

Research on Cruise Material Inventory Control Strategy Based on Material Classification

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Abstract: With the continuous development of economy and the needs of China's cruise market, China's shipbuilding enterprises have begun to build the first domestic cruise ship. There are great differences between cruise ships and conventional merchant ships in construction, especially cruise materials have the characteristics of many kinds, large quantity, high storage requirements, scattered suppliers and so on. Inventory cost is an important part of cruise construction cost. Effective control of cruise material inventory and improvement of inventory management efficiency can further ensure the controllable construction period, quality and cost of cruise. Therefore, how to optimize the cruise material inventory management has become a problem that cruise construction enterprises need to attach great importance to.

1. Introduction

In the cruise ship construction, the material cost will account for about 70% of the whole ship construction cost, and the inventory cost is the most important factor affecting the material cost. In order to ensure that the overall cost of cruise ship construction can be controlled, efforts must be made from the inventory cost control. Huang Liling and Yang Jiaqi proposed that joint inventory management should be adopted in cruise construction. Based on the strategic cooperation relationship between cruise manufacturing enterprises and suppliers, joint inventory model should be built to improve the efficiency of cruise manufacturing enterprises. Lu Guoqing thinks that after analyzing the characteristics of ship materials in detail, the shipbuilding industry can reduce the shipbuilding cost by using the strategic procurement method based on material classification. Pan Yanhua, Chen Tingting and Li Xiangyuan think that when shipbuilding enterprises use zero inventory management, they need to analyze the material characteristics. Li Zheng proposed that for the materials with high value, long lead time and unstable demand in enterprise inventory management, the problem of multi cycle and multiple orders should be considered, and a non-stationary inventory control model should be established and solved to improve the inventory efficiency of such materials. Yu Zhijing, Wang Keping introduced the combination of se-eda and AHP to calculate the comprehensive weight, which can avoid the influence of subjective factors on classification to a certain extent.

Due to the characteristics of cruise materials, the difficulty of inventory management and inventory cost control is higher than that of ordinary merchant ships. Starting from the characteristics of cruise materials, this paper attempts to identify the factors that affect the control of cruise materials, construct a classification method suitable for the characteristics of cruise materials, and select inventory control strategies for different types of cruise materials, so as to optimize the management of cruise materials and reduce inventory costs.

2. Analysis on the Current Situation of Cruise Material Management

2.1 Analysis on the Characteristics of Cruise Materials

(1) High storage requirements

The storage conditions of functional materials such as decoration and entertainment in cruise materials are more strict than those of general ship materials, and due to different transportation modes and subsequent installation requirements, it is necessary to meet the management characteristics of such materials and carry out multi-level storage management.

(2) Difficult material management

Due to the wide variety and huge quantity of cruise materials, more management costs need to be paid in various management of materials, such as procurement management, warehousing management, maintenance management and defect management.

(3) Suppliers all over the world

According to the experience of foreign cruise ship construction, there are many kinds of cruise ship special materials in the process of cruise ship construction. At present, nearly 80% of the cruise ship construction special materials in China need to be imported, and the supply sources are all over the world. Because we can't rely on the domestic ship supporting enterprises to provide materials, the decentralized overseas supply environment of suppliers increases the difficulty of supplier management.

(4) There are many kinds and a large number of them

There are many kinds of materials needed for cruise construction. The specifications of various materials are diverse, and the use scenarios are not the same. Different types can be subdivided, making the whole cruise material category up to tens of thousands. In addition, the number of parts needed for cruise materials is also huge, up to 20 million pieces, and the number of supporting items is also large.

(5) Long supply time and high cost

Cruise materials need to be supplied across borders and regions. The whole supply process includes the production, transportation and customs clearance of the suppliers. It usually takes 2-3 months without accidents, which makes the time of material supply longer.

2.2 Problems in Cruise Material Inventory Management

(1) Improper classification of inventory materials

The classification of cruise materials follows the classification of ordinary merchant shipping materials, and the materials are controlled in three groups. Under this classification method, cruise materials can be managed as a whole with other shipbuilding materials. However, the characteristics of various materials are not the same, such as procurement lead time, warehousing frequency, commodity value, quantity used, storage conditions, etc. if the materials can not be classified in detail, the management method will be extensive, which will affect the procurement, warehousing, logistics and logistics A series of processes such as collection and distribution.

(2) There is a large backlog of goods and materials in stock

Most of the cruise materials are special materials, and there is no corresponding material supplier in China, so they need to be imported. Compared with the domestic material procurement, there are more uncertain factors in the whole procurement process of imported materials, such as accidents caused by the mode of transportation, customs clearance requirements, etc., which lead to a very long lead time of some material procurement and the backlog of inventory materials. Moreover, due to the inaccurate grasp of the construction demand, ordering materials in advance, or even one-time purchasing according to the usage of the whole ship in accordance with the mode of ordinary merchant ships, some inventory materials have not been installed and used for nearly a year.

2.3 Optimization of Cruise Material Inventory Control

Inventory management includes many aspects, and its optimization can be carried out from many aspects. By analyzing the causes of the problems existing in cruise material inventory management and solving the problems pertinently, the effect of cruise material inventory management can be improved to a certain extent. In order to improve the efficiency of cruise material inventory management and effectively control the cruise material inventory cost, this paper adopts the following inventory cost control strategies: the first step is to build a classification model to accurately classify cruise materials; the second step is to take different inventory cost control

strategies for different types of cruise materials.

