

Consolidation of Load in Supply Chain Management

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ABSTRACT

Effective supply chain management (SCM) has become a potentially valuable way of securing competitive advantage and improving organizational performance since competition is no longer between organizations, but exists among supply chains. This research deals with Load Consolidation & Cubic Feet Improvement which is carried out in Logistics department. Load consolidation is method to achieve full truck load by combining or consolidate different products into one container and optimally utilizing the container. This paper also explains different problems faced by Logistics department in industry.

Keywords: Supply Chain, Load Consolidation, Cargo Optimizer, Cargo-Wiz

I. INTRODUCTION

Supply chain is other name for logistics. Cooper proposed that supply chain is a synonym for Logistic (6). The activities that occur within the boundaries of a single organization comes under logistics while supply chains refer to networks of companies that work together and coordinate their actions to deliver a product to market. Traditional logistics focuses its attention on activities such as procurement, distribution, maintenance, and inventory management. Supply chain management acknowledges all of traditional logistics and also includes activities such as marketing, new product development, finance, and customer service. Supply chain and industrial cluster are the results of competition economy. According to (16) research a company can then improve the cash flow with 30%, the customer service with 10%, and in addition the company could experience an improved and more efficient supplier relationship. Benjamin and Wigand (1995) had said that understanding the supply chain cooperation helps to position the entire chain as a source of competitive advantage. According to (19) supply chain management as “the integration of key business processes among a network of interdependent suppliers, manufacturers, distribution centers, and retailers in order to improve the flow of goods, services, and information from original suppliers to final customers, with the

objectives of reducing system-wide costs while maintaining required service levels”. Though these definitions differ slightly in wording, all communicate the importance of integration, communication and coordination between functions and organizations that will create value for the customer (8). SCM is a discipline in the early stages of evolution (15). The term supply chain management has grown in popularity over the past two decades, with much research being done on the topic (15) said, a supply chain will exist whether a firm actively manages it or not. (20) noted that 60% of supply chain alliances tended to fail.

Every industry has supply chain department which further consists of various departments such as Demand & Distribution planning department, Sales and promotion department, SCM accounts department, Production department, Store & purchase department, Export & import department, Logistics department. Demand & distribution planning is the most important department in supply chain management. Its key role is to forecast demands according to the sales of the product and plan distribution accordingly to different branches. Sales and promotion department collects the sales history of the regional distributional centers, reviews at the previous year trends and collaborates with demand & distribution planning department to come up with the scheduled forecasting trend to provide accurate data.

Accounts department keeps track of the costs like purchasing of raw material for production purposes, cost of each finished goods after production and also when the products are transported to other facilities & distribution centers. Production department is a part of manufacturing unit, when the demand plan sheets comes from demand & distribution department, this department produces goods according to the plan. The productions are in lots of 192, 96 or 48 specifically for washing machines. From each of the lots some of the products are kept for outgoing quality assurance and early life testing, until these tests are cleared the products is hold on floor and does not get dispatched. Store and purchase department's role is to purchase raw material accordingly for production and store it. While keeping necessary check and track of the raw material so that production does not stop due to non-availability of materials. Export and import department is different from the logistics department as its main purpose is to export the finished goods by airways or ships. Logistics is the most important department in all of supply chain. Its key role is to dispatch the products safely to the branches and distribution center. Demand & distribution planning department send a distribution sheet to the logistics, this department decides how much products to send & load in a truck & dispatch. Logistics always try to achieve full truck load by consolidating products to cut transportation cost.

A. Load Consolidation

Load consolidation is a project which is carried out in Logistics department. Load consolidation is method to achieve full truck load by combining or consolidate different products into one container and optimally utilizing the container. This paper is concerned with improving the utilization of the truck containers. There is considerably potential of making the cube capacity of high cube vehicles. Sometimes many low density products fills the container space without maximum utilization of space and weight given that there is limit on how much your product can be stacked. Loading is mostly constrained available floor space by total cubic capacity of each product. According to survey conducted average density load diminishes this is result of changes made in a product and the increasing amount of packaging. Load consolidation method is used to convert less than truck load to full truck load mainly in the manufacturing companies there is outsourcing of

transportation different vendors are hired on contract bases and the freight or transportation cost are negotiated according to the delivery location. Loading of shipment onto the container is constrained by weight and height we have to keep both the things in mind before consolidating the products. There is a regulatory issue India where one vehicle dispatched to one zone example east the same truck cannot go to other zone example south to do this manufacturing has to take special permission from government but it is only allowed in special circumstances. Consolidation method reduces transportation cost, taking a scenario where in the west zone two branches which are close to each other have demand of products.

Load consolidation is necessary for optimizing the shift of units from one place to another. It also reduces transportation cost. It rationalize asset utilization and capacity and Provide improved services to customers and satisfy their needs. Load consolidation also handles fluctuating demand and variable capacity and achieve economies of scale by consolidating freight rate.

