Reflections on Zero Inventory from the Perspective of Supply Chain
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Abstract. This paper analyzes the present situation of zero inventory in manufacturing enterprises by analyzing the thoughts of zero inventory and its misunderstanding, and puts forward the reasonable inventory management concept. Enterprises should combine their own production and operation mode, scientific and reasonable to reduce inventory, not one-sided understanding or misunderstanding of the true meaning and role of zero inventory, not to blindly pursue zero inventory and simple imitation, copy the dogma, thus affecting the normal production operations. In this paper, from the perspective of supply chain management of zero inventory, inventory control by reasonable profit maximization for enterprises to provide theoretical support.

Zero inventory management is the current enterprise in the supply chain operation control in the application of a management approach. At present, the academic circles has carried on the thorough research to the zero inventory management, but in the research process has many disputes. So far, the academic community has not yet formed a unified understanding of zero inventory, mainly on the zero inventory can bring benefits and pay the cost of lack of systematic cost analysis. Also failed to maintain safety stocks and the number of safety stock standards to form a general consensus, so that a lot of intent to implement and is implementing zero inventory of enterprise managers are at a loss. Based on this, this paper discusses how to maintain a reasonable inventory and inventory management in the country to achieve the conditions, through research has been a clearer conclusion: the relative correct approach should be in the supply chain perspective to ensure the use of reasonable inventory production needs, Resulting in lack of inventory led to operational imbalances. Inventory should not be too much or too little, do not advocate zero inventory; the actual operation of enterprises should be based on their own actual situation to develop a reasonable inventory control strategy.

The Meaning of Zero Inventory and Analysis
Zero inventory originated in Japan's Toyota Motor Corporation's JIT (Just In Time) production, "on time production" as the basis, the formation of "zero inventory" management concept. The basic idea is "a specific demand time, according to customer demand for the implementation of production plans and delivery on time," the purpose is to eliminate all invalid or excessive operations, to optimize the use of enterprise resources. Modern supply chain management is by no means in the form of storage in the traditional sense of the warehouse, but in the community have sufficient material reserves under the premise of the lowest cost target, the materials (including raw materials, semi-finished and finished products) in the procurement, production, distribution, sales and other aspects of the planned turnover flow, improve inventory turnover, reduce inventory backlog and risk of loss, which is zero
inventory. Here the cost is not a single enterprise cost, but in the supply chain, the total cost of all enterprises; that is, through the implementation of specific inventory control strategies to achieve the rationalization of the entire supply chain inventory. In this paper, the study of zero inventory refers to the inventory is in the state of stagnation or turnover flow, does not mean whether the number of stocks is zero. Even if the company advocated JIT Toyota is not zero inventory, the best inventory status is still about 3 to 5 days of raw materials, semi-finished and finished products. This shows that many people do not know the essence of the concept of zero inventory management; in fact, the number of zero inventory, scope and cost are relative, the following were systematically described:

1. Relativity of the "zero inventory" quantity standard. "Zero inventory" is a dynamic, relatively balanced state, is based on business units in the use of time and demand, combined with the procurement cycle, mode of transport, arrival time and other factors set the best inventory standards. Inventory should be maintained between the minimum inventory and the largest temporary inventory, when the inventory is below the minimum inventory, the need for timely procurement, supplement; when the inventory is higher than the maximum inventory, the existence of a warning backlog risk, the need for timely compression. Inventory management should be linked with production, sales, etc., to form a dynamic balance, which is the pursuit of zero inventory management objectives. From the macro level of economic operation, the whole country or society can not and is not suitable for zero inventory, especially some strategic materials, non-renewable mineral materials and emergency materials, etc., because the different dimensions of their needs Maintain a reasonable inventory, can not be simply zoned "zero" inventory. From the perspective of the whole industry chain, due to product production and consumer existence of time and space inconsistencies and information asymmetry, absolute "zero inventory" is difficult to really achieve.

2. The Relativity of Applicable Scope of Zero Stock. Zero inventory does not necessarily apply to all businesses. First of all, we usually refer to the "zero inventory" refers to a single enterprise in the supply chain in the production and operation of a link to achieve the minimum inventory, such as the supply chain in the individual operators can be "zero inventory" type of production, Inventory type of sales. Relatively speaking, the supply chain plays a leading role in the core business to achieve better conditions for zero inventory, rather than the core business is in a passive dependent position, not easy to achieve zero inventory. Second, from the industry point of view, the product life cycle long, non-personalized products (such as consumer goods), non-core components and high degree of standardization, small size, relatively low prices, inventory costs far lower than a single Procurement of transportation costs, in addition to the production and sale of such goods is generally carried out in bulk, to achieve zero inventory is not economic, so the enterprises involved in such goods should be appropriate inventory rather than zero inventory strategy.

