Identification of Factors which are Affecting for Effective Implementation of 5S Technique in SMEs of Vadodara Region

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Abstract: - Workplace, one of the most important places which decide productivity of any industry whether it is micro, small, medium or large scale. Workplace can be defined as the physical locational where someone works. It can be vary from office workplace to manufacturing workplace. So if the workplace is to be made in such a way that it provides best working conditions then surely the productivity of the company will be increased and can also sustain in the competitive market. 5S methodology is one of the best workplace organization techniques which make the workplace in such a way that the working conditions become best. 5S technique is a step by step approach of organizing workplace. Steps include 1.Seiri (Sort out), 2.Seiton (Set in Order), 3.Seiso (Shine), 4.Seiketsu (Standardize), and 5.Shitsuke (Sustain). Before applying 5S technique in the workplace; there should be awareness of this technique which include what is 5S, its pros and cons, what are its steps, how to apply the 5S step by step in respective industries. These are the basic awareness level of 5S technique. So the attempt is made to know awareness level of 5S in SMEs in Vadodara Region (Gujarat) by using empirical study. Attempt is also made for identification of factors which are affecting for effective implementation of 5S. Survey methodology is used for this empirical study. Questionnaire is prepared for taking survey and face to face interaction is used by survey. 75 companies were surveyed among which 31 companies have given response of 5S implementation in SMEs.

Keywords: - 5S technique, SMEs, Vadodara Region, Survey Methodology, Questionnaire

I. INTRODUCTION:-
5S technique is one of the tools of lean manufacturing which includes in Toyota Production System. 5S technique is also a sub part of ‘Kaizen’ which means “Change for better”. 5S improve the workplace effectiveness by making it perfect for working. It reduces the working time, increase the productivity, making the workplace safer and better for working. It includes 5 Steps started with ‘S’ which are 1.Seiri (Sort out), 2.Seiton (Set in Order), 3.Seiso (Shine), 4.Seiketsu (Standardize), 5.Shitsuke (Sustain). The five phases of 5S are described as below:

1. Sort – Remove unnecessary items from the work area and attach red tag to the all unnecessary and infrequently used items.
2. Set in order – customize the work area for effective working by keeping important materials, tools nearby workplace.
3. Shine – Clean the work area, machines, tools, equipments for finding and eliminating the minor and unwanted constituents.
4. Standardize – create a standardized and consistent 5S work flow by maintaining high standards of housekeeping, workplace organization, cleanliness and orderliness, everything in order and in its right place.
5. Sustain – ensure the 5S as a long term goal and give awareness and training to the workers and employees by explaining its significance.

II. LITERATURE REVIEW:-
5S is a technique originated from Japan and it was first developed by Hiroyuki Hirano. Hirano provided a structure for improvement programs with a series of identifiable steps, each building on its predecessor. Toyota's adoption of the Hirano approach was '4S', with Seiton and Seiso combined. Although the origins of the 5S methodology are in manufacturing, it can also be applied to other services sectors like banking, hospitals, and pharmaceuticals. In India 5S has gained positive attention and SMEs are started working on 5S by implementing step by step different ‘S’ of 5S. Some of the studies as a form of literature review are explained below.

Ghodrati et al. (2013) studied on topic of “The Impact of 5S Implementation on Industrial Organization’s Performance”. The purpose was to determine performance factors and characteristics in industrial organizations and identifying the effectiveness of 5S implementation on organizational performance as well. Survey methodology is used and data collection is done by distribution of questionnaire among 5 target organizations which have implemented 5S technique. The target industries are from different sectors and...
different field of work. The result is obtained by measuring the organizational performance before and after 5S implementation. To determine the performance of the organization, performance factors were identified by studies of literature and expert’s opinion, judgment and confirmation. The questionnaire was prepared according to 30 performance indicators which are marked according to Likert type scale 1 to 5, before and after 5S implementation. Results were analyzed by SPSS software. The questionnaire has two parts, first part is related to background of organizations and second part is related to 30 questions of performance factors. 2 out of 5 target organizations were government and the other was private. Also 2 out of 5 were service provider and the other was production. Result of individual analysis of 5 organizations successfully showed that 5S implementation has an effective impact on performance of organization. It also concluded that 5S is a useful quality management tool cause to improve performance in any organization without any limitation on different kinds of products or services.

Fareza et al. (2013) studied on the topic ‘Survey to See the Impact Of 5-S Implementation among Staff of Kpj Seremban Specialist Hospital, Malaysia’. The survey forms were distributed to 330 staff consisting of questionnaire which is delivered into two sections. 234 respondents had returned the survey form. The questions are done based on the scale from 1-5 in second section respondents are required to give the answer as YES or NO for questions listed in the survey from which were related to knowledge and understanding among staff. Based on survey, it was found that before implementation of 5-Sscores varies from poor to good related to the impact on productivity for quality of working place, quality and moral of staff and safety of works place. However after implementing 5-S scores has changed which varies from good to excellent. Regarding second section found that 100% commitment towards clean and safety, 99% scoring for the important of schedule for cleaning of work place to ensure it is free from dust and 99% scoring on the important of 5-S as a good management system.

