



PATROL INSPECTION AND TIME STUDY TO IMPROVE QUALITY

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Abstract- This project is concerned to analyze and increase the efficiency of patrol inspection and thus reduces time consumption for inspection. Inspection is the process of checking whether the specification of the product meet the standard specification provided by the customer. Inspector takes more time for checking the parameter that meet the specification at all time than Checking the parameters that does not satisfy the customer specification which leads to rejection .Thus the inspector should inspect the parameter that increase the rejection or rework with more attention .on the whole this concept helps the inspector to improve the quality of the product by inspecting more components according to the frequency of the component.

Index terms: Patrol Inspection, standard specification

I. INTRODUCTION

Inspection is the method of standardizing the quality of the product it is used to maintain the quality of the product within the standard specification. if the specification does not lie within the standard then the project will be rejected .This process helps to eliminate the rejection control the quality of product and reduces the lead time.

1.1 Objectives of inspection

- To eliminate the poor quality of the product manufactured
- To know the information on the performance of the product
- To identify the failure of the product.

1.2 Stages of inspection

1.2.1 Incoming material inspection

In this stage all the parts and raw material that are purchased and supplied are inspected. Production process inspection here the inspection is carried out during the stages of production itself. Inspection is made at different work areas of men and machine.

1.2.2 Finished goods inspection

Finished goods are inspected in order to see the quality of the product that is manufactured.

1.3 Inspection procedure

1.3.1 Floor inspection

Patrol inspectors are used to check the component at the time of production .The inspector should inspect the product at different work centre at different machine. Floor inspection reduces the defect in the product and handling of material and delay in production.

1.3.2 Centralized inspection

Inspection process is centralized to one place where the inspector used to check the product.

1.3.3 Combined inspection

This is the combination of above two method. this inspection Is to prevent the defect that does not repeat again and again in the subsequent operation.

1.3.4 Sampling inspection

Samples of the product from the different batches are randomly selected. The selected samples are inspected. if the inspected sample does not meet the customer specification then the sample is rejected .Sampling inspection is cheaper and quicker. It is suitable for inspection of the product with less Importance in precision

II. Study on Patrol Inspection and Time Study

2.1 Patrol inspection

Patrol inspection means that an inspector patrols the manufacturing site and inspects items on timely basis. Thus leads to reduction of manufacturing lead time.

2.1.1 Work of patrol inspector

- Inspection of various components.
- Tool change approval.
- Setting change approval.
- CMM reports follow up.
- Gauge calibrations.
- Rejection parts delivery to rework

Gauge calibration

It is the process measuring instruments are properly calibrated is critical to quality manufacturing operations. Gauge calibration determines the deviation from the true value of the indication supplied by a measuring instrument .The results of the calibration process can be used for gauge adjustment.

2.1.2 Reason for rejection

- Casting defects such as blow holes.
- Improper machining of parts which doesn't meet specification.
- Improper inspection of components.

2.1.3 Gauges used for patrol inspection

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- Air plug gauge
- Screw plug gauge
- Vernier depth gauge
- Core plug gauge
- Flush pin gauge
- Digital height gauge
- Receiver gauge and position gauge

2.1.4 Check sheets

Check sheets is a simple tool, on which data is collected by putting a mark against predetermined items of measurement. Patrol check sheet contains customer standard specification of the product check sheets can be used to track events by factors such as time, reason for failure, no of customer complaint per day.

2.1.5 Work study as a productivity improvement

Work study is an important management tool to achieve higher productivity. It is related to human work, method of doing work and standard of performance. The survival of any organization is dependent on use of latest technology and efficient methods of production. To improve efficiency of production it needs effective utilization of plant, equipment and labor. This can be achieved by using work study which studies method and evaluate the performance.

It divides work into smaller elements, studies it, and rearranges it to get same or greater efficiency at reduced cost.

