RESEARCH ARTICLE

TO IMPROVE EFFICIENCY OF INCOMING VERIFICATION PROCESS BY LEAN TOOLS.

*Ajay Sharma[1] and Dr. Devendra S. Verma[2].

Department of Mechanical Engineering, Institute of Engineering & Technology - DAVV, Indore, Madhya Pradesh, India-452017.

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Manuscript Info	*Abstract*
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Lean tools are very essential for continuous improvement in any organization. Lean is a philosophy to identify and eliminate waste. It also identifies Non value activities in any organization. In many industries, they face problem in inspecting the part bought from the vendor company, this decreases the overall efficiency of the industry, so to improve this we are using lean tools. This project is done at quality department in John Deer India Private Limited Dewas we use Time study, pareto chart, cause & effect diagram. By using these tools, we have increased the efficiency of incoming verification. This will help other industries to increase their efficiency.

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Introduction:-
As a lean manufacturing is a technique to reduce human efforts and produce defect free product[2]This project is carried out at John Deer India Private Limited Dewas in quality department. The aim of the project is to improve the efficiency of incoming verification process by lean tools, this problem was improved to a great extent by using parato chart analysis and cause & effect techniques. At quality department in John Deer India Private Limited Dewas, tractor parts bought from Vendor Company are inspected to maintain the quality and standard of the company. During this phase, non value added activity and wastage were seen which resulting in decrease in inspection efficiency. In this project we are dealing with reasons behind this reduced efficiency and also how we are going to eliminate this. From the last one decade Lean Tools had been used by many companies and organizations. In these years it has not only affected the manufacturing industry but, had also proved as a productivity improvement tool for services industries like for example, Hospitality, Medical organizations etc.

Literature Review:-
Many researchers had given different concepts and innovative ideas to use lean tools in organizations and service industries. They have also used varies lean tools like VSM ,MUDA, 5S KANBAN KAIZEN, etc. all this tools are use in organization for continuous improvement. Apply the lean tool by method time measurement and line balance efficiency and reduce the cycle time in a truck body assembly line and improve efficiency in that product line [1]. apply the value stream mapping on bearing industry and reduce the work in process and inventory and lead time. In this article gives the information about value stream mapping and gives the methodology for the implementation of VSM. In this case study paper to apply the 5s and kanban system for the reduction of work in process inventory and lead time. [4]SCORE is the one of best tool and methodology for improve efficiency of incoming verification it is not only identifies the root cause of an existing problem but also provides better way to identity and eliminate

Corresponding Author:- Ajay Sharma.
Address**:-** Department of Mechanical Engineering, Institute of Engineering & Technology - DAVV, Indore, Madhya Pradesh, India-452017..

wastes. SCORE methodology scans deeply the organization to identify the existing problem and also the opportunity to get change to the redundant technique or practices

Objective:-
This project main objective is to improve efficiency of incoming verification process by lean tools using SCORE methodology.

Methodology:-
SCORE is one of the best methodologies for implementing lean tools in an industry.

