

Operation Mode of Steel Logistics Park based on Drop and Pull Transport

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Abstract. With the development of economy and industrial level, the steel logistics industry has problems such as low utilization of logistics resources, single-fixed service model and unreasonable resource allocation, resulting in loss of benefits and waste of resources. The steel industry, at the same time, is the important goal of promoting national energy conservation and emission reduction. Therefore, the optimization and improvement of steel logistics is particularly important. This paper proposes the operation mode of steel logistics park based on drop and pull operation, by which the transport capacity, load capacity, information and other resources are integrated, the steel industry is promoted to join the logistics socialization and the operational efficiency of the steel logistics park is improved.

Keywords: steel logistics; drop and pull operation; resources integration.

1. Introduction

1.1 Status of Steel Logistics

China's output of steel logistics is huge, ranking first in the world. The output value in 2016-2018 was more than 800 million tons and the self-production and sufficiency rate exceeded 95%, however, the steel logistics industry still faces the three-low situations: low level of normalization, standardization and resources integration. The singular service model limits the operation and development of the steel logistics park, and also prevents the professionalization, deepening and integrated development of the entire industry. The state has also introduced a series of related measures to the steel industry to promote the supply-side reform of the steel industry. As an important part of the steel industry, steel logistics needs to integrate and optimize the logistics resources and improve the service level.

1.2 The Necessity of Steel Logistics Resource Integration

The steel logistics industry responds to the national call for supply-side reform, but the blind expansion of production capacity will lead to a reduction in market efficiency, thus steel enterprises need to actively seek new sources of profits. Resources integration can help the enterprises adapt to social logistics trends and establish new operational strategies to improve the operational efficiency of the park. It can even more advance industrial upgrading, promote standardization processes, establish new service models, and improve service levels.

2. Drop and Pull Transport and Sharing Vehicles

2.1 The Meaning of Drop and Pull Transport

Drop and pull transport refers to a kind of organization mode in which the trucks and trains continue to operate at the loading and unloading sites by dropping down and hanging on the designated trailer, according to a predetermined plan. In this way, the downtime of trucks (or tractors) can be minimized to the minimum so that the traction can be exploited to the maximum to improve the transportation efficiency. Under the same conditions, it has the higher transportation efficiency, compared with fixed transport.

2.2 Shared Vehicle

The shared vehicle refers to the “tray-up” of the trailer to a certain extent, by which the vehicle is divided, and the transport vehicle is divided into the tractor and the trailer from the whole by means of dropping and pulling, whose function is the same as the pallet that plays a role in the logistics activities. The trailer has become a tool for the circulation of goods in the steel logistics; it has become a circulation vehicle between the various steel logistics parks and manufacturers; it has become a shared economy in the steel logistics industry, and a shared trailer profited by many.

Instead of truck transportation, the "tractor + trailer" transportation mode can separate the powered tractor from the trailer loaded with cargo, and the load will be released from the fixed transportation process to maximize the utilization of transportation capacity and to make transportation more flexible and more efficient.

3. Status of Steel Logistics Park

3.1 Traditional Mode Operation Management Level is Low

Compared with foreign advanced operation modes, such as Japan’s “Distribution Park”, Germany’s “Freight Village”, mostly the government’s macro-control is responsible for the logistics park’s project planning and policy support, and the enterprises are responsible for the operation of the logistics park. Compared with Germany’s advanced logistics parks such as the Bremen Logistics Park, the operation and management of China’s steel logistics parks still have problems such as limited service areas and low standardized operations.

Logistics park services lack innovation. At present, the industrial types of logistics parks in China are still labor-intensive. The sources of profit are mainly concentrated in the basic logistics services such as warehouses, facilities, equipment rental services and transportation, warehousing, etc., while value-added service projects with high profitability, such as logistics organization planning and logistics services that go deep into the production field of the supply chain are less involved, which makes the logistics park’s profit sources more singular, and also limits the professionalization, deepening and integrated development of logistics park services. At the same time, the enterprises in the logistics park still lack the support of a unified logistics information platform. The level of resource sharing is low, the integration ability is limited, and the coordinated operation of logistics cannot be realized. This also greatly limits the overall function of the logistics park and makes that the integration advantage of value chain of the logistics park cannot be achieved.

