

## GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES A REVIEW ON WORLD CLASS MANUFACTURING (WCM)

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### ABSTRACT

To study an impact of WCM in small scale and large scale organizations, firms in order to compete the world market. This paper gives a review of WCM process strategies, aims, aspects, relationship between quality standards, along with the several Managerial pillars are discussed in this review paper. This paper examines the chief issues that are important to become world class manufacturer. The results of the analysis are very worrying for companies in our country as they lack in innovative strategies, advanced infrastructure, poor management techniques, awareness about the changing scenario of the business worldwide. For attaining the world class status it becomes therefore very essential to focus on flexible manufacturing rather than just introducing (IT) Information Technology to automate their common functions.

*Keywords: JIT, WCM, Lean manufacturing.*

## I. INTRODUCTION

World leaders use WCM (World Class Manufacturing) concept in business. There are altogether 9 pillars in WCM concept, out of which one is directly linked with quality, whereas other eight are indirectly linked with it [4]. It was come to understand that the current method of judging the excellence of the company, factory or organization was no longer having the significant results. Therefore it was necessary to implement the innovative productive concept like WCM in order to meet the order to meet the growing competition. In Syria, strict vigil was kept by the foreign companies on the changes in business competition. They make surveys in each month in order to stay updated regarding the drastic changes in the business.

## II. LITERATURE REVIEW

1) Ekta et al.(2017) has stresses the use of WCM. Its use have developed a essential tool for the organization to get world class rank. All this principles and tools are discussed in this paper. This has led them to arrive at the conclusion on that it provides better benefits during the competition. WCM is important but little complex tool to be implemented if they want to survive in the competition.

2) Ivan Dokic et al.(2012) has elaborated the relation of quality with the WCM deals with the direct and indirect relations of various pillars of WCM with quality. It becomes important to study this paper in order to clear knowledge regarding the linkage between the quality and WCM.

3) Johnny Lind\*, has studied the affects of WCM on the control of production. The paper also focuses on the comparison between the WCM and the traditional manufacturing.

4) H.B.C. Saxena et al., has elaborated the current situation of WCM in India in comparison with the Western Countries and Japan. And concluded that Indian companies has to do lot in order to gain the world class rank, as the companies in India do not give proper attention to the aspects of WCM.

5) Callon (1996) has mentioned the advantages of the Information Technology if the company, firm, organization wants to attend the World Class Status. Moreover in the conclusion he has given the statement that use of Information Technology is very important.

**III. PRINCIPLES OF WCM:**

WCM is a planning related to production in which the chief importance is given to the improvement of standard of products, price, time to produce, product's ability to be modified & assistance provided to buyer, quick decision making in organization so that production can be taken to the next level with the rapid improvement in the quality of production [2]. WCM methodology has main goals of no misuse of raw material, imperfections, and shares, increase the inclusion of people in organization, creating better standards and more contented customers. WCM is based on 20 pillars; out of which 10 are Technical and remaining 10 are Managerial pillars of production. In this Managerial pillars provide support to the Technical pillars. In case of Managerial pillars certain requirements are supposed to be fulfilled so that desirable job circumstances and advancement of technical pillars can be done. In order to go to the next level technical pillars following the given standards are supposed to fulfill certain tasks and 7 important steps [4]. Despite of having different objectives for each pillar they are closely related to each other and one does not have value without other. For e.g. Safety pillars aims for removal of mishaps, Cost Deployment aims to find out the problem from the point of view of cost. Focused improvement elaborate new knowledge and minimize the cost by using appropriate methods. Therefore it is said that pillars are bound to support each other and the concept of WCM [4].

**III. WCM OBJECTIVES**

The objectives of WCM are continuous and quick change. World Class manufacturers are those who develop world class maintenance system by combination of TPM and six-sigma and lean tools and techniques.

WCM emphasizes mainly on the elimination of imperfections in products, extra wastage of time, money and manpower in order to achieve world class status. In addition to this it also gives special priority to the satisfaction of customers and quality of the products.

**IV. EXECUTION OF WCM**

WCM concept has 3 powerful and efficient tools which helps the organization to eliminate the problems permanently. This includes description of the problems, to search the root cause of the problem, and to analyze and find the solution for it [4]. In first step the problem is initially described along with its nature. Later the root cause of the problem is searched which is followed by the elimination of the problem in such a way that the problem will not appear again and again (it will be eliminated permanently). This fully removal of problem is done by very effective tool of 5 why's. Here each and every person in an organization has to think reason for the occurrence of the problem for at least 5 times. At the first time the person may not find any solution for the problem, same might happen in the second stage, but at last he has to give some important or minor suggestion for the existing problem depending upon his skills and experiences [4].

