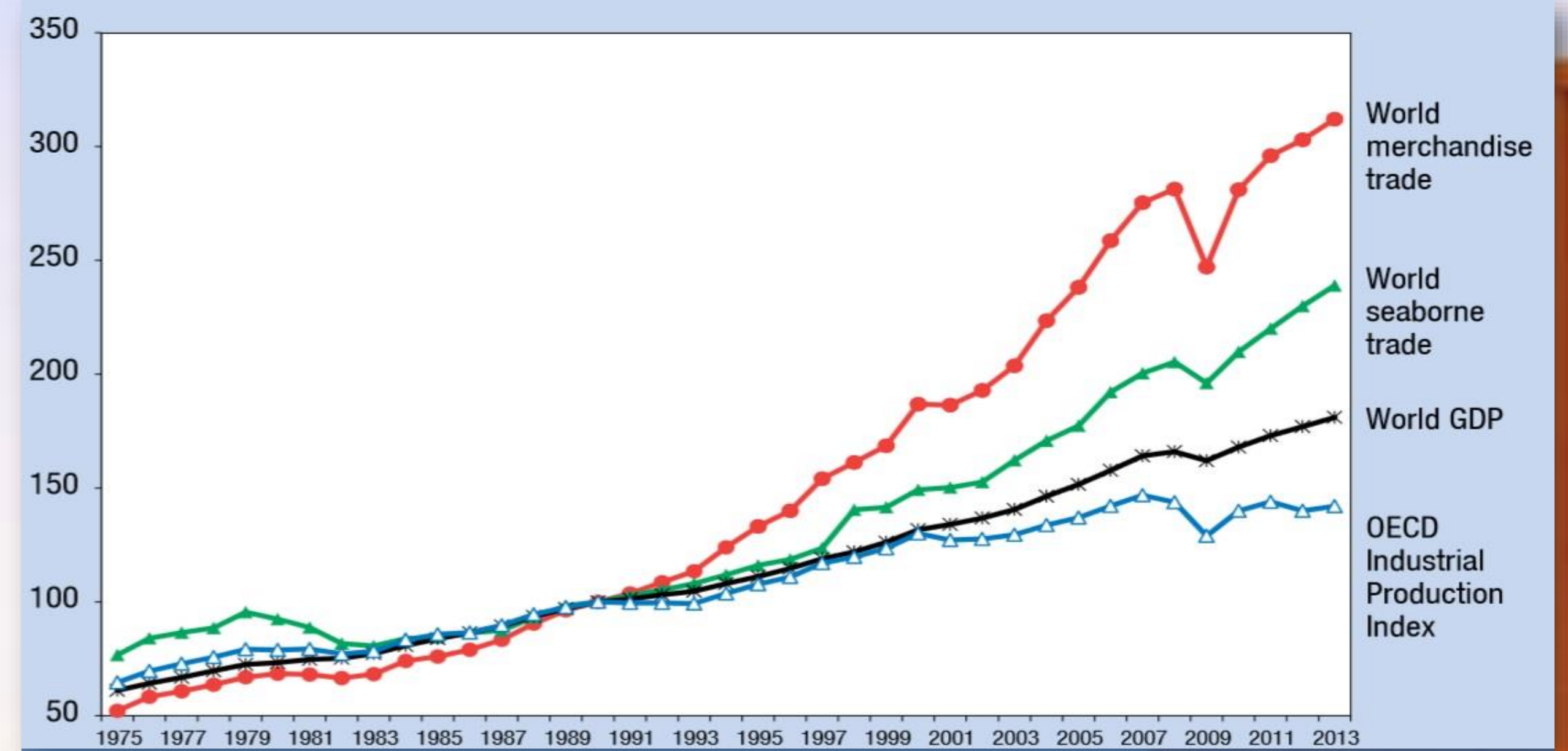


Figure 1: UNCTAD, Trade and Development Report 2014



Picture 1: CMA-CGM, Leader of maritime transport

Motivation

The multimodal container is the element on which globalization has been built in international trade. For this reason, the proper management of logistics is essential in reducing the costs associated with storage and transport, both at the port and at the maritime stage in container ships. Some of the operations on which it is possible to act to improve its management are:

- Loading and unloading containers.
- Planning dock cranes and assigning space in the ships.
- Transportation truck planning (including Vehicle Routing Problem)
- Stock management at the terminal.

