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"A STUDY ON KAIZEN AT SHOP FLOOR WITH REFERENCE TO SHREE REFRIGERATIONS PVT. LTD. KARAD."

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Abstract
Research study focuses on the Kaizen activities at the shop floor in the organization.It identified problems in achieving improved productivity.After identifying the problems,various kaizens are implemented leading to improvements in the productivity of the organization.Effects of Kaizens are also analyzed.Thus overall study is concentrated on implementation of the ten kaizens and realizing the effects of it on the productivity. Organization can achieve competitive advantage in this globalized era.

KEYWORDS-Kaizen, Productivity, Shopfloor, Competitive advantage, Globalized era.

INTRODUCTION:
'Kaizen' is a Japanese word which meaning is improvement. It used in Business Sense and applied to work place. Kaizen refers to activities that continuously improve all functions and involve all employees from CEO to Assembly line workers. It also applies to process such as purchasing and Logistics, that crosses organizational boundaries into supply chain. By improving Standardized activities and processes, Kaizen aims to eliminate waste. Kaizen was first implemented in several Japanese businesses after Second World War. Kaizen is a daily process the purpose of which goes beyond simple productivity improvement. It also a process that when done correctly, humanizes the work place eliminates overall hard work and teaches people how to perform experiment on their work using scientific method.
The present study focuses on various Kaizens in the organization.

REVIEW OF LITERATURE-
Janjic(2015) analyzed the different techniques and tools that are used to reduce costs and improve performance, which are gaining in importance by the development of kaizen concept.Macpherson(2008) notes that while much is known about the concept of kaizen within the organization there remain aspects that are still not fully understood or are misunderstood; that current (English language) academic literature may fail to provide accurate accounts of the Japanese point of view, and differences between Japanese and Western perspectives. Shrinivas(1995) Detailed points by collecting extensive data over a period of 23 months, and by using statistical methods to understand the dynamics in the *kaizen* process. The *kaizen* process was found to be an auto regressive process, which leads to habit formation in making improvements.Adam(2003) reports the study of *kaizen* as practised in a selection of Japanese companies. After discussing the general understanding of *kaizen* and proposing a clear definition, the paper describes the methodology of the study, and presents findings from the research, taking Nippon Steel Corporation (NSC) as a base

model and comparing this with the data from other companies.Alexander Styhre(2014)described that The notion of empowerment has been increasingly used within management discourses during the 1990s. Empowerment is depicted by its proponents as the common denominator for recent managerial techniques and activities that acknowledge the individual employee as an intelligent, accountable, creative being, and therefore a productive resource for the company.G Wittenberg(1994) Explores the Japanese kaizen philosophy and its application to manufacturing. The kaizen strategy is based on the process of gradual change bringing improvements to all area of management and production. It is a people based system with standardisation being an essential feature.Cheryl(1994)described that The world market share leader in the peripheral intravenous catheter market, Johnson & Johnson Medical's Critikon Vascular Access Facility attributes its latest successes—including a 1994 Shingo Prize—to a management philosophy of continuous improvement through total employee involvement.K.P Ravikumar(2013) described that Kaizen is a cost-effective and customer-friendly strategy, which calls for small incremental improvements. It is one of the eight important and distinct pillars of Total Productive Maintenance (TPM).Dr.Ch.Venkataiah(2012) The automotive component industry in India is around two-thirds the size of the OEM (Original Equipment Manufacturer) segment and this proportion is around one to two times in mature markets like Europe, America and Japan.Juan(2009) explored the possibility of improving production indicators by implementing Kaizen Events. The teams are composed of both managers and operators with the aim of developing and/or implementing improvements in three to five days.

OBJECTIVES OF THE STUDY:

1)To study to concept of Kaizen.
2)To know problems in achieving improved Productivity.
3)To implement various Kaizens
4)To analyze effect of various Kaizens

SCOPE OF THE STUDY:

1.The geographical scope of the study is limited up to the operations of Shree Refrigerations Pvt. Ltd. Karad.
2.The conceptual scope of the study includes the various aspects of Kaizen.
3.The analytical scope is confined up to comparative study of before and after kaizen activity.
4.The scope of the study is limited only to certain "Kaizens" in Organization as below:

- Design of 'All in one trolley' for Welding Machine
- Use of Partitions between two welding & grinding workstations.
- New Embossing Tool Developed for Drain connection.
- New Vertical Storage Arrangement for condensing units.
- Roller Fixture for Circular Seam Welding.
- Leak Test Medium replaced from soap foam to liquid soap solution.
- Shadow boards for frequently required tools.
- Bins for use of fasteners at shop floor.
- Fixture for checking positional accuracy of mounting holes of sheet metal parts.
- Fixture for checking positional accuracy of mounting holes of Machined components.

