

TITLE: TO IMPROVE PRODUCTIVITY OF PRODUCTION PROCESS**ATHARVA BHAVE, P.K. KALE**¹Production engineer, ²Assistant professor, VIT Pune
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Abstract— In this paper we have improved productivity of plant by changing plants layout. First of all for improving productivity of plant various tools and techniques were studied like Continuous improvement process, lean management, layout improvement, cycle time etc. Then we examined present layout of plant by calculating cycle time of operations and number of parts produced. It is observed that it is getting stuck at fettling stage and thereby increasing cycle time of manufacturing. Then concepts of CIP were applied for plant layout improvement. We proposed new layout and also restrained movements of worker and again calculated cycle time and number of parts produces per hour. Tremendous improvement in plants productivity has been observed. Overall improvement was around 25 %.

Keywords— Plant Layout, Continuous Improvement Process, Cycle Time.

I. INTRODUCTION

CIP mean continuous improvement process which is ongoing efforts to improve process, services, and products. This improvement can be over time or breakthrough improvements at once. Following diagram shows wheel of improvement.

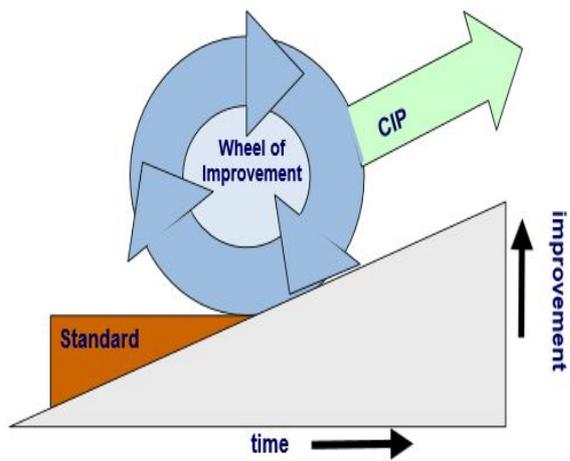


Fig.1 Wheel of improvement

Broader definition of CIP defined as gradual never ending process.

Layout can be of different types as in process layout, computer graphics layout, and automobile layout. Basically layout means the way in which parts or process of something are arranged or laid out. For designing factory layout we have to consider different aspects like ease of future expansion, flow of movements, material handling, output needs. There are different output needs we have to consider in designing layout like space utilization, shipping and receiving, safety and promotional value.

Cycle time is the total time from beginning to end of process which includes actual manufacturing of product, waiting time.

If you're moving your manufacturing operation or running up against capacity constraints, your

company has a perfect opportunity to benefit from improved plant layout using the principles of lean flow.

We can sometimes fall prey to a series of bad habits, leaving equipment and inventory where they are because it's convenient – yet not efficient. This is a trap we can fall into and also be blind to without some outside perspective. We probably spend a good amount of time working on improving your production processes. But chances are that we haven't applied that same discipline to improving the physical space that houses your operations, perhaps since you last moved

Value stream mapping is a lean-management method for analyzing the current state and designing a future state for the series of events that take a product or service from its beginning through to the customer. At Toyota, it is known as "material and information flow mapping".

II. PROCESS FLOW

- Melting of raw material in furnace.
- Casting of part using Die
- Cooling of part using normal fan
- Cutting of runners and risers
- Sand core removal
- Removal of feeders and excess material using sanders
- Finishing on parting line by filing
- Inspection and filling bag
- Packing for further process

III. PREVIOUS LAYOUT OF FLOOR

CH- Charge
F 02/ F 01- Furnace
C1/C2- Cutting machine (Band saw)
S1/S2/S3/S4- Belt Sanders
D1/D2- Drilling Machine
Total Distance travelled is 203 feet or 60.96meter

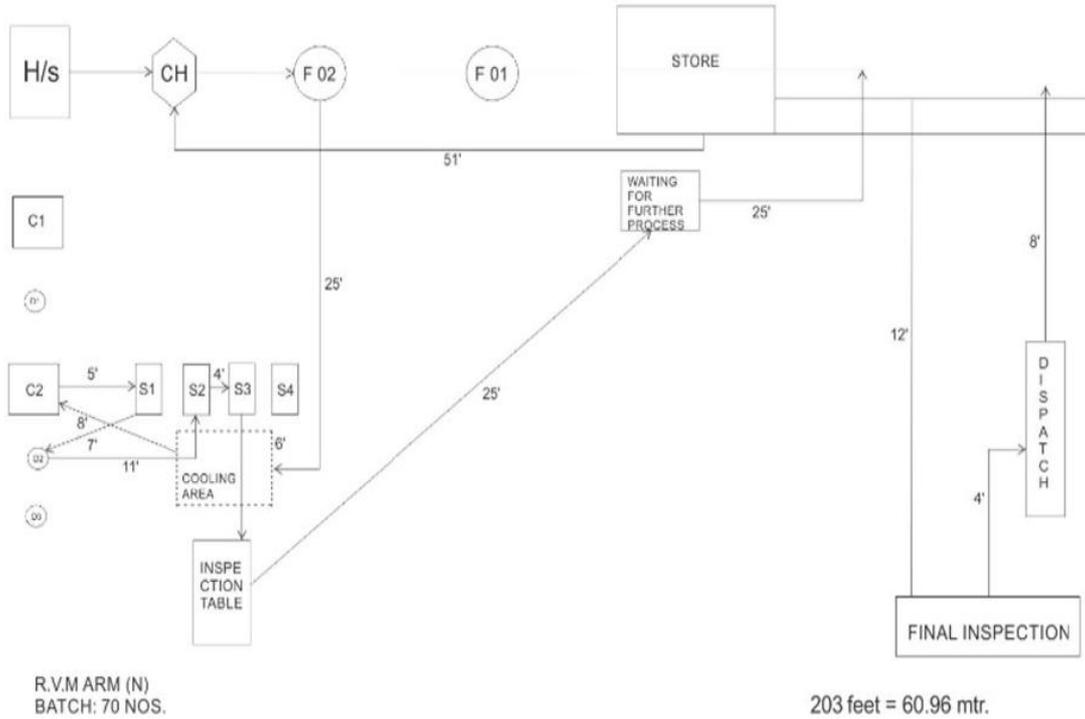


Fig.2 Previous layout

IV. CHANGED LAYOUT

S1/S2/S3/S4- Belt Sanders
D1/D2- Drilling Machine

CH- Charge
F 02/ F 01- Furnace
C1/C2- Cutting machine (Band saw)

