



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 Issue: VI Month of publication: June 2017

DOI:

www.ijraset.com

Call:  08813907089

E-mail ID: ijraset@gmail.com

Design and Development of Simulation Model for Plant Layout

Mahesh R. Korde¹, Dr. Achal Shahare², Dr. A. R. Sahu³

^{1, 2, 3} Mechanical Department, RTMNU, India

Abstract: *The objective of this work is to research the attainable enhancements within the blanking plant layout that manufactures automotive elements. For this the systematic layout coming up with theory (SLP) is employed. during this study, wiper pivot plate producing method was studied. The elaborated study of the plant layout includes, operation method simulation in flexsim package has been investigated. The new plant layout was designed and simulated on flexsim to check results mentioned below. Compared with this plant layout, the new plant layout considerably diminished the gap of fabric flow, that has direct result on material cost, work force management and Production per day / Shift.*

Keywords: *Flexsim, Roller, systematic layout planning, wiper pivot plate*

I. INTRODUCTION

The production method now a day has to be equipped with the flexibility to own lower price with higher effectiveness. The plant layout is a method to scale back the value of producing and increase the productivity. Additionally, to will increase smart advancement in production route. Efforts area unit created to scale back the motion waste within the work. A poorly designed method leads to overuse of producing resources (men and machines). There aren't any good processes in producing. Generally, method enhancements area unit created frequently with new efficiencies embedded inside the method. Continuous method improvement could be a important part of Lean manufacturing.

The layout of the plant plays very important role for the economical operating of the system. To satisfy the various half families it's terribly troublesome to own common layout which might satisfy the necessity. Therefore, reach sure purpose wherever most would like ought to be glad by the layout for effective operating. For this Systematic Layout coming up with (SLP) plays terribly very important role, clearly showing the link among the accessible machines and to shows the work flow the alimentary paste diagram is most useful. From this background and technical analysis for practicability for potential layout resolution is noticed and changes were created at the plant.

Tools accustomed do optimisation were AutoCAD for layout drafting in step with actual scale. The plant overall dimensions and machines dimensions were measured and premeditated in AutoCAD. This AutoCAD drawing was accustomed simulate the present layout in flexsim. with the assistance of SLP technique the relation chart was ready and analyzed with constraints. These relations were accustomed plot the new layout in AutoCAD and therefore the new layout was derived. This new layout was once more simulated in flex sim to check results.

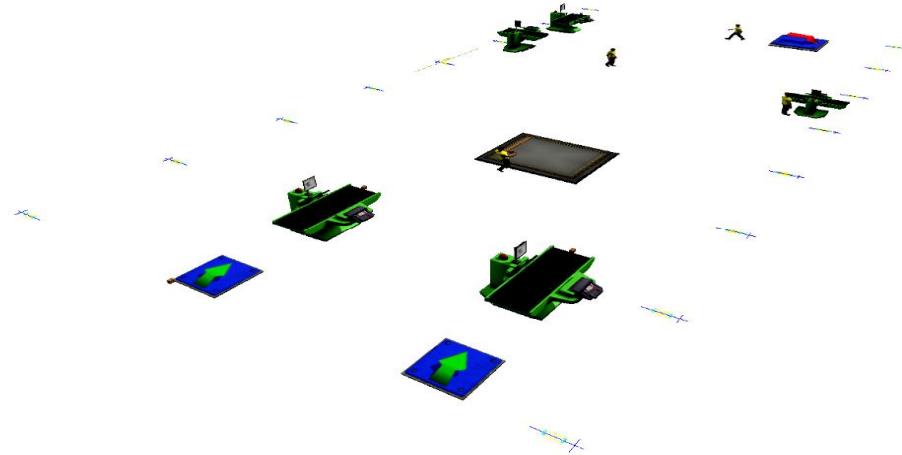
II. FLEXSIM

FlexSim may be a true object familiarised simulation package for producing, material handling, deposit, and flow processes marketed by FlexSim code product (Orem, Utah). A model is built by dragging and dropping "objects" into the "Model View" then written material their parameters victimization dialog boxes. FlexSim will model a large sort of producing configurations, since existing objects is totally customized spoken to fulfill specific necessities. These bespoke objects will then be placed within the library for apply in current or future modeling applications. A model may have an infinite range of levels of hierarchy and use all aspects of object-oriented technology.

FlexSim provides three-dimensional, prospective-projection model building and animation by default; but, the user has the choice to change to associate degree writing read or show each views at the same time. Material-handling devices on the market in FlexSim embody conveyors (transport and accumulating), self-propelled vehicle trucks, AGVS, AS/RS, cranes, elevators, robots, and operators. FlexSim provides preempting and process{data processing} for capturing details of product movement and processing. The FlexSim code includes a price model that permits one to account for the profit for every half made and additionally for the prices related to machines, labor, work-in-process, etc. There area unit an infinite range of random-number streams on the market in FlexSim. what is more, the user has access to 24 commonplace theoretical likelihood distributions and additionally to empirical distributions. The time to failure of a machine is supported busy time, calendar time, or a user-defined event. there's associate degree

International Journal for Research in Applied Science & Engineering Technology (IJRASET)

“Experimenter” that may be wont to mechanically create freelance replications for every of variety of various eventualities, and to get purpose estimates and confidence intervals for performance measures of interest. what is more, the replications is at the same time dead across multiple processor cores. variety of plots area unit on the market, together with time plots, histograms, bar charts, pie charts, and Gantt charts.