3. Zero inventory to save the relative cost. First of all, from the point of view of the entire supply chain, the product from the raw material suppliers through to manufacture and then to the dealer, with the flow of goods between enterprises, suppliers, manufacturers, distributors between the inventory and cost pressures. If there is a strong link to suppress the situation of weak links, such as many downstream supply chain enterprises in order to market competition pressure passed to the upstream business, choose a number of orders, and through such as high quality, low price discounts, short delivery time, high after-sales service quality And other demanding requirements, increased competition between suppliers, so suppliers will
meet their needs will be a large number of hoarding inventory. Second, from the perspective of procurement management, procurement departments in order to ensure timely supply, require suppliers to set up a dedicated warehouse near the factory, this approach seems to ensure that the enterprise zero inventory, but in fact a substantial increase in specific assets. Thereby increasing the cost of suppliers. At the same time, the enterprise itself has increased the handling, handling and storage links, a number of suppliers scattered storage, disguised lead to the total supply chain inventory increases. To sum up, in the supply chain to ensure the normal production of enterprises, zero inventory is the result of the supply chain balanced cooperation is the formation of integrated supply chain inventory number (whether the most reasonable), inventory cycle (whether the shortest), inventory cost (whether the minimum) of the optimal state, it is not only from the number of single-enterprise inventory items to determine whether the realization of the zero inventory.

The Domestic Enterprises to Zero Inventory Management Understanding of the Errors, Evaluation and Risk

The Misunderstanding of Zero Inventory Management

Chinese enterprises to foreign zero inventory management technology learning and reference, largely in the form of a simple imitation of the zero inventory management of the core concepts and the substance does not have in-depth study, and even some people in accordance with the Chinese literally meaning to zero inventory understanding No Warehouse, No Inventory, and so on. Mainly in the following four aspects:

1. Misleading zero inventory management equates to zero inventory management. Many companies in China learn from the Toyota JIT management, there is no production in the field of zero inventory and circulation areas to distinguish between zero inventory. Many companies believe that the implementation of zero inventory management is not set up warehouses, or all of the existing warehouse into the workshop, there is no inventory of materials there is no inventory costs. If the transport rate is greater than the production rate, the zero inventory in the production area is realized. When the number and frequency of infinite increase in transport, the flow of logistics can replace the role of inventory in order to achieve zero inventory.

2. Misconception that zero inventory is a panacea for enterprises to increase profits. Some domestic enterprises that zero inventory can reduce product costs, the blind to the zero inventory as the only goal pursued by enterprises. And even some companies do not know the number of times a day out of the library, each time the number of delivery and handling of the case, to blindly reduce inventory, the result will inevitably fail. Even with a clear lean management philosophy and experience of Toyota, the pursuit of zero inventory is not starting from the reduction of inventory, but in the use of standard operations, Kanban management, pull production, production synchronization and a series of standard and regulatory methods To obtain the results of the zero inventory is greater than the cost of a reasonable inventory management methods.

3. Misconception that zero inventory is an advanced method that can be applied. The buyer through the cost, risk to the seller to achieve their own zero inventory, but at the same time there is also the risk of out of stock. There is no systematic study of zero-inventory production methods, it is impossible to achieve zero inventory by imitating a single management method. Many domestic enterprises to implement the "zero inventory" management tried to push
through all the inventory in one step down to zero, contrary to the basis of enterprise
development and management practices of objective laws, and even hope that by hiring
experts to quickly down the inventory, short-term May have a certain effect, but with the
implementation of the passage of time, the cost of most companies do not fall but rise. The
reason is mainly due to the production mode is not systematically optimized, curing.

4. Misconception that zero inventory means the lowest total cost. From the perspective of
explicit and implicit costs, costs and inventories are not always proportional. Inventory is zero,
the explicit cost is reduced, but the hidden costs have increased, the final total cost may
increase. If only to achieve the assessment objectives, one-sided pursuit of the book inventory
of funds is zero, will inevitably lead to individual management of the grass-roots considerable
number of workshops, not in the book of materials to turn a blind eye to the "ostrich policy."
Warehouses in kind, but the book inventory is zero, these conditions contrary to the principles
of inventory management ideas, not only can not reduce the total supply system inventory, but
also may cause confusion in the management of materials.