The relationship of work study and productivity improvement can also be understood from the objectives of the work study. All objectives of the work study indicate that there is positive (direct) relationship between work study and productivity improvement. The objectives of the work study are as follows:

- i) Analysis of existing method
- ii) Finding weakness in existing production process
- iii) Most effective utilization of existing or proposed report and resources

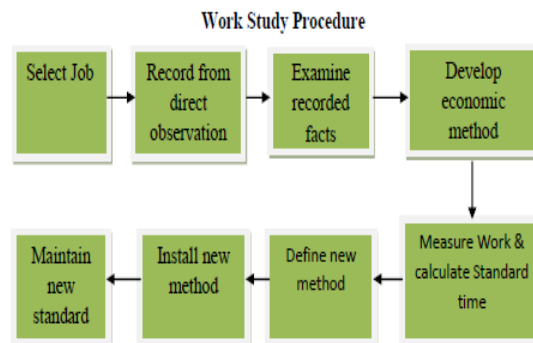
- iv) Setting and measuring performance standard
- v) Use of performance standard to pay incentives
- vi) Standardize method, material and equipment's used in the production process.

2.1.5.1 Techniques of Work Study

The amount of work in a given job is referred to as work content. The work study consists of two techniques:

(a) Method Study: Method study is the systematic recording and critical examination of existing and proposed ways of doing work. It is concerned with the reduction of work content of a job or operation.

(b) Work Measurement: Work Measurement is the application of techniques designed to establish the time for a qualified worker to carry out a specified job at defined level of performance. It is concerned with the investigation and reduction of any ineffective time associated with it.



2.1.5.2 Basic procedure of work study:

2.1.6 Time study

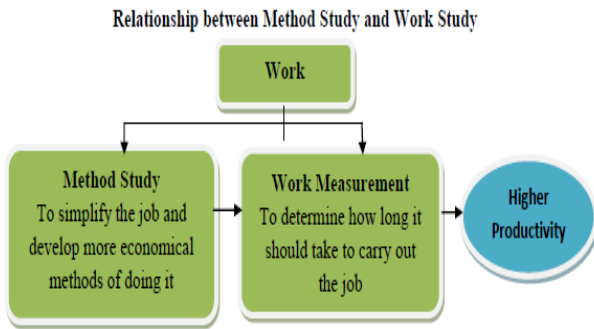
Time study is the technique of work measurement to establish time for a qualified worker to carry out specified task under specified conditions and at defined level of performance. Basic time study equipment consists of – a stop-watch, a study-board and time study forms.

The time study procedure consist of steps such as

- i. Selection of Job
- ii. Standardization of Method
- iii. Select the operator for study
- iv. Recording of details
- v. Measure the duration of each element

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- vi. Calculating representative time of each element
- vii. Convert observed time into normal time



III. PROBLEM IDENTIFIED

3.1 Non value added activities

- Activities that do not contribute to the product or the process and should therefore be eliminated. Non-value added steps are waste.
- The work schedule is not prioritized.
- Working in manual check sheets takes more time in patrol.

3.2 Time delay

3.2.1 Printers & Computers

- Lack of printers for bar code printing.
- No separate printer & computers for CMM report generation.

3.2.2 Workplace

- Very few Height Gauges available, therefore many assemble at that area which leads to waste of time. Gauges are misplaced
- Gauge handlings vary on person to person and some takes more time than usual.
- Few receiver gauges are available.

- Calibration of gauges takes more time.
- Tool change approval consumes more time.
- No trolleys available for patrol inspectors, so they look for trolleys in other places and it affects their patrol time.

3.2.3 Checking process

- Patrol frequency inspection according to QCPC.(Quality control process chart)
- Checking of available Tools.
- Replacement of gauge.

Effects

- ✓ Increases Lead Time
- ✓ Increases Rejection Rate

Finally, these things make delay in the overall delivery time.

IV. Ideas To Improve The Inspection Process To Overcome The Problem Identified

- Scheduling the work of inspectors based on the priority of components.
- Separate trolleys for inspectors.
- More height gauge can be placed at small distance gap.
- Additional printers for bar code printing.
- **Patrol frequency change in QCPC.(Quality control process chart)**
- Reduction in rejections will help inspectors to for more patrol.
- Receiver gauge can be placed for all parts.
- Shadow box can be placed at every possible inspection areas.