III. TECHNIQUES

SLP technique is suitably used for the format fashion at glorious Blanking plant. None of the less SLP or any technique to search out the layout of a plant isn't correct, as a result of in real check up on the case at plant is notably distinctive. For this reason take the assistance of SLP system to hunt out the theoretical layouts and use those outcomes at actual site. In step with in operation conditions and constraints the required changes are essential within the format.

The scope of this analysis is to search out manageable upgrades in existing plant, and to use Systematic format planning (SLP) technique to search out optimized format. And compare the results practice flexsim software package program system.1.2PIRSensor:

The systematic layout coming up with (SLP) could be a tool wont to organize a work in an exceedingly plant by locating areas with high frequency and logical relationships near one another. [1] the method permits the fastest material flow in process the merchandise at all-time low price and smallest amount of handling.

A. *The primary purpose of any plant layout is to facilitate the producing process. Further objectives include:*

- 1) Minimizing material handling, especially travel distance and time
- 2) Maintaining flexibility of arrangement and operation as needs change
- 3) Promoting high turnover of work-in-process – keeping it moving
- 4) Holding down investment in equipment
- 5) Making economical use of floor space
- 6) Promoting effective utilization of labour
- 7) Providing for employees' safety, comfort and convenience

Layouts for distribution centers, offices, laboratories, and facilities of every kind share many of those objectives despite the fact that their processes are quite completely different. The aim of layout designing is kind of merely to realize the objectives on top of. Its worth and necessity is clear once fixing a replacement facility. Over the facility's life, layout designing remains essential. Rearranging within the absence of a sound arrange, will, in much each case, end in lost time, idle instrumentality, and disruption of personnel. additionally, it's going to well result in serious blunders within the use of a company's obtainable land, in pricey re-arrangements, in really leveling buildings, walls, or major structures that are still usable however that afterwards prove to be

International Journal for Research in Applied Science & Engineering Technology (IJRASET)

roadblocks to potency and affordable operation. to a small degree time spent in designing the arrangement before it's put in will forestall such losses. Moreover, it permits the mixing of consequent moves and rearrangements into a logical overall program. designing makes facilities arrangements associate in nursing orderly logical sequence. Layout designing pays off: Clearly, it's abundant easier to maneuver templates or replicas of facilities and instrumentality around on a bit of paper or monitor than it's to maneuver the particular buildings, machinery, or instrumentality around. "Mistakes" caught during this means buy themselves if they avoid mistakes within the physical installation. really from Associate in Nursing installation stance, it's concerning as cheap to place in a very sensible layout on put in a very poor one – oftentimes abundant less costly. However, once a poor layout is put in, the price of rearranging, disrupting production, and fighting your means through a replacement money appropriation compel creation it into an honest layout.

