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"Cost Analysis of Foldable Containers on Container Freight Station and Port in Chennai Region"

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Abstract: In today's world, most of the goods are traded only with the help of containers. Containers plays a vital role in trade practices. At the same time, transport of empty containers which arises from the need to reposition containers is an expensive business. This holds in particular for shipping lines which are usually responsible for container repositioning and have to bear these container management costs. Shipping lines are known to follow various strategies to reduce the costs of empty transport. A rather unfamiliar but interesting option to save costs is the possibility to fold empty containers. This could save transport costs but also transshipment and storage costs. The primary objective of this study, to analyze the cost analysis of foldable containers in Maritime and logistics sector and secondary objective is to find out some benefits by using foldable containers. This study investigates employees/container operators of Chennai Port Trust and CFS in Chennai Region. Using this data, we have found the costs analysis involved in using foldable container on CFS and port in Chennai Region and also some economic and environmental benefits by using foldable containers.

Key words: Foldable container, cost analysis, SIO and FALLPAC, containers and transport, congestion, reposition

INTRODUCTION

The arrival of the Maritime container in the middle of the 1960's led to a great improvement of freight transport in many respects. The transfer of goods became much easier and safer and the use of containers paved the way for intermodal transport development. At present, the Maritime container dominates the shipping industry and the extent of its influence in land transport is also substantial. In reviewing the present strategies of shipping lines to control the costs of empty transport, one can notice that these strategies are mainly focused on minimizing transport movements of empty containers. This is done by trying to improve the match of empty containers and cargo (palgrave-journals.com/mel).

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Literature review: We have derived this concept from foldable containers to reduce the costs of empty transport? A cost-benefit analysis from a chain and multi-actor perspective by Konings (2005a, b) Delft University of Technology, the Netherlands. In the study of Konings, he says that the opportunities for commercial application of foldable containers. The cost concept by Butt and Ogsten (1999), Manitoba's Maritime container traffic: trends and developments in the 1990's also helped us to make this study. This study helps the reader to know about the cost analysis of foldable containers on CFS and port in Chennai Region and some other economic, environmental and social benefits by using foldable containers.

Reason for transport of empty containers: Looking at the problem of empty container transport, there are several causes for the fact that containers have to make expensive, unproductive journeys but most of these causes have their root in the dynamics of the world economy. Transport is a derived activity and therefore, trade volumes determine the demand for transport. Since, trade patterns are the result of developments in the world economy, economic developments determine the size and direction of cargo flows and put their mark on the volumes of empty transport. Financial economic events may have far-reaching effects as has been illustrated by the Asian crisis when the demand for slots in East and Westbound trades diverged dramatically. Vessel utilization on eastbound shipments dropped from 85% in 1997 to

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55-60% in 1998 while the westbound load factor reached 100%. Consequently, transport of empty containers to Asia increased enormously.

Furthermore, there are trades that suffer more or less with structural imbalances such as the trade lanes to Africa. Here, containerized cargo is predominantly inbound, the outbound containerized flows are rather small. In addition to these conjectural and structural causes, there is the phenomenon of seasons, leading to cargo flows which temporally swell in one direction.

Finally, a matter which is also relevant is the fact that different type of goods demand for different type of equipment, either as regards the dimensions of containers (20, 40 ft containers, high cube containers, pallet wide containers) or the specific application possibilities (standard containers, reefers, tank containers, etc.). This can also lead to imbalances and create a need for transport of empty containers (Butt and Ogsten, 1999).

Concept of foldable containers: The idea of foldable containers is not so new. In the past, many designs have been proposed. The majority of these ideas, however, never passed the phase of patent granting. In fact, only two designs have achieved the stage of experiments or even a small-scale introduction in the market and these designs are at the moment still available:

- The Six-In-One (SIO) container
- The Fallpac container

SIO container: The SIO container is a fully dismountable 20 ft dry freight box that once dismantled can be folded, stacked six high and interlocked to the exact dimensions of a standard 20×8×8 ft, 6 in container. It was launched about 20 years ago by the Swiss based SIO Container Company (SCC). A shortcoming of the first series of the SIO was its maximum gross weight of 20 tons (standard boxes having a gross weight of 24 tons). In the next generation, the carrying capacity was increased to 24 tons which left only one significant difference with the standard 20 ft container; the higher tare weight of SIO (500-600 kg heavier) (Konings, 2005a, b).

