Vol 6 Issue 11 Dec 2016

ISSN No : 2230-7850

International Multidisciplinary Research Journal

Indian Streams Research Journal

Welcome to ISRJ

RNI MAHMUL/2011/38595 **ISSN No.2230-7850**

Indian Streams Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial board.Readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

Address:-Ashok Yakkaldevi 258/34, Raviwar Peth, Solapur - 413 005 Maharashtra, India
Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.isrj.org

Indian Streams Research Journal

ISSN: 2230-7850 Impact Factor : 4.1625(UIF) Volume - 6 | Issue - 11 | December - 2016

VALUE STREAM MAPPING OF HUB-750 PRODUCT LINE TOWARDS IMPROVEMENT IN CYCLE TIME AND OVERALL PRODUCT FLOW

Mr. Prashant R. Mahadik[1] and Dr. U. M. Deshmukh[2]

[1]Quality Engineer, Neeta Instrument (Pillai Group) Shiroli MIDC, Kolhapur .

[2] Chairman, M. Phil Programme ,Chhatrapati Shahu Institute of Business Education & Research (SIBER), Kolhapur.

ABSTRACT

Nowadays in manufacturing industry require more profit with the help of the small lead time and low cost many manufacturing companies spent more money and time on the reduced the lead time. This paper addresses the implementation of value stream mapping in the manufacturing industry. Current state plant layout is give details about the existing position and identifies the various problems. Future state plant layout show the implementation action plans.

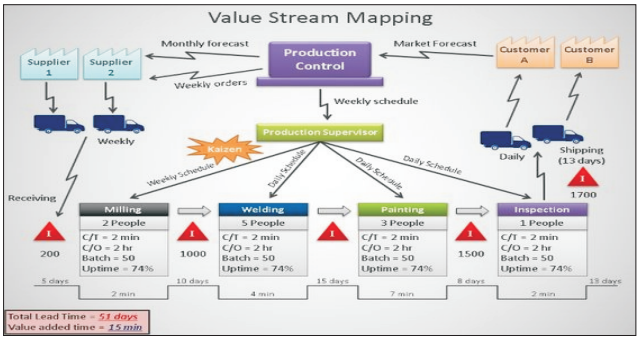
KEYWORDS:*Logistics, customer value, customer, customer satisfaction, customer benefits.*

INTRODUCTION :

Value stream mapping is a lean manufacturing technique used to analyze and design the flow of materials and information required to bring a product or service to a consumer. At TOYOTO, where the technique originated, it is known as "Material and information flow mapping." It can be applied to nearly any value chain.

The goal of VSM is to identify, demonstrate and decrease waste in the process waste being any activity that does not add value to the final product values stream mapping also has the benefit of categorizing process activity into three main areas – value add, non value add and waste.

Value stream mapping method visually maps the flow of material and information from the time products come in the back door as raw materials, through all manufacturing process steps and off the loading dock as finished products.



MEANING:

Definition of value stream mapping value stream mapping is a lean manufacturing or lean enterprise techniques used to document, analyze and improve the flow of information or materials required to produce a product or services for a customer.

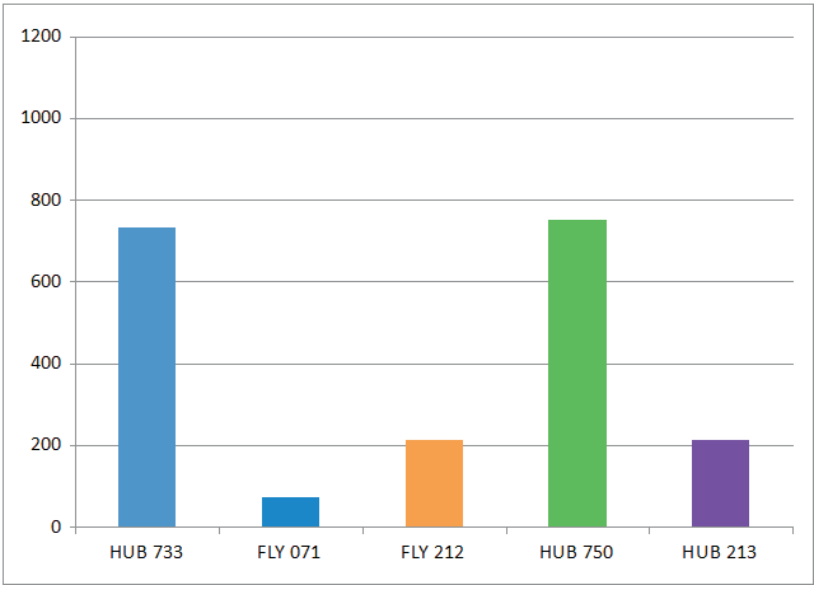
VSM METHODOLOGY:

VSM has four major steps as given.

1.Select a product family
2.Draw current state map
3.Draw future current state map
4.Develop work plan for implementation future state.

1)Product selection:

A company is producing around 400 – 500 types of jobs for different customers.



From the above graph it is clear that H750 is having maximum production quantity. Therefore the selected product for value stream mapping is H750.

2) Current plant layout:

Before draw a current plant layout collect a require data to draw current plant layout.

Data collection method:

Method that will be used in collecting data needed is observation to the activities that performed in the shop floor data is collected by using a stopwatch.

Bulk material handling:

Bulk material handling equipment is used to move and store bulk materials such as ore, liquids and cereals. This equipment is often seen on farms, mines, shipyards and refineries. This category is also explained in bulk material handling.

LITERATURE REVIEW

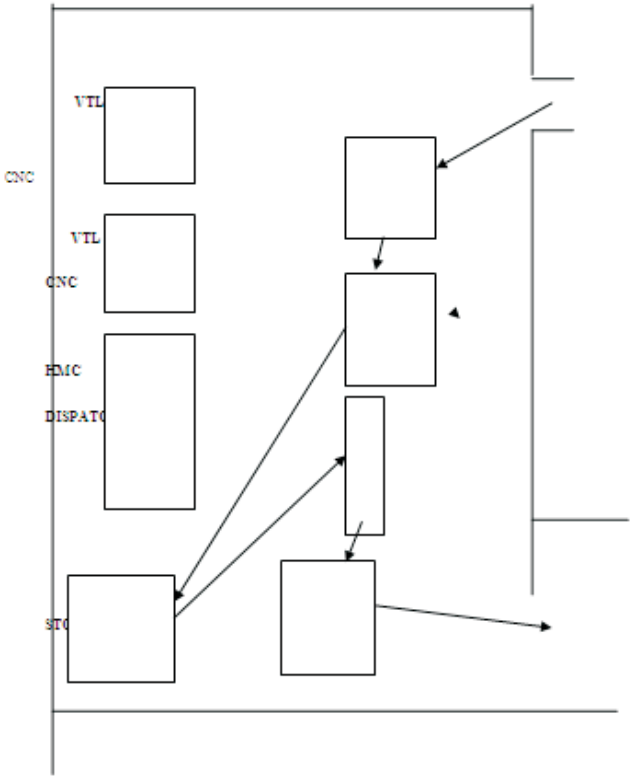
Value Stream Mapping is used to identify the current process of small scale industry. The current state map is used toidentify the wastes and non-value added activities in the production process. A future state mp is created with the waste activities eliminated and improve process cycle time and reduce work in process inventory. (Rahul R Joshi, G.R.Naik (2012)).Dinesh and A. Prabhukarthi (2013) explain value stream mapping in pump manufacturing industry. They draw current and future state map were developed with the objective if improving productivity according to customer requirements.Florin Buruiana and A.M.Goncalves Coelho have created current state map in shaft manufacturing industry. Draw and analyze the current state map found that the large inventory between two processes, and big difference between total lead times and value added time. Then draw a future state map with providing a supermarket pull system and one work cell and reduced a lead time.