IV. RESULT AND CONCLUSION

A. Tools Used

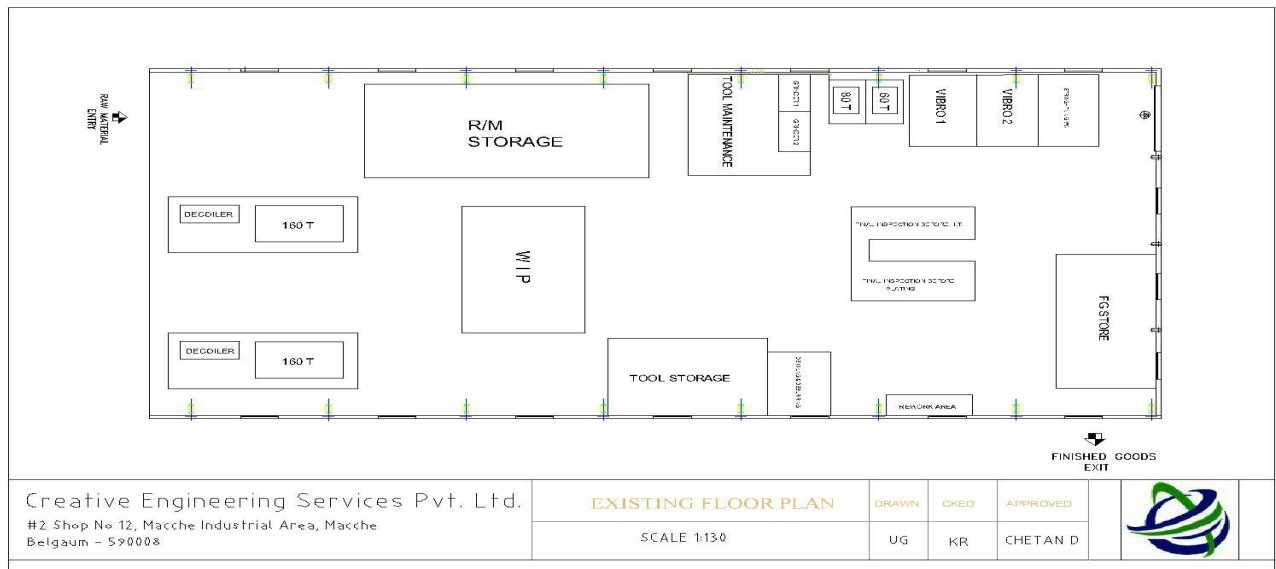


Fig.1. Showing Existing Layout

Tools wont to do improvement were AutoCAD for layout drafting in line with actual scale. The plant overall dimensions and machines dimensions were measured and premeditated in AutoCAD. This AutoCAD drawing was used to come up with the spaghetti diagram or string diagram, that shows the schematic flow of material in plant. From this the entire distance affected by the merchandise in its production section was calculated. Now, with the assistance of SLP technique [1] the relation chart was ready and analyzed with constraints mentioned above. These relations were wanted to plot the new layout in AutoCAD and also the new layout was derived.

In existing layout the net production output was (Simulated) 6 Pallets.

B. Systematic Layout Planning

The best way to improve the plant is to apply SLP method to make the work flow continually by arranging the important sequence of the manufacturing. The relationship of each activity in closeness was considered to make the relationship of each activity.

The closeness indexes are defined as:

A = absolutely close

E = especially important

International Journal for Research in Applied Science & Engineering Technology (IJRASET)

I = important
 O= ordinary closeness
 U= unimportant

Based on this the relation, chart was plot for each process to another process as shown in figure



Fig.2: SLP Matrix Showing Closeness of Important Elements of Plant

The relation chart clearly shows the closeness relation between the process and the important elements of the plant. According to relation chart the raw material storage and fine blanking press must be as near as possible, but in current layout vibro Machines are much far from WIP. So these sorts of deficiencies were identified in the plant post analysis. Keeping in mind the constraints the plant resources and facilities were re allocated. It can be seen clearly. The figure below shows the improved layout.

International Journal for Research in Applied Science & Engineering Technology (IJRASET)



Fig.3: New Layout

This new layout was simulated in flexsim for results.

V. ACKNOWLEDGMENT

First and foremost we would like to thank Prof. A. R. SAHU (Guide) for their indispensable support, priceless suggestions, and valuable time and for giving us this opportunity to present this review. Finally, we would like to thank our faculty members, friends and family for being supportive to us, without whom this review would not have been possible. Every work is an outcome of full-proof planning, continuous hard work and organising efforts.

REFERENCES

- [1] Hari prasad.na, rajyalakshmi.gb, sreenivasulu reddy, “a typical manufacturing plant layout design using craftalgorithm” 12th global congress on manufacturing and management, gcmm 2014, (2014) 1808 – 1814
- [2] J g barberena*, a mutuberria larrayoza, m sánchez, a bernardosa, “state-of-the-art of heliostat field layout algorithms and their comparison”, africa-eu renewable energy research and innovation symposium, reris 2016, 8-10 march 2016, tlemcen, algeria (2016) 31 – 38
- [3] Yosra ojaghia, alireza khademia, noordin mohd yusofa, nafiseh ghorbani renaia, syed ahmad helmi bin syed hassana, “production layout optimization for small and medium scale food industry” 12th global conference on sustainable manufacturing, procedia cirp 26 (2015) 247 – 251
- [4] David gyulaia,b, a da’ m szallerb, zolt ja’ nos viharosa,c, “simulation-based flexible layout planning considering stochastic effects”, 49th cirp conference on manufacturing systems (cirp-cms 2016), procedia cirp 57 (2016) 177 – 182
- [5] Jose antonio diego-mas a, *, rocio poveda-bautista b, diana garzon-leal c, “using rgb-d sensors and evolutionary algorithms for the optimization of workstation layouts” applied ergonomics 2017
- [6] Miguel f. Anjosa,1, manuel v.c. Vieirab,2, “mathematical optimization approaches for facility layout problems: the state-of-the-art and future research directions” european journal of operational research 2017\
- [7] Ibrahim abotaleb, khaled nassar, ossama hosny, “layout optimization of construction site facilities with dynamic free form geometric representations” automation in construction 2016
- [8] Douglas thiago s. Alves a*, jose luiz de medeiros b, ofelia de queiroz f. Araújo c, “optimal determination of chemical plant layout via minimization of risk to general public using monte carlo and simulated annealing techniques”, journal of loss prevention in the process industries 2016
- [9] Ipek gürsel dino, “an evolutionary approach for 3d architectural space layout design exploration”, automation in construction 2016.
- [10] Chandra ade irawan a , *, xiang song a , dylan jones a , negar akbari b , “layout optimisation for an installation port of an offshore wind farm”, european journal of operational research 0 0 0 (2016) 1–17.



10.22214/IJRASET



45.98



IMPACT FACTOR:
7.129



IMPACT FACTOR:
7.429



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24*7 Support on Whatsapp)