A Reasonable Assessment of Zero Inventory Management

"Zero inventory" management is to ensure that the production and business activities carried
out under the premise, in order to deal with all kinds of unexpected situations, the use of
scientific management methods, the rational calculation of inventory and effective control to
ensure the production of economically rational inventory Normal operation, as much as
possible to reduce the inventory of a management model.

1. Zero inventory model of innovation should be in the national culture and corporate
culture to find the appropriate fulcrum. With the deepening of the study of zero inventory
management, it will find that it is not just a production management technology, but also a
culture, a philosophy, it is the root cause of success in Japan to comply with the spirit of the
contract and pay attention to each other Cultural essence. Many Japanese enterprises system is
matched with this belief, such as "life-long employment system", "annual power system" and
so on.

2. Zero inventory management with a clear prerequisite. In practice, the following
objectives should be followed: First of all, to ensure production and sales needs under the
premise set goals, it is necessary to avoid the phenomenon of inventory out of stock due to
lack of raw materials, but also to prevent stock shortages due to stock phenomenon. Most
products have their peak season and off-season, the general use of off-season backlog of
inventory to meet the needs of the season. If the implementation of the zero inventory, the
season requires a considerable size of the production line; off-season will have to reduce
production, which is unreasonable for the enterprise. Secondly, the overall supply chain cost
optimization as the goal, each supply chain partners should share the appropriate amount of
inventory. Through this management to control the amount of inventory to the best amount,
with a minimum of manpower, material and financial resources to manage inventory. Once
again, we must carefully analyze the actual situation of their own enterprises. For the supply
chain nodes on the enterprise, are expected to reduce the inventory of some of the viable way
to achieve zero inventory. But in practice, this approach is only the supply chain to reduce
self-inventory approach. Cost analysis shows that zero inventory is not necessarily the best
way to profit. Zero inventory management as an advanced management technology, its
successful implementation can not do without the rigorous internal operation of enterprises
and good external conditions. If these conditions are not met, the results will only transfer
their own inventory pressure and internal logistics problems to other links in the supply chain.
The negative effects will worsen the relationship with all aspects of the supply chain, weakening the overall competitiveness of enterprises.

3. According to the requirements of the classification of the classification of dialectical appropriate "zero inventory." Inventory has many functions, and the inventory function is in the rationalization of the inventory structure under the conditions to give full play, it must be for the nowadays popular enterprise zero inventory concept, dialectical thinking. In the real world because of too many uncertainties, such as supply and demand uncertainty, demand for personalized, unexpected events, ahead of time, the transport of goods, raw material quality, production anomalies, and each inventory management methods Its lack or need special attention, therefore, zero inventory management theory is not applicable to all products, the need to integrate the use of a variety of inventory management methods, learn from each other, it is more practical significance. According to the classification of inventory also shows that inventory can not be completely reduced to zero. In fact, once the order was issued, it produced a material in transit, it began to produce inventory. Enterprises in order to eliminate the separation of production and marketing, supply shortages, transport delays, fluctuations in demand, hedging and other phenomena arising from the inventory can not do "zero" campaign, there should be adequate inventory to meet normal needs. So, specific to the enterprise of a product, which should be emphasized that inventory management? Can be used to determine a simple scale: If it is oversupplied products, adhere to the "zero inventory management"; if the product is in short supply, there is the potential for appreciation, the appropriate inventory but may bring higher returns. It should be noted that the "appropriate inventory" is not "a lot of inventory". In addition to consider the cash flow and inventory costs and other cost estimates, the need to prevent supply and demand judgments. From the production of seasonal, production and consumption needs a certain inventory of contradictions point of view, the real goal of zero inventory is no business can achieve.

4. "Zero inventory" can not completely replace the minimum safety stock. Enterprises can not accurately predict future changes in demand, in order to effectively alleviate the contradiction between supply and demand to maintain uninterrupted production and business activities, it is necessary to hold a certain amount of inventory. As the company's inventory can not be zero, so companies can be based on cost-effectiveness and safety of the best stock as the enterprise inventory limit. Stock on the development of the market, the normal operation and development of enterprises played a very important role, such as maintaining the stability of product sales, production stability, balance the enterprise logistics, balance the circulation of funds and so on.

