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TO IMPROVE QUALITY & REDUCE REJECTION LEVEL THROUGH LEAN MANUFACTURING METHOD IN AUTOMOBILE WORKSHOP

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ABSTRACT

This paper presents an explorative study of lean manufacturing implementation in India EICHER engineering Works Ltd. Indore. It is a small scale industry. A questionnaire survey is used to find out the extent of lean manufacturing execution. This paper also investigates the material rejection and recovery work that impact the implementation of lean manufacturing. The respondents were precast from those who are directly besmeared with lean manufacturing practices such as production and quality personnel. The conclusion shows that most of the respondent industry is classified as in-transition towards lean manufacturing practice. This in-transition company has intermediate mean values of six month data for lean manufacturing practice categories. It is also found that live more attentions and resources in internal areas such as firms' operation and management, compared to external relationships with suppliers and customers. These industries consider that the factors that drive the implementation of lean manufacturing are the desire to focus on customers and to achieve the organization's continuous improvement. The results from this investigation also revealed the main barrier that thwart or impediment the lean implementation. The main barriers to put into operation lean mechanized system are the lack of indulgent lean concepts and shop floor employee's attitude.

Keywords: *Lean manufacturing, EICHER Industry, Materials Rejection and Recovery, manufacturing practice*

INTRODUCTION

From the down of human civilization to the modern civilized society the basic physiological needs viz - food, cloth and shelter have remains the same. Of course, the type, nature, style and quantum of the commodities fulfilling these needs have undergone remarkable changes. Such changes have kept pace with the development of human civilization. With the development cultural standards and growth of civilization, the liking, tests and styles of fulfilling these physiological needs like food, clothing and shelter but human beings also aspire for the status, recognition, esteem etc. The human civilization has passed through the varied stages with settled life, village society or household system, factory system, industrial town and city life, global partnerships stage.

1.1 Lean Manufacturing

Lean manufacturing or lean production, often simply "lean", is a systematic technique for waste minimization within a manufacturing system without sacrifice productivity, which can root problems. Lean also takes into account waste twisted through overstrain and waste created through inequality in workloads. Working from the perception of the buyer who consumes a product or service, "value" is any action or route that a customer would be keen to pay for. Lean manufacturing makes obvious what adds value, by falling the whole lot else (which is not adding value). This running idea is derived mostly from the Toyota Production System (TPS) and well-known as "lean" barely in the 1990s. TPS is prominent for its focus on reduction of the creative Toyota seven wastes to improve overall customer value, but there are varying perspective on how this is best achieve. The steady growth of Toyota, from a small friendship to the world's largest automaker has focused awareness on how it has achieved this failure.

Types of Waste

The main issue in textile is:

1. Fritter away of overproduction.
2. Waste of waiting.
3. Waste in transportation activities.
4. Waste in processing itself.
5. Waste of stocks.
6. Waste of motion.
7. Waste of making defective products.

The waste of overproduction is mother of all wastes. it overproduction occur when a company produce more than its customer needs. It is the motivation of overproduction wastes is the birth of other kind of wastage. The is also worst kind of desecrate because it causes corresponding waste and obscures the need for advance and also results from producing more or faster than required. Waiting is another productivity killer and is a major source of dissatisfaction for customers. It does not matter if the waiting occurs in the manufacturing area, doctor's party and airport etc.

Causes:

1. Shortages & unreliable supply chain
2. Lack of multi-skilling/flexibility.
3. Downtime/Breakdown.
4. Ineffective production planning.
5. Supremacy design issues.
6. Black art process.

The most basic cause of kill time is an unbalanced process. Solitary part of a progression runs nearer than a previous step. There force is waiting in the process. A further common cause of in the offing is when material is not available. This can be due to

i. matter handling process not operating effectively or due to stock out as when replenishment inventory is out of with manufacture. The most basic cause of wait instance is poor communiqué and poor decision making process. When human resources do not have inadequate information and are not empower to make decisions. This more organization is wait time due to slow contact and decision making. The most familiar form of transportation waste occurs when objects is transported across the plant with forklifts. Additionally, conveyor system is nothing more than elaborate and space consuming haulage waste creators.

Causes:

1. Badly designed process / cell.
2. Poor value stream flow.
3. Complex material flows.
4. Sharing of equipments.

Concept of Manufacturing

ii.

An industrial complex consists of number of different sections which work together in order to attain its objectives. As such unification of problems concerning various sections becomes essential. The industrial complex is assumed to be unity and the inter-relationship between the various sections is established with the help of flow of materials, information and other such actives. It provides a perspective view of an industry or manufacturing industry or system which is very complex in nature because of many factors such as product variation, labor unrest, keen competition, high cost of labor etc.