WCM gives focus on the following 3 tasks and 6 supporting proficiencies mentioned below:

- Attention towards customer.
- Focus on the standard of the products.
- Agility in the manufacturing.

Proficiencies are as follows:

- Inclusion of staff
- Problem Handling Strategy
- Evolution of fabrication.
- Protection of staff and surrounding.
- Corporate Status.

## V. WCM AND TRADITIONAL MANUFACTURING

*Table 1.1: Comparison between WCM & Traditional Manufacturing [2]*

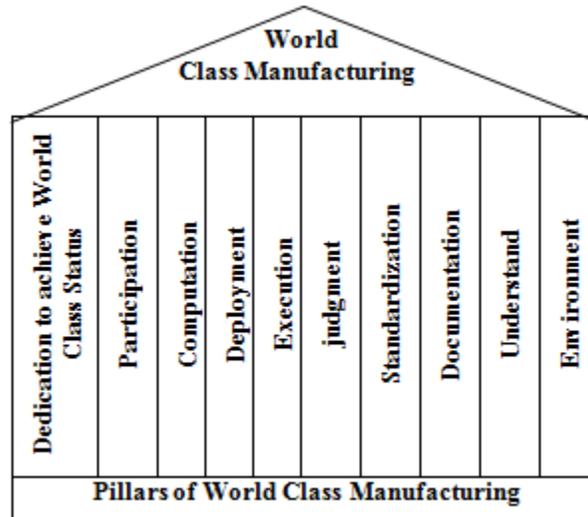
Aspects	WCM	Traditional manufacturing
<b>Modification</b>	Distinction of product is high	Distinction of product is low
<b>Response</b>	Response to customer is high	Response to customer is quick
<b>Time factor</b>	Time is given special priority in production.	Less importance to time.
<b>Automation</b>	Automation of machineries, management is done.	Comparatively less importance is given.
<b>No. of functions</b>	Short layout and little operations are done.	Many operations are done.
<b>Quality of Working</b>	High standards & working quality.	Working quality is low.
<b>Size of batch</b>	Batch size is small.	Batches are Large.
<b>Responsibilities</b>	Each and every worker is responsible for production and quality.	Only selected people look towards the quality.

## VI. WCM IN INDIAN SCENARIO

In order to shift from shielded and limited business to a World Class level and to achieve its name in whole world Indian business has to accelerate its pace. According to survey, India it is found out that most of the companies in present has divided information controlling system. In this way it will be difficult to attend the World Class rank [3].

In order to do so, it is very important to shift the Information Technology from just doing automation in their traditional behavior to the quick manufacturing. According to the survey, it is found that 80% of Indian companies lack in world class vision, because of penniless fabricating process or poor IT infrastructure [3].

As far as the economic agenda of Indian Govt. The manufacturing sector really needs to work hard or else the economic development of country will be in the harm [3].



*Fig 1.1 : Pillars of World Class Manufacturing*

The following are 10 managerial pillars which forms the base of the WCM [4]:

- 1) **Dedication to achieve World Class Status:** In order to take the organization in competition with the world business and market, each and every person in an organization right from the board members to the person on shop floor has to think regarding the elimination of existing problems occurring [4].
- 2) **Participation:** All the people in an organization have to be aware of the vision and mission of their organization in order to boost up the quality of the production [4].
- 3) **Computation:** Once the solution of problem is found out and implemented successfully on it, it is very essential to monitor the improvement prior and after the implementation of the solution. This monitoring helps to keep the record of the changes made [4].
- 4) **Deployment:** It relates to how the objectives, vision, mission of the company are brought up into operation [4].
- 5) **Execution:** Execution of right solution by appropriate people in an organization forms the key part of the positive result. By doing these practices they can grow and increase the boundaries of their knowledge [4].
- 6) **Judgment:** It becomes a crucial and significant part of the action to see whether the changes are properly done [4].
- 7) **Standardization:** This is very important step after the judgment step. Implementation of this step is very necessary in order to avoid the occurrence of problems in future again and again [4].
- 8) **Documentation:** This is very necessary to keep the track of the problems and solutions applied for it [4].
- 9) **Understand:** The very first step of the improvement in the problems is to check out the nature of the problem and to find out its location where exact does the problem arises [4].
- 10) **Environment:** While undergoing the following changes one must be aware that there is no harm to environmental surrounding [4].

## VIII. WCM & SUCCESS

Every firm wants to achieve height of the progress. For doing so it is important that the methods for increasing the efficiency of the output should be followed. Every firm must do whatever it takes to achieve efficient output and in turn to achieve the world class rank. In addition to this there should not be mis-attention towards the satisfactory policies related to customer in order to gain a good position in the market [3].

