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Construction of Prefabricated Building Supply Chain Operation Model Based on SCOR

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Abstract. On the basis of SCOR, combined with the characteristics of the prefabricated building industry in China, the reference model of the prefabricated building supply chain operation is constructed, which provides a set of standard business processes for the prefabricated building supply chain node enterprises to make better communication among the members, thus improving the core competitiveness of the installed construction enterprises and promoting the core competitiveness of the installed construction enterprises. Promote the sustainable development of the prefabricated building enterprise.

1. Introduction

Prefabricated building is an important part of the development of building industrialization, which is the requirement of The Times of green development. Compared with the traditional construction, pay attention to integrated manufacturing prefabricated construction, not only has large investment, long construction cycle, of suppliers and subcontractors involved in community larger, process more complex, the prefabricated construction enterprise supply chain efficiency is low, the production cost. Based on SCOR, prefabricated construction enterprise supply chain operation model is established, can make the supply chain to understand the performance of a supply chain process, clear interest relations in the whole supply chain, analysis of the whole supply chain operation performance. At the same time, because of the supply chain operation model with a standard terms and symbols, and the entire organization and all the functions of division of labor can be established in the form of communication process, and combining specific assignments and performance indicators, can provide the basis for the improvement of the supply chain operation model, the prefabricated construction enterprises to obtain enough information to support decision making.



King WU and Xiaolong XUE the perspective of construction project participants in the research on and is suitable for the construction of the supply chain model is established, and put forward about the information support system integrated construction management framework [1].Jing WU, Shaoshuai YE and other scholars studied the application of supply chain management theory in the construction industry [2]. Dongdong WANG Through in-depth analysis of the construction enterprise supply chain operation process, topology structure on construction enterprise supply chain is given, on this basis, make the application of four kinds of used in construction supply chain integration strategy [3].Ying ZHANG analyzed and studied how to construct the supply chain of large construction enterprises [4]. Wanqiong LI introduced the reference model of supply chain operation in the management of construction supply chain, and combined with the unique characteristics of construction supply chain, established the reference model of operation of construction supply chain [5]. There are few studies on the construction of the reference model for the operation of prefabricated building supply chain, so this paper constructs the reference model for the operation of prefabricated building supply chain.

2. Construction of Reference Model for Supply Chain Operation of Prefabricated Building Enterprises

Because of the existence of construction and manufacturing, is suitable for manufacturing of SCOR is not fully applied in the construction industry, therefore, in order to pass the prefabricated construction enterprise supply chain management objective benefit, it is necessary for prefabricated construction companies formulate suitable supply chain operation reference model, complex business processes for prefabricated construction enterprises to establish a clear business process framework.

2.1 The construction of the first level operation reference model

Based on SCOR five basic business processes [6], based on general contractor (prefabricated construction enterprise supply chain are mentioned in this paper the general contractor enterprise as the core to build), the basic framework of prefabricated construction supply chain business processes including the following six basic business processes: plan (P), source (S), assembly (A), Delivery (D), return (R) and recycling/MRO (M), as shown in figure 1. This model includes the entire process from the tender submission of the general contractor to the completion of delivery and maintenance inspection of the project.

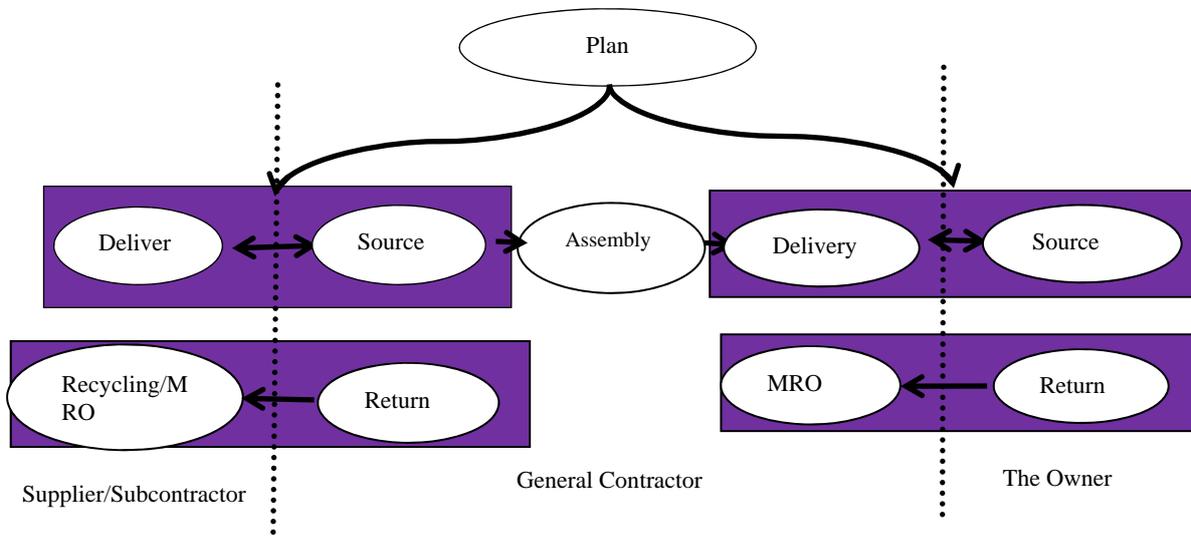


Figure 1. Prefabricated building supply chain operation model level 1.

