

Analysis Printing Machine Defect Using Quality Tools

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Abstract - Web offset printing machine is use for high-volume printing of books, magazines, news papers and brochures etc. The main objective of this study is analysis of Web Offset Printing Machine defect using quality tools. Web offset printing machine having many different types of defects. The defects are analysis by using Pareto chart and Cause effect diagram. The failure data of machine is collected from log book and analyze defects using Why Why analysis. Why-why analysis suggestions action plan is implemented to machine. This is useful for reduce the defects of web offset printing machine and avoid the breakdown improve the availability.

Key Words: Defects, Pareto Analysis, Root Cause, why-why analysis.

1. INTRODUCTION

The news paper manufacturing industry aims at meeting the customer adds and high-precision colour picture to publish with good quality printing is required by customer. Printing press target is to delivery news paper market in morning time. The quality of the product is achieved by minimization defect and reduces down time. In many cases, the failures occur during the processing and some defects that can be found in newspaper quality. In night shift working is consider for the analysis of identification of quality and productivity of web offset printing Machine. To reduce the defects rate by tracking the root causes and by providing suggestion. Quality tools are used for achieve the objectives. The Log book failure data is collected and analyze frequency of defects by using Pareto chart. The root cause is identified with help to Cause and effect diagram and why-why analysis is use for the suggestion action plan.

2. LITERATURE SURVEY

The section highlights on different research work in area of printing press. These researches are use different techniques and tools for reduction of defects. Hasan et al. (2018) analyze the defects in production lines of crackers manufacturing company. Sandra Helena et al. (2016) using the quality tools for process analysis in a textile factory checking the contribution to the quality. Makoto et al. (2016) describe the systematic workflow from designing, procurement, manufacturing, and acceptance inspections to the delivery of machines, which contributes to improvement of machine quality. Ashwini (2015) examine the process going on in the production line, to reduce the rejection rate by tracking the root causes and by providing suggestion using check sheet, Pareto chart, cause and effect diagram and control charts. Kirit Singh and Avinash (2016) implementing the Root cause analysis to diminish the product defects within a Gloves manufacturing unit. Heena and Suri (2017) apply quality control tools in production process to reducing the rejection and rework by identifying where highest rejection occur at and to go give suggestions for improvement. Some of tools and techniques used to achieve the objectives were check sheet, Pareto chart, cause and effect diagram and control charts.

3. METHODOLOGY

3.1 Data collected and Data Analysis

In news paper production web offset machine different defect occurrence running machine they solve problem night shift maintains team to avoid down time they give feed back related problem day shift different problem written day shift problem sheet. The study collect data from Logbook of web offset printing machine "DB CORP LTD."

Table -1: Types of Defects and Their Effects.

Defects And Their Effects			
Defect Type	Production Effects	No Of Failures	Cumulative %
Plate tear(A)	CTP (Aluminum) Plate Are Crack Due To Mark On Paper	16	21.9%

Zero setting(B)	Make Ink Key Not Proper Set.	12	38.4%
Solid problem (C)	Make Word In Dark And Also Also Image Also Dark The Affect In Quality Newspaper	10	52.1%
Blanket/packing(D)	Image Or Colour Not Transfer The Paper Affect In Quality Newspaper.	9	64.4%
Doubling (E)	Make Word And Images Repeat Not Proper And Quality Of Gay Bar Is Affect	8	75.3%
Pneumatic Leakage.(F)	Due To Environmental Change And Various Problems Like Seal Kit ,Air Leakage Elbows Etc	8	86.3%
Impression Seating(G)	Registration Problem And Also Plate Tear Problems.	5	93.2%
Gear Failure, Rig(H)	Machine Tower Problem To Next Shift Tower Paper Pages,Colour Not Match Due To Registration Problem	3	97.3%
Belt,Timer pulley Belt. (I)	Breakdown The Machine.	2	100.0%

Pareto is one of the most significant and valuable tool. It was at first evolved by Italian market analyst named Vilfredo Pareto.It consists of simple series of bar whose height indicated the impact of defect/problem. It is based on 20-80 rules. This shows that which of the 20% errors cause 80% defects. In Pareto chart is arranged in descending order and shows variables in graphical form. Pareto diagram in Figure1shows the information in graphical structure. The frequency of every defect is visible and its height shows the impact of every problem. After implementing 20-80 rule on the Pareto chart it shows three problems Data.

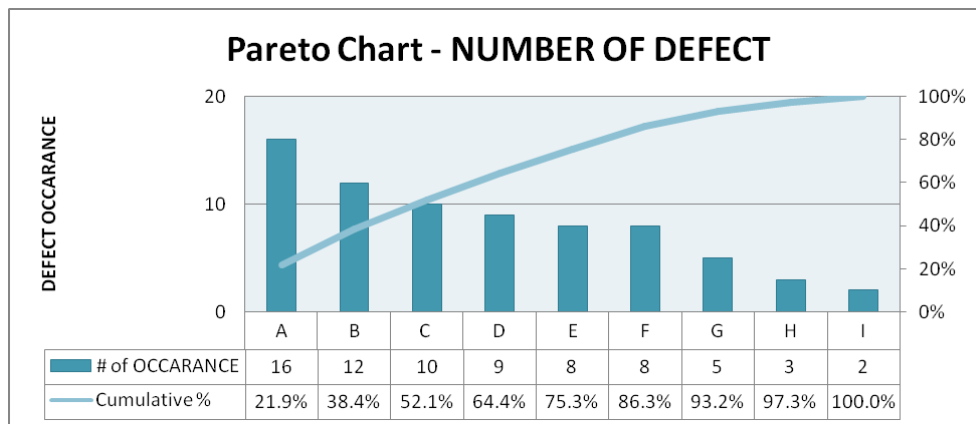


Chart -1: Pareto analysis of Web printing Machine defects

3.2 Cause and effect diagram

Cause and Effect diagram are frequently arranged into four major’s categories. These classifications can be anything: Manpower, Methods, Materials and Machinery (measurement).