The most striking characteristic of the SIO is the absence of hinges, other than the standard door hinge. The SIO incorporates seven separate elements with locking devices. Simple production and reduced manufacturing costs were important motives to choose for this construction based on dismountable parts. Avoiding the use of hinges was believed to be a key factor for success because of well-known problems with hinges (i.e., corrosion, frost, bending) (Fig. 1).

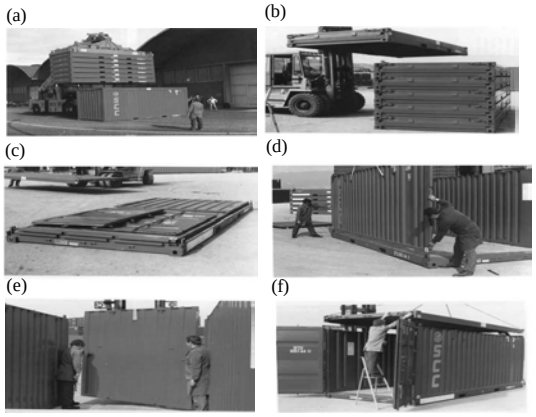

Fig. 1: a-f) European transport

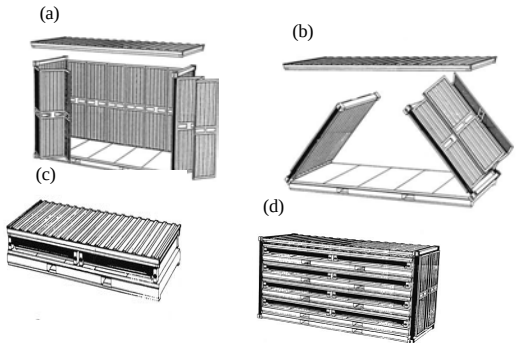

Fig. 2: a-d) Fallpac container

Fallpac container: The Fallpac is a 20 ft dry freight box which combines dismountable and collapsible features. The roof of the container is dismountable, the remaining elements are foldable. Four folded units can be stacked inside a fifth assembled unit for empty transport. In this way, the Fallpac container has also the same dimensions of the 20 ft standard box. The maximum gross weight of the Fallpac container conforms to ISO standards (24 tons) but its tare weight is approximately 4,000 kg which is about 1,700 kg heavier than the standard 20 ft container.

To fold or unfold the container two people and a forklift are required. According to the Swedish manufacturer (Fallpac AB), the box can be folded within 10 min. Since, the folding technique incorporates folding side doors, the container is suited for side loading as well as end loading. In the original design there was a problem with leakage through the side doors but this has been solved in the more recent design. The first Fallpac container dates from the mid-1980's (HCI, 2014) (Fig. 2).

Table 1: Cost analysis

Costs	20 ft	40 ft
Storage cost in CFS	56/-	120/-
Handling cost (lift on, lift off costs)	50/-	100/-
Transport cost (for 15 km)	750/-	1400/-

Anonymous (2010)

Cost analysis: The study investigates 54 container operators of various container freight stations to derive various costs which is involved in movement of empty container. But for every CFS, the level of costs are differ. So, we have taken an average level of costs to analyze (Table 1).

At the same time, container operators pointed that the cost for folding and unfolding of foldable container may be 50/- for 20 ft and 100/- for 40 ft container.

A total cost for a 20 ft empty container is the sum of storage cost, handling cost and transportation cost. Cost for an empty container is:

For one 20 ft container (Storage cost+handling cost transport cost = Total cost) 56+50+750 = 856/-

If, we use foldable containers which is has shown on Fig. 1 and 2, the cost of five 20 ft empty containers will be the sum of cost of folding and unfolding, storage cost for five containers, handling cost of five containers and transportation cost as shown as:

For five 20ft foldable container (Folding and unfolding cost+ Storage cost+handling cost+transport cost = Total cost)
250+280+250+750 = 1530/-

From the analysis of cost, for a five 20 ft traditional container, the total cost will be:

(Cost of 5 traditional container×5 units)
856×5 containers = 4280/-

But for five 20 ft foldable containers, the total cost will be only Rs. 1530, so that, a usage of foldable container will reduce the cost of transportation in a huge. The cost of a 20 ft container is equals to the cost of 3 foldable containers.