3. Construction of Cruise Material Classification Model

3.1 Construction of Classification Index System

The general objective level of cruise material classification model should be set as the importance of materials. When determining the criteria layer of the model, the characteristics of cruise materials should be fully considered. In Section 2.1, the characteristics of cruise materials have been analyzed. According to the characteristics analyzed, it can be divided into five dimensions, namely storage dimension, production dimension, procurement dimension, cost dimension and standard dimension. These five dimensions are determined as the criteria layer of the model, and then the analysis and evaluation index can well deal with the characteristics of cruise materials. In the selection of specific evaluation indicators, we still need to fully consider the characteristics of cruise materials. Starting from these five dimensions, we further determine the classification evaluation indicators on the basis of internal and external factors. The corresponding indicators selected are storage facilities requirements, storage site requirements, maintenance difficulty, logistics deployment ability, recyclability, supplier factors, procurement lead time, unit value, and inventory occupancy, inventory liquidity, impact of defective parts, replaceable parts, standardization degree.

3.2 Using Ahp to Calculate Weight

In the weight calculation of classification evaluation index system, this paper uses AHP method. This method can model and quantify the thinking process of decision-making problem, decompose it into different hierarchies according to the order of general objective layer, evaluation criterion layer and evaluation index, construct pairwise comparison judgment matrix for different hierarchies, obtain the weight value of each level to the upper level, and finally make decision according to the weighted weight value.

By sorting out the collected data and inputting it into the professional software Yaahp, the weight of each evaluation criterion layer for the total target layer can be obtained by constructing the judgment matrix of pairwise comparison. The results are analyzed. If the selected cruise materials are recorded as P, experts are invited to score the materials P according to each index of the index layer, with a full score of 10. Then the fuzzy evaluation matrix is obtained by statistics, and the comprehensive score is the corresponding weight of each index evaluation result score. Assuming that the cruise materials are classified into ABC three levels, the comprehensive score above 7 is A, the comprehensive score from 4 to 7 is B, and the comprehensive score below 4 is C.

4. Selection of Cruise Material Inventory Control Strategy

4.1 Selection of Inventory Control Strategy for Class A Materials

Class A raw materials have high requirements for all kinds of evaluation indexes, such as long order cycle, long lead time of procurement, high unit price of materials, high requirements for storage facilities, and large impact of defective parts. Once out of stock, the construction progress will be seriously affected. Therefore, in view of the characteristics and management needs of class A materials, this paper proposes to adopt (R, q) inventory control strategy to manage class A materials. Although it will produce relatively high management cost, it can effectively deal with the characteristics of high importance and no shortage of class A materials.

4.2 Selection of Inventory Control Strategy for Class B Materials

Class B materials belong to the medium value in the comprehensive weight of classification, and the requirements of various dimensions are also slightly lower. Because the capital consumption of class B materials is generally lower than that of class A materials, and the requirements for inventory control are slightly lower than that of class A materials, it is not necessary to adopt a very

strict control strategy like class A materials. Therefore, class B materials can choose the (T, s) strategy and use the control strategy of regular ordering to control class B materials. To manage the materials.

4.3 Selection of Inventory Control Strategy for Class C Materials

Most of class C materials are commonly used materials, which occupy less funds and have short lead time for procurement, so it does not need to be controlled. If (R, q) strategy and (T, s) strategy are adopted, a lot of human and material resources will be wasted, which is not conducive to further cost control. In the inventory cost control of class C materials, we can learn from the relevant management strategies of foreign cruise construction enterprises, such as VMI. Class C materials are highly standardized and versatile, and a large part of them can be purchased directly from domestic suppliers. Moreover, shipbuilding enterprises and domestic suppliers have already reached a strategic cooperation relationship. If VMI strategy is successfully implemented for class C materials, it will have significant advantages in reducing inventory costs and dispersing enterprise risks.

5. Conclusion

This paper analyzes the characteristics of cruise materials in detail, analyzes the current situation of inventory management, summarizes the problems of inappropriate classification of inventory materials and overstock of inventory materials, and puts forward the corresponding optimization ideas for these problems. The specific classification and evaluation indexes of cruise materials are determined from five dimensions, and the weight is calculated by using the analytic hierarchy process, so as to build the classification model of cruise materials. On the basis of this classification model, different inventory control strategies are adopted for different types of materials, and the cruise material inventory control system is constructed, which provides reference for cruise construction inventory management and inventory cost control.

References

- [1] Yanhua Pan, Xiaoyun Yu, Xiangyun Li. Research on material cost control of shipbuilding enterprises under information integration environment. *Ship Engineering*, vol.36, no.04, pp. 120-124, 2014.
- [2] Liling Huang, Jiaqi Yang. Research on joint inventory management of cruise logistics based on the perspective of supply and demand coordination. *Logistics Technology*, vol.37, no.11, pp. 56-59, 2018.
- [3] Guoqing Lv. Research on procurement management strategy of shipbuilding enterprises based on material classification. Harbin Institute of Technology, 2007.
- [4] Yanhua Pan, Tingting Chen, Xiangyun Li. Construction of material category selection decision model of zero inventory management in shipbuilding enterprises. *Accounting Monthly*, no.29, pp.43-47, 2017.
- [5] Zheng Li. Research on raw material classification and inventory control strategy of auto parts manufacturing enterprises. Beijing Jiaotong University, 2018.
- [6] Zhijing Yu, Keping Wang, Jianwen Zhen, et al. Spare parts management of navigation lights based on improved ABC classification management method. *Computer application and software*, vol.36, no.07, pp. 59-64, 2019.