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Improvement in Productivity by Lean Approach Method in Amararaja Industries

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ABSTRACT

To survive in the market, the goal of any manufacturing industry is to produce goods at the lowest time and lowest cost possible. To attain this lean approach improves productivity systems by manufacturing without wastes. The purpose of this project work is to improve production system in assembly section and finishing section at the Amara raja batteries, Tirupathi. In the finishing section the cycle time is reduced from 103 sec to 68 sec and production rates is increased from 245 skids/shift to 371 skids/shift. The fatigue of workers also reduced by adapting belt conveyor system.

KEYWORDS: *Lean approach, RPW method, Assembly section, finishing section*

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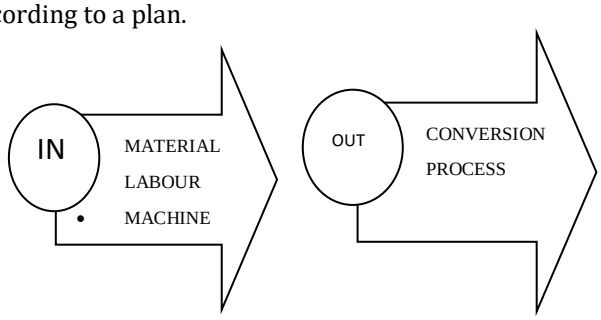
INTRODUCTION

Production is the sequence of operations which transform the given materials into desired products. This transformation from one form to another is carried out either by one or a combination of different manufacturing processes. A system is a logical arrangement of components (physical and conceptual) designed to achieve objectives according to a plan.



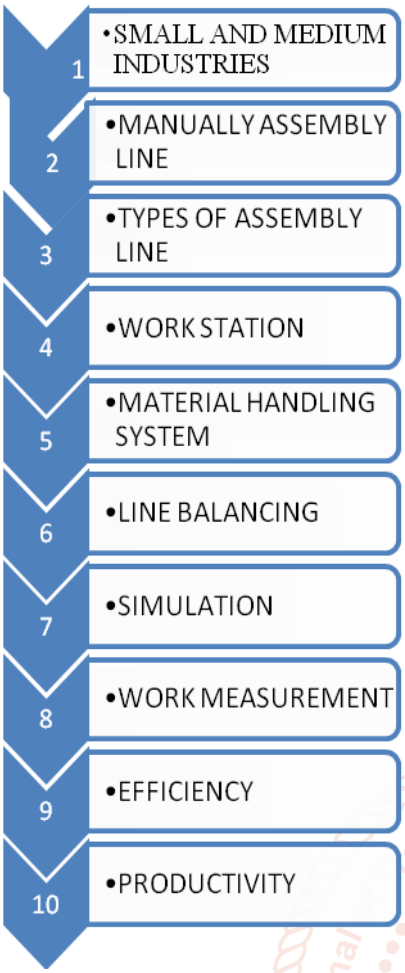
A production system is the framework within which the conversion of input into output occurs. At the one end of the production system are the inputs and the other end outputs. Inputs and outputs are linked by certain operations or processes which impart value to the inputs and are called transformation process.

Objective of the project:

To improve production system in SBD assembly section at AMARA RAJA BATTERIES Ltd, Tirupathi by applying lean manufacturing technique. Lean manufacturing mean manufacturing without wastes. In the assembly section the cycle time is reduced from 15.00 sec/battery to 12.50 sec/battery and production rate is increased 1680 batteries/shift to 2018 batteries/shift.

LINE BALENCING

Chapter is to explore and gathered all information in order to understand clearly about the balancing. The information is come from reference books, journals and thesis. The structure of this chapter is show in the fig. these sections are mainly concern about related knowledge about line balancing. Small and medium industries becoming the selected area then the scope is narrow down from manually assembly line through down until last part in productivity.



