

Parameters of Production in a Manufacturing Plant

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Abstract— Parameters of production is the set of factors and system by which we can achieve a good product, which will satisfy our customers. Parameters of production are PQCDMS I.e productivity, quality, cost, delivery, safety, moral, only by all these aspects an production house can be successful.

Index Terms— productivity, manpower, quality, CVL, cost, delivery, safety, HIRA, moral.

I. INTRODUCTION

Highlight Parameters are the measurable factors forming a group of the set that defines an operation or a system and production is the action of manufacturing or making a thing by components or raw material.

If we talk about a standard manufacturing plant, they follow all the parameters of production i.e. productivity, quality, cost, delivery, safety, moral. All these parameters have equal importance in the production of a product.

All these parameters should be maintained and monitored by a production house, if we skip any of them then it can harm us in any of the direction.

II. OBJECTIVE

To fulfill our customer as well as our need we have to follow all the parameters, If we are making a product without quality then there is no use of it, if we are not getting proper profit from our final product then we are not going to stand in market for long, if we are not delivering it in a required time then there will be customer loss, if we harm someone in manufacturing then it will degrade our self-confidence and even we can face big trouble, if we are not improving our manufacturing process by which we can increase our production or decrease our cost then in future how we are going to compete with other manufacturers. By following all the parameters of production we can achieve or take care of all these and many more aspects.

III. PARAMETERS OF PRODUCTION

In production, we have 6 parameters of productivity, quality, cost, delivery, safety, moral, which are together called as PQCDMS. All of them have their own importance, if we bypass any of them then it can harm us from any of the direction.

A. Productivity:

In productivity, we have to see all the points in which we can achieve our daily target of production. The terms like Plan per shift, work content, total manpower are used in productivity and for that we have Effective work time.

Effective work time is all related to plan, work content and total man power required to complete the product within the given time.

$$EWT = \frac{\text{Plan} \times \text{work content}}{\text{Total man power}}$$

Where Plan = Quantity of product within a time period

Work content = Time to make a unit of product

Total man power = Total manpower required to complete the planned quantity within given time

For example,

In an Tractor manufacturing plant the plan of production per shift is of 75 tractor. If one tractor takes the time of 218 minutes with a manpower of 75 people, the the effective work time will be

$$EWT = \frac{\text{Plan} \times \text{work content}}{\text{Total man power}} = \frac{75 \times 218}{75} = 218$$

218 will be our effective work time.

B. Quality

Quality is the standardization of something as measured against other things of similar kind or we can say degree of excellence of something. We can not measure quality of any product but we can compare it with some another product. When we are talking about quality we have some elements to control or monitor it like.

Customer voice letter

CVL is a really big issue for a production unit, whenever a customer writes a letter, explaining how much difficulty is he facing related to that product. The production plant should keep the CVL in highest of its priorities and should come up with the best related solution as soon as its possible for them. Whenever a production plant faces a CVL, the company has to take a very strict action towards the employee and they should take an action so that the complain is not registered again. The action taken by the company should be effective and after taking that action the complaint should not be repeated again. Also, the employees of the production plant should check the available stock once again if the registered error is there in any of the manufactured units, and to duly inform all the dealers that the production unit has received a

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CVL.

To communicate the CVL we have the following data sheet

CUSTOMER VOICE LETTER			
CVL NUMBER			
Area Office	Date	Dealer location	Name of dealership
Complaint as reported by the customer			
Dealer team observation and action			
Dealer Code			
Product serial no.			
Hours use			
Model			
Warranty claim no.			
Despatch Detail			
Category			
Repeat			

CVL Repeat:

Whenever a CVL is repeated, the production team and the quality team have to improve their action plan and have to give a full proof action so that the action is not repeated again.

Stock Yard RPH:

Most of the companies have different stock yard or we can say storage godowns in different different places. They store their product in that location and whenever they have the requirement they release the product as per the requirement. If anything found with any kind of defect in the product then the plant has to repair it. The percentage of defect per product is the RPH.

$$\text{RPH} = \frac{\text{Defect} \times 100}{\text{number of product checked}}$$

Direct Pass Ratio:

When you are working in a production unit it's very important to follow the tag time, if the finished product is made within the tag time with keeping all the safety and precaution measures in consideration the product increases the Direct Pass Ratio.

$$\frac{\text{Ready for Dispatch}}{\text{Pre-delivery Investigation}} \times 100$$

Clean Card

When a product is manufactured and the product is matching all the required criterion of the manufacturing as it should and is upto the mark in the traveller's card. Then the product is said to have a Clean Card i.e. the product is with no defects and is ready for dispatch.

To measure the quality efficiency of the plant the following calculating formula can be used:

$$\frac{\text{Clean Card}}{\text{Total Cards}} \times 100$$

C. Cost:

In business, the cost is the most monetary valuation of material, effort, resources, utilities consumed, risk incurred, time and opportunity forgone in the production and delivery of a good or service. There are many factors which we have to

keep in mind when we are looking towards a better future for our company. Some of the points are given below:

Material scrap rate

It is the percentage of failed material that can not be repaired or rework and therefore, discarded. In this we have to identify the regions where the scrap rate is maximum and therefore we have to reduce it day by day. We can show or present the scrap rate with a chart as shown in figure.

Cost of poor quality:

It is the cost which can not be identified if system, process and product is not perfect. If we are facing this kind of issues we have to identify the problem and rectify the product. Cost of poor quality is really a big issue for customer as well as for the industry. It may decrease the product market value and hence customers will be reduced.

