

Evaluation of Part Production Methodology in automotive industry

Suryakant Namdeo Wahane , Dr Achal Shahare

Department of Mechanical Engineering
 G.H. Rasoni Academy of Engineering & Technology, Nagpur
 NAAC Accredited
 (Affiliated to Rashtrasanta Tukadoji Maharaj Nagpur University, Nagpur)
 Session 2017-18

Abstract -Methods of Production, Planning & Inventory Control, Industrial Layout, and Statistical Quality Control of component in Industry gives new era for production of defect free components. When creating the design solutions the following challenges arose: failure in function, customer complaints, limited space in production floor, implementing without impacting the production process or the associate’s tasks, upholding the company’s ethics code and creating solutions compatible with the company’s technology. For better process performance each component would be assigned a bin in the production line, and the material handler would be in charge of loading the components into the bins and need to have proper design analysis (DA). This resulted less material on the production floor, better utilization of the company’s transportation trucks, and more efficient material flow since smaller batches are easier to control and transport within the facility. This resulted in a simpler, more intuitive database which will facilitate the data recollection process and a better record for scrap/reworked materials. This project, Freight Data Analysis, creating a detailed freight database so all the data could be found in a single place and creating a Standard Operating Procedure (SOP). Both of these solutions were aimed towards creating a better record and control for the freight expenses. With more detailed and accessible records it will be easier to identify opportunities to reduce costs and control freight expenses; it will guarantee that all expenses regarding freight are thoroughly examined before being approved in fabrication and assembling of different component.

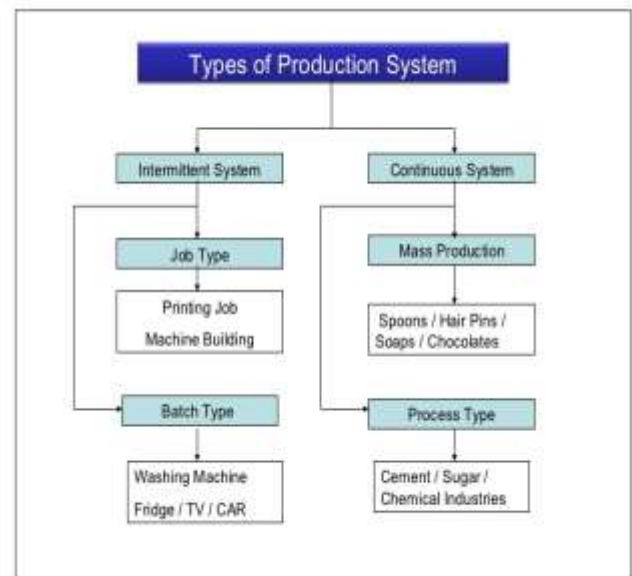
1. INTRODUCTION

Production :

Production is a process of combining various material inputs and immaterial inputs (plans, know-how) in order to make something for consumption (the output). It is the act of creating output, a good or service which has value and contributes to the utility of individuals.

Economic well-being is created in a production process, meaning all economic activities that aim directly or indirectly to satisfy human wants and needs. The degree to which the needs are satisfied is often accepted as a

measure of economic well-being. In production there are two features which explain increasing economic well-being. They are improving quality-price-ratio of goods and services and increasing incomes from growing and more efficient market production.



Types of productions:

A. INTERMITTENT PRODUCTION

- a. Batch type
- b. Job type

B. CONTINUOUS PRODUCTION

- a. Mass type
- b. Process type

A. Intermittent PRODUCTION

- a. Batch type production

Batch production is a technique used in manufacturing, in which the object in question is created stage by stage over a series of workstations, and different batches of products are made. Together with job production (one-off production) and mass production (flow production or

continuous production) it is one of the three main production methods.

Batch production is most common in bakeries and in the manufacture of sports shoes, pharmaceutical ingredients (APIs), purifying water, inks, paints and adhesives. In the manufacture of inks and paints, a technique called a colour-run is used. A colour-run is where one manufactures the lightest colour first, such as light yellow followed by the next increasingly darker colour such as orange, then red and so on until reaching black and then starts over again.

b. Job type production :

Job production, sometimes called jobbing or one-off production, involves producing custom work, such as a one-off product for a specific customer or a small batch of work in quantities usually less than those of mass-market products. Together with batch production and mass production (flow production) it is one of the three main production methods.