Select:-
In this is the stage at which the Kaizen event leader must select the process or processes in need of improvement. They must also determine who internally will be affected by the change, who should be involved in making it and how changes will affect customers. 'Select' also refers to choosing the tools and methods to address different performance issues. We have select incoming verification process for improve efficiency Fig. 4.11 shows incoming verification process
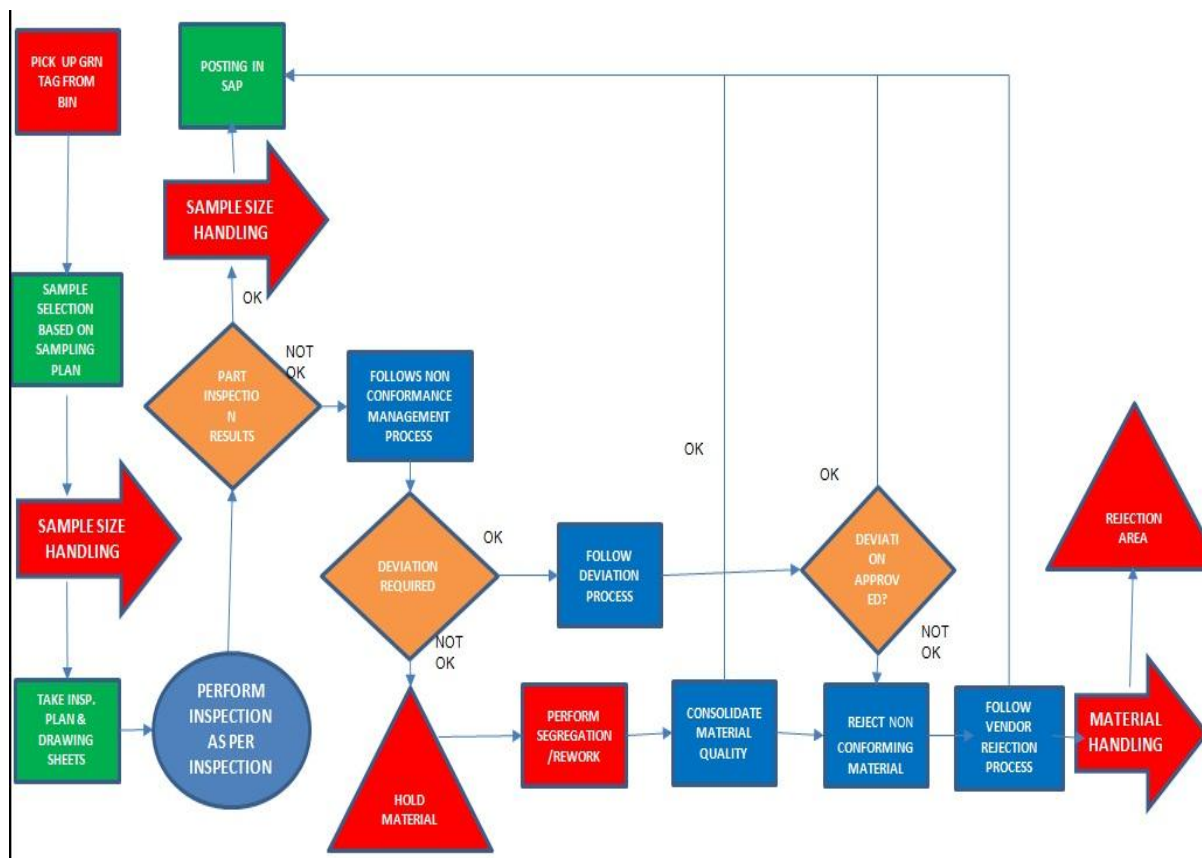
Fig 4.1.1:- Process Flow Diagram for Verification

Clarify:-
Here, quantify current capability, including performance and waste. This is also the stage at which the Kaizen event team is confirmed and the members agree on what the programme entails so that they can communicate it to others consistently. The event leader must clarify the problem statement and the project objective. They should measure historical data.
Problem statement

At quality department in John Deer India Private Limited Dewas , tractor parts bought from vendor company are inspected to maintain the quality and standard of the company. During this phase, non value added activity and wastage were seen which resulting in decrease in inspection efficiency. In this project we are dealing with reasons

behind this reduced efficiency and also how we are going to eliminate this.

