

Analysis of Generic Flexible Manufacturing Systems

Research Scholar Yedula Anil Reddy, Registrar & Professor Dr. G. R. Selokar (Supervision)

Department of Mechanical Engineering,
Sri Satya Sai University of Technology & Medical Sciences Sehore, Bhopal, M.P, India,
mail2yanil@gmail.com,selokar1960dr@gmail.com

Abstract – A regular Flexible Manufacturing System (FMS) has been considered under Planning Design and Control (PDC) methodologies. The central target is to test the effect of structure technique (steering adaptability) on system execution under arranging methodology (interchange system burden condition) with control methodologies (sequencing and dispatching rules). A PC reenactment model is created to assess the impacts of previously mentioned procedures eager for advancement range time, which is taken as the system execution measure. Most limited Processing Time (SPT), Maximum Balance Processing Time (MBPT) are the sequencing rules for choosing the part from the info support while for machine determination the dispatching guidelines are Minimum Number of parts in the Queue (MINQ), and Minimum line with Minimum Waiting Time of all parts in the Queue (MQMWT).

Keywords – FMS , PDC SPT , MINQ, MQMWT etc.

I. INTRODUCTION

Among all the current manufacturing system, they require a manufacturing system, which is having the adaptability to make the altered item with medium volume. In this way, they are appealed to the flexible manufacturing system (FMS), which is a tradeoff between employment shop manufacturing system and clump manufacturing system. Flexible manufacturing system is the system, which is outfitted with the few PC controlled machines, having the office of programmed changing of apparatuses and parts. The machines are interconnected via Automatic Guided Vehicles (AGVs), beds and a few stockpiling cradles. The controlling activity in any manufacturing system is having expanding significance. In the flexible manufacturing system, the constant part need control and directing machine need are the two control activities, which are contemplated under the elective control methodologies has tried diverse sequencing rule for a system and they have inferred that the SPT (Shortest Processing Time).

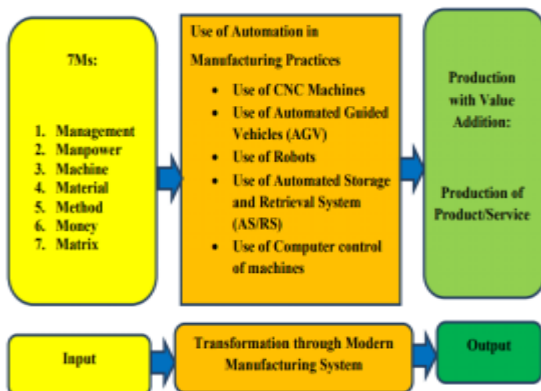


Fig .1.1. Manufacturing System.

II. LITERATURE REVIEW

1. Flexible Manufacturing System Scheduling

The term planning principle is utilized to allude to decides that organize occupations in a line standing by to be adjusted. At the point when the procedure winds up accessible, an occupation must be chosen from its information line for quick set up and preparing. The greater part of the guidelines revealed before 1980 considered booking issues in work shop condition. A review in employment booking by Panwalkar et al detailed that in excess of 100 planning standards have been proposed in the writing. They grouped the planning rules into three classes, basic need rules, heuristic booking standards, and mix principles including ideas from both of the initial two classifications.

III. RESEARCH METHODOLOGY

Taking into view the unpredictability of the subject, and the way that such investigations can be done fundamentally by intently stepping and breaking down the methodologies received by different associations and results thereof, it was viewed as suitable to do the study under the general structure of 'adaptable frameworks methodology'.

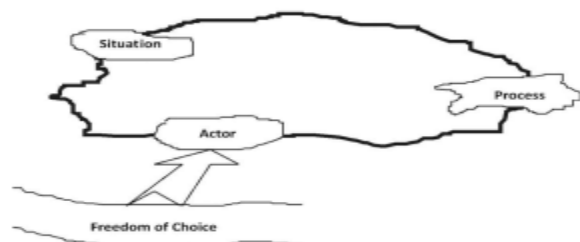


Fig.3.1. Flexible systems management paradigm.

In this structure, the 'circumstance' viewpoint contains the present mechanical circumstance in assembling industry, while the association establishes the 'on-screen character' perspectives. The job of new innovation versus sourcing rehearses in overseeing fabricating adapt abilities establishes the 'procedure'. The entertainer has different alternatives to work out, contingent on the circumstance and procedure, which structures his 'opportunity of decision'. In light of SAP, key learning's of a case are integrated, activities recommended and expected exhibitions are condensed.

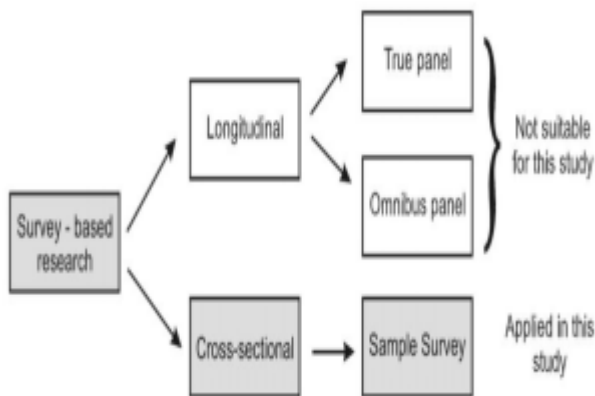


Fig.3.2. Overview of survey based research.