Rahman et al (2008) studied on topic of “Essential Quality Practices in Indonesian Manufacturing SMEs”. The purpose was to determine whether the essential quality practices such as 5-S quality practices have a significant contribution to the successful TQM implementation. Paper outlines the results of the 5-S survey conducted among 36 Indonesian manufacturing SMEs with a total of 78 per cent are applying 5-S in their environment. The approach was focused on development, implementation and the operation evaluation at the selected manufacturing SMEs. The research was carried out in the SMEs in Jakarta and Bekasi, Indonesia. Research uses questionnaire survey and interviews and literature research in gaining empirical evidences. The questionnaire was designed to obtain background information about the surveyed company, including ownership of the company, existing workforce, and management perception of existing system, methods used for improving quality, quality training frequency, the 5-S rule practice and TQM. The companies were selected based on their willingness to participate in the study. This research is focused on the SMEs in Jakarta and Bekasi as a center and represented industrial estate area in Indonesia. Based on the size of the companies a proportion of 14 companies (38.9%), classified into medium-sized enterprises and employing between 100 to 300 employees. The other 22 companies (61.1%) classified into small sized enterprises and having less than 99 employees. Based on company ownership, 5 companies (13.9%) are classified into joint venture and 31 companies (86.1%) classified as local investment. From the 5-S practice, out of 36 companies, 29 companies (80.6%) have practiced the 5-S concept (5S score: 3, 4 and 5) in their organizations. About 7 companies (19.4%) have not come across the 5-S concept. The main finding is that the 5-S provides an essential total quality environment which is an important base for TQM implementation successfully. TQM training policy should incorporate the 5-S practice guidelines.

Thakkar et al. (2014) studied on topic of ‘Review on Implementation of 5S in Various Organization’. The paper explains the methods &techniques of 5S use to increase the efficiency of all processes in the company. Research have shown that very essential is training of the workers about the 5S rules. The essential thing is also to divide activities on some main steps & to maintain the continuous improvement. Authors simply represented basic information regarding the all steps of the 5S by mentioning various questions which should be answered at each stage & authors have also represented pros of the 5S technique. Conclusion of the paper represented that implementation of 5S system of rules leads to the various effects regarding the improvement in quality like 1. Visible results within a short period of time (2-3 weeks), 2. Workers get used to order & discipline, 3. Labelling draws attention to change that is about to occur, 4. Reduction of physical efforts, less accidents during the production process, 5. Increase the worker’s professional training, better organization of activities.

Ghodrati et al. (2012) studied on topic of ‘A Review on 5S Implementation in Industrial & Business Organizations’. The study aims to review previous studies about benefits of 5S implementation & its efficiency in the organization. Consequently 5S can support the objectives of organization to achieve continues improvement in performance & productivity. Authors have represented the basic information about 5S technique & also gave the reviews on 5s technique by reviewing the various work done on the 5S technique in various areas. Conclusion said that the most important barrier for implementation of 5S effectively is poor communication. Techniques of
communication are rarely addressed in an industrial workplace. There must be an applicable way for using 5S as an improvement tool for communication system. Another significant barrier is the space between managerial level & shop floor employees, poor training and awareness of 5S. It is also concluded that 5S key of success is training. 5S implementation is not possible without proper training & employees are not capable to actively standardize the 5S. It is obvious that the target of 5S application is vast & diverse & when effectively implemented the business improvement can be surprising. However the total benefits of 5S can’t be imagined in industries & business until the barriers associated will be fully understood, addressed & removed.

III. PROBLEM STATEMENT & OBJECTIVES:-

From the various literature reviews some of the major barriers for the 5S implementation are less awareness, less training of 5S from top management to worker level, less effective communication of importance of 5S techniques. One of the major problems is the awareness of 5S technique. Since it is the first barrier towards the implementation of 5S because without basic awareness how anyone can exactly say about their action plan & steps to implement the 5S technique. Also various factors play very important role for implementing 5S such as awareness of 5S, training of 5S, file management, items arrangement in stores as well as in the tools racks etc. The main problem is on which particular factors a company should first focus for successful implementation of 5S.

So from the above explanation of problem statement objectives of the survey can be summarized as follow

1) Providing an empirical data which shows the awareness and implementation level of the 5S technique.

2) Identification of factors which are affecting for effective implementation of 5S technique.

IV. DATA COLLECTION:-

- To collect data for analyses of the survey, a questionnaire was designed from the study of various literatures and it was modified as per the requirement.
- Face to face interactions were carried out in various Vadodara Industries for the survey.
- Scale-type questions were used to collect response of various industries.
- All the items in the questionnaire were rated with a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5) to ensure consistency and the ease of data computation.

