Improving the Logistic Efficiency by Reducing Weight of the Plastic Bin

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Abstract- *Supply chain management encompasses the planning and management of all activities involved in sourcing, procurement and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies. Logistics act as a nervous system to all type of industries.*

The objective of this paper is to improve the supply chain efficiency through bin life management. Plastic Bins play a vital role in handling the parts in all the industries. In automotive industries the majority of the parts are coming in plastic bins. Plastic bins resulting in easy handling of the part and also to improve the volumetric efficiency of the supply chain.

Keywords- Supply chain, Logistics, Roto bin, Injection bin, Plastic bins, Easy Handling, workability,

I. INTRODUCTION

Various types of materials are used in industries for various operations. By considering packaging as one of the important operations in many manufacturing industries has given lot of importance for the packaging materials. Packaging ensures quality of the parts during transportation. Billions of pounds are spent on packaging. Sixty percent of all packaging is done on food products. Now a day's, packaging is used in all industries for transportation of parts and storing the parts without affecting their functionality. There are six main reasons why packaging developed and is in use today.No matter what kind of product is being moved, crates and pallets are an important part of the shipping and packaging process. They act as secondary wrapping and keep the actual goods safe until they are delivered. Pallets keep packages raised off of the surface they are sitting on—whether it is the ground or the bed of a delivery truck. Keeping products off the ground keeps the packaging in good condition, and protects against dirt and moisture.

II. LITERATURE SURVEY

Kannan Govindan et al. [1] reviewed the literature and suggested that a holistic view of the recent and state-of-the-art studies in reverse logistics and closed-loop supply chain. The results can clarify the current gaps and future directions for research. This paper shows that supply chain and logistics plays a vital role in terms of cost benefits in all manufacturing areas.

Ru-Jen Lin et al. [2] stated that green supply chain management involves supplier, manufactures, customers and reverse logistics throughout the closed loop supply chain. To aid in GSCM performance evaluation, the authors have utilized the fuzzy set theory and decision making trial and evaluation laboratory (DEMETAL) method. They have concluded that the fast growth of automobile manufacturing industry creating the business opportunities worldwide but concurrently increasing the substantial environment burdens. So GSCM has emerged as an important approach to reduce these environmental burdens and improve green image. They have also concluded that purchasing the environmental friendly materials is considered most important in GSCM method

Sazrinee Zainal Abidin et al. [3] stated that packaging design play several role as communication tools for products and brand. They clearly stated that packaging design serves to contain, protect, transport, identify and distinguish a product. The authors have observed that many countries don't buy Malaysian made product because of poor packaging. They have concluded that packaging design must function as the aesthetic means of communicating to people from all different backgrounds, interests and experiences.

Qinhong Zhang et al. [4] have compared the modes which are shared mode and dedicated mode used in packaging system management for automotive parts logistics. They concluded that shared mode has lower transportation volume, lower pipeline inventory, lower safety inventory and lesser inventory carrying cost but dedicated mode has higher transportation volume, higher pipeline inventory andhigher safety stock and high inventory cost.

EzutahUdoncyOlugu and Kuan Yew Wong [5] studied the Closed-loop supply chain management (CLSCM) and concluded that CLSCM is complete in all respects which facilitates green purchasing, green manufacturing and material management, green distribution and marketing, as well as reverse logistics. Thus, CLSCM is a method to design and/or redesign the supply chain that incorporates recycling of metals and plastics, repair and reuse of parts and components for the production of new devices, and remanufacturing and/or refurbishing of entire discarded products for use as second-hand devices. An automobile manufacturing company in Malaysia was used as a case study to assess the applicability of the performance measurement system. From the evaluation conducted, it was found that the system is easily applicable to evaluate the performance of an automobile CLSC. It was also found that the case company's CLSC still requires a lot of attention. It is recommended that the system be improved to have a real time assessment capability which can be structured to measure the CLSC performance from time to time based on raw data feed.

III. OBJECTIVE OF THIS PAPER

The objective of this paper is to improve the supply chain efficiency through bin life management and adoption of euro standards. Plastic Bins play a vital role in handling the parts in all the industries. In automotive industries the majority of the parts are coming in plastic bins. Plastic bins resulting in easy handling of the part and also to improve the volumetric efficiency of the supply chain.

IV. METHODOLOGY

1. Implementation of euro standards

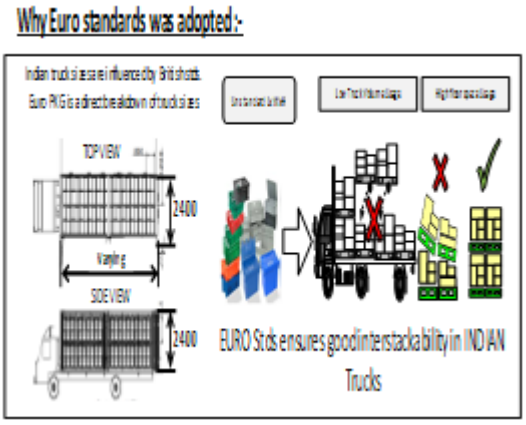

Fig 1: Euro standards

Euro standard concept was adopted because to achieve the maximum logistic efficiency. To obtain maximum efficiency the Plastic bin also developed according to euro standards.

