Customers' Opinion about Management of Empty Containers in Liner Shipping

R. Sritharan

Assistant Professor, Department of Business Administration,
Directorate of Distance Education, Annamalai University, Tamil Nadu, India
E-Mail: srisrithar13@gmail.com

Abstract - **A container is any portable device in which material can be stored, handled, treated, transported, recycled, or disposed of. The definition of container is found in California Code of Regulations, Title 22, and section 66260.10. Containers range in size from small lab bottles to trucks and rail cars, but the most common containers used for hazardous waste and hazardous materials management are 55 gallon steel or plastic drums and inner liners from these drums (Cheung and Chen, 1998). The empty container management requirements discussed in this fact sheet pertain to containers and their liners that are less than 110 gallons in volume. The main aim of the study is to identify the various factors in managing empty containers in Liner shipping. The data were collected and analyzed through proper statistical tools and the results were presented in the article.**

Keywords: **Liner Shipping, Container Management**

I. INTRODUCTION

The strategy adopted by DTSC to define an "empty" container or container liner was to establish standards that require the generator (the person who uses the contents of the container) to empty the container of material as much as is reasonably possible. This standard is more stringent than the federal empty standard (found in Title 40 Code of Federal Regulations, section 261.7), which allows up to one inch or 3% of the total weight of the container's contents to remain in the container (Choong *et al.,* 2002). The California regulation sets three standards to define an empty container, each based on the type of material held by the container:

That Held Pourable Materials: For containers that held a material that can be readily poured, all material must be removed by any practicable means (including draining, pouring, pumping or aspirating) before the container can be considered empty. In regards to draining, a container is empty when there is no longer a continuous stream of material coming from the opening when the container is held in any orientation (Crainic *et al.,* 1993).

A. Container Management: The quantity of empty container allocation gets large, and the container using efficiency gets low, those makes the cost of empty container allocation increase, and the harbor empty container stock level rise, meanwhile indirectly influence the route container equipment quantity, container rent quantity, causes the total cost of container transportation to increase (Drewry, 2002). The cost control and reduction in empty container allocation have become the key aspect to influence the shipping companies' state of operation.

B. Container Circulation Process: The container circulation in the entire transportation process is as follows:

1. The cargo owners are in need of empty containers. These empties are obtained from the nearby container freight stations
2. Then the empties are stuffed with the cargo. Then they are transported through the intermodal facilities to the container yard
3. The loaded containers are then load to ships in ports and are transported to the destination port.
4. There they are picked up and transported through the interior transportation modes and are delivered to the consignees' premises.
5. Then the containers are destuffed and become empty again and are either stored or transported to the place of demand.
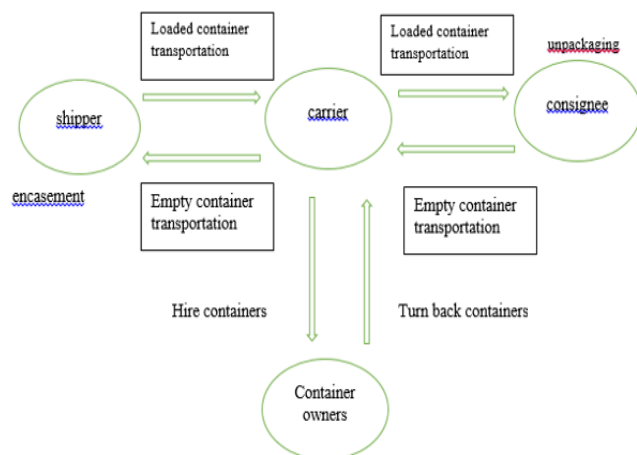

Fig. 1 Empty Contanarisation Process

C. Current Status of Liner Shipping: According to Alpha liner the three world leading shipping lines, Maersk Line, MSC and CMA CGM, who have been growing in capacity since 2000, represent one third of the global market. In 2007 alone they managed to grow from 32.1% to 34.1% in terms

of TEU capacity (UNCTAD, 2008). Maersk Line bought P&O Nedlloyd in 2005, which led to an increase of its market share from 12.5% to 18.2% but in 2007 its share fell to 16.8% indicating the difficulties Maersk experienced integrating P&O Nedlloyd (UNCTAD, 2007). In the beginning of 2008 its share continued to fall reaching 16% but grew again to 16.3% during the first 4 months of 2008 thanks to its fleet growth as new buildings coming in. In the meantime, MSC and CMA CGM have been growing fast and enlarging their market shares. MSC has increased its share from 8.6% in 2006 to 10.4% in 2008 and CMA from 5.6%

II. REVIEW OF LITERATURE

The industrial network approach is described and how it can be used to describe the actors, resources and activities that are involved in intermodal freight transportation. Intermodal freight transportation Intermodal freight transportation occurs when an intermodal transport unit (ITU) is transported from location A to location B using different transportation modes.