- Out of 75 small and medium scale industries 31 valid responses were received by face to face interactions at GIDC cluster in Vadodara region.
- Basically Vadodara Region is divided into four clusters for survey.
- Clusters are mainly GIDC Makarpura, BIDC Gorva, Por GIDC, and Manjusar–Savli GIDC.

From all this Clusters various sectors of the companies are chosen randomly for the survey process.

Figure 1: Figure represents the various sectors

From the above chart it can be seen that more than 50% area is covered by machinery/metallic products and minimum area 3.22% is covered by pharmaceutical products.

Then various companies in the sectors are also divided based on the number of employees. As we have focused more on the SMEs so we have more number of Small and medium level companies.

Figure 2: Figure represents the number of employees

As seen from the chart more than 60% companies have employees between 0-50. So we can say that we got more number of SMEs than Large scale industries.

Also various companies have a various ownership levels. We have divided it into Family business, started as a new business, other categories which includes partnership etc.
As seen from the chart more than 50% is created as new business and least one is the family business ownership. So the above charts are basically shows the classification of the various companies from which we have collected data. From above charts we can say level of surveyed companies in terms of products or sectors in which they do business, in terms of employees currently working there and in terms of their ownership of the company.

V. DATA ANALYSIS:

- After collecting the data, Analysis is carried out and results are shown by using bar chart and pie chart.
- Basically the mean of every rating is calculated and based on the mean value rank is given to each factors.
- According to the rank first three factors are considered as the critical success factors.
- Same calculation is carried out for barrier factors and their rank is decided.

The above chart shows the awareness level of 5S technique. As seen from it only 41.33% companies are aware about 5S i.e. only 31 companies out of 75 surveyed companies. The ratio is not that much low but also not that much high for awareness, which shows 5S has gained near to average attention in Small and Medium Enterprises.

![Figure 3: Figure represents the ownership of the organization](image)

![Figure 4: Figure represents awareness about 5S](image)

Table 1: CSFs of 5S and its mean rating & ranking of each factor

<table>
<thead>
<tr>
<th>CRITICAL SUCCESS FACTORS</th>
<th>MEAN RATING</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness of 5’s</td>
<td>4.41</td>
<td>8</td>
</tr>
<tr>
<td>Arrangement of items in the store</td>
<td>4.48</td>
<td>4</td>
</tr>
<tr>
<td>Cleanliness</td>
<td>4.48</td>
<td>5</td>
</tr>
<tr>
<td>Comfortable working area</td>
<td>4.48</td>
<td>6</td>
</tr>
<tr>
<td>Effective utilization of floor space</td>
<td>4.45</td>
<td>7</td>
</tr>
<tr>
<td>File management</td>
<td>4.58</td>
<td>1</td>
</tr>
<tr>
<td>Safety and accident issue</td>
<td>4.51</td>
<td>3</td>
</tr>
<tr>
<td>Time taken for searching item</td>
<td>4.12</td>
<td>10</td>
</tr>
<tr>
<td>Team work</td>
<td>4.54</td>
<td>2</td>
</tr>
<tr>
<td>Working culture</td>
<td>4.38</td>
<td>9</td>
</tr>
</tbody>
</table>

Above Table shows the 10 Critical Success Factors for 5S implementation. According to rating given to each factor by respondents mean is found out. Top 3 values of mean are considered as the top three CSFs for 5S implementation.
CSFs For 5S Technique

<table>
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</tr>
</tbody>
</table>

Figure 6: Bar Chart of CSFs of 5S according to mean rating

Above bar chart shows the mean value of all the factors in descending order. So as it can be seen top three CSFs are File management, Team Work, safety & accident issue.

VI. CONCLUSION:-

There are some interesting conclusions which are discussed here:-

1. Since there is a less than 50% of the awareness level of the 5S i.e. approximate 42%; so it shows that there is not a good awareness level of 5S in the various cluster of the Vadodara region. Analysis has also shown that; around 20% of the companies have implemented 5S and around 20% have planned for Implementation. Rest of the companies shows only awareness level related to 5S implementation in their organisation.

2. The major critical success factors for effective implementation of 5S have came out from the analysis work are file management, Team work, Safety and accidental issues. All factors which have considered for this analysis have played very crucial role for effective implementation of 5S in the organization.

VII. FUTURE SCOPE:-

Since the survey is carried out only for 75 companies and it covered majority of the manufacturing sectors which includes various product range staring from metallic or machinery products to electrical and pharma products, so there is a scope of the study in the various service sectors like Banks, Hospitals where 5S has started gaining attention also apart from manufacturing sectors. Also apart from 5S, survey can be carried out for other management system also like Total Productive Maintenance, Kaizen, Total Quality Management, etc. Also the survey carried out has not covered all the industrial Sectors comes under Vadodara region like Waghodia GIDC etc., so there is a scope of study also in the various industrial area comes under Vadodara Region.

REFERENCES