Objectives

- Improve the performance of containers management at the level of the terminal.
- Reduce times and costs associated with the movement and temporary storage of containers at the port.
- Optimally design the position of each container in both the port and the ships to minimize subsequent movements.

Methodology

- Operational Research
- Combinatorial Optimization
- Mathematical Modelization
- Simulation



Picture 2: Loading container by Forklift

Stages in Research Development

- Systematic review of the literature to identify those problems that have either not been solved or on which alternative treatment may be possible.
- Approach the problems to solve and the techniques adjusted to their characteristics.
- Description of the current state of these problems in the scientific literature. Formulation of solutions that are innovative in some sense.
- Search for real data and empirical application of the analyzed models to study in an applied form the main theoretical developments for the analyzed models.

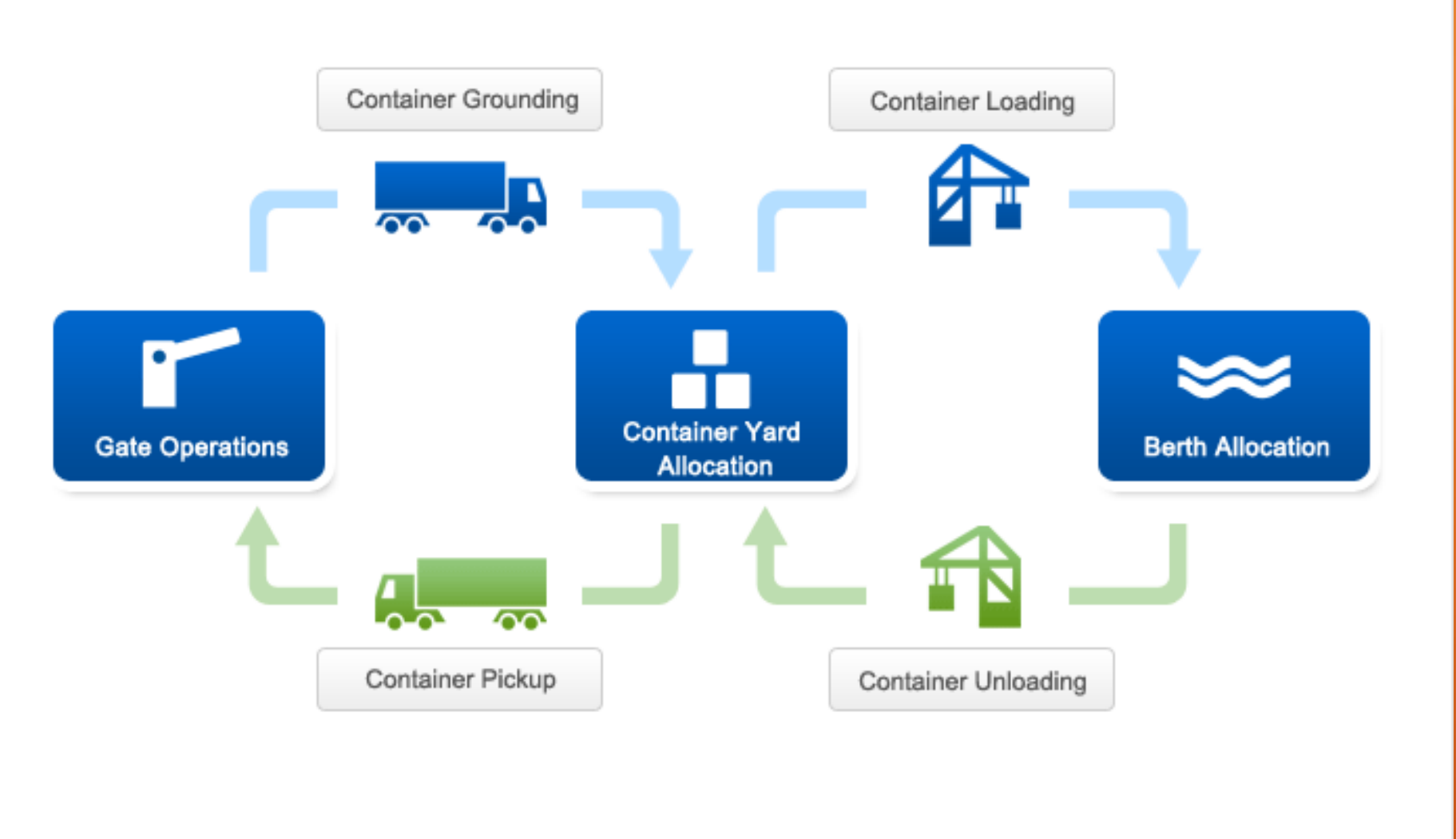


Figure 2. Operation flow for maritime transport

Expected results

- It is hoped to identify and solve three real problems in the port management of containers, each one of which can be published in an international journal specialized in these topics.
- A priori the journals targeted for publication will be those included in the Operations Research & Management Science thematic category of the Web of Science database. More precisely, those journals with a significant JCR impact factor in this category.
- Before sending for review in these journals, we will try to share the results obtained with the scientific community in one of the specialized congresses of the area (one the second year and another the third).

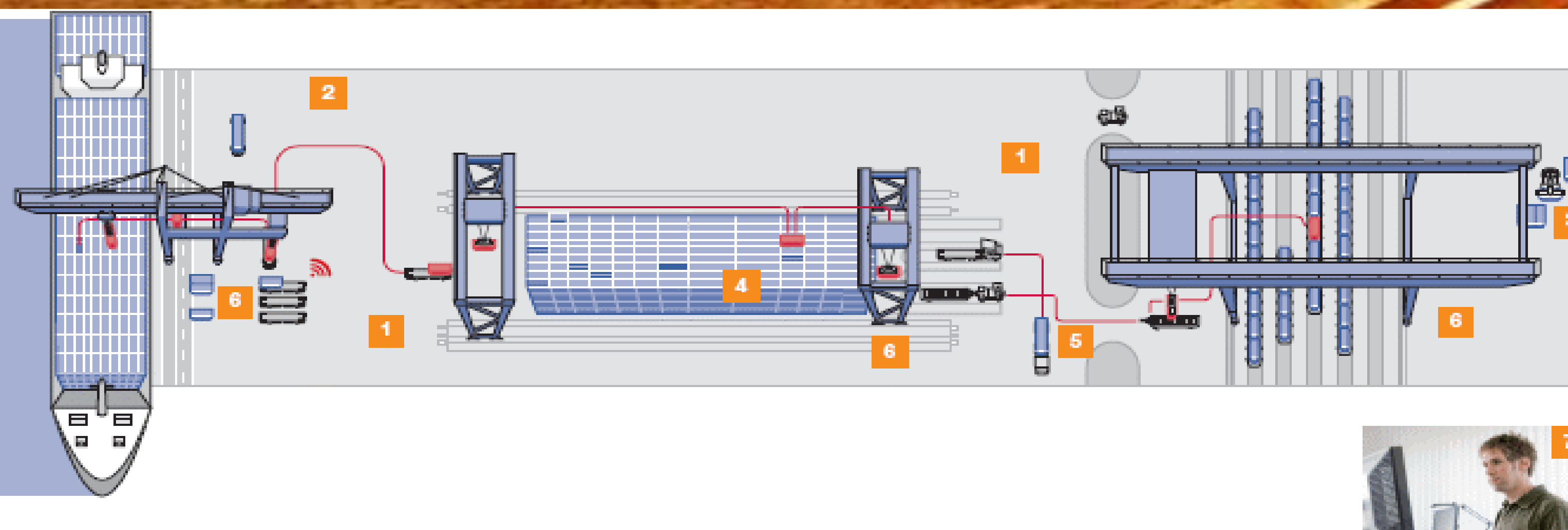


Figure 3: Transportation flow through a port container terminal (terminalstar.eu/img/illustration.gif)

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