Economic and environmental benefits: Savings for a shipping line made with a foldable container depend on the chosen route and the trade imbalance. A foldable container will result in lower transport costs for repositioning, storage and ship handling. Extra costs are mainly folding and unfolding, maintenance and initial investment. The most realistic and profitable way for operating the foldable container is achieved by folding at the inland depot. The highest savings on using foldable containers will be realized in transport between inland depot and seaport. If the returning distance increases the total costs with standard containers rapidly increase.

Shippers and/or shipping lines will benefit the most of transport costs reduction in trades where multiple empty containers movements in the supply chain are required. There is a critical shortage of storage space in many ports in the world. Empty containers are stored in order to wait for a modality to take them to a certain place. The storage space required for empty containers will strongly depend on the dwell time of each container. Besides the economic, environmental and financial benefits, the foldable container also influences social aspects like noise pollution, aesthetics, (city) development and employment.

MATERIALS AND METHODS

Objective of this study is to analysis the cost in usage of foldable containers. It is exploratory in nature and its primary goal is to gain better understanding of an issue or situation and it is an appropriate way to provide ground work studies. The main findings of this study says that the difference between the cost of foldable and traditional container and also the employees of port and CFS don't aware of this type of containers.

This study investigates 63 employees/container operators of Chennai Port and Sical, Sanco, Gateway Distriparks Ltd. and Allcargo, Sattva, E.C.C.T CFS in Chennai Region. Using this data, we have found that how people aware of foldable containers and costs analysis of foldable container in Maritime and logistics sector.

It prompted the application of a qualitative methodology. This was done by administering both physical and questionnaires as well as conducting in-depth interviews. Those interviewed had to be the employees/container operators of Chennai port and various CFS's in Chennai. The key purpose of data collection was to ensure that a rich set of description was obtained. To achieve this, the interviews were transcribed in real time by the interviewer (Fig. 3-8).