Job production can be classical craft production by small firms (making railings for a specific house, building/repairing a computer for a specific customer, making flower arrangements for a specific wedding etc.), but large firms use job production, too, and the products of job production are often interchangeable, such as machined parts made by a job shop.

B. CONTINUOUS PRODUCTION :

a. Mass type production :

Mass production, also known as flow production or continuous production, is the production of large amounts of standardized products, including and especially on assembly lines. Together with job production and batch production, it is one of the three main production methods.

The term mass production was popularized by a 1926 article in the Encyclopædia Britannica supplement that was written based on correspondence with Ford Motor Company. The New York Times used the term in the title of an article that appeared before publication of the Britannica article.

The concepts of mass production are applied to various kinds of products, from fluids and particulates handled in bulk (such as food, fuel, chemicals, and mined minerals) to discrete solid parts (such as fasteners) to assemblies of such parts (such as household appliances and automobiles).

Mass production is a diverse field, but it can generally be contrasted with craft production or distributed manufacturing. Some mass production techniques, such as standardized sizes and production lines, predate the

Industrial Revolution by many centuries; however, it was not until the introduction of machine tools and techniques to produce interchangeable parts were developed in the mid 19th century that modern mass production was possible.

b. Process type production :

Flow production (Process Production) is also a very common method of production. Flow production is when the product is built up through many segregated stages; the product is built upon at each stage and then passed directly to the next stage where it is built upon again. The production method is financially the most efficient and effective because there is less of a need for skilled workers.

Part production methodology :

The complete study of design is done on the basis of different stages during the whole process of part production.

1) Part design analysis: The aim is to give the complete design information about the part to be produce. In this, the explanations and some other parameters related to the project are included

A. Design consideration

Process flow diagram

Control plan

Failure mode effect analysis

Standard operating process

B. Functionality of various dept

Store

Quality control

Production planning

Production

Final inspection

Failure /Performance analysis:

Cause and Effect / Ishikawa / Fishbone Diagram

Check Sheet

Control Chart

Histogram

Pareto Chart

Scatter Diagram

Stratification Diagram

D. Suggested new methodology of part production:

Evaluation in method/operation

Evaluation in machine

Evaluation in material

Evaluation in other factors.

A) Design consideration (basic requirement)

i) Drawing

ii) Drawing Evaluation

PSW

Level 1- Warrant, Appearance Approval Report (for designated appearance items only)

Level 2- Warrant, Parts, Drawings, Inspection Results, Laboratory & Functional Results, Appearance Approval Report

Level 3- At Customer Location- Warrant, Parts, Drawings, Inspection Results, Laboratory & Functional Results, Appearance

Approval Report, Process Capability Results, Capability Study, Process Control Plan, Gauge Study, FMEA

Level 4- Per Level 3, but without parts

Level 5- At Supplier Location- Warrant, Parts, Drawings, Inspection Results, Laboratory & Functional Results, Appearance

Approval Report, Process Capability Results, Capability Study, Process Control Plan, Gauge Study, FMEA

iii) PFD

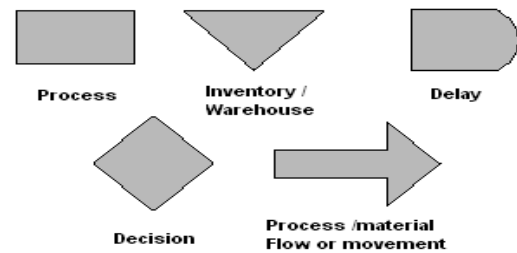
iv) CP

V) PFMEA

vi) CP

vii) SOP

Process Flow chart Symbols



Reference

Int. J. Industrial and Systems Engineering, Vol. 1, No. 4, 2006 by Kanthi M.N. Muthiah* and Samuel H. Huang

Carrie, A. and Macintosh, R. (1997) 'An assessment of GRAI grids and their use in the strathclyde integration method', Production Planning and Control, Vol. 8, pp.106-113

Feigenbaum, A.V. (1991) Total Quality Control, New York: McGraw Hill

B. Agard and A. Kusiak, Standardization of Components, Products and Processes with Data Mining,

International Conference on Production Research Americas 2004, Santiago, Chile, August 1-4, 2004.

5. Application of Statistical Process Control (SPC) in Manufacturing Industry in a Developing Country
Ignatio Madanhire

□ □