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A Study on Process Improvement in the Assembly Line of Switch Manufacturing

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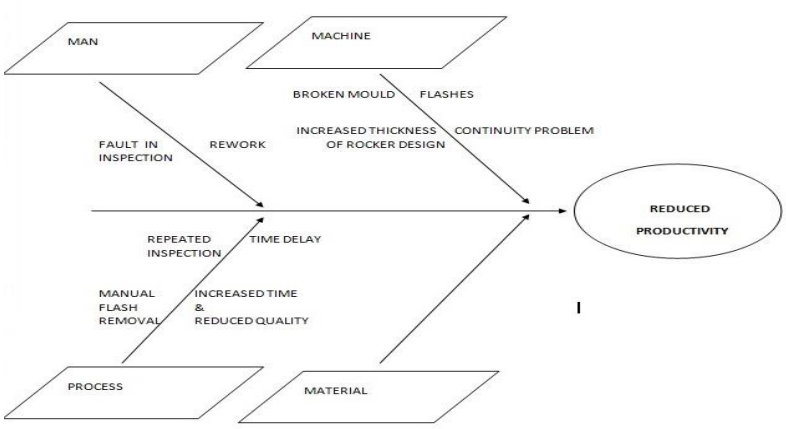
ABSTRACT
The paper is about the process improvement in the assembly line at switch manufacturing company and to improve the process by focusing into the areas viz. Process flow, Time study and rework minimization. This improvement are made by using cause-and-effect diagram, critical path method and root cause analysis. The analysis will help to reduce the amount of rework that occurs during manufacturing of modular switches in the assembly line process.

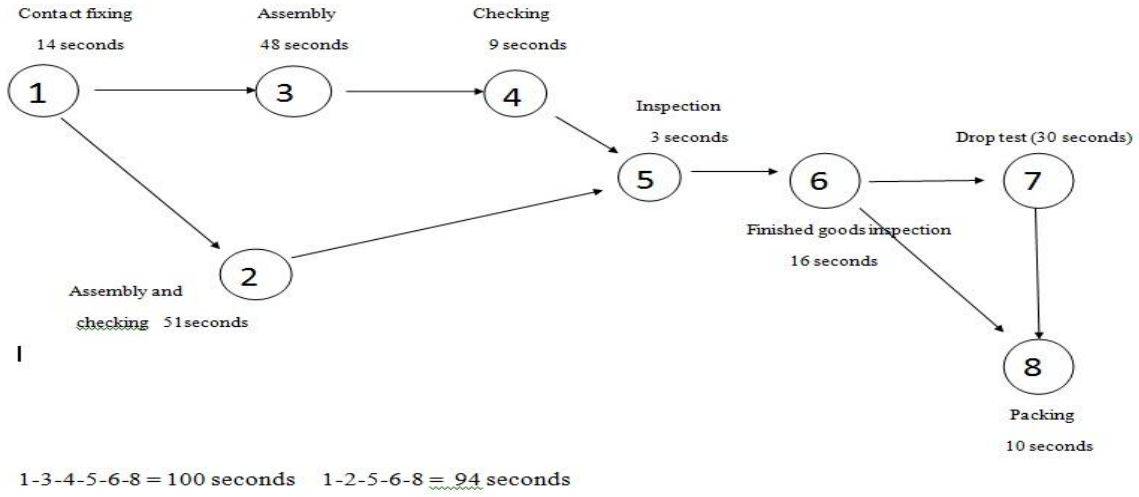
I. Introduction

Ishikawa diagrams (also called **fishbone diagrams**, **cause-and-effect diagrams**) are causal diagrams created by Kaoru Ishikawa (1968) that show the causes of a specific event. Common uses of the Ishikawa diagram are product design and quality defect prevention, to identify potential factors causing an overall effect. Each cause or reason for imperfection is a source of variation. Causes are usually grouped into major categories to identify these sources of variation.



II. Critical Path Method

CPM is commonly used with all forms of projects, including construction, aerospace and defense, software development, research projects, product development, engineering, and plant maintenance, among others. Any project with interdependent activities can apply this method of mathematical analysis. Although the original CPM program and approach is no longer used, the term is generally applied to any approach used to analyze a project network logic diagram.