Objectives:-
- ❖ To Improve Efficiency Of Incoming Verification Process By Lean Tools
- ❖   Find out Value Added Activities & Non Value Added Activities
- ❖ Identification and elimination of waste (muda),

Organize:-
The team members should now be organised and trained on the methods and scope of the project. This is also a phase of preparation in terms of the workplace, its suppliers, customers, facilities and people, and constitutes the final stage before actual implementation. We have done time study all data shows bellow table for identify NVA activity after that use parato diagram for find more time taken NVA activities because parato deal with 80- 20 principle. After that use cause & effect diagram for find what is the cause for NVA activities

Table 4.1.1:-Time study

Sr. No.	Activities	Time(Min)
1	Inspection	240.39
2	Material handling	66.83
3	Training	52.86
4	Meeting	25
5	Line Supporting	22
6	Segregation/Rework	20
7	Parts Searching time	18.75
8	5s	12.76
9	personal allowance	9.748
10	Cleaning Parts	6.4
11	Waiting for SAP ID	5.266

Table 4.2.1:- NVA activities

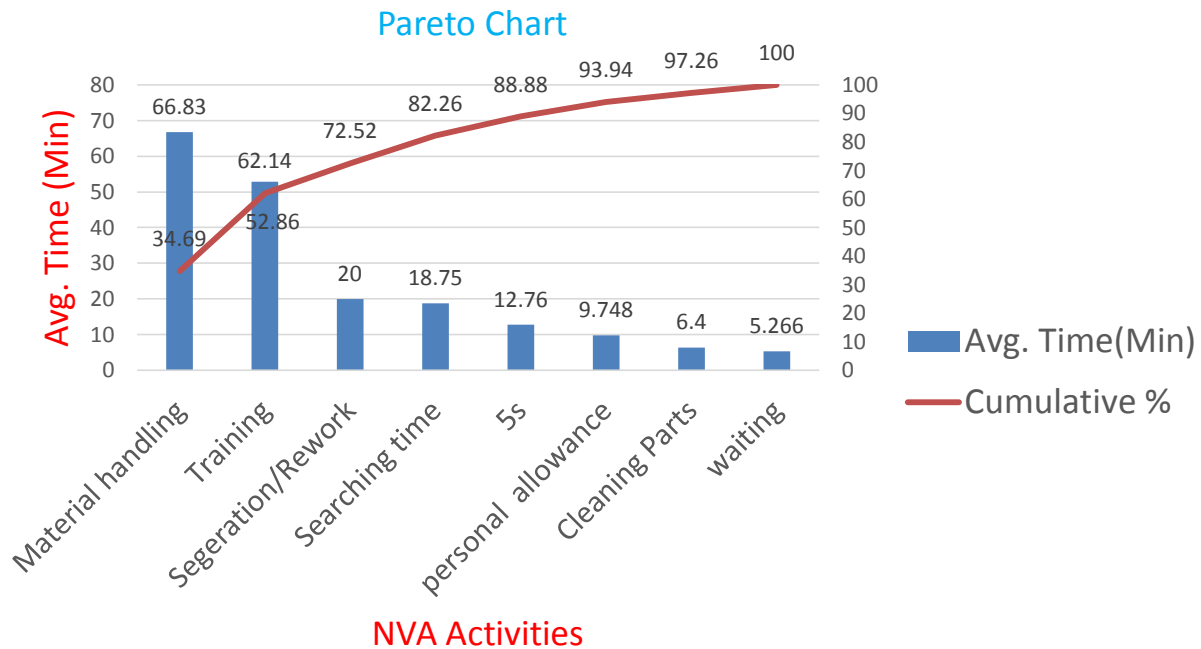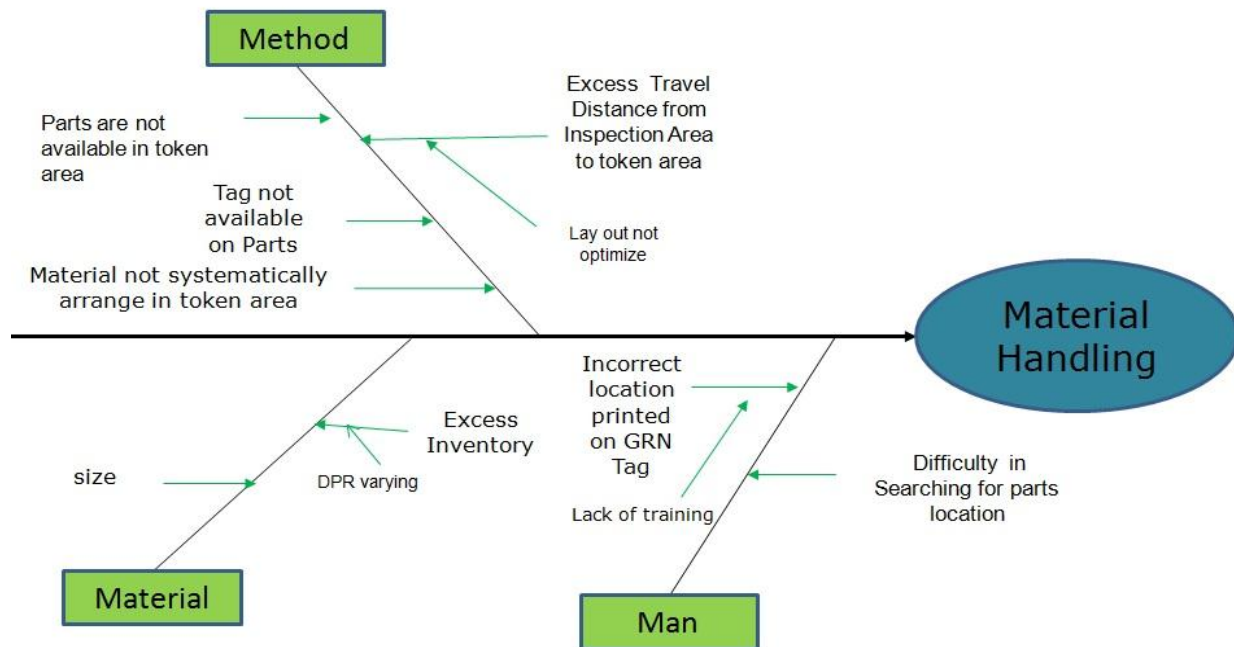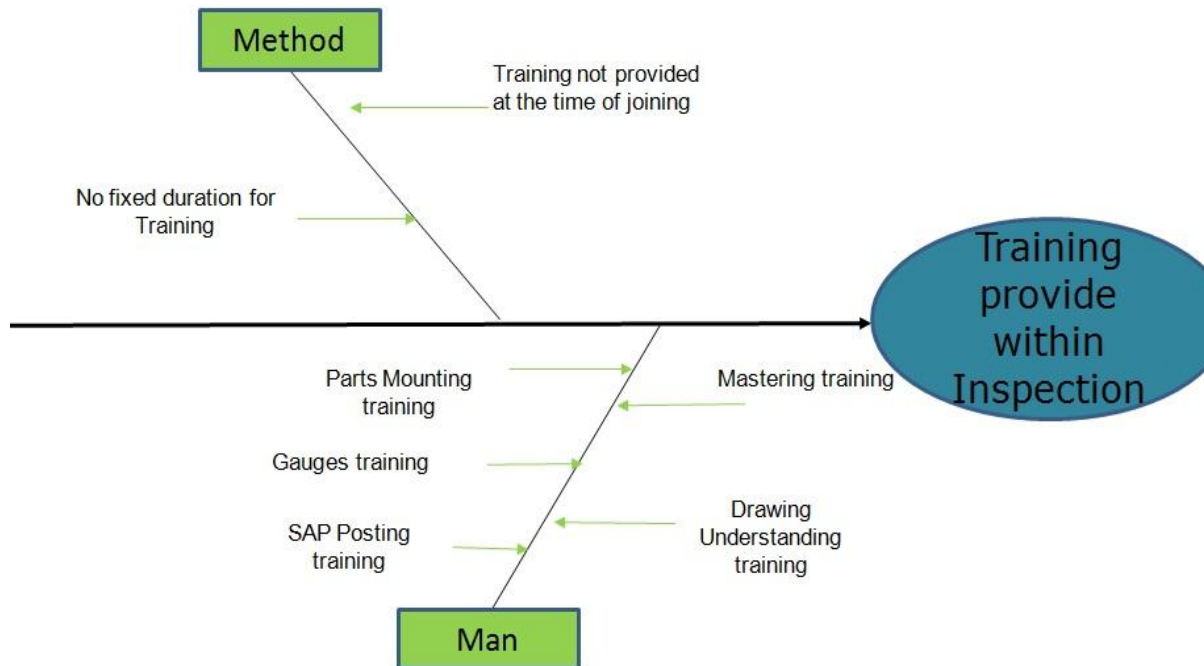| Sr. No.	Activities	Avg. Time(Min)	Cumulative Frequency	Cumulative %
1	Material handling	66.83	66.83	34.69
2	Training	52.86	119.69	62.14
3	Segregation/Rework	20	139.69	72.52
4	Searching time	18.75	158.44	82.26
5	5s	12.76	171.2	88.88
6	personal allowance	9.748	180.94	93.94
7	Cleaning Parts	6.4	187.34	97.26
8	waiting	5.266	192.6	100