In order to survive in the competition, policies should be designed in such a way that company will remain one step further than the other manufacturing firms. Human resources section forms the backbone for any of the organization. If they do not have right, positive perspective and appropriate point of view towards the development of the firms, the company will definitely lack in the business. In this era of cut throat competition where it is almost difficult to sustain, organization should focus not only on the quality but also on such quality which will keep the business one step ahead of others [3]. WCM focuses on brisk change in order to compete worldwide. Every organization looks for improvement in production and good benefits, expanded profits, better productivity. Every firm, organization, factory owner is well aware about the ill effects of the lack of strategic planning and steady concepts. Earlier there was belief that progress in the production and development of the business is totally dependent only upon innovations. But in addition to innovations there is a need of numerous different formulas of development which WCM provides. WCM is a bunch of exercises should be attempted by recognizing what is needed by firms to struggle at the world class level. It is almost impossible to achieve world class status by regular production capabilities and by the system which used to measure the progress.

## IX. ASPECTS OF WCM

WCM has several aspects which are briefly discussed below:

### 1) *6 sigma*:

This concept of production means only 2 imperfections per billion. If the process is achieving more than 2 defects per billion then it cannot be termed as 6 sigma. In order to achieve this there is a requirement of correct tools, facilities, and proper guidance [1].

### 2) *Lean Manufacturing*:

The primary goals of lean manufacturing are minimize time and assets for the manufacturing process and focus on the removal of all types of wastages. And this goal should be accomplished by half the man power, space and engineering hours. Here the wastages can be of in the [1]

- Action of staying
- Catalogue
- Flawed parts
- Excess Production
- Excess processing
- Non-value added activities.
- Extra travelling of products in factory
- Less motion of body parts of workers

### 3) *Total Quality Management*:

This is the system for the management of products, processes and assets. Its main aim is to remove the differences from the production processes [1].

### 4) *Total Productive Maintenance (TPM)*:

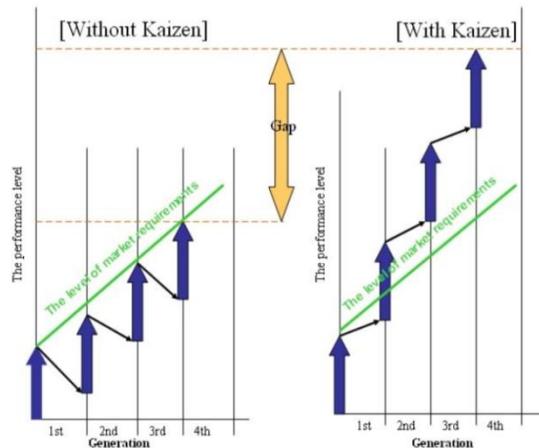
This involves the systematic apparatus conservation along with employee's safety. This step involves the updating of all the machineries, regular maintenance of working parts in order to reduce the flaws and upgrade the production. This maintenance of equipment is done from the top authorities to the operator on the shop floor. The aim of implementing the TPM is to create an environment which will make the employee feel that it is their responsibility to keep the equipments in running and efficient conditions [1].

### 5) *JIT (Just In Time)*:

JIT aims the production of appropriate number of products and combination of parts at exact place on right hour. According Drury(1990), if there is need to apply the JIT production and to get the desired results, the shop floor area and design should be rearranged from the batch production towards the product layout with the flow streams. It

mainly focuses on to meet the customers demand with negligible hold up (i.e. to make the delivery to customers on time) [1].

#### 6) *Kaizen*:



**Fig 1.2 : Before and after kaizen effects**

This is actually the Japanese term and invented in Japan. Kaizen means continuous improvement at the minor level in order to achieve a great result one day. This technique is implemented in Japan even for the daily life chores. It is considered as the important thinking and philosophy in Japan to meet the demands of customers and to take the business to World Class Level [1].

## X. CONCLUSIONS

From the detailed study of various papers it can be concluded that implementation of WCM tools and techniques will help the companies to survive in the world market. In addition to this the quality of products, delivery speed, reliability, and focus on innovation & out of box thinking is improved with the reduction in various wastages in terms of time, non- value added products, activities, etc. ultimately making the organization world class.

The only minor disadvantage related to WCM can be stated as that it involves various principles, skills, strategies, pillars so therefore it ultimately becomes slight difficult at an initial stage to implement WCM.

From this study is been concluded that there is no shortcut for attaining world class rank. WCM includes number of principles, skills and processes which are slightly difficult to implement altogether in combination especially in small scale companies, organizations, etc. But if small scale companies or any organization works little hard to fulfill the conditions of WCM then it will be very convenient for them to sustain in world market and to compete with them. After studying about the review of WCM it can be easily concluded that in upcoming future there will be no substitute for the concept of WCM. Despite of the little complications sticked to this concept each and every small scale industries will have to adopt this concept if they wish to keep their business alive and growing.

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