Different transportation modes can be container vessels, railways, barges, aircrafts and trucks depending on where the transport is requested (Lopez, 2003). When two or more transportation modes are used, ITU´s are crucial to maintain the effectiveness of the system. Therefore, the container as an ITU is considered a suitable option as it is easy to transfer between transportation modes and provide a good protection for the cargo (Krajewski L, and Ritzman, 2005). Specific cargo handling gear is needed to load and discharge containers between different transportations modes. Special handling gear of this kind is located at cargo terminals where the shifting between transport modes occurs, e.g. container depots and railway- and sea-traffic terminals (Panayides, and Cullinane, 2002)

Regional empty container management often refers to the last movement in intermodal freight transportation of containers in door-to-door shipments, where empty containers are returned to depots or moved to shippers for exportation (Murrhy RP, and Wood FD, 2004). Moreover, containers can either be returned to a depot for storage in the hinterland of a port or directly to the port depot for global repositioning. Furthermore, regional empty container management can refer to repositioning of empty containers between inland depots, port depots or port terminals to decrease empty container imbalance (Jula *et al.,* 2006).

Imbalance of empty containers at a regional level is often the result of trade imbalances in export and import among businesses and industries in the region. For example, if an area is high in import and low in export, the area can be assumed that there will be a surplus of empty containers in the depots in that area (Murrhy RP, and Wood FD, 2004). According to existing research, it can be assumed that the majority of regional empty container management is carried

out via trucks (Jula, *et al.,* 2006). The average distance of regional repositioning has increased. Historically businesses and industries have been located close to the port, but lately businesses and industries have been located further into the hinterland due to spatial issues and land cost increases in areas near the ports and depots (Stopford, 2002).

Outsourcing: The term outsourcing is generally used to describe an actor who seeks services currently performed in-house to be provided by other external actors (Heaver, 2001). Outsourcing can also mean to transfer certain activities to specialized actors in a certain segment to improve quality of the activity. This has been part of a trend towards outsourcing non-core activities to external actors (Konings, 2005). Outsourcing non-core activities is a proven business strategy to enable resources to focus on core activities and internal processes. It also spreads risk and enables the company to achieve a higher quality and service toward their customers (Logozar, 2008).

Cost: Costs refer to additional cost that occurs due to disturbances (i.e. disturbance costs). Disturbance costs are costs that might occur from events that are not under the actor's control. Disturbance costs are therefore additional fees for freight payers and are not agreed on before the haulage commence. Disturbance costs can be influenced by weather, congestion or queuing (Mongelluzzo, 2005a). Costs considered in this study were disturbance costs caused by queuing and the location change for the inspection.

III. FACTORS EFFECTING THE TRANSPORTATION OF EMPTY CONTAINERS

Through the study of literatures, the factors contributing the need for repositioning and transportation of empty containers are as follows:

1. The objective factors include, imbalance in in/out container numbers, which indirectly emphasizes on demand and supply, the imbalance in container types, rate of turnover of the containers, which is a slow process due to which the container cycles are delayed and it remains inactive for long periods, the sudden variation of cargo volume, the difference in the economic development between different regions, etc.
2. The subjective factors include, backlog of empty containers, mistakes made by different parties in managing the containers, extended use or misuse of containers by parties, the cost of container repairs and standards differ from place to place.
3. Some of the other factors are: the company stores empty containers to meet customer demand and attempts to minimize safety stock of empty containers at each port. Safety stock of empty container affects the amount of repositioned-into empty containers and repositioned-out empty containers.
4. The cost factor plays a major role. Handling cost at port is a major and indispensable expenditure. The cost of transportation mode is divided into three kinds of cost:

cost of owned slot; cost of charted slot; and cost of inland drayage by truck.

IV. RESEARCH METHODOLOGY

A. Objectives
1. To study the management of empty containers in Liner shipping
2. To analyze various factors to be considered for managing empty containers.

B. Population: The population for this study is anybody who use liner shipping to export their products to other countries or import some foreign goods. In this study, the number of population cannot be defined.

C. Sample: The sample for this study is the persons who are involved in export or import of some goods through liner shipping and can be done through Balaji Shipping agencies, Chennai.

D. Sampling Technique: Since, the number of customers coming to Balaji Shipping Agencies is more, the researcher adopted convenience sampling method to acquire the data.

E. Instruments Used: In this study, questionnaire is used to collect the data from the respondents. The questionnaire consists of data regarding age of the firm, annual turnover, experience with Balaji shipping agencies and place of origin. Apart from that, ten statements were identified to measure the management process of empty containers in liner shipping. Those statements were measured in FIVE point Likert scale where 5 represents strongly agree and 1 represents strongly disagree.

F. Procedure: The data were collected from the respondents who approach Balaji shipping agencies for the shipment of goods. The researcher approached them regarding the need for the study and got their opinion with the help of questionnaire. This study was conducted during the month of February and March 2019. 100 samples have been collected for this study.

