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SUPPLY CHAIN ALLIANCE: A CASE STUDY OF GREY CEMENT PRODUCTION IN INDIA

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Abstract

The grey cement industry is a process industry and when the industry runs on full capacity utilization, any additional demand is difficult to be catered. Distribution and sales of material from any grey cement plant in trade is done from plant to warehouse and further to different locations. Warehousing is very important component in this business and the cost involved is not small. There is an ample scope of practicing just in time in grey cement warehousing operations. Even if practiced in part, it could improve the bottom line of all those companies who practice it. On one hand it would improve the profitability part and on the other hand it would help in reduction of quality deterioration. The research has examined the just in time approach which is quite specific and applicable to a wide variety of supply chain problems.

Key words: Inventory, Warehouse, Rey Grey cement Auto Nullifying, Grey cement Industry, Supply Chain, Upstream.

Introduction

In grey cement trade the material moves from factory to company's warehouse to stockiest to retailer to the consumer. The flow of material does not strictly follow this route and depending upon different situations it may skip one or more stage(s). This means that it may also come directly from factory to the customer. Also one of the most important aspects of the product so far is that in spite of so many brands with differential pricing, brand loyalty shifts very fast and

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in case of non availability of one brand, customer can easily be shifted to other brand. In high demand scenario the chances of bull whip effect is high as the impact could be on the whole industry and not on a particular brand since the brand loyalty in such situations are not very high among trade customers. While the impact of bull whip could be very high while studying it theoretically but in practical situation it gets auto nullified in upstream and the reason of it is the capacity constraints of the players and high logistics cost involvement. In this situation the demand of one location or site reaches to multiple supply sources. Though the demand is genuine with respect to the customer but since it is not catered due to low availability, all the sources which were approached or where the enquiry is floated pass it to the upper layer and so the cumulative demand figure reaches to upstream. The situation aggravates as even bigger construction sites which normally do not procure material from open market and buy directly from the manufacturers, approaches retail market in shortage scenario as they also do not want to compromise on speed of work. Traders too want to capitalize the situation to get extra margin or speedy recovery and they to (too) demand more material than their actual requirement. All these things clubbed together create the bull whip effect in upstream but the real damage due to this is negated due to the overall capacity limitation of the industry and slowly the situation reaches to the normalized state.

Just in time is a well established concept where operations are managed in such a way that required material reaches the destination exactly when it is required. This is a philosophy which stresses an avoidance of waste in all its forms with high degree of quality coupled with utmost reliability and fast enough throughput time of transformed resources. Initially the philosophy was developed for manufacturing operations but with time the scope extended.

Just in time as a concept is not very new and around 1920 it was operationalised at Henry Ford's great industrial complex in River Rouge, Michigan in his automobile assembly line.

Toyota Motors Company, Japan studied and learnt the process and techniques of Ford Motors operations. On this basis they developed the assembly process which was initially called Toyota Production System (TPS). Gradually the system evolved in such a way that during 1980 Toyota created very high quality product as compared to their American rivals and that too at lower cost.

Japanese as such are considered very sensitive towards waste and rework and takes inventory as an evil as it consumes space and resources.

Just in time strategically is nothing but an improvement in process flow so that in assembly line the desired component reaches exactly on time when it is actually required. Different researchers have given different frame work and guideline and there is no uniform frame work which is acceptable or applicable to all however the purpose and objective remains by and large common which is system and process improvement for overall gain.

Literature Review

Past literature and research have emphasized that the concept of supply chain is not very old and literature based on bull whip is studied mostly with other industries. Chandler, A.D., (1990) stated that the bullwhip problem has been known about since at least 1919 when Procter and Gamble found it in their supply chains. Lam, D.A. and Miron, J.A (1996) defined the effects of temperature on human fertility. He analysed the monthly birth and temperature data for a variety of states and countries are used to estimate the effect of short-run temperature fluctuations on fertility. This finding suggests that other factors too play an important role. Hau L Lee, V Padmanabhan, and Seungjin Whang (1997) described that distorted information from one end of a supply chain to the other can lead to tremendous inefficiencies. Fransoo, J.C. and Wouters, M.J.F (2000) in his paper measuring the bullwhip effect in the supply chain, discusses Bull whip conceptual measurement problems and discusses experiences in dealing with some of these problems in an industrial project. Dejonckheere, J., Disney, S.M., Lambrecht, M.R. and Towill, D.R. (2003) said that when production is inflexible and significant costs are incurred by frequently switching production quantities up and down, order-up-to policies may no longer be desirable or even achievable. Geary, S., Disney, S.M. and Towill, D.R. (2006) presented historical review, present practice and expected likely impact of bull whip. Warburton, R.D.H. and Disney, S.M. (2007) described the replenishment rules for solving the bullwhip problem

Just in time is not a new concept for manufacturing industry. Lim and Low (1992) had written one of the earliest books about the application of just in time to increase productivity in the construction industry. The book emphasized that though there are fundamental differences

between the manufacturing and construction industries still some of the basic principles of just in time may be applied, with some alterations, to the construction industry. Low and Chan (1997) further worked on Lim and Low's (1992) work. While Limand Low (1992) had given a general overview of the just in time concept in construction industry, Low and Chan (1997) suggested as how well the just in time theory could be applied to the other industries whose nature is almost similar to that of the manufacturing industry. There were several in-depth researches on specific aspects of just in time in construction industry. Tan (1996) emphasized on the accounting procedures for the wastage of time and material, to find quantitative just in time measurements. Tay (1996) analyzed the role of human resource management in the altered just in time principles to gain success in reducing waste. Mok (1998) focused on applying just in time principle into the site layout to enhance productivity and quality of work. Mok (1998) explained that by controlling waste on site, managing the movement of inventory, and optimizing the usage of machinery, smooth work flow could be achieved. Chong (1999) examined if ISO 9000 could be used on which just in time concepts could rely upon. Ang (1999) tried to find out the problems faced by the practitioners while applying just in time system. Ang (2002) tried to integrate just in time and 5-S principles which may improve productivity and quality. Show (2004) came up with the application of just in time principles as how the light factory design would help in reduction of waiting time and double the handling of goods during transportation; and also provided smooth movement of delivery to each unit with minimal damage to the quality of the goods.