2.2 The construction of the second level operation reference model

The second layer of the operational reference model is the configuration layer, which defines three types of processes: the plan class, the execution class, and the support class. According to these three types of process and the first layer of the relationship between the basic flow, we can draw a contains 23 core process configuration tool box, as shown in table 1, enterprise managers can choose suitable process on the basis of the actual situation in enterprises in the supply chain configuration.

Table 1 .Prefabricated building supply chain operation reference model configuration toolbox.

		The Basic Flow					
		Plan (P)	source (S)	Assembly (A)	Delivery (D)	Return (R)	recycling/MRO (O)
T y p e s	Planning Process	P1	P2	P3	P4	P5	P6
	Execution Process		S1,S2	A1	D1,D2	R1,R2,R3	O1, O2, O3
	Supporting Process	EP	ES	EA	ED	ER	EO

2.2.1 Three process types

1) Planning process is a process of meeting expected requirements by arranging expected resources. In the layer configuration, program class and can be divided into the following six processes: planned supply chain (P1), plan to purchase (P2), plan to assembly (P3), plan to delivery (P4), plan to return (P5) and plan to recycling/MRO (P6).

2) Execution process is a process of changing the state of materials according to planned or actual requirements. The procurement (S), assembly (A), delivery (D), return (R), and recovery /MRO (M) processes in the first layer are all execution-class processes. According to the characteristics of the prefabricated construction enterprise supply chain, the implementation of such processes can be

further subdivided into: according to the design procurement (S1), according to the inventory purchase (S2), according to design assembly (A1), according to drawings delivery (D1), according to the stock delivery (D2), return the defective product (R1), returned to the MRO products (R2), returned to the remaining products (R3), recovery (O1), defective product recycling MRO products (O2), the recovery of residual (O3).

3) Enable process is a process that supports the establishment of basic process and manages all kinds of information in the basic process. Support class processes include planning support (EP), procurement support (ES), assembly support (EA), delivery support (ED), return support (ER), and recovery /MRO support (EM). Reference Hui ZHUANG and Peiqing HUANG, the SCOR model of support system [7], this paper support classes to the first layer of each basic processes are defined 9: the support of the same element in the set up and manage business rules, performance evaluation, data and information management, inventory management, asset management, transportation management, supply chain management, network management, abide by the regulations and process special element.

Figure 2 shows the second layer of the above 23 core processes

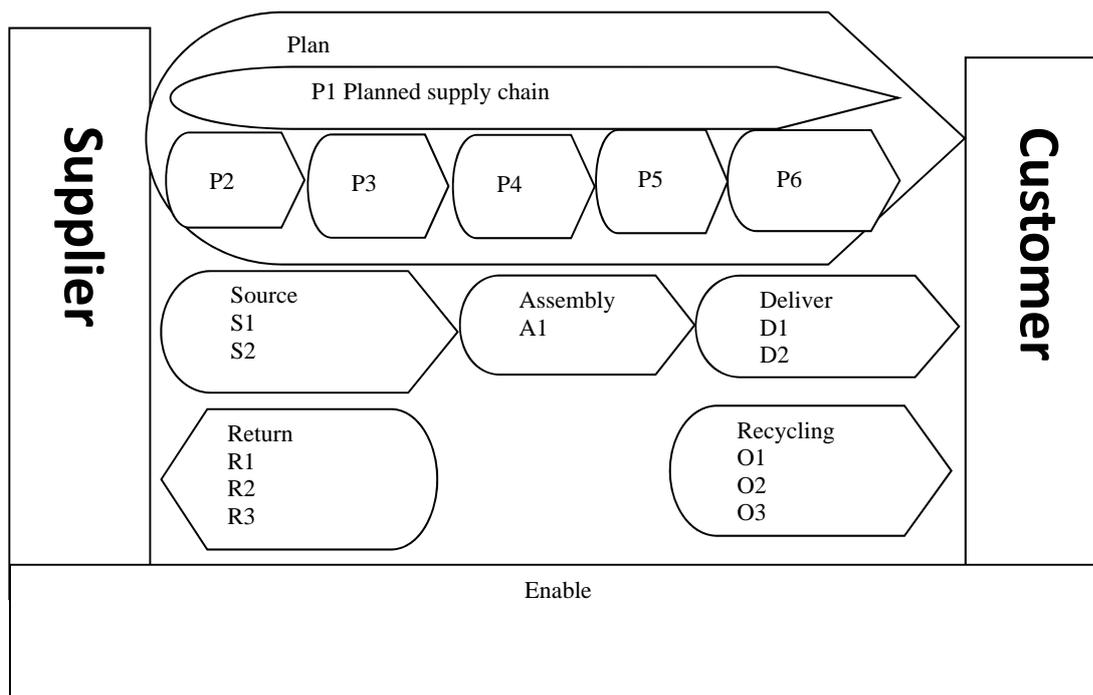


Figure 2. Prefabricated building supply chain operation model level 2.