Lean approach method

Inspired from the Japanese management methods, and more specifically, the Toyota Production System, the LEAN approach is intended to have the enterprise think first and foremost about maximizing the value that its products and services can bring to the client.

Six sigma is one of the lean approach method to increase the production rate of plant.

Six sigma:

Six sigma at many organizations simply means a measure of quality that strives for near perfection.

Six sigma is a disciplined data driven approach and methodology for eliminating defects from manufacturing to transactional and from product to services.

Six sigma aims to deliver "breakthrough performance improvement" from current level in business and customer relevant operational and performance measures.

Six sigma black belt method is one of the operational methodologies in six sigma. This process is used in to improve the productivity SBD assembly section in Amara raja batteries limited.

Six sigma black belt will provide the valuable skills used to tackle the toughest problem confronting the organization.

The black belt methodology composed of five phases each bear the acronyms DMAIC and DMADV.

RANKED POSITIONAL WEIGHT METHOD:

Ranked positional weight method (RPW) was introduced by Helgeson and Bernie in 1961, which it's value to be computed for each element in the system. The RPWfor each T_{eK} and its position on the raw chain in the precedent diagram. T_{eK} is a time to perform work element k, minute and hence thes values of T_{ek} are additives.

The ranked positional weight method used and computed for each element. The method accounted for T_{eK} value and its position in the precedence diagram. The RPW_k is calculated by summing T_{eK} and the other times for elements that follow T_{eK} in the arrow chain of the precedence diagram table. Assignment of elements to stations proceeds with the solution is shown in figure. The idle time was determined to be zero second for station 2 with 1, 5 and 3 seconds for stations 1, 3 and 4 respectively, in this case, station 2 is the bottleneck station.

WORK ELEMENTS ARRANGED ACCORDING TO T_{Ek} VALUES FOR THE RPW WORKSTATIONS:

Sequence of operation	Name of activity	Function
1	Cell insertion	To be insert in to Rack
2	OCV checking	To know the OCV of the cell
3	Resin pouring	Resin -for Know positive And negative terminal
4	Apply methanol	Lubricant for Hardware
5	Putting hardware	Hardware fixing
6	Fixing hardware	Hardware removing
7	Hardware removal	Remove hardware
8	Cleaning with thinner	For Cleaning
9	Number punching activity	Final punching -what is the code represents
10	Traceability	What is updating in traceability
11	CR plate	Supporting frame for the cell
12	Hardware Fixing-CR plate	Hardware fixing
13	Tightened-CR plate	Tightening
14	Moved to dispatch	

The total time for producing one battery is 1680/60=28 mins

Assembly section Result

Shift Time	480	Min
Lunch time	45	Min
Tea time	15	Min
Actual available time	420	Min
No of components produced per shift	1680	Batteries
No of persons used per shift	01	Person
cycle time per Battery	15	Sec
Productivity	4	Batteries/Mint
proposed System:		
No of components produced per shift	2028	Units
No of components produced extra	348	comp/shift
Cycle time per battery	12.42	Sec
Productivity	4.83	Batteries/Mint

Productivity matrix

S. No	Description	Present	Proposed	Savings	UOM
1	Manpower	20	11	9	No of persons
2	Movement	17885	5390	12495	No of meters/shift
3	Equipment	2	0	2	Fork lift

CONCLUSIONS

In assembly section the proposed system is developed by Six Sigma Method. The cycle time is very much reduced. So, the productivity of the assembly section is increased.

In finishing section, the proposed Layout is developed by RPW Method. The cycle time is very much reduced. The no of workers required are also reduced per shift. The fatigue of workers is also reduced by adopting conveyor for material handling.

By adopting both proposed assembly section and proposed finishing section the productivity of the organization will be increased. The company can get more profit if assembly section and finishing sections are modified.

In assembly section the savings may be around 15 Lakhs per year and in finishing section the savings may be around 35 Lakhs per year. The total savings may be around 50 Lakhs per year.

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