V. ANALYSIS AND INTERPRETATION

TABLE I FREQUENCY DISTRIBUTION OF THE RESPONDENTS' OPINION REGARDING SIZE OF THE CONTAINER IS IMPORTANT

	Frequency	Percent
Strongly Disagree	13	13.0
Disagree	35	35.0
Neutral	6	6.0
Agree	29	29.0
Strongly Agree	17	17.0
Total	100	100.0

Table I shows the frequency and percentage distribution of the respondents' opinion about the less cost of service. It is observed that 29 percent of the firms agree to the statement and 17 percent of the firms strongly agree to the statement that the cost of service is less . It is also noted that 35 percent of the firms disagree and 13 percent of the firms strongly disagree to this statement. However, 6 percent of the firms show neutral opinion. Therefore, it is concluded that 48 percent of the firms do not accept that the size of containers is important. The percentage distribution is shown in the following bar chart.

TABLE II FREQUENCY DISTRIBUTION OF THE RESPONDENTS' OPINION REGARDING STORING OF EMPTY CONTAINERS IS EASY

	Frequency	Percent
Strongly Disagree	6	6.0
Disagree	34	34.0
Neutral	8	8.0
Agree	27	27.0
Strongly Agree	25	25.0
Total	100	100.0

Table II shows the frequency and percentage distribution of the respondents' opinion about the less transit time. It is observed that 27 percent of the firms agree to the statement and 25 percent of the fims strongly agree that the transit time is less . It is also noted that 34 percent of the firms disagree and 6 percent of the firms strongly disagree to this statement. However, 8 percent of the firms show neutral opinion. Therefore, it is concluded that 52 percent of the firms accept that the storing of empty containers is easy in Balaji Shipping Agencies. The percentage distribution is shown in the following bar chart.

TABLE III FREQUENCY DISTRIBUTION OF THE RESPONDENTS' OPINION REGARDING MANAGING DISPOSALS OF EMPTY CONTAINERS IS EASY

	Frequency	Percent
Strongly Disagree	13	13.0
Disagree	23	23.0
Neutral	17	17.0
Agree	35	35.0
Strongly Agree	12	12.0
Total	100	100.0

Table III shows the frequency and percentage distribution of the respondents' opinion about the assurance of safty for cargo. It is observed that 35 percent of the firms agree to the statement and 12 percent of the firms strongly agree to the statement that the assurance of safty for cargo is good. It is also noted that 23 percent of the firms disagree and 13 percent of the firms strongly disagree to this statement. However, 17 percent of the firms show neutral opinion. Therefore, it is concluded that 47 percent of the firms accept that the managing disposals of entainers is easy in Balaji Shipping Agencies. The percentage distribution is shown in the following bar chart.

TABLE IV FREQUENCY DISTRIBUTION OF THE RESPONDENTS' OPINION REGARDING EMPTY CONTAINERS ARE CLEAN AND NON-TOXIC

	Frequency	Percent
Strongly Disagree	14	14.0
Disagree	27	27.0
Neutral	12	12.0
Agree	37	37.0
Strongly Agree	10	10.0
Total	100	100.0

Table IV shows the frequency and percentage distribution of the respondents' opinion about the time duration for customs. It is observed that 37 percent of the firms agree to the statement and 10 percent of the firms strongly agree to the statement that the time duration for customs is less. It is also noted that 27 percent of the firms disagree and 14 percent of the firms strongly disagree to this statement. However, 12 percent of the firms show neutral opinion. Therefore, it is concluded that 47 percent of the firms accept that the empty containers are clean and non-toxic in Balaji Shipping Agencies. The percentage distribution is shown in the following bar chart.

VI. FINDINGS OF THE STUDY

It is found that 48 percent of the firms do not accept that the size of containers is important. 52 percent of the firms accept that the storing of empty containers is easy in Balaji Shipping Agencies and 47 percent of the firms accept that the managing disposals of entainers is easy in Balaji Shipping Agencies. It is concluded that 47 percent of the firms accept that the empty containers are clean and non-toxic in Balaji Shipping Agencies.

VII. SUGGESTIONS

Since, the cost of managing empty containers is high in Balaji Shipping Agencies, it is suggested that new methods can be implemented in the containerization process so as to reduce the overall cost of managing the containers. Since customers do not accept that the hazardous materials are not found in empty containers of Balaji Shipping agencies, it is suggested to the management that whenever they send containers to the customers, they should ensure that the containers are clean in all aspects.

Hazardous materials may create harmful effect to the product which are loaded on to the containers. shipping agencies can send different sizes of containers to customers provided the cleanliness should be maintained in the containers.

VIII. CONCLUSION

Managing empty containers in Liner shipping is not as easier. It may contain toxic items, hazardous materials and sometimes explosives also. So it is important to manage empty containers. This study is performed to study the management of empty containers in Liners shipping of Balaji Shipping Agencies, and conducted a study with 100 customers and their opinions were observed. Based on their opinion it is concluded that, new methods can be implemented in the containerization process, the containers should be clean in all aspects, sending different sizes of containers to customers provided the cleanliness should be maintained in the containers, the complicated procedure should be removed in the documentation process, and apply newer techniquest to reduce the time of managing empty containers.

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