RESEARCH METHODOLOGY:

The present study is descriptive in nature. Research design used is descriptive design. The research methodology for study is as follows:

Data Sources:

Primary Data:

Primary data has been collected through observations & discussion with various department heads.

Secondary Data:

Secondary data regarding various Kaizen activities is obtained through kaizen manuals of respective departments. Also company information & conceptual background is taken from website & books respectively.

DATA ANALYSIS AND INTERPRETATION

Table:- 4.2.1

Title:- Design of 'All in one trolley' for Welding Machine .

Problem:-	**Kaizen Activity:-**
The Welding machine, Cooling Water tank & Gas cylinder was placed separately on the shop floor, Covers more space and difficult to move from one place to another.	All in one trolley is designed for placing all the components of welding Machine.
Before  -	**After** 

Interpretation:-

Above table & diagrams shows that due to kaizen,Space required is reduced to 1/3 of the previous space requirement , also no additional transport facility required for the movement of machine on shop floor. A single person can moves the machine on shop floor. Machine adjustments & controlling during operation becomes easy with only one operator.

Table:- 4.2.2

Title: - Use of Partitions between two welding and /or grinding workstations.

Problem:-
A person working in the workshop suffers from welding light & grinding burr from adjacent workstation. Grinding burr spreads over large area of shop floor, jobs & machines near the work station.

Kaizen Activity:-
A light & portable partitions developed from scrap material and used in the operations.

Before

After

Interpretation:-
Above table & diagrams shows that due to kaizen,Protection of Machines & tools placed in adjacent to the workstation from grinding burr ensures better safety to the person working in adjacent workstation.

Table:- 4.2.3

Title: - New Embossing Tool Developed for Drain connection.

Problem:-	**Kaizen Activity:-**
Embossing for drain connection is a laborious job. Also the embossing pattern is not uniform	Threaded tool developed for the embossing of drain connection

Before

After

Interpretation:-

Above table & diagrams shows that due to kaizen, single person can complete the activity by tightening the bolt using a spanner. Which saves 20 minutes per emboss getting uniform pattern without dents.

Table:- 4.2.4

Title:- New Vertical Storage Arrangement for condensing units

. **Problem:-**	**Kaizen Activity:-**
There is a space constraint for the storage of finished goods.	Racks for storing finished products developed in house from scrap material generated during production.

Before

After

Interpretation:-

Above table & diagrams shows that due to use of vertical storage arrangement, requirement of space reduced by 1/3 of previous one handling becomes easy using forklift. Also cleaning & housekeeping becomes easier.

Table:- 4.2.5

Title:- Roller Fixture for Circular Seam Welding and finishing.

Problem:-	**Kaizen Activity:-**
The welding & finishing quality is not consistent throughout the circular seam.	Roller fixture developed for uniform seam welding & finishing by continuous rotating the job on the fixture
Before	**After**
	 

Interpretation:-

Above table & diagrams shows that due to kaizen,uniform welding, grinding & finishing throughout the circumference is achieved. Also In process inspection becomes easier with reduction in handling time & human fatigue.

Table:- 4.2.6

Title :- Leak Test Medium replaced from soap foam to liquid soap solution.

Problem:-	**Kaizen Activity:-**
Minor leakages are not detected causing drain out of gas on long run	Leak Test Medium replaced from soap foam to liquid soap solution

Before

After

Interpretation:-

Above table & diagrams shows that due to kaizen,minor leaks are also detected & system without leakage is possible as layer of foam generated after application of solution, saving testing time by 10 minutes, also easy and convenient for use.

Table:- 4.2.7

Title :- Shadow boards for frequently required tools.

Problem:-	**Kaizen Activity:-**
Too much time requires for searching of the tools from tool box.	Shadow boards for tools with identification and sequential arrangement developed in house
Before 	**After** 

Interpretation:-

Above table & diagrams shows that due to kaizen, quick & easy access of tools is possible reducing waiting time for tools to start the actual job with saving of lead-time by 4.5 minutes, also proper housekeeping of tools using shadow board is maintained & human fatigue gets reduced**.**

Table:- 4.2.8

Title :- Bins for use of fasteners at shop floor

Problem:-	**Kaizen Activity:-**
Finding of required fasteners during assembly of machine is very tiresome activity, fasteners gets mixed up.	Bins for fasteners developed with proper identification of type ,size & materials
Before	**After**
	

Interpretation:-

Above table & diagrams shows that due to kaizen,searching time reduced from 5 min. to 1 minutes, also mixing of fasteners gets avoided and finding out the exact quantity of individual item within few minutes is possible.

Table:- 4.2.9

Title: - Template for checking positional accuracy of mounting holes of sheet metal parts.