1.2 Representation of A System

"Webster" defines a system as a regularly interacting or inter depended group of items forming a united whole.

Fig.1: Schematic representation of a system

Figure 1 gives the schematic representation of a system. Precisely, a system must have specified inputs and contribute to a set of production (outputs) taking all the measures of effectiveness. In a system, we expect that a change in one variable within the system may affect the other variable of the same system.

Classification of System

System may be broadly classified as:

i) Open loop system
ii) Closed loop or Feedback system

Open loop system: Figure shows the schematic representation of open loop system. This system comprises of the following elements.

a. Input
b. Processing unit
c. Output

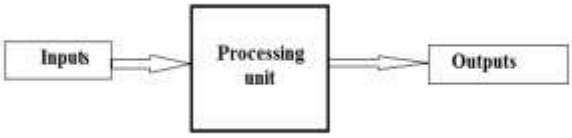

Fig.2: Open loop system

This system does not have any influence of outputs on inputs i.e. inputs do not contribute any control on outputs. Some examples of open loop systems are:

1. Watch
2. Metal cutting machine
3. Metal working machine

Open loop system: Figure shows the schematic representation of closed loop system. This system brings result from the past action of the system and thereby it controls the future action.

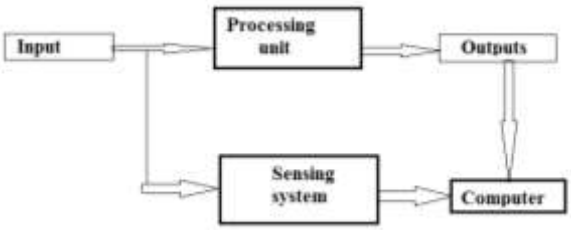

Fig.3: Closed loop system

Here inputs are converted into outputs through a processing unit. This output is compared with the desired output and the difference between the actual and desired result provides control action equals the desired output. Some examples of closed loop or feedback system are:

a) A thermostat receives temperature information, decides to start the furnace and changes the temperature accordingly.
b) In a manufacturing system, order and inventory levels lead to manufacturing decisions which fills orders and correct inventories.
c) A manufacturing unit attracts competitions until the profit margin is reduced to equilibrium with economic forces.

1.3 System Concept of Production & Productivity

A production system is a part of, and operates within, several larger socio-economic-political systems, oriented towards a defined goal, which either explicitly or implicitly means production of goods and services. The production system is also an input output system procuring its input from selling its output to the larger socio economics surroundings it operates in. except for gland production systems, having indirect control over surroundings socio-political systems, most production systems are subject to uncertainties: of supply demands that input and outputs ends of its interface with the surroundings. Against these uncertainty vibrations, all production systems try to stabilize, survive and grow by having the:

i) Foresight to anticipate and ability to plan
ii) Flexibility to adjust and tenacity to deceive
iii) Faculty to add and enterprise to lead, taking risk.

Features of Production System

i) It is goal oriented: goal being production of goods and services.
ii) The goal is achieved through technological transformations of raw material using energy.
iii) Technological transformation is carried on by a suitable choice of technique an optimal combination of capital and labour from the broad spectrum of techniques ranging from complete automation to completely manual labour.

Production System as an Input-Output Model

All human societies make use of natural and artificial material and forces to provide products .the products may be goods like milk, clothes, houses, vehicles etc.. to it may be service like electrical energy ,bus rides , health care, education etc. An essential requirement of these products is that they need the needs of those members of society who will actually use them. In "primitive societies the complexity of the product is so simple that even a single person can do the coordination activities between various activities. But now the modern system is so complex and it requires a number of specialized departments. Therefore it is necessary to analyze the production system on "system concept". The system concept provides a conceptual framework of production situation.

t is worthwhile to put a production system in a model form which can represent all the parameters involved in the industry. Note that such a model would be of immense value for the analysis of production system.

