

Management on the recombination of manufacturing whole process logistics operation based on MES

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Abstract

With the constant intensification of market competition, manufacturing enterprises are racking their minds to lower the cost so as to obtain more profit. As the enterprise's third profit source, logistics has attached more and more enterprises' attention. According to the relevant data statistics, in the current production system, trucking expense accounts for 30% to 75% of total expense. However, after optimal management of logistics, it can save 15% to 30% of expense for enterprises. This paper discussed the current situation and research results of the workshop logistics of machine manufacturing, and analyzed the loopholes existed in the whole process of traditional logistics management of manufacturing. It also established a kind of manufacturing whole process logistics lean management operation model based on MES, which provided a kind of feasible management mode for machinery industry to lower the logistics cost of the whole manufacturing process.

Keywords: MES, manufacturing whole process, logistics lean management, operation model

1 Introduction

As we all know, the main aim of enterprise manufacturing is to make a profit, and one of the methods of obtaining profit is to lower production cost. However, with the continuous innovation of science and technology, and after the sufficient excavation of the first profit source and the second profit source, people gradually realized that the cost saving of materialized labor and direct labor seems to have come to the end [1]. Therefore, in recent years, not only the enterprise external logistics (supply chain management), but also the enterprise internal logistics (workshop logistics) have become research hotspots. In the article Research on the Operation Mode and Mechanism of Logistics Network System Based on Dissipative Network [2], Shan Lihui of Beijing Jiaotong University started from the entirety of logistics system and conducted recognition on logistics network from systematic and macro perspective. Through researches on the dissipative structure and entropy model of logistics network, she analyzed that resources integration, dynamic alliance and collaborative optimization are beneficial to the coordinated operation of logistics network. In addition, the operation mode of logistics network was established based on it, which optimally utilized the limited logistics resource and provided brand new exploration and theoretical security. In the article A Study on the Collaborative Operation of Logistics Service Supply Chain Based on Process Management [3], based on relevant theory commentaries, Li Yibin, Dong Qianli and Sun Haojie conducted research on the logistics service supply chain coordination with the idea of business process

management and modeling approach of workflow for reference. They pointed out that the logistics service supply chain coordination should base on the perspective of process optimization and take the coordination of technology and management into consideration, thus to promote the performance of logistics service supply chain coordination. In the article Exploration and Analysis on the Logistics Process of Guangdong Donghong Metal Equipment Manufacturing Enterprise [4], Huang Yubin and Qian Yuanfang conducted field research on Guangdong Donghong Metal Equipment Manufacturing Company. Through the understanding of the company logistics operating process, they combined the theory of enterprise logistics management and found some problems existed in the company. They also combined the theory of logistics process reengineering, which provided a good referential experience for the remodeling of enterprise logistics process and the operation of other enterprise logistics management models in future.

This paper established a kind of manufacturing whole process logistics lean management operation model based on MES, which conducted redefinition on the department responsibility of manufacturing enterprise and recombination on the logistics operation process of the whole manufacturing process. In addition, this paper described the support of MES and other relevant information system to the logistics lean management operation mode of the whole manufacturing process. It also further perfected and managed enterprise logistics in technology level so as to promote the enterprise economic benefit, which has important economic and practical significance.

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2 Traditional logistics management problems

Manufacturing whole process logistics management refers that after the manufacturing enterprise accepts productive task execution instruction, the management on the dispatching, carrying, loading and unloading, and storing of materials and half-finished products during the process of starting from the recipient of raw materials, through the process and assembly of intermediate products and finally the production of qualified finished products.