Fig 4.2.1:- Pareto chart

Fig 4.3.1:- Fish bone diagram.

Fig: 4.3.1:- Fish bone diagram shows training

Run:-

This fourth stage is when the actual improvement event is executed, typically lasting up to five days. This entails making observations, brainstorming and selecting improvements, and testing and implementing them.

Recommended solution

1. 8 Hours training to be provided to new trainees (4 hours theory and 4 hours practical)
2. Training duration should be fixed
3. Training should be provided for the part mounting as per drawing to reduced time for inspection
4. Training should be provided for the inspection equipment for every month
5. Make process flow chart for SAP posting
6. Training should be provided of GD&T for every week
7. Gauge mastering training provide theory as well as practical
8. First check material location then write location on GRN Tag
9. Regular Monitoring of parts in token area
10. Training should be provided to UGC operators
11. Inventory should be controlled
12. Token area should have rack System for different parts
13. DOL/skip parts area should be separate
14. Marking should be done by paint on location in token area
15. Buyer should approach more to local supplier 5S should be followed

Evaluate:-

As the concluding stage of the methodology, this is the point at which the Kaizen event team can evaluate the results and see the benefits achieved so far. This information is also important as feedback for standardising new procedures, measuring return on investment and defining future work.

❖ Training duration 15 min per day fixed
❖ GD & T training provided every Saturday
❖ Operator regularly check material on location
❖ Supervisor is regularly monitoring of parts in token area
❖ Marking is done on token area by paint
❖ Now the operators are motivated towards performing 5s due to training was provided

Table 4.51:- Time study after implementation

Sr. No.	Activities	Time(Min)
1	Inspection	322
2	Material handling	36.83
3	Training	22.5
4	Meeting	25
5	Line Supporting	22
6	Segregation/Rework	20
7	Parts Searching time	6
8	5s	5
9	personal allowance	9.748
10	Cleaning Parts	6.4
11	Waiting for SAP ID	5.266

Results And Discussion:-
* The successfully implementation of the lean tools using SCORE approach was done. This helped the selected industry to improve their Efficiency. Elimination of non-value added time and performing wrong practices.
* Efficiency was increased from 51 % to 67 %.
* Inspection time increase 240 minute to 322 minute
* Material Handling Time decrease 66.83 minute to 36.83 minute
* Training Time decrease 52.86 minute to 22.5 minute
* 5s time decrees 12.76 minute to 5 minute

Conclusion:-
The successfully implementation of lean tools by SCORE methodology was done. Efficiency has improved by using lean tools; literature review and brainstorming have helped for completion this project. The goal of this paper was to improve efficiency at finally efficiency was improve 51% to 67 %.The coordination and support was immense during the entire process. Management was very cooperative and appreciated the new ideas and thoughts of the workers. While carrying out the project, it encouraged many other industry owners to implement the same in there industry. This would open new horizons to emerging business for implementing lean tools.

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