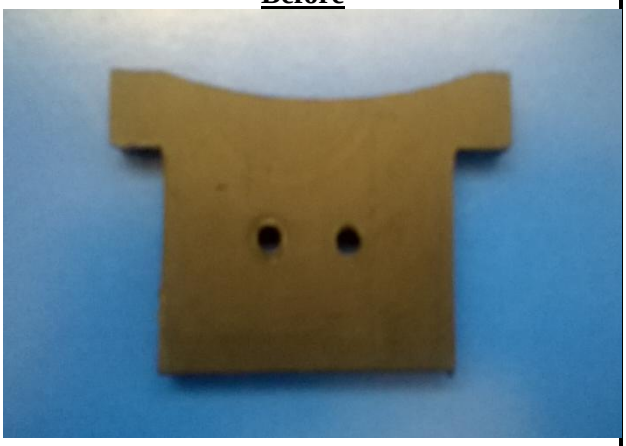
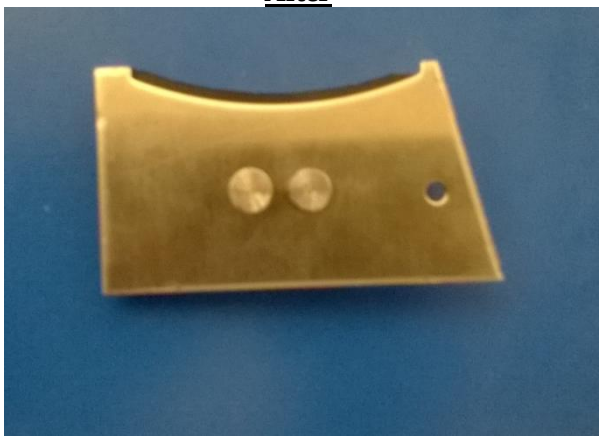
Problem:-	**Kaizen Activity:-**
Sometimes there is complaint from customers about shifting of mounting holes when the quantity of jobs are in hundreds & inspection using vernier & measuring tape is not possible for each job.	Template for checking positional accuracy of mounting holes of sheet metal parts developed for critical parts.
Before 	**After** 

Interpretation:-

Above table & diagrams shows that due to kaizen,the inspection time reduced from 8 minutes to 1 minute also there is no any compliant from customer for holes shifting and possibility of human error in the inspection reduced to almost zero.

Table:- 4.2.10

Title :- Template for checking positional accuracy of mounting holes of machined components.

Problem:-	**Kaizen Activity:-**
The problem of minor holes shifting cannot be identified until the assembly of the part.	Template for checking positional accuracy of mounting holes of machined components developed.
Before 	**After** 

Interpretation:-
Above table & diagrams shows that due to kaizen,easy inspection is possible at material inward stage also **i**nspection time reduced by 2.5 minutes and **e**mergency shortage of raw material & production stuck up due to rejection at eleventh hour reduced to zero.

FINDINGS:

General Findings:

1)There is no separate department for Kaizen activity.
2)Employees are doing the kaizen but they are not motivated further.
3)There is no integrated communication system in the organization.

Specific Findings:

1)Space required is reduced to 1/3 of the previous space requirement for the machine with ease of transportation & operation (Table no 4.2.1)
2)Due to use of partitions at welding & grinding workstations, better safety to the person working in adjacent workstations achieved. (Table no 4.2.2)
3)Use of new Embossing Tool for drain connection reduces 20 minutes per emboss with superior quality. (Table no 4.2.3)
4)Use of vertical storage arrangement, requirement of space reduces by 1/3 (Table no 4.2.4)
5)Using roller fixture, uniform welding & finishing quality achieved using minimum efforts. (Table no 4.2.5)
6)Using liquid soap solution testing time reduces by minutes with better precision. (Table no 4.2.6)

7)Due to kaizen activity, quick & easy access of tools is possible reducing waiting time for tools to start the actual job from 5 min. to 0.5 min. (Table no 4.2.7)
8)Using fasteners bins, searching time reduced from 5 min. to 1 min. (Table no 4.2.8)
9)After using the template, the inspection time reduced from 8 min. to 1 min. (Table no 4.2.9)
10)After using the template, inward inspection time for face plate reduced from 3 min to 0.5 min. (Table no 4.2.10)

SUGGESTIONS:

1)Organization should create separate department for kaizen activity.
2)Organization should select the best Kaizen activity & give awards to those people.
3)Organization should take review of all kaizen activities.
4)Organization should always assure that implemented Kaizens will be maintained & lead continuing saving time as well as cost
5)While implementing Kaizen organization should implement 5S so that Kaizens be optimized.

CONCLUSION:

The research study was focused on knowing the problems leading to decrease the productivity in terms of various wastes. After knowing the problems various Kaizens implemented and its effects also analyzed. If organization takes corrective action as suggested optimized Kaizens can be maintained

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