Voo (2006) fostered the attraction of employing just in time in the construction process by showing a cost savings by 20-30% of the total contract value. There has also been several non academic work on just in time.

Scope of just in time in grey cement distribution and warehousing.

Grey grey cement is an industry which is very high volume business. This year the expected Indian domestic capacity is approx 300 million Ton. The grey cement is transported to customers in the form of packed bags of 50 kgs mostly. Though it is sold loose to bulk customers where customers have their own storing arrangements like silos etc but for the majority of customers

the mode of transportation in the domestic market is through Rail and surface. To manage the uninterrupted supplies companies manage and maintain ware houses at different places.

At any construction site normally the conditions are not very conducive to store or manage the material. Grey cement being a sensitive product requires special attention. The shelf life of grey cement as well as sensitivity with water/moisture is very high and price of each bag is no less. Also at the beginning of the construction activity, there is no store at any site.

As a practice, at any big project initially the stores are made. The quality and size of store depends on the size and class of the project. Even to construct the store, there is the requirement of grey cement. In small houses/building the process remains same however any nearby retail shop or some rental structure, if available, is used to cater such requirement.

The ideal situation for all these sites is to get the daily requirement of grey cement on daily basis. The advantages includes, no storing requirement, fresh material receipt, no risk of damages, no risk of pilferages/theft etc. however it being the basic necessary item for civil work, unavailability of grey cement would stop the work creating the work loss. Just in time is important to dealers and retailers as well. If the same is managed well, it will make the product competitive as the pricing of the material is based on FOR destination basis. Loading and unloading of the material at shop and then sending it to the customer attracts additional cost by way of loading and unloading as well as transportation. This makes a dent of overall profitability as this cost is not paid extra by the customer. As on date all big consignments are dispatched directly from the company's factory or warehouse to the customer site. If just in time is not effective, the customer does not suffer as the required material delivery in time is the responsibility of the concerned network. Manpower and other resources can not wait at construction site and so if just in time is followed it will reduce a lot of cost and give convenience to all concerned.

Warehousing too is a challenge for all grey cement companies as the space is getting expensive day by day as per companies requirement. This is one of the most important features for countering the competition as services are the prerequisite and premium charged is not in line

with the cost involved. The geographies of cities are expanding which pose an additional threat to have multiple warehouses to cover the geographies better. We may manage the ware houses with relatively less capacities if we could control the inflow and out flow of material. It will give a lot of cost advantage as well as associated benefits to the companies like

- Less space would cost fewer rentals.
- Faster movement of material would reduce the risk of material getting damaged.
- FIFO maintenance would be easier.
- Improved transshipment would reduce the cost of dual operations namely loading and unloading of material.
- Reduced operations would reduce the damages to the bags.
- Reduced operations would reduce the pilferages of material.
- Less stock would reduce the overall inventory carrying cost.

If we analyze the major components in grey cement warehousing with inventories reaching just in time, there is a huge scope of improving the bottom line of companies. No doubt that operations management would be important part but with technological advantage of grey cement and communication improvement a huge cost may be saved, if not all.

Table below shows the direct monthly expenses in ware housing operations

Total Volume from w/h (MT)	**Handling exp Dual operation Rs 40 PMT**	**Godown exp Rs 10 PSF**	**cost of inventory Rs 5500 PMT**	**Interest @12%**	**Total Cost (Rs)**
160000	**6400000**	**177778 1777778**	**220000000**	**2200000**	**10377778**

Assumptions taken:

1. Total volume taken as 160000 MT which is being handled through warehouses in Jaipur.
2. Handling of bag taken as per prevailing market rate is Rs. 1 per bag (average) per operation at ware house. Loading and unloading are 2 operations so per MT cost is taken as Rs. 40 per MT.
3. As per practice per square feet storage of grey cement of grey cement is 0.225 MT.
4. Prevailing grey cement price is taken as Rs 275 per bag.
5. Average godown rent is taken as Rs. 10 per square feet.
6. It is taken as on an average one week inventory is kept in godowns by various companies.
7. Total cost excludes other expenses/cost like administrative cost, damages, pilferages, insurance cost, quality deterioration etc.

If we analyze the situation in one city only, of course the city is big; there is a huge scope of cost reduction at one hand and quality improvement on the other side. Mobile godown kind of a concept where only the transshipment space is required may bring down whole cost near to 32 lacs as only one operation i.e. transshipment will be applicable and only some amount on account of vehicle of grey cement space but it would be quiet hypothetical in present situation but if we could just bring it down to half, there would be a great industry saving. The most important components would be the advance order planning, dedicated fleet for inward as well as outward material flow, regulated material movement and effective communication flow.

Conclusion

Warehouse management is very important in grey cement industry. It is difficult to survive by any company in present scenario with out have godown(s) but at the same time if work is done towards JUST IN TIME concept it would improve the profitability of the company. There is a lot of push effect especially in lean period and in those areas where there is excess capacities. Moreover some disturbances in an area give direct impact to the adjoining areas. Also further study may be done on taking all India scenarios. (May be either excluded or may be written as limitations with slight modification)

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