Layout of Machine Shop

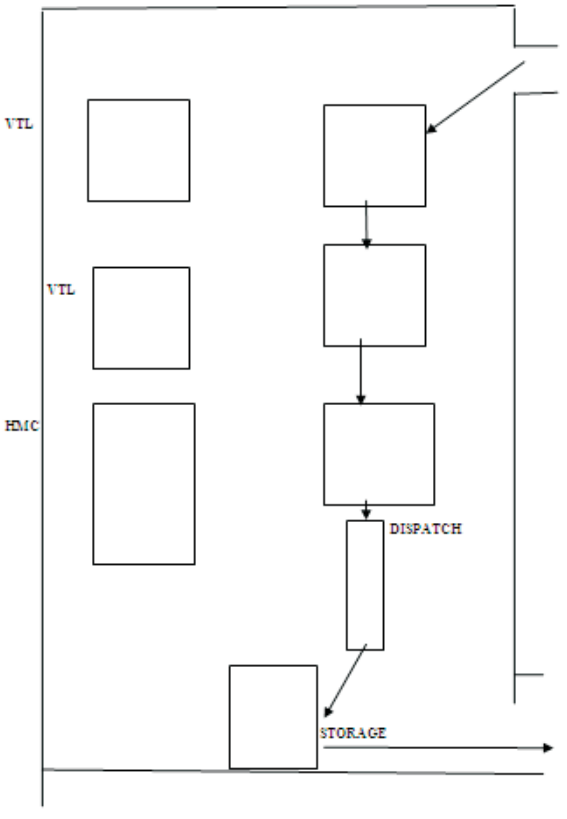
A study on machining of hub has been chosen to fin the working of current layout & its performance. The hub is machined using CNC, Lathe & VMC Machines.

Volume - 6 | Issue - 11 | December - 2016

Plant layout of machine shop:



Proposed layout of machine shop:

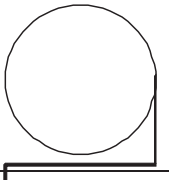
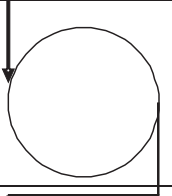
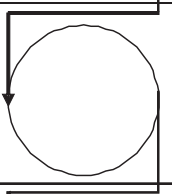
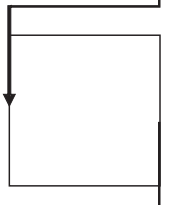
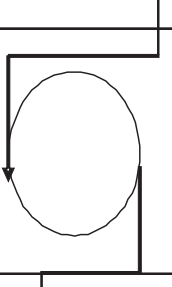
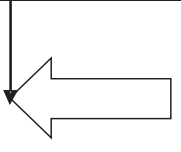


Volume - 6 | Issue - 11 | December - 2016

Operator motion distance comparison in machine shop:

Sr. no.	Station	Distance travelled in meters	Distance travelled in meters (Proposed layout)	Difference
1	Opn. 10	3	1.5	1.5
2	Opn 10-20	1.5	1.5	0
3	Opn 20-30	3	1.5	1.5
4	Opn 30-40	2.5	1.5	1
5	Opn 40-50	3.2	2	1.2
	Total distance	13.2	8	5.2

The part flow and sequence of machining process:

Operation no.	Process description	Process flow
10	Top face turning on cnc	
20	Bottom face turning on cnc	
30	Drilling on vmc	
40	Final inspection	
50	Deburing	
60	Washing and packing	

Volume - 6 | Issue - 11 | December - 2016

Time study analysis:

1.First shift available time: 8hrs = 8*60*60 = 28800sec.
2.First shift available working time : 28800 – lunch – tea break
3.First shift available working time: 28800 – 1800 – 900 = 26,100 sec.
4.Total available time / day = 26100*3 = 78,300

Time study of machine shop:

Opn no	Machine time	No of operators	No of component	Loading and unloading	Inspection time	Deburing time	Washing time	Machining time	Cycle time
10	Cnc	1	1	20	5	-	-	25	50
20	Cnc	1	1	23	15	-	-	25	63
30	vmc	1	1	18	10	-	-	20	48
40	Final inspection	2	1	15	25	-	-	-	40
50	Deburing	2	1	15	-	45	-	-	60
60	Washing and packing	2	1	8	-	-	6	-	14
								Total cycle time	275

Analysis:

1.First shift job production on existing plant layout = first shift time/one job production time.
2.First shift job production on existing plant layout = 26100/275 = 94.90 = 95
3.One day production in 3 shift of existing layout = 95*3 = 285.
4.One month production in 3 shift of existing layout = 285*26 =7,410

Time study of machine shop (proposed layout):

Opn no	Machine time	No of operators	No of components	Loading and unloading	Inspection time	Deburing time	Washing time	Machining time	Cycle time
10	Cnc	1	1	20	5	-	-	25	50
20	Cnc	1	1	22	15	-	-	24	61
30	vmc	1	1	18	5	-	-	20	43
40	Final inspection	2	1	15	25	-	-	-	40
50	Deburing	2	1	15	-	40	-	-	55
60	Washing and packing	2	1	6	-	-	6	-	12
								Total cycle time	261

Analysis:

1.First shift job production on existing plant layout = first shift time/one job production time.
2.First shift job production on existing plant layout = 26100/261 = 100 job.
3.One day production in 3 shift of existing layout = 100*3 = 300.
4.One month production in 3 shift of existing layout = 300*26 =7,800
5.Product increase quantity = 7800 – 74100 = 390 jobs.

Takt time calculation:

1.Takt time calculation as per customer demand = $\frac{\text{Total available time/day}}{\text{Customer demand/day}}$

$= \frac{78,300}{294} = 266.32 \sim 266$

2. Takt time calculation as per existing plant layout = 78300/285 = 275
3. Takt time calculation as per proposed plant layout = 78300/261 = 300
4. Proposed plant layout increases the productivity.

CONCLUSION:

1.The loading and unloading time of product is more in plant layout.
2.Machine shop, then increase the cycle time.
3.Product follows zigzag path during its travel. The 11.5 meter travel requires machine shop from start to end.
4.No proper facility of the material handling equipment.
5.The line of sequence of operation in the machining division is not proper.

SUGGESTION:

After studying the entire exiting condition must consider some suggestion.
1.They require change the position of the machine in plant layout.
2.They provide the crane for loading and unloading purpose then they reduce the cycle time.
3.They reduce the waste in transportation then increase the productivity in less time.

REFERENCES

[1]. R.M.Belokar, Vikas Kumar, Sandeep Singh Kharb, “An application of value stream mapping in automotive industry”,IJITEE, July-2012.
[2]. G.Saranya, Mr.S.B.Nithyananth, “Improvement of crankshaft assembly supply chain using lean techniques”,IJMER, Apr-2012.
[3]. J.Dinesh, A.Prabhukarthi, “Reduction of lead time usingvalue stream mapping in pump manufacturing industry”,MISSA, April-2013.
[4]. Soniya Parihar, Sanjay Jain, Lokesh Bajpai, “value streammapping: Case study of assembly process”, IJERT, Oct-2012.
[5]. Anderes Nielsen, “Getting started with value stream mapping, 2008.
[6]. Rother M., J.Shook, “Learning to see”, Lean EnterpriseInstitute, 1999.

Mr. Prashant R. Mahadik
Quality Engineer, Neeta Instrument (Pillai Group) Shiroli MIDC, Kolhapur .

Publish Research Article
International Level Multidisciplinary Research Journal
For All Subjects

Dear Sir/Mam,

We invite unpublished Research Paper,Summary of Research Project,Theses,Books and Book Review for publication,you will be pleased to know that our journals are

Associated and Indexed,India

- International Scientific Journal Consortium
- OPEN J-GATE

Associated and Indexed,USA

- Google Scholar
- EBSCO
- DOAJ
- Index Copernicus
- Publication Index
- Academic Journal Database
- Contemporary Research Index
- Academic Paper Databse
- Digital Journals Database
- Current Index to Scholarly Journals
- Elite Scientific Journal Archive
- Directory Of Academic Resources
- Scholar Journal Index
- Recent Science Index
- Scientific Resources Database
- Directory Of Research Journal Indexing

Indian Streams Research Journal
258/34 Raviwar Peth Solapur-413005,Maharashtra
Contact-9595359435
E-Mail-ayisrj@yahoo.in/ayisrj2011@gmail.com
Website : www.isrj.org