1-3-4-5-6-8 = 100 seconds 1-2-5-6-8 = 94 seconds

III. Root Cause Analysis

Root cause analysis (RCA) is a method of problem solving used for identifying the root causes of faults or problems. A factor is considered a root cause if removal thereof from the problem fault-sequence prevents the final undesirable event from recurring; whereas a causal factor is one that affects an event's outcome.

Simulation after changing the mould for cavity 8 and rocker middle line:

The below is the simulation of the change in the amount of time taken for the completion of a unit from the assembly unit.

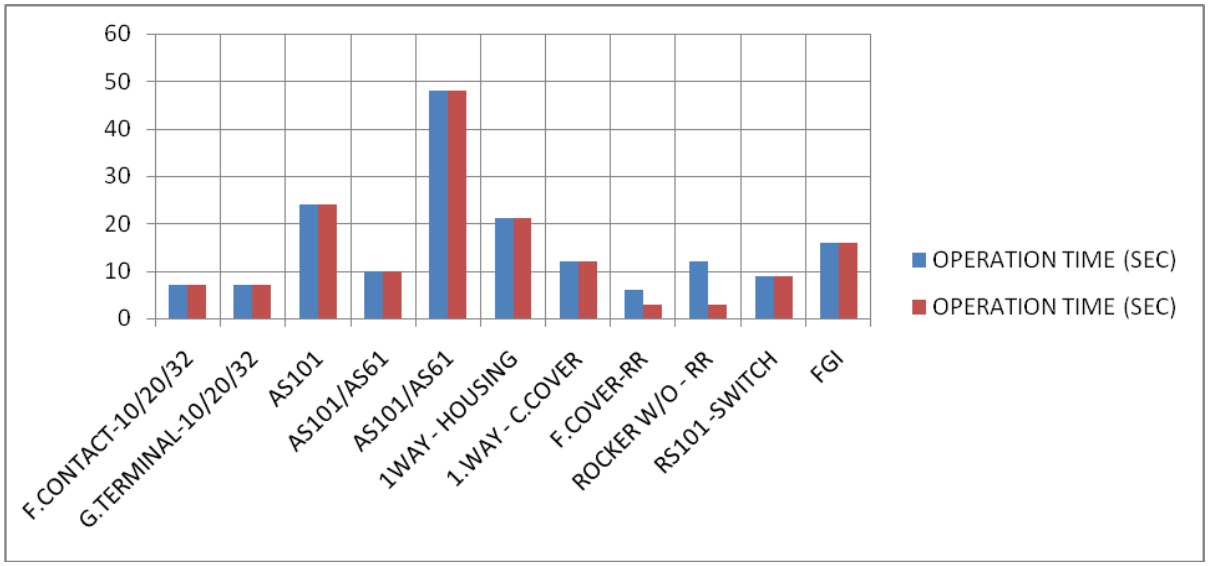
The amount of time taken to scrape the middle line of the rocker could be reduced to 2 seconds from 12 seconds.

The amount of time taken to de flash the flash cover would be reduced to 3 seconds.

Results after Simulation

U3 - Modular Assembly Norms Details				
				Per Qty
Sl. No.	**Job Description**	**Operation Type**	**Norms Qty/Hr**	**Opn.Time In Sec.**
1	Screws Fixing	F.Contact-10/20/32	550	7
	Screws Fixing	G.Terminal-10/20/32	550	7
2	Contact Assly	AS101	150	24
3	Contact Cover Fixing	AS101/As61	350	10
4	Final Assly	AS101/As61	75	48
5	Deburring	One-way Housing	175	21
6	Deburring	One-way Cover	300	12
7	Deburring	Front Cover-Rr	600	3
8	Panel Checking	Rocker W/O - Rr	300	3
9	Panel Checking	RS101 -Switch	400	9
10	FGI	FGI	220	16

COMPARISON BETWEEN ACTUAL AND SIMULATED PROCESS



Total amount of time taken in the initial process is 172 seconds
The amount of time reduced is 12 seconds
The amount of time consumed in the new process is 160 seconds
The % of change is 6.97%

IV. Conclusion

By changing the mould for the flash cover, the time taken for rework can be reduced from 9.09% to 4.54%. By following the critical path, 6% of time consumed can be reduced for every unit produced, this will increase the production from 5500 to 5830 units each day. The process time of deburring can be reduced by 6.97% if the rocker design is modified.

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