

The Establishment and Solution of Coupling model on Coordinated Scheduling of Handling Facilities in container terminals

Yi Ding¹, TianYi Gu^{2*}, GuoLong Lin³, ChengJi Liang⁴

Logistics Research Center, Shanghai Maritime University, Shanghai 200135, China

Received: May 15, 2012; Revised Jul 4, 2012; Accepted Aug. 15, 2012

Abstract: The logistics operation of container terminal can be exploded into several subsystems which are correlative, these subsystems connect by some handling facilities. This paper study the coordinated scheduling of three main kinds of facilities-Quay Crane(QC),Yard Truck(YT) and Yard Crane(YC), use multidisciplinary variable coupling design optimization method(MVCDO) to build YT coordinated scheduling coupling model based on QC, obtain the YT coordinated scheduling scheme faced multi- working lanes. This paper presents a new way of studying the coordinated scheduling of handling facilities in container terminals through building coupling model.

Keywords: container terminals, handling facilities, coordinated scheduling, multidisciplinary variable coupling design optimization method, coupling model.

1. Introduction

With the rapid increase of economic globalization, more and more production operation and resource allocation activities are worldwide. The position and function of modern ports have occurred profound changes in the social economic development, these ports become important rely that keep a national economy to effectively participate in the economic globalization and possess dominate position in international competition. In order to meet the increasing containers throughout and shipping companys high service level requirement, its urgent to build highly efficient container transportation system, improve the internal logistics operation efficiency in container terminals.

The logistics operation of container terminal is a complicated system, it can be exploded into several subsystems which are correlative, such as berth subsystem, loading and unloading subsystem, storage subsystem and horizontal transportation subsystem etc. There are three main kinds of handling facilities in the loading and unloading operation in container terminals-QC,YT and YC, the main feature in loading and unloading operation of the three facilities is that they need pairwise cooperate, collaborative operate, and connect mentioned subsystems. The coordi-

nated scheduling of handling facilities can reduce the resource waste due to the idle facilities mutually wait, form fluent port container logistics system, improve the logistics operation efficiency in container terminals.

Many domestic and foreign scholars have a lot of research on handling facilities problem in container terminals, and have obtained abundant research achievements. The existing papers which study the number configuration problem in container terminals are combining simulation model. Yang Jing-lei et al.(2003) study on the simulation of a dynamic multilevel queuing network for container terminals, the network is presented for Waigaoqiao container terminals of port of shanghai, and composed of a roadstead, berths, quay cranes ,yards, yard cranes and trucks, the optimal equipment allocation is obtained by analyzing the simulation indexes. Han Xiao-long et al.(2005) study resources Allocation in Container Terminal Charge/ Discharge Operation, firstly build Berth Allocation Model(BAM), then build Berth Quay-crane Allocation Model(BQAM), then present models for yard trucks and gantry crane allocation in container terminal adopting dual cycle and pool strategy, finally, give a simulation system in container terminal charge/discharge operation. The existing papers which study the dispatch problem in container terminals most

* Corresponding author: TianYi Gu, e-mail: gutianyi.726@hotmail.com