3.2 Campus Layout is Limited by Traditional Mode

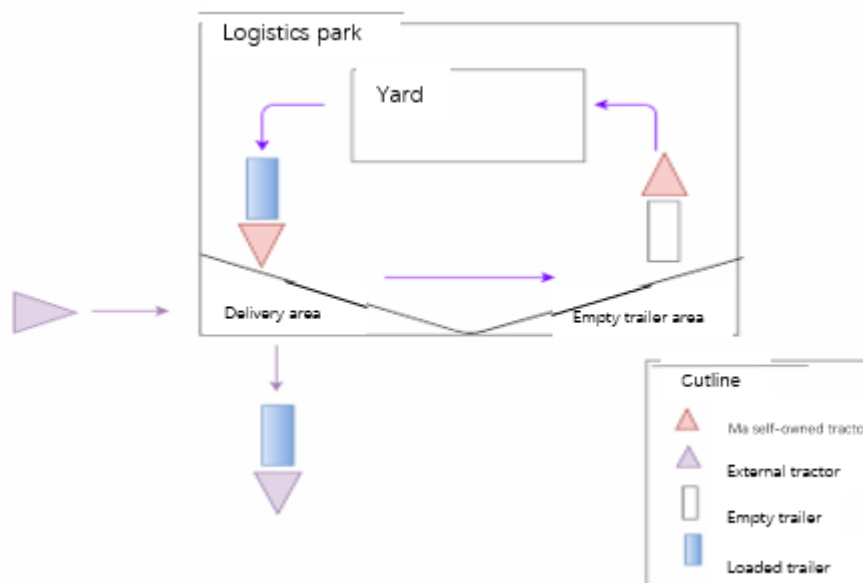
There are problems that planning of steel warehouses in the park yard is unreasonable, the number of lanes and flow direction is restricted, and the vehicle circulation path is single and fixed. The layout of the traditional steel logistics park is limited by the operation mode, so it is difficult to achieve an efficient operation coordination. A reasonable position layout will help improve vehicle pickup efficiency, optimize the inbound and outbound process, and improve warehouse utilization, which is extremely important for improving the efficiency of the yard operation.

In the traditional operation process, the arrival and occupation capacity of the pick-up vehicles is random and uncontrollable, which impacts the operational capacity of the park to a certain extent. The subjective initiative of the steel logistics park is not fully mobilized, passively accepting orders and processing operations. The park’s access to goods is inefficient and the overall operating condition is not good. There are queues, congestion and other conditions during the peak period. It has a negative impact on both the customer and the park operator.

4. Drop and Pull Operation in the Steel Logistics Park Application

4.1 Activity

The new type of vehicle operation is similar to the “shared economy” model. When the customer needs to pick up the goods, the whole vehicle does not need to enter the logistics park to pick up the goods, only the own tractors in the park do. In the park, there will be trailers waiting to be matched with the tractors, and then loading the goods. After the trailer is transported to the designated location, the tractor is released, that is, the transportation capacity is liberated. After the loading of the goods is completed, the tractors are matched with the trailers loaded with the goods and transported to the waiting area of the park. Customers only need to use their own tractor or third-party tractor to match the loaded trailer to complete the pickup.



4.2 Optimization Strategies under This Plan

1) Self-management and scheduling

The operation of the park will be transformed from the original multi-party entrance, coordinated management, information dispersion and lagging operation status to unilateral, autonomous resource allocation, and the information collection and processing, traffic flow control, etc. will be managed by the park owner to improve management and information utilization.

2) Time and space separation operation

The new model provides capacity by the tractors in the park, and the trailers provided by the third-party trailer associates provide the load. The customer extracts the trailer to complete the cargo handover mode to achieve the separation of time and space, included the separation of time and space to improve the efficiency of the park. Of time: The loading and unloading time is separated from the delivery time, which can smooth the operation demand; of space: the capacity is separated from the load. In some cases, the tractor is loaded in the new mode and goes to the next operation in the neutral time, forming a work cycle, so that the capacity is active.

3) Reduce costs and follow the trend

Reduce investment costs: Compared with vehicle transportation, sling transportation can achieve “1+N” type operation, that is, one tractor service for multiple trailers, and the main cost of vehicle is the capacity part. By creating more value at a lower level investment reduces the demand for environmental resources.

Comply with the trend of social logistics: At present, the transformation of corporate logistics to social logistics is a big social trend. Third-party and fourth-party logistics enterprises can adapt to the development of society and respond to the national policy of energy conservation and emission reduction.

5. Summary

With the development of the steel logistics industry and the increasing flow of materials, its radiation range is more extensive. China has also introduced relevant policies and measures to develop the steel industry, but there has been no limitation of the service mode all the time. The resource allocation in all aspects of steel logistics is unreasonable, the inherent mode integration capability is limited, and social logistics is progressing slowly.

By analyzing the current situation of steel logistics and the necessity of resource integration, combined with the development status and dilemma of steel logistics industry, this paper proposes a new logistics park based on shared vehicles. The operation mode realizes the separation of time and space, optimizes the operation efficiency of the park and reduces the emission of pollutants when the vehicle is circulating in the park thus reduces energy consumption. Secondly, by the mathematical modeling method, the layout of the yard in the park will be rectified, the positions and positions will be adjusted, and the storage system will be improved. After the rectification, FlexSim simulation is carried out to verify the operational efficiency of the yard, to find problems, and to further optimize the layout of the yard with simulation results.

The new logistics park operation mode proposed in this paper is aimed to improving the operational efficiency of the yard and the value of resource utilization, and reducing resource consumption and environmental pollution. Following the theme of model innovation and industrial adjustment, it can provide solutions for the transformation of steel logistics enterprises, increase the competitiveness of enterprises, and be applied to fourth-party logistics companies to integrate market capacity, information and other resources.

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