B. Benefits of Load Consolidation

- 1) Consolidation drives simplicity and consistency.
- 2) Company can often leverage this balance to underpin business process improvement that have that have for reaching impact elsewhere in the supply chain.
- 3) Merging shipment and delivering more frequent truck load volume, so that shippers can increase turns and reduce inventory.
- 4) This flexibility derives continuous flow of strategy from production at each pooling point and more efficiently match supply and demand.
- 5) Consolidating freight is a simple way for shippers to save the by finding a shared network that meet their transportation requirement.
- 6) Companies can reduce freight costs anywhere from 20 % to 30% by converting LTL (less than truck load) to FTL (full truck load).

C. Bottleneck for Load Consolidation in Existing System

Firstly, loading of shipment onto the container is constrained by weight and height. Secondly, there is a regulatory issue in India where one vehicle dispatched to

one zone, for example, the same truck for the eastern zone cannot go to any other zone, such arrangements requires special permission only for a few cases. Thirdly, some products cannot be horizontally loaded as it may cause damage to the product. We cannot stack heavy product on the light weight product. We have to load the shipments in such manner that the carton or product shouldn't be damaged.

Solutions identified to the existing problems and ratified by the Logistics Department such as changing the orientation of the product. Club the warehouse of certain branches in case of LTL. Mixing of different product models to achieve FTL. As the shipment pan is fixed for next 3 days, dispatch can be manipulated to ensure FTL for the present day. In case of exceptionally high demands we can Hire new centers in a particular city to cater the inventory needs or can Directly send the finished goods to the distributor or can Hire small vehicles (not normally used) to ensure FTL.

II. METHODS: OPTIMIZING SOFTWARES USED FOR LOAD CONSOLIDATION

Container loading problems are complex. Providing technological assistance in the form of computers or other equipment to service company personnel can make improvements. Optimization software calculates optimum solutions (least cost/best packing/ highest profit). Some companies try to develop computer software to optimize container utilization. **Auto Load Pro** is an automatic 3D Palletizing and Loading optimization software solution. **Max Load Pro** is a cargo loading planning, container loading, freight calculation and cube optimization software. **Cube Master** is a cost effective cargo load planning software to optimize the load on trucks, air and sea containers. It reduces shipping and transport costs through intelligent loading and optimal space utilization. **Optimizer** is optimization software in Thailand for exporters/importers, packaging, manufacturers and logistics which handle regularly shaped containers such as ocean containers, trucks and refrigerated units. It offers several advanced options such as loading by sequence, loading by FILO (first in last out), multiple container sizes per shipment (no limit), multiple package sizes per shipment (no limit), manual optimization override, calculate costing and cost per package being shipped.

A. Cargo optimizer software

Cargo optimizer software slashes the time it takes to work out the best solutions to cargo, cutting or packaging problems. Different types of cargo such as rectangular, square, cylindrical etc. can be used in this software. This software gives step to step details of loading cargo in truck.

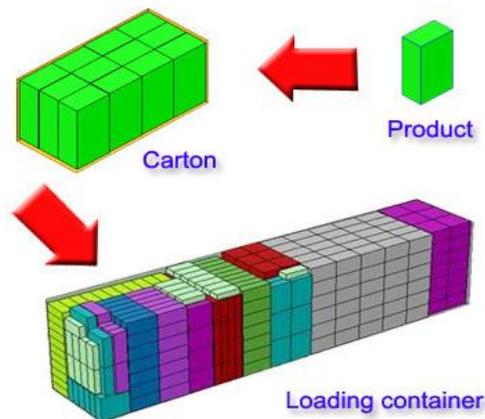


Figure 1. Cargo optimizer- 3D loading software

B. Cargo-wiz software

Cargo-wiz is logistics software designed for cargo loading optimization. It is designed especially for loading containers at maximum efficiency. The program is very customizable, everything from the container size to the order in which you want the cargo loaded can be modified according to your needs.

We can import your own data and customize it as we see fit. Cargo-wiz comes with its own preset dimensions for containers which can be set to the Imperial system, or the metric system. We can also create our own container with the dimensions we want. Some information about the cargo has to be written in the program: quantity, length, width, height and weight. We can also prioritize the cargo and we have the option to put some cargo on the bottom only. The program offers many options here, we can sort the cargo, name the shipment and, if we have a large list of cargo a search tool is provided for finding the information faster. The most useful feature of Cargo-wiz is a 3D model, how to load the cargo in the container step-by-step. In addition, in the 3D model, the program shows you exactly how much of the container volume is used, as well as some other statistics. The design is done well, the cargo is shown in different

colours and if you hold the mouse over it, the description appears. Cargo-wiz is a very good tool for those looking for better cargo loading optimization.

Cargo-wiz software is drop and drag software.