Table 2: Euro standards of plastic bin

Bin Code	L	W	H
4311	400	300	110
4322	400	300	220
6411	600	400	110
6422	600	400	220
6433	600	400	330
6444	600	400	440
8611	800	600	110
8622	800	600	220
8633	800	600	330
8644	800	600	440
12411	1200	400	110
12422	1200	400	220
12433	1200	400	330
12444	1200	400	440

2. Implementation of Injection moulding bin to reduce the weight

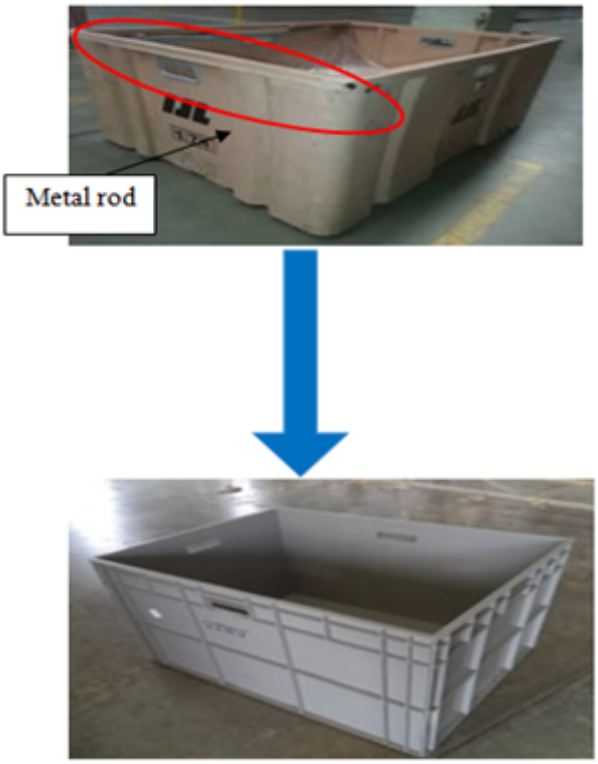

Fig 2: Changing from Roto to Injection bin

The main theme of packaging is to go with 100% standard packaging with returnable bins. To overcome the roto mould issues the injection moulding bin is implemented. So this injection moulding technique has provided the good outcomes over the rotational moulding bins. It is possible to obtain more production in Injection moulding when compare to rotational moulding technique.

V. DEFECTS IN ROTO MOULDING BINS

1. More Bin weight

Fig 3: Roto bin with increased weight

In order to get the strength in roto moulded bin metal rods are provided. But metal rods incur more weight which reduces the logistic efficiency.

2. Improper Wall bending and stacking

Fig 4: Wall bending and stacking of roto bins

Wall bending and stacking problem occurs due to continuous strapping and destrapping. If the strength of the bin is less, then the stacking of the bin will become difficult. Due to this the volumetric defects Injection moulding bin has implemented

VI. ADVANTAGES OF INJECTION MOULDING OVER ROTO MOULD BIN

1. Less bin weight

Fig 5: Injection bin with reduced weight

In injection moulding bin the weight of the bin is less when compare to roto mould bin because of the removal of metal rod. The strength to the bin is obtained by design of side ribs and also the raw material.

2. Wall bending and stacking

Fig 6 : Wall bending and stacking of Injection bins

By usage of proper raw material in the injection moulding bins the wall bending and stacking is eliminated. So because of this the volumetric efficiency will be obtained.

VII. TESTING OF INJECTION MOULDING BIN

Rope tie test

Fig 7: Rope tie test for injection bin

Here the injection moulding bin is subjected to rope tie test for 48hrs to identify the defamation of the bin because if the deformation of the bin high then the stacking of the bin is difficult.

VIII. RESULTS

1. Bin weight

Table 2: Bin weight

Bin Weight			
Sl	Size in mm	Roto mould Weight in Kgs	Injection moulding in Kgs
1	600*400*110	1.906	1.705
2	600*400*220	2.685	2.4
3	600*400*330	3.635	3.25
4	600*400*440	4.285	3.635
5	800*600*110	3.075	2.755
6	800*600*220	4.105	3.955
7	800*600*330	6.105	4.8
8	800*600*440	7.115	6.02
9	1200*400*110	3.725	3.035
10	1200*400*220	5.545	4.415

2. Logistic efficiency

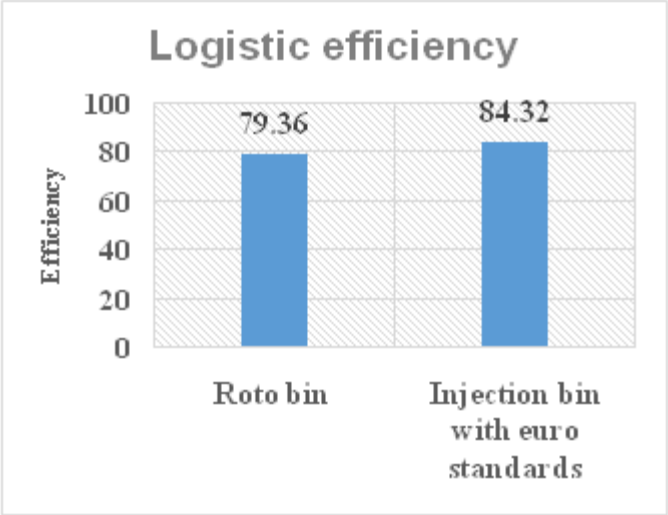

Fig 8: Logistic efficiency of Roto and injection bin

IX. CONCLUSION

The present paper dealt with improving the supply chain efficiency resulting in easy handling of plastic bins and improving the workability through packaging. By going with the returnable packaging the cost of packaging will be reduced and also cartoon boxes can be eliminated which is knows as green packaging. So this paper concludes that changing from roto mould to injection moulding process results in reduction of Plastic bins weight by 10% which intern minimizes the overall manufacturing cost of the Bins. The results has shown that euro standards helps in improving the efficiency by 5%.

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