Total Distance travelled is 181 feet or 54.35 meter

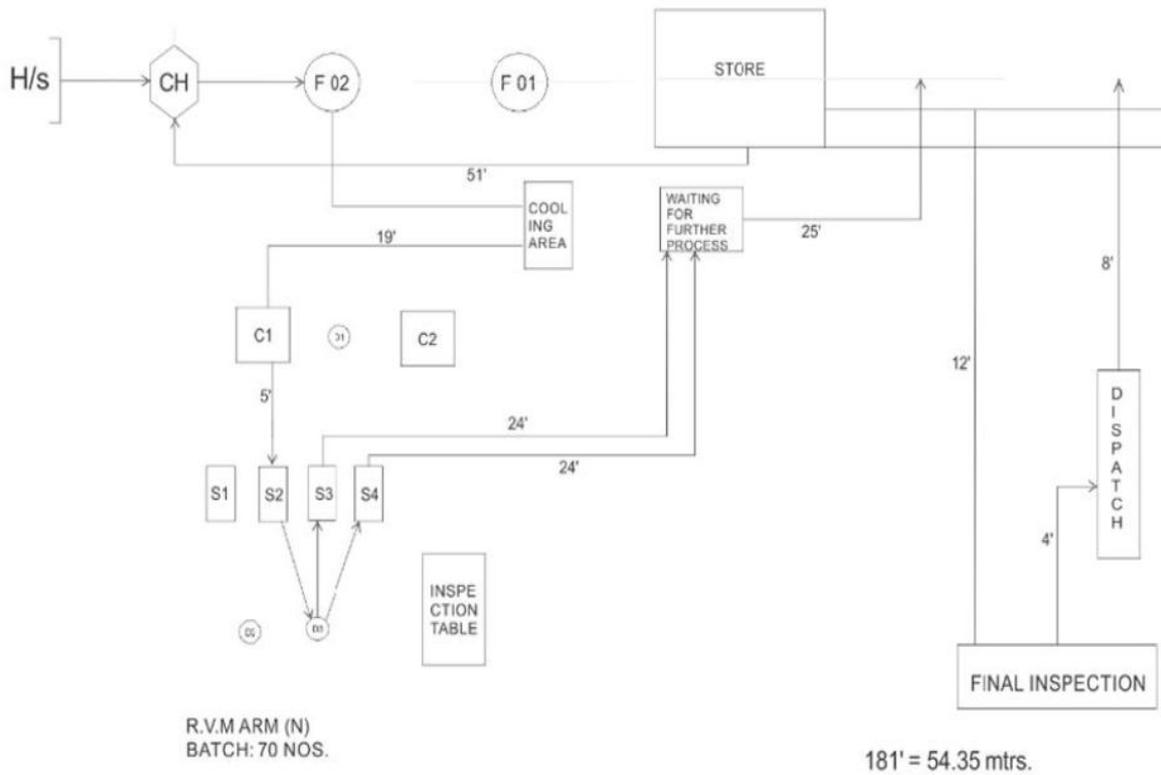


Fig. 3 changed plant layout

Table 1: Observation after plant layout improvement

Operation	Observation Table					
	Charge No.					
	1	2	3	4	5	Avg.
Issue Of Material	7	5	5	5	5	5
Melting	213	91	105	105	113	125
Casting ID, 2M	88	89	100	90	99	93
Cooling	178	127	137	161	497(65)	142
Cutting	101	91	85	80	500	171
Sand Removal	115	88	94	80	605	196
Sanders	80	80	108	95	617	196
Filling, Inspection & Filling bags	93	64	127	94	617	199
Packing For Further Process	93	63	127	93	617(29)	94
Production	Total Casting Produced: 406 Total Rejection: 2Nos.					

V. FINAL OBSERVATION

Table2
Comparison between before and after plant layout

SR. NO.	Casting Name	Improve. Criteria	Before	After	Improve. %.
1	J.D.MANI FOLD	Casting Production/2 shifts	350	406	16
		Casting Fettleing Completion/2 Shift	225	360	60
2	M&M MANIFOLD	Casting Production/2 shifts	275	326	18.55
		Casting Fettleing Completion/2 Shift	225	280	24.45
3	R.V.M.AR M.NEW	Casting Production/2 shifts	325	420	29.3
		Casting Fettleing Completion/2 Shift	225	345	53.34
4	ALL CASTING	Cooling Time...AVG in minutes	148	112	24.34
		Total Distance Travelled	203	181	10.84

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CYCLE TIME CAN BE CALCULATED AS PLANT WORKS IN TWO SHIFTS OF EIGHT HOURS AND NUMBER OF PARTS MANUFACTURED IS KNOWN

CONCLUSION

We improved productivity of plant by changing layout. It has been observed that percentage change was around 25% on an average. Project of improving productivity of plant was successfully completed but as company is practicing lean management methodology, according to concept of CIP we will continuously work on company's plant layout.

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