With the increasingly fierce market competition, manufacturing enterprises in China are increasingly highlighting

the optimal management of logistics. However, in recent years, most of manufacturing enterprises focus on the optimal management of enterprise external logistics (that is supply chain management), but neglect the enterprise internal logistics optimal management (that is manufacturing whole process logistics management). Therefore, manufacturing whole process logistics management has become the weak link among most of manufacturing enterprises in China. At present, under the circumstances of non-transparent workshop logistics information, the typical logistics management process of manufacturing enterprise is shown as follows:

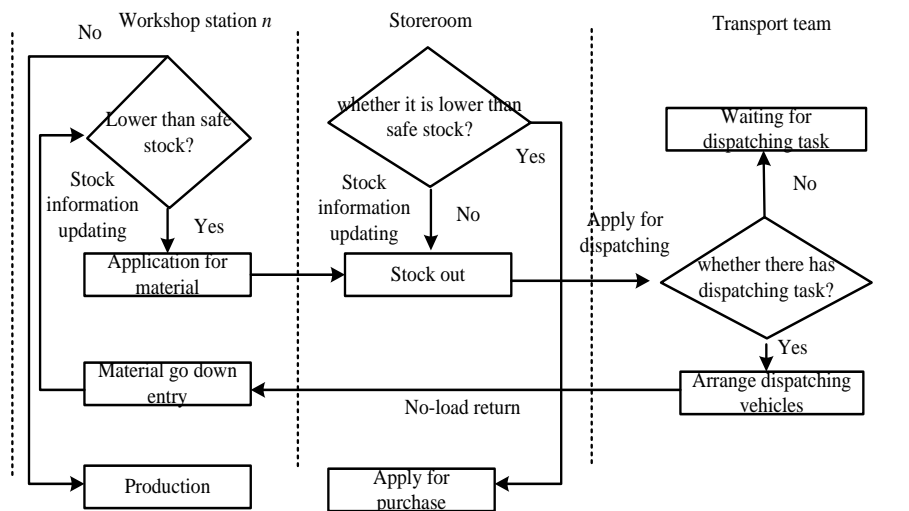


FIGURE 1 Manufacturing whole process traditional logistics management process

From the above Figure 1, the disadvantages of traditional logistical management can be summarized as follows: waste of space, large occupation of material capital; high no-load ratio of logistics transportation; repeated handling; unreasonable logistics path; untimely waste debris recycling.

3 Logistics lean management mode

3.1 MANUFACTURING EXECUTION SYSTEM (MES)

MES is the executive layer between the operation control system (SFC) of planning player (ERP) and workshop layer, which is mainly responsible for the production management and scheduling execution of production site. MES can transmit the management information in management layer like production plan, production instruction, etc and production instruction information like working diagram, process flow diagram, etc to lower levels of each station of production site. At the same time, MES also can real time collect and process the production data of production site, and submit them to ERP [5]. Therefore, manufacturing enterprises can realize the visual and digital management on the manufacturing whole process by im-

plementing MES, which can provide timely and comprehensive information support for the manufacturing whole process logistics management.

3.2 LOGISTICS LEAN MANAGEMENT

As for manufacturing enterprise, in products total cost, the logistics cost of manufacturing whole process often occupies a large proportion. Therefore, the realization of manufacturing whole process logistics lean management is one of the core links of enterprise to reduce cost and improve market competitiveness. Manufacturing execution system can provide all static and dynamic data of manufacturing whole process for enterprises, a set of real time comprehensive logistics information and abundant data foundation for the logistics tracing, statistics, analysis and optimization of manufacturing whole process [6,7]. At present, MES has obtained more good graces of Chinese manufacturing enterprises as well as enough reusing. Therefore, this paper proposed a kind of logistics lean management mode based on MES. The main content of manufacturing whole process logistics lean management based on MES is "material storage" and "material flow". Thus the purpose of manufacturing whole process logistics lean management based on MES is to realize the stock lean management and dispatching lean management.

4 Operation model

4.1 TOTAL FLOW DIAGRAM

Manufacturing whole process logistics lean management mode based on MES not only needs to realize the logistics lean management to manufacturing whole process, but also

needs to perform recombination on traditional manufacturing whole process logistics management process. The recombined process will make full use of the powerful logistics real time information in MES, so as to maximize embody the value of real time logistics information in MES. The specific operation mode is shown as follows (Figure 2):