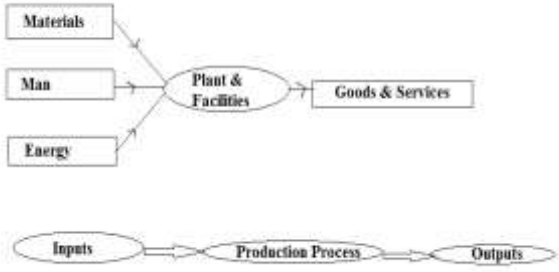

Fig.4: Input – Output Model

Production Processes Input-Output Concept

From the time immemorial this has been continuously quest of man to transform the natural resources into useful products. With the rapid advancement in technological field for the last several decades there have been notable contributions made by the scientist, designers and production experts. Production process comes under the discipline of engineering. Of all the sub-disciplines of engineering, manufacturing process gets the top priority as it involves the conversion of raw material into final o finished product. The conversion of resources into raw materials is normally brought about by two sub-disciplines of engineering mining and metallurgy.

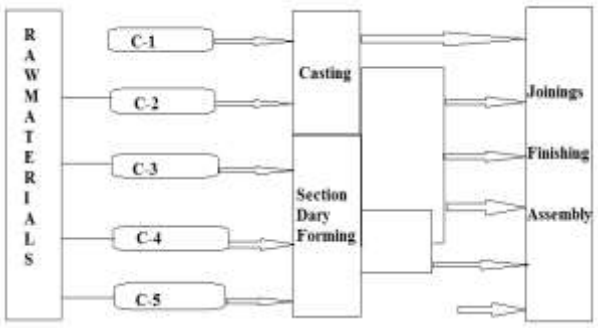

Fig.5: Manufacturing processes

Manufacturing process involved three main activities, e.g. designing, production and development of new techniques.

1.4 Material Requirement Planning (MRP)

Material requirement planning is defined as a computational technique that transforms the master schedule for finished product into detailed schedule for raw materials and component required for the finished product.MRP clearly signifies as to when each of these items must be ordered and delivered with a view to meet the target of master schedule of finished products.

An enormous amount of manufacturing data is required for MRP. Data from each part are stored in two files. The first is the items master file, which contains information about the pare, such as description, source, unit of measure, lot size and lead time stock balance. The second is the product structure life, which contains the computerized version of the engineering drawing parts list with additional manufacturing information.

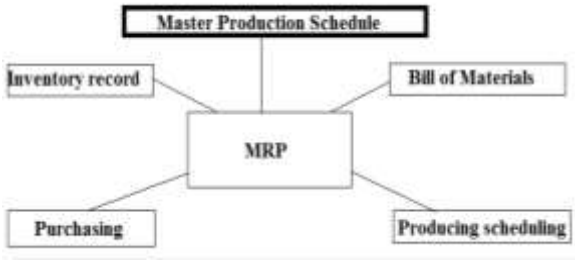

Fig.6: Open Loop System

2. LITERATURE REVIEW

Milind Raut , Dr. Devendra S. Verma 2017 [1] has state that improve their product/process/services continuously and progressively for that lean six sigma is the holistic approach that address multiple aspect of organization competitiveness it is only operational excellence. CNC cutting involves various processes which include machine setting, blade speed, machine parameter, lamping, cooling, etc. It is not easy to produce blemish free cutting. Occurrence of the blemish may absorb single or multiple causes. These causes can be minimizing through systematic course of action of applying various tools and technique. These papers represent analysis and investigation of cutting defect and identification of remedial measures carried out at specific industry. Diagostatic study carried out on overall process of cutting. Cutting products revealed that the contribution of the five prominent defect in cutting rejection were found and they are taper cutting, over size, under size, rough surface and burr. It was notice that these defect were frequently occurring at different location.

Sanjeev Kadian,Randeep Singh & Ashok Kumar Malik 2015[2] They are say waste and refining customer gratification. LM is a set of value, attitude and business procedure to allow the execution of it, which is broadly recognized and applied since 1960. Thus the Lm is demarcated as a industrialized classification that focused ceaseless flow within supply chain by remove all wastes and completing continuous progress towards product excellence. Waste is the whole thing other than the compulsory equipment, supplies, parts space and functioning time. In this case study the scientific equipments built-up company employs part of the seven basic class joystick tools to drastically improve the course rejection and rephrase.

Farzed Behrouzi & Kuan Yew Wong 2011[3] They are say that LM has become an important avenue for both academics and practitioners in recent times .Many organization around the world have attempted to implement it but the lack of a clear understanding of lean performance & its measurement will contributes to the failure of lean particles. They are many papers and articles and report that address lean manufacturing and there techniques and tools. But few studies are found to focus systematically on lean performance evolution.