2.3 The construction of the third level operation reference model

Supply chain operation reference model of the third layer is the process elements, this layer to the second process is decomposed into more detailed process element information, mainly including planning process, source and delivery process between the owner and the contractor, general contractor and subcontractors/suppliers sourcing and delivery process, assembly process, the general contractor and the subcontractor/supplier between the return and recycling/MRO process, as well as between the owner and general contractor return with six parts such as MRO process. The planning

process is taken as an example to introduce the concrete work of the third layer operation reference model.

2.3.1 Planning process

(1) Planned supply chain. The planned supply chain consists of four process elements, as shown in figure 3. General contractor must first determine the contract of the supply chain of the demand information of the project, and the demand for sorting and summary of importance, and then according to the existing inventory, material plan, financial plan, construction plan, delivery plan and other information, determine the supply chain resources, finally through the balance of demand in the supply chain and resources, work out a plan for the complete supply chain.

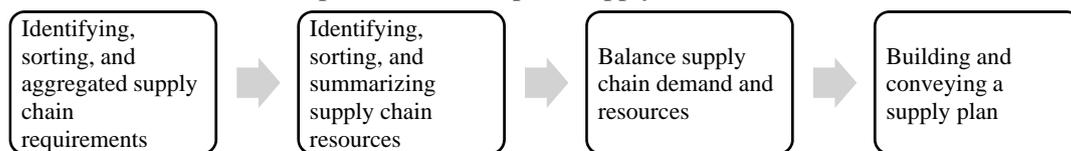


Figure 3. Planned supply chain.

(2)Planned procurement. The planned purchase consists of four process elements, as shown in figure 4. General contractor according to the supply chain plan, material plan, assembly plan, delivery plan, etc., determine the resources required for the project, and according to the ranking the importance of these resources and summary; At the same time, identify the resources already in place, and then balance the needs and resources to develop a procurement plan.

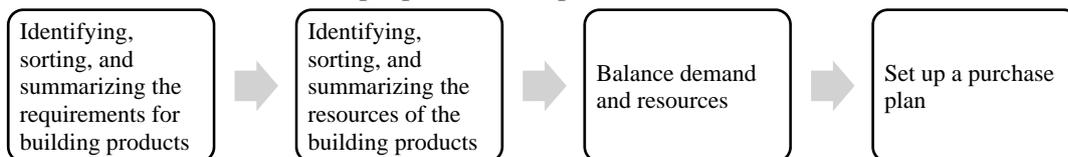


Figure 4. Planned procurement.

(3)Planned assembly. The planned assembly contains four process elements, as shown in figure 5. The general contractor determines the assembly requirements according to the relevant assembly requirements and sorts and summarizes the requirements. Then, according to the source, schedule and inventory information, determine the necessary assembly resources, and formulate the assembly plan by balancing the assembly requirements and resources.

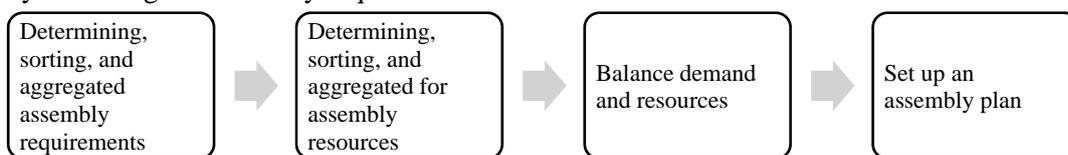


Figure 5. Planned assembly.

(4)Planned delivery. The planned delivery consists of four process elements, as shown in figure 6. General contractor according to owner requirements, supply chain planning, such as data, identify, sort and summarize delivery requirements, according to source plan, existing inventory, delivery date and other data, identify, sort and summary to deliver the required resources; Finally, a delivery plan is developed by balancing requirements and resources.

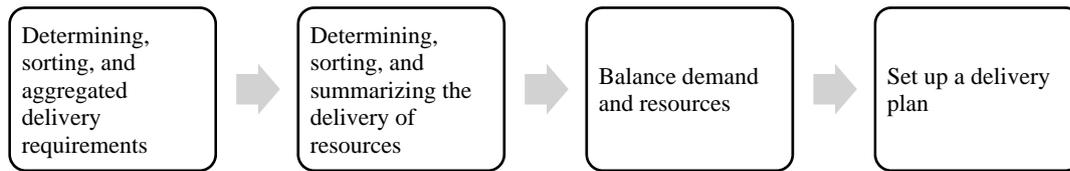


Figure 6. Planned delivery.

3. Conclusion

This article mainly research into the construction of prefabricated building enterprise supply chain operation model, based on SCOR model, focused on building model of all levels of the standard business processes, in measure system, the operation model ones best performance extremely character description system should also be further research. Prefabricated construction enterprise supply chain operation model was constructed, which can be extremely the supply chain for the prefabricated construction enterprise to provide a measure, manage and control standards and methods, better communication between members, and to achieve goals to improve competitive advantage. The SCOR model is a very good supply chain management tool. If it can be applied to the prefabricated building industry, it will have a profound impact.

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