5. Zero inventory management model is not suitable for the current situation in China. The market and customer demand is constantly fluctuating, the supplier's situation may change at any time, the domestic logistics and distribution market is also very unstable. If the blind pursuit of zero inventory, resulting in production due to lack of material and blocked, resulting in increased contradiction between supply and demand, the huge loss of suspension will not be able to make up. Toyota automobile assembly line to do the production of zero inventory, in addition to their own advanced and effective management tools and methods, the hundreds of parts suppliers are not located around the supporting plant, is a raw material warehouse layout in the Toyota plant Peripheral, to ensure timely delivery, accurate. Zero inventory is based on "zero distance" supply, but also on the basis of the supplier's reliable inventory. It requires the management of the enterprise to be very accurate, any small deviation may lead to production line shutdown; also supplier groups with a relatively fixed
and agree with the characteristics of the Toyota culture system, can implement the relative "zero inventory strategy. Only the size of the Toyota kind of business to be able to have enough orders, which can do to suppliers of stable supply. The actual situation in China at this stage is that most of the smaller enterprises, suppliers, poor stability, the supply chain nodes of the information sharing is not enough, has not yet made the appropriate supporting facilities. If the rush to select the Toyota-style small batch, multi-batch purchase, although the inventory will be zero, but the resulting transportation costs may be sufficient to offset or even greater than the "zero inventory" cost savings and then more harm than good. China's enterprises in order to use zero inventory management, just by understanding and learning Toyota's inventory management method is not enough, it is necessary to combine their own characteristics and the actual conditions of the industry chain to explore the possibility of implementation of zero inventory management and reality. Therefore, enterprises in the implementation of zero inventory management, should actively think and improve, can not blindly copy.

To Achieve Zero Inventory Risk Control and Implementation Requirements

Zero inventory management is based on business-to-market needs and changes in the law. To implement zero inventory, the first problem to be solved is to predict the risk and zero inventory strategy, and then how to implement the problem of zero inventory. Whether an enterprise needs to pursue zero inventory depends on its own conditions, management capabilities, product characteristics, production costs of product markets, market factors, transportation costs and storage costs and other objective conditions. And JIT, commissioned by third-party management and logistics companies are in the logistics environment inseparable from the degree of development. Specifically:

1. Optimize the process to create a suitable operating environment. Plan synergy is an important prerequisite for "zero inventory". JIT operating environment is based on the following assumptions on the basis of: First, the custodian fee and inventory size, the number of linear correlation, material demand is continuous and balanced, the demand for various materials is relatively independent, logistics is stable. The supplier has sufficient materials, etc.; second, re-ordering fees, shortages are fixed at a low level. Third, the estimated time of ordering and transportation accurate; Fourth, the ordering fees and shortages are not stock. Many of the assumptions of traditional inventory management methods are not sufficient to meet the changing business environment. Such as inventory and procurement lead time, the production lead time, if the lead time is longer, the more the inventory backlog, and lead time are closely related with the internal business processes, through process optimization, with supply chain management system to achieve synergies, Lead time is a lot of room for compression. Implementation of supply chain management, enhance the core competitiveness of enterprises, the key is not used in the advanced nature of information technology companies, but in the use of reasonable management system and operational mechanisms and the construction of the entire supply chain health profit distribution mechanism.

2. Strengthen the integrated management strength is to achieve "zero inventory" of the core elements. Zero inventory management is difficult to implement, it involves the procurement, production, logistics, distribution, distribution and sales of all aspects, and penetrate into each enterprise activities, the need to be integrated internal and external environment for analysis and measurement and step by step. The implementation continues, in order to receive better results. At present, the way to achieve zero inventory management are: entrusted custody,
collaborative subcontracting way, on-time supply system, Kanban way (the implementation of cooperative delivery), faucet way, no inventory reserve, order production, wheeled also known as synchronous Way, Vendor Managed Inventory and Delayed Provisioning. According to the system principle, inventory management and other business activities (including R & D, procurement, production, sales, finance, information management, etc.) are mutually influencing and constraining, and constitute the organic logistics system and supply chain system.