Norani Nordin,Baba Md Deros & Dzuraidah Abd Wahab 2010[4] They are worked on exploratory study of lean manufacturing implementation in Malaysian automotive industries. A questionnaire survey is used to explore the extent of lean manufacturing implementations. This paper also examines the drivers and barristers that influence the implementations of lean manufacturing. The survey was performed on sixty Malaysia automation components manufacturing firms. The respondents were chosen from those who are directly involved with lean manufacturing

OBJECTIVES

The objectives of my project work are as following:-

1. To given that world class manufacturing process is to the concern in which it is applied as change are effective only on those manufacturing concern where manufacturing process is of world class standards and in unity to be prevailing technology.
2.
    1. To humanizing quality improvement.
    2. To provide job situation safe and secure
    3. To eliminating waste.
    4. To maintain the proper stock level.

3. RESULTS & DISCUSSIONS

Table 1:

Nov 2017 Process R/J				
Part No.	Quantity /Freq.	Contribution %	Cumulative Freq.	Cumm. %
ID312200	20	16.2601626	20	16.260162
IA305928	12	9.756097561	32	26.016260
ID309829	10	8.130081301	42	34.146341
ID330549	7	5.691056911	49	39.837398
IA306921	6	4.87804878	55	44.715447
ID340885	6	4.87804878	61	49.593495
IA207966	4	3.25203252	65	52.845528
IA329975	4	3.25203252	69	56.097561
IC308538	4	3.25203252	73	59.349593
IC309884	4	3.25203252	77	62.601626
IA228749	3	2.43902439	80	65.040650
IA329974	3	2.43902439	83	67.479674
IB002087	3	2.43902439	86	69.918699
IC308537	3	2.43902439	89	72.357723
ID328410	3	2.43902439	92	74.796748
IA304750	2	1.62601626	94	76.422764
IA306920	2	1.62601626	96	78.048780
IA328478	2	1.62601626	98	79.674796
IC308923	2	1.62601626	100	81.300813
IC309928	2	1.62601626	102	82.926829
IC318181	2	1.62601626	104	84.552845
IC321088	2	1.62601626	106	86.178861
fan	2	1.62601626	108	87.804878
Others	15	12.19512195	123	100

Result-1(Pareto Graph)

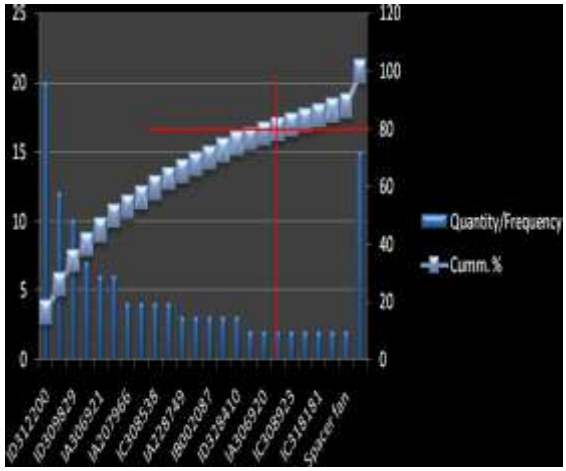

Table-2

Part No	Part Name	Defect	Type of RJ
ID312200	Quill	OD Ø44-0.025/-0.064 obs. 43.916 mm	Process
IA305928	Steering G/B Mtg.	Hole Ø15 +/-0.2 obs. 16.5mm	Setting
ID309829	Auto Tension	Hard Casting results ir not possible to machine results in Burring surface obs.	Casting
ID330549	Quill	Dim 27.5+/-0.3 obs. 24.38 and Obs. Tool mark.	Setting
IA306921	Tilt Hinge	Due to bend Casting Hole Ø10.8 obs. Shift.	Casting

4. CONCLUSION

The purpose of this research is to maximize quality of product, customer satisfaction and to improve its work process. Planned and opportunity of attractive productivity was confirmed through compare it with the previous system. To achieve this litheness, companies should look up the quantitative literacy of their people. Individual attention should be given to the service sector, which embraced the basic quality improvement ideas simultaneously with the manufacturing sector, but has been neglecting the use of statistical quality control and improvement tools even more than its manufacturing counterpart.

From the review of above mention research articles, following conclusions are derived.

1. Quality control tools are very uncomplicated and easy to use for all majority industries.
2. Quality improvement can be made by tumbling rework and denunciation rate using Quality control tools.
3. Reduction in rejection is indirectly humanized productivity and fertility of the organization.
4. Quality control tools have shown better results in quality improvement as referred many case studies.

An improvement action plan had been set up, than the data had been collected for the 4 weeks from 24 lots and re-examine the rework and rejection results. The has been reduced to 20% from above analysis we are find that after removing the various root causes of rejections.

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