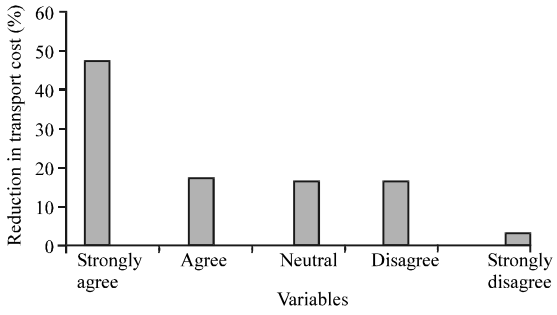

Fig. 3: Reduction in transportation cost

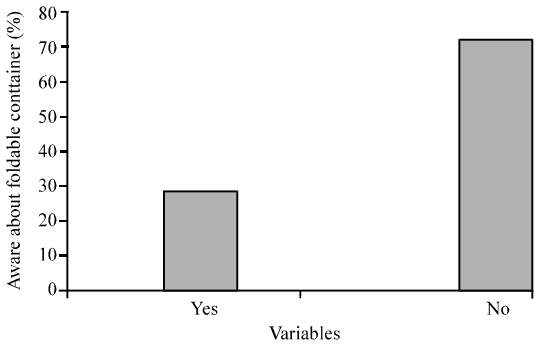

Fig. 4: Awareness of foldable

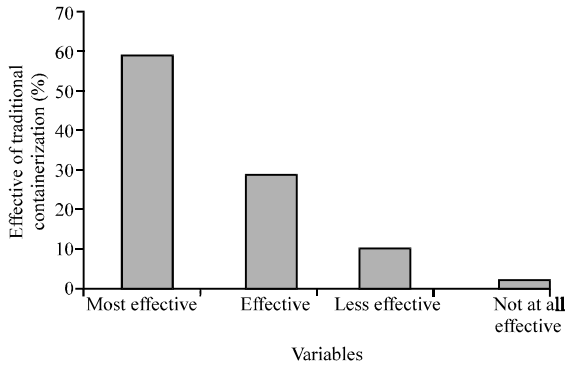

Fig. 5: Effectiveness of traditional containerization

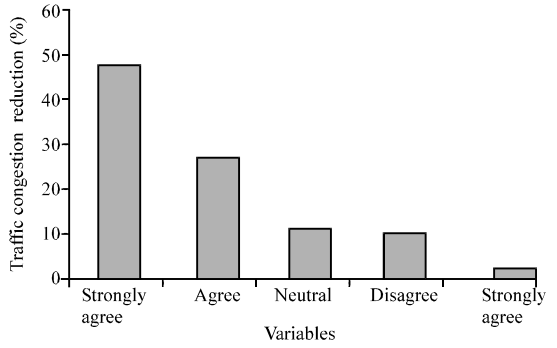

Fig. 6: Reduction in traffic congestion

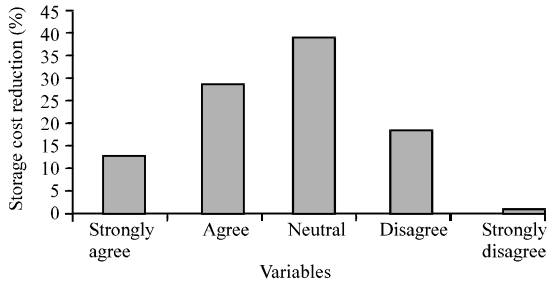

Fig. 7: Reduction in storage cost of empty container

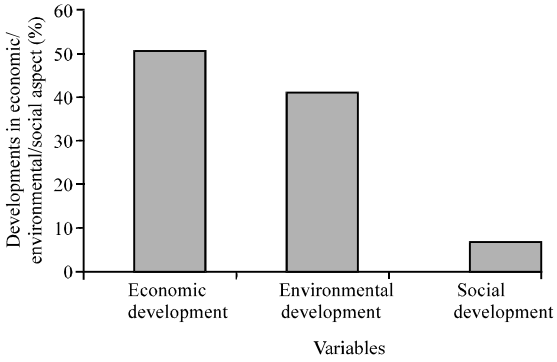

Fig. 8: Increase in economic/environmental/social

RESULTS AND DISCUSSION

Majority of respondents mentioned that this type of containers is not useful for any kind of sea transportation. It will be useful only for road transport around local areas.

About 79% of respondents felt that this type of containers surely will brings the cost reduction in transportation, storage, handlings of empty container, etc.

About 46% of respondents indicated that costs of folding and unfolding (manpower plus ancillary equipment) in relation to the number of times that a container is folded and unfolded in the logistic chain.

About 57.09% of respondents point outs that this type of containers may increase the economic development of the country by reducing various cost involved in the handling of empty containers.

About 12% of respondents specifically pointed that higher exploitation costs for a container because of a higher purchase price and probably higher maintenance and repair costs due to a more complex construction.

About 64.05% of respondents indicated that there is no specific equipment to fold or unfold of these

containers. Most of the people thinks that this containers leads to any malpractice and pilferage may happens during any transshipment of cargo.

About 42% of respondents pointed that this concept is not easy to implement in our country to implement this, we have to abolish our dry containers and also have to invest more to manufacture this foldable containers in our country.

Most of the respondents pointed that the transporters business may affects by implementing this type of containers. Mostly shipping vessel operators gets benefits of carrying large amount of empty containers in a single voyage, only if the containers are in foldable type. Few respondents mentioned that this type of containers will give's employment opportunities for the purpose of folding and unfolding of containers in container depots. Most of the respondents indicates that the foldable container will also influence social aspects like noise pollution, aesthetics, etc.

CONCLUSION

The use of foldable containers can lead to substantial net benefits in the total chain of container transport. In principle, these benefits increase as foldable containers are used on longer distances and through more links in the chain because the costs of empty transport are reduced. The net benefits actually depend on the dditional costs of foldable containers, namely. The costs of folding and unfolding a container (plus the associated costs of inspection and so forth), the additional exploitation costs of a foldable container, any additional transport movements that might be needed to places where facilities for folding and unfolding are available. The usage of foldable container gives not only economic benefits and financial benefits but also includes environmental and social benefits.

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