3. To achieve zero inventory must have the necessary conditions. To achieve "zero inventory" requires the following necessary conditions: (1) enterprise's own management level to continuously upgrade, the establishment of standardized equipment management system. (2) have a high level of information technology; (3) has a strong logistics system support, material supply is small batches of multiple batches, and smooth transportation; (4) business status, supply chain coordination, enterprises in a favorable geographical Location, with suppliers to establish mutually beneficial cooperation between the strategic partnership and sound supply chain management; (5) relatively stable market environment, the existence of the buyer's market and the continued stability of orders, the demand for regular products, a stable, (6) accurate prediction of market demand and the ability to quickly adjust the capacity and flexible production systems; (7) enterprise types of raw materials and price changes; (8) good level of product quality control. (9) good product quality control and product quality control;

4. To achieve the basic method of zero inventory.

First, a clear inventory of materials procurement strategy based on the implementation of zero. Clearly supply and demand sides are facing the buyer's market or the seller's market, is the implementation of procurement strategy of the primary premise of zero inventory. When the market is the seller's market demand for products, the market initiative by the supply side to master, at this time the market is often relatively tight supply of goods, the procurement side in order to ensure their own needs had to properly increase the inventory, in this case, Not suitable for the implementation of the procurement strategy of zero inventory.

The second is to develop a comprehensive and reasonable supply and inventory plans. The preparation and distribution of raw materials is the basic requirement to complete the production. The question is how to prepare, when to prepare and who will prepare. An extreme way is for the manufacturer to prepare the various raw materials needed for production, store it in the raw material warehouse, and deliver it to the production station whenever it is needed. The other extreme is that all the raw materials needed for the production are supplied by the supply business in accordance with the production requirements of direct distribution to the workshop. In the latter case, the supplier in order not to affect the production, generally in the factory around the warehouse storage of raw materials, and then in accordance with the production requirements for delivery. In reality there are two kinds of integrated situation: part of the raw materials using the first model, part of the raw materials using the second model, and even other models, such as third-party distribution. Regardless of which model is used, the nature of the inventory is a reasonable control.

Third, the entire supply chain organizations to work together. Zero inventory management will become the most ideal model in the field of inventory management, supply chain management will also provide further development, more ideal development ideas. Zero inventory is the embodiment of integrated management strength, this kind of management
model can be achieved in the enterprise material management, not the subjective will of the people, not to material management departments unilateral efforts, it is a system Engineering, production operations need to work closely with the various links to achieve the quantitative control of materials. Whether the material storage quota is realistic and reasonable, depends on the relevant departments to work together to formulate the inventory control strategy, as well as tight and accurate project materials planning, scientific and adequate procurement control, suppliers suitable for timely supply and other appropriate link the best convergence, the number of stocks in the best control, so that the efficient operation of funds.

Fourth, optimize the enterprise system to break the bottleneck constraint. Constraint bottleneck theory points out that local improvement is not equal to the overall improvement, all local optimization must be beneficial to the overall performance of the system. Inventory is only part of the enterprise system, the optimal inventory is not equal to the entire business management system is optimal, the enterprise system is the best enterprise management system objectives. The optimization of inventory depends on the complementarity of other links to achieve the $1 + 1 > 2$ effect. This requires optimizing the enterprise system and improving the efficiency of the system. The key to continually improve the process is to find bottlenecks and break bottlenecks.

**Conclusion**

Zero inventory management is not a panacea, zero inventory is only a direction. In the Internet technology has been highly developed today, with the supply chain management technology and popularization, "zero inventory" management has exposed some limitations. If business managers can accurately understand the "zero inventory" of the ideological nature, and understand the implementation of zero inventory to the enterprise to bring the benefits and risks, combined with their own business philosophy, business operations, so that the enterprise inventory is reduced to the optimal level is a Kind of good method.

In short, the implementation of the zero inventory model is both beneficial and detrimental, not all manufacturers of inventory management panacea, by promoting zero inventory management to reduce inventory costs, can enhance the supply chain management level, improve the overall strength of enterprises; but the one-sided pursuit of long-term inventory The lowest zero inventory, there may be so that enterprises face the risk of product sales and production out of stock risk. Therefore, enterprises should combine their own production and operation model to reduce the scientific and reasonable inventory, enhance the flexibility and flexibility of business operations, not a one-sided understanding and even distort the true meaning and role of zero inventory, but can not simply imitate, copy dogma, so as not to the enterprise Bringing a devastating disaster.

**References**

