

PROCEEDINGS

APCOMS



The 1st Asia Pacific Conference on Manufacturing Systems

The 8th National Conference on Production Systems

A Challenge for Collaborative Manufacturing Systems

Ramada Bintang Bali Resort
Kuta-Bali, Indonesia
September 5-6, 2007

PRODUCTION SYSTEM LABORATORY
MANUFACTURING SYSTEM RESEARCH GROUP
DEPARTMENT OF INDUSTRIAL ENGINEERING
FACULTY OF INDUSTRIAL TECHNOLOGY
INSTITUT TEKNOLOGI BANDUNG

ISSN:



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Integrated Production-Distribution Planning with Considering Preventive Maintenance

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Abstract. The preventive maintenance activity is important thing in production system especially for a continuous production process, for example in fertilizer industry. Therefore, it has to be considered in production-distribution planning. This paper considers the interval of production facility's preventive maintenance in production-distribution planning of multi echelon supply chain system which consists of a manufacturer with a continuous production process, a distribution center, a number of distributors and a number of retailers. The problem address in this paper is how to determine coordinated production-distribution policies that considers the interval of production facility's preventive maintenance, and customer demand only occurred at retailers and it fluctuates by time. Based on model of Santoso, et al. (2007), using the periodic review inventory model and a coordinated production and replenishment policies that are decided by central planning office and it must be obeyed by all entities of multi-echelon supply chain, the integrated production-distribution planning model is developed to determine the production and replenishment policies of all echelon in the supply chain system in order to minimize total system cost during planning horizon. Total system cost consists of set-up/ordering cost, maintenance cost, holding cost, outsourcing cost and transportation cost at all of entities. With considering preventive maintenance and there is one production run over the planning horizon, the replenishment cycle at distribution center, distributors and retailers that are found out are greater than the basic model. Also, the multiplication of replenishment cycle at distribution center in production cycle that is found out is greater than the basic model but the multiplication of replenishment cycle at retailers in its distributor are smaller than the basic model.

Keywords: production-distribution planning, preventive maintenance, continuous production, time dependent demand

1. INTRODUCTION

Although some manufacturer use a continuous production process, such as in the fertilizer and paper manufacturers, researches in the integrated production-

distribution planning mainly address the discrete production process, such as Chen and Chen (2005), Lin and Lin (2005), Weng (2004), Routroy and Kodali (2005), Nur Bahagia and Toruan (2001), and Nur Bahagia and Sofitra (2001). This paper proposed integrated production-