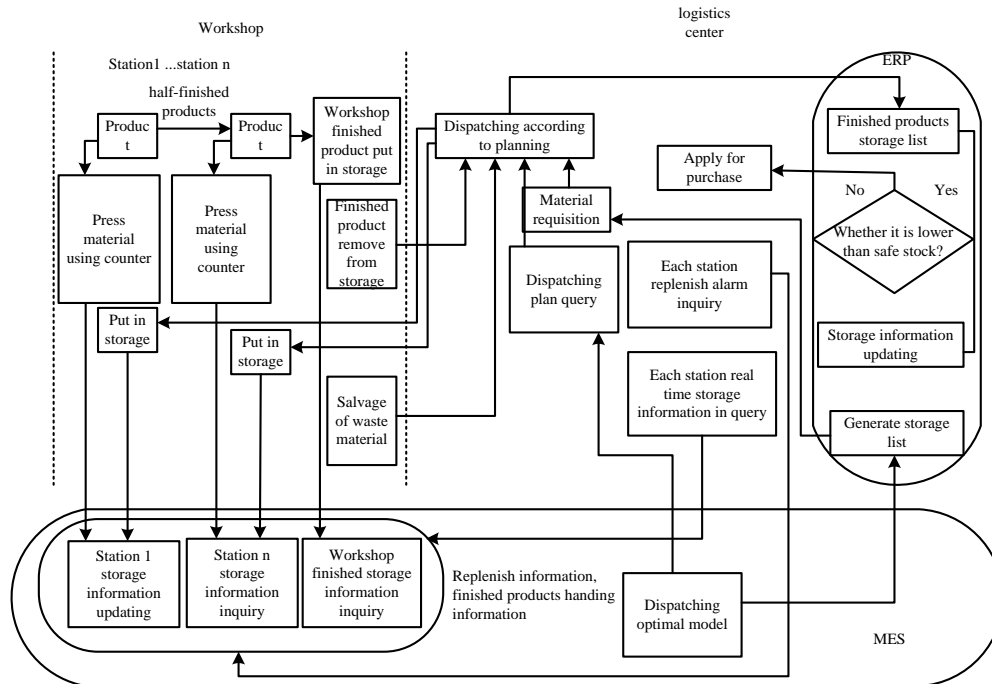


FIGURE 2 Logistics lean management operation mode based on MES

4.2 INFORMATION SUPPORT SYSTEM

Manufacturing whole process logistics lean management based on MES can not leave the enterprise informatization supporting environment. Besides MES system, it also needs ERP system of MES integration and SFC system of control layer. The information supporting system designed based on the above three systems are shown as follows in Figure 3:

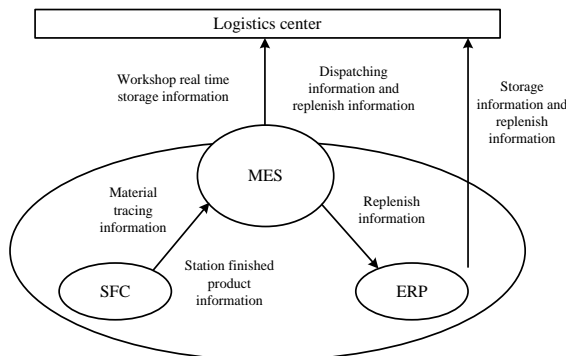


FIGURE 3 The informatization supporting environment of logistics lean management

Conclusion

Modern enterprise is a complex and large scale system. The generation of logistics is to meet the demand for purchase, production and sales departments, which is the inter communication bridge among various subsystems. It plays an important role in enhancing the quality of products and reducing production cost. Therefore, an increasing number of enterprises turn their attention to the enterprise logistics optimization. As a kind of advanced organization mode and management technology, modern logistics has become the third enterprise profit source of creation besides reducing material consumption, raising labor productivity. In terms of essence, the optimization of logistics management model is an important strategic decision for enterprises in coping with increasingly fierce market competition [8,9]. Base on the analysis of the shortages of traditional logistics model, this paper proposed the manufacturing whole process logistics lean management operation mode based on MES, thus to have the enterprise MES plays terrific value in logistics management. Its assistance in reducing production cost has better maintained enterprise profit, and created superior environment for further driving the economic development of society.

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