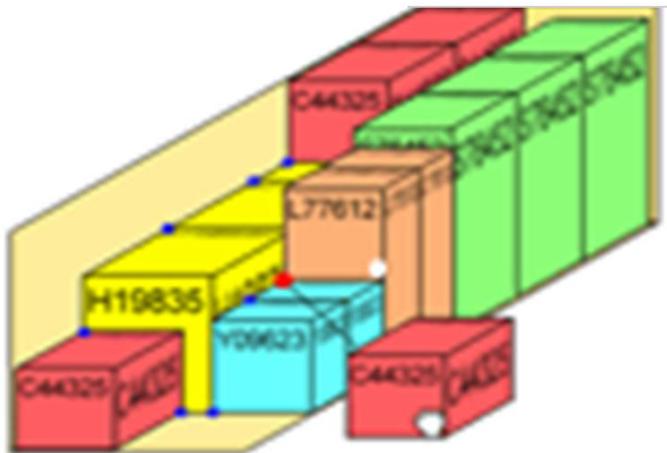


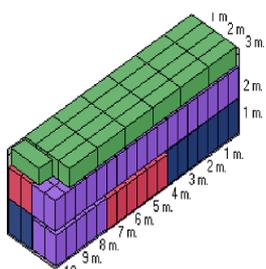
Figure 2: Cargo-wiz software: drop and drag

III. RESULTS AND DISCUSSION

Both software (Cargo optimizer and Cargo-wiz) is done by taking same data and results of both software is compared.

Model of (Refrigerator DC) WITH FF IN 34' HIGH CUBE H: 10.6' W: 8.8' is analysed using two softwares.

A. Using Cargo optimizer software:



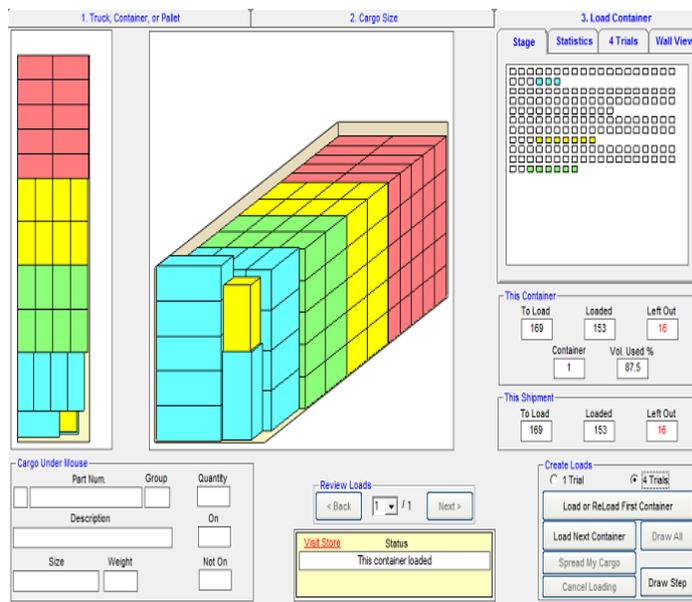
Picture Summary

Customer		
Shipment ID	34" HIGH CUBE	
Container	1 of 1	
Container ID	34" HIGH CUBE	
		Utilization
Wgt.	6,165.00 kg.	77.06 %
Vol.	83.46 CB.M.	92.93 %

SKU #	Name	Qty	Product	Weight	Volume
B195CIGR.AIGZBEN	B195CIGR.AIGZBEN	46	46	1,610.00	20.16
B205KGSL.AGSZEBN	B205KGSL.AGSZEBN	48	48	1,680.00	21.04
D205KSHN.AGHZEBN	D205KSHN.AGHZEBN	50	50	1,750.00	24.90
B292SGSM.AGSZEBN	B292SGSM.AGSZEBN	25	25	1,125.00	17.36
Total		169	169	6,165.00	83.46

From above experiment it shows that cargo optimizer gives 92.93% volume utilization of truck which is very economical for any industry. This reduces cost of inventory. Cargo optimizer can be used for mixed cargo and it also gives details of step by step loading of cargo in truck.

B. Using Cargo-wiz software:



From above experiment it shows that Cargo-wiz gives 87.5% of volume utilization. Although this software gives less volume utilization of trucks and is not so efficient but cost of this software is less compared to cargo optimizer software. Cargo-wiz software is very simple to use and does not require any training.

IV. CONCLUSION

Load consolidation is maximum utilization of truck containers. Many companies do not use any software for loading and unloading truck. Companies use trial method for loading. The study further suggests remedial measures that could be used by companies. Cargo optimizer and Cargo-wiz are two such softwares that can be used by companies. In this paper two softwares are used for comparing the results by taking same data. Both softwares have some limitations and benefits. By using software time can be saved while loading and unloading trucks. From above experiments it is concluded that cargo optimizer software gives more volume utilization and also it gives step by step detail how cargo are uploaded and arranged. The cargo which is to be

unloaded first are loaded in last. Cargo-wiz software is cheap and easy to understand. This software does not require training and skills. Volume utilization is less compared to cargo optimizer software. This software can be used where cost is main factor. It is used by drag and drop according to one's requirement. Cargo-wiz work only work with rectangular cargo. Therefore, where mixed cargo like rectangular, square, cylindrical are used this software cannot be used. Cargo optimizer can be used in such case.

V. REFERENCES

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