1. Survey methodology

A survey of different assembling associations, engaged with accomplishing producing adaptabilities at strategic and key level has been taken up by utilizing a particularly structured poll. Exceptional accentuation has been given to look for data identified with business methodology and execution of the associations, status of volume, adjustment conveyance and assembling adaptability and the job of innovation and sourcing rehearses in accomplishing adaptability at strategic and key level. The survey has been planned after broad writing audit and approved through friend survey from academicians, divisors and specialists from the business.

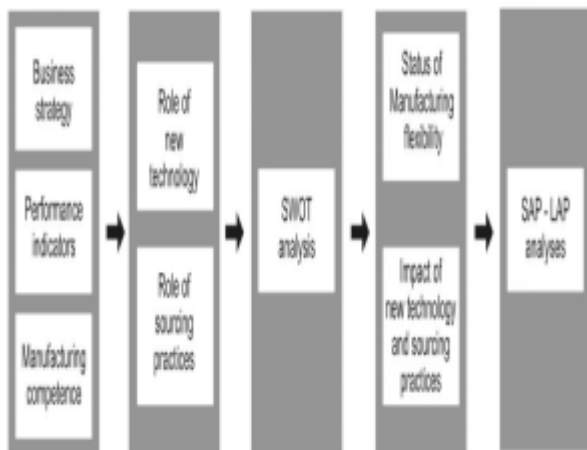
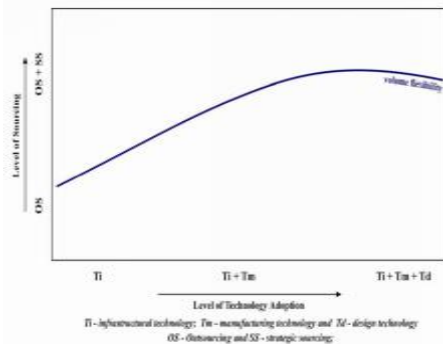


Fig. 3.3. Methodology for conducting the case studies



2. Development of Technology-Sourcing -Flexibility Systematic Plan

An idealistic strength lattice approach has drawn out the job of assembling innovation from the outset spot pursued by the key sourcing. Interest in infrastructural and plan advancements further reinforce the abilities of the association to accomplish producing adaptabilities at strategic and vital level.

IV. DATA ANALYSIS

The gap is identified that there is no statistical measure and decision making model to compute the intensity of various barriers and frame work for adoption of FMS in industry. Despite the significant amount of work that has promoted the use of Flexible manufacturing system model building, the gap that requires further investigation to identify various barriers as per literature review and intensity of barriers for adoption of FMS, decision making modelling and frame work for adoption of FMS.

• Reliability Test

Adoption barriers for FMS are grouped into seven major categories. To identify intensity of barriers and sub-barriers for the adoption of Flexible Manufacturing System , all sub-barriers are quantified on linear scale as per intensity in path for adoption of FMS. If the Cronbach's alpha value greater than 0.6, it shows good reliability and is appropriate for exploratory analysis.

Table- 4.1: Construct Reliability of Adoption Barriers for FMS

Sr. No.	Adoption barriers for FMS	No of Items	Cranach's Alpha
1	Human Resources Behavior barriers	06	0.782
2	Technological barriers	06	0.859
3	Operational barriers	06	0.765
4	Investment and Financial	05	0.712

	resources		
	Barriers		
5	Strategic and planning barriers	06	0.878
6	Supply chain and Logistic barriers	04	0.715
7	Miscellaneous barriers	05	0.706

Table- 4.2: Construct Reliability of Performance Indicator for FMS

Sr. No.	Performance Indicator for FMS	No of Items	Cronbach's Alpha
1	Financial	04	0.763
2	Customers/Market Measure	11	0.898
3	Process	12	0.912
4	People	03	0.756
5	Future	03	0.712

Table - 4.3: Importance level of organization for adopting FMS

Area	Mean	Std. Deviation
Reduced labour content	3.95	.711
Increased flexibility	3.78	.755
Quality enhancement	4.09	.669
Capacity increases(leading to quick response)	4.21	.633
Reduced change over and installation times	4.07	.665
Reduced floor space requirement	3.92	.709
Reduced down times	3.97	.717
Improved safety	4.13	.666

V. CONCLUSIONS

A bit by bit approach has been expounded by structuring a proposed usage plan for TPM in Hero MotoCorp Ltd. The examination has shown the plan and advancement of TPM advancement authoritative structure, the system structure of formal instruction and preparing program for representatives and foundation of TPM Master Plan including every one of the eight TPM columns.

The research has featured the commitments to figuring a nitty gritty and elaborative guide and execution steps of 5S technique for chose office zone zones. The usage was led right off the bat at five pilot office zone territories and later on extended all through the plant. The workplace was totally new to the whole workforce, which added to learning.

The examination concedes a few suggestions with respect to human-related issues while executing TPM. The size of the example utilized in this study isn't adequate to mirror the practical image of the undertakings set up and assessment of the impact of human-related issues during execution of TPM among chiefs and laborers. Therefore, this study proposes bearings for conceivable planned researches. Appropriately, a longitudinal study ought to be completed all through the nation for a significantly more significant evaluation of the association between human-related issues (delicate variables) and the presentation of various assembling area those actualizing TPM.

At long last, research has displayed sway investigation of TPM on Productivity (P), Quality (Q), Cost (C), Delivery (D), and Safety (S) and Morale (M) PQCDSM markers. The examination has concentrated on the substantial advantages picked up in regards to TPM key execution pointers. There was a noteworthy improvement underway volume, client grievances, the expense of tasks, no. of mishaps and resolve of representatives are the real points of interest which the association accomplished in the objective time of three years.

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