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Pre-planning for new patrol inspectors

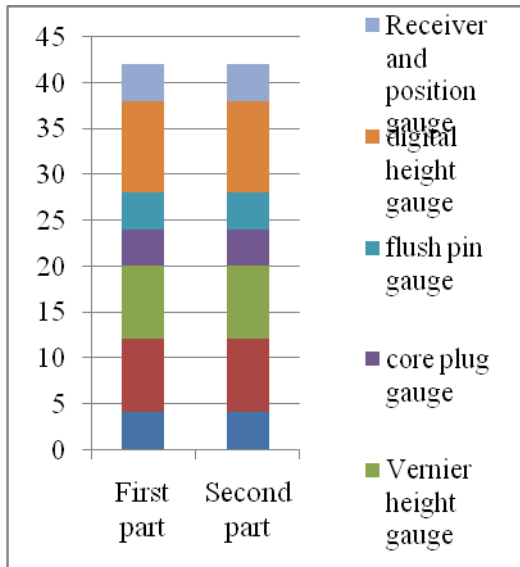
- Man power plays major role, separate person for rejection works will be easier to finish patrols.
- Gauges with slots will help in measuring some dimensions in easy manner.
- Instruments can be calibrated only by standard employee.
- Separate printers and computers to work for CMM reports.

4.1 Implementing change in patrol frequency

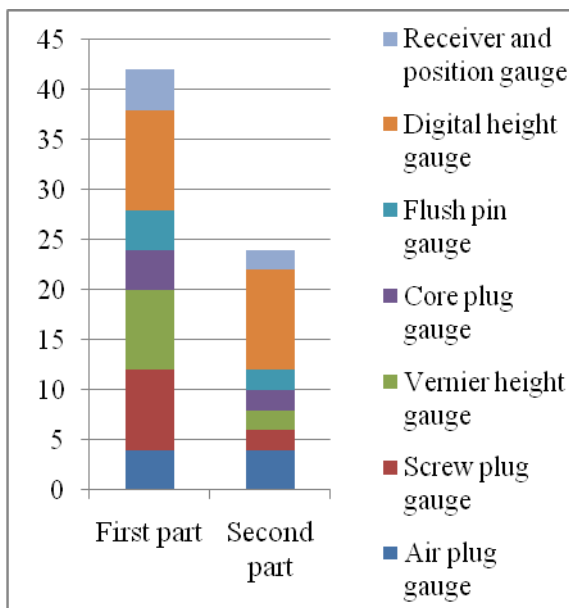
From the identified problems mentioned above, Patrol frequency change in QCPC can help the patrol inspector to check many numbers of components which automatically leads to improve the quality of the product. Therefore the patrol check sheets can be modified with the help of inspectors & reduces the no. of patrols for specific dimensions. The specific dimensions are the parameters which meet customer specifications. These parameters are noted down with last ten set of readings of a component with different part numbers. Thus the parameters which lie between the tolerance values of customer specification are called as specific dimensions. These parameters of a component are patrolled minimum number of times.

Check sheet to be prepared based on critical dimensions with the help of quality supervisors. Critical dimensions are those parameters with maximum deviations that lead to rejection or rework. In the check sheet critical dimensions are denoted with a “box” and those dimensions alone requested to patrol many number of times. The other dimensions which are not denoted can be patrolled with minimum possibility times. Such dimensions can be patrolled with less time consumption than normally it takes before the check sheets are modified. This check sheet can be given to inspectors & monitored, based on their response it can be further modified.

4.1.1 Graph based on Inspection time before change in frequency



4.1.2 Graph based on patrol inspection after changing Patrol frequency



V. CONCLUSION

Thus change in the patrol frequency according to the type of component to be manufactured will help the patrol inspector to check the different components with different objectives with less time consumption. This makes an improvement in quality of the product. Thus efficiency of patrol inspection is also increased.

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