D. Delivery

It is an action of delivering your product at a given time period. At that given time period the product should be passed through all the checkpoints decided by a manufacturing plant. If we talk about the automobile sector, most of the customers have to book their vehicle and then the company decides, that at what time it can be delivered to the customer. We have some major points in the delivery section that are

Schedule Adherence:

It is the degree to which a representative should stick to their schedule, measured as a percentage. It is mostly used by supply chain metrics and forms part of the quality and cost. Even in a call centre they have Schedule adherence, by which way we calculate their schedule disturbance and all the adherence is noted with remark.

Monthly Volumetric Schedule Adherence				
Month	Plan	Actual	Gap	Remark

Goods inventory:

It is the complete list of items which we have in our stock and according to that organization we have to pay tax. In India all companies have to give their stock on 31st March of every year, in that they have to release their production as well as their raw material in their stock.

E. Safety

It is the condition of being protected from an injury or a risk. It is one of the most important factors in production, all workers want their surroundings safe. For safety we have different projects and tasks by which we can calculate risk. In safety we take care of

Reportable Accident

A reportable accident is an accident with a serious injury, in which the person met death or permanent injury. All these type of injuries are reported and send to government concern department, the company have to take a strict action toward these type of accidents so that it won't get repeated in future.

Accident sheet						
Sr.No	Name	Time	Other Operator	Supervisor Name	Detail	Work Place

Non reportable accident:

Accident in which the person is able to work within 24 hours of the incident is non reportable accident. These type of accidents are non reportable but some documents and actions are taken so that it won't get repeated.

First Aid incident

Incidents in which workers can be treated within the company facility and get back to work instantly, are first aid incidents. These type of incidents are also noted by the present incharge.

Near Miss:

The kind of incidents which could've taken the form of a serious accident causing injury to a person but are avoided by mere luck. These kinds of incidents are also noted and to be taken care of from then onwards so that the it doesn't harm anyone.

Hazard Identification and Risk analysis (HIRA)

HIRA is an application of safety management. It is a systematic risk assessment tool that can be used to assess the risks of various hazards. In this project the safety team have to find all the hazards and risks involved and also close them within a time period. By this we can achieve an environment free of hazard and risk.

Safety observation tool (SOT)

SOT is a tool to document and identify all unsafe acts and unsafe conditions in a manufacturing plant. SOT's main target is to seek out action more than condition and action can be of any type. It can be a safety training or any modification in a process.

F. Moral

Concerned with the principle of right and wrong behaviour of a process is moral. Any kind of modification or encouragement is moral in a manufacturing plant. Any kind of increment in customer satisfaction or process is a great concern.

Innovation:

Any kind of major change which leads to an increased efficiency of the manufacturing plant should be adopted with immediate effect and to be monitored specially so the the efficiency increases constantly. The increase in efficiency can be in any form i.e. increase in

quality, decrease in manpower, process time, simplification of any process.

Continuous Improvement Team:

The kind of minor improvement which leads to the immediate ease and increase in efficiency is taken care of by the Continuous Improvement Team (CIT) i.e. to make a process simple, to make a process safe, to make a process simple, to make a process more organised, etc.

Recognition Awards:

The action of an individual or team leading to an innovation or a CIT in the plant should be Awarded and/or Recognised by the institution i.e. may it be an increment, may it be a bonus, may it be an award or memento given to the person, etc.

IV. THINGS TO REMEMBER

1. All the parameters should have an equal importance.
2. All the members in the production unit should have full fledged knowledge of all the activities and the documents.
3. All the parameters should have a dedicated department of their own to take care of themselves.
4. The training of HIRA and Safety should be provided to every new joiner also the training sessions should be repeated for all the employees at regular intervals to make them aware of new safety measures and tools.
5. If there is any mistake then it has to be noted and displayed on a large screen in common area and the screens should be placed at every possible part of the plant so that everyone can have a look at them.
6. The screens should also display the achievements of an individual if he does something extraordinary overall and especially the achievements in the terms of safety.

V. RESULT / EXECUTION OF PROJECT

All the processes are drafted and followed by all the workers in the production line. As the main target of project is to increase quality with quantity has achieved.

VI. ADVANTAGES

1. The parameters are developing to reduce the variation and to enhance the quality of an product.
2. To minimize the communication gap and to increase the safety concept.
3. Old data can be extracted for any future use for the betterment and advancement purpose.
4. Quality of the product can be increased and the cost of production can be lowered at the same time by following the above mentioned measures.
5. The probability of the occurrence of an accident can be reduced and a significant increment in safety measures can be noted.
6. Sustained return of investment due to reduced process errors.
7. Performing continual quality improvement.
8. Providing the customer the best service within the given

timeframe hence increasing the business.

VII. DISADVANTAGES

1. In this process we have note and draft all the relevant and required procedure, due to this reason it becomes time consuming.

2. Reduction in workplace individuality.

VIII. CONCLUSION

This project has achieved best accuracy and has proven to provide good efficiency. Application of this project in any organization will reduce the human workload at the same time increasing the productivity with the increased benefit of customer satisfaction and will also provide more accuracy. This system will be easy to operate and guide and the production line can be operated with a minimal knowledge (so that the workers can also operate the system for without prolonged supervision). The project can be used for guiding new employees in the plant.

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