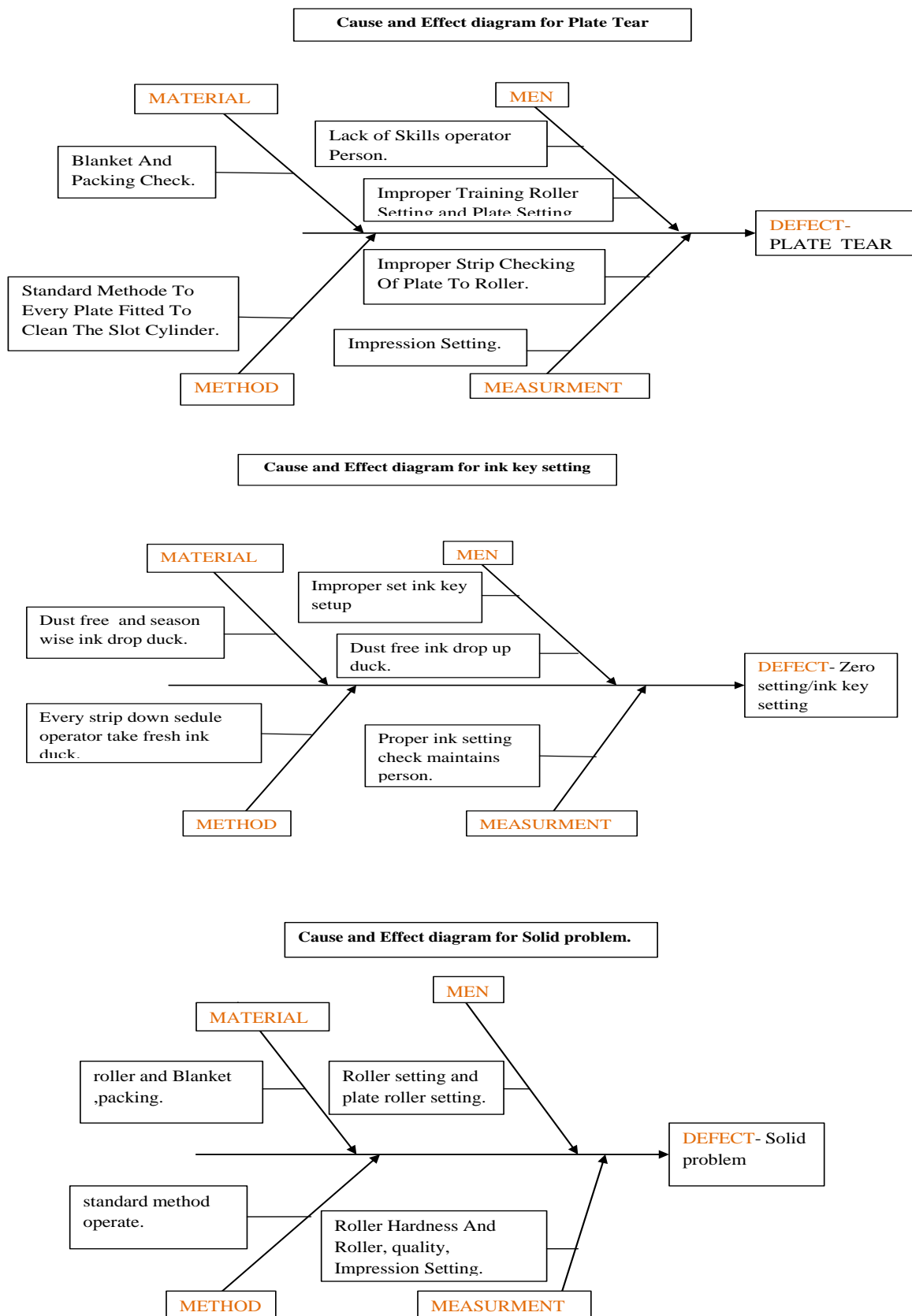


Figure 3 : Cause and Effect diagram

3.3 Why Why Analysis

Why-Why analysis is done in order to identify the root cause of the two major defects which was identified using Pareto chart. These “whys” were presented to concerned people in management and workers to obtain precise reasons behind the defects. At last all suggestion action plans to overcome these type of problems and lastly action taken solution of problems in machine to implement it.

Table 2: Why-Why Analysis with suggestion and action plan.

Why is that	Problem Statement - Plate tear 1. To increase pressure on plate due to setting problem. 2. Plate not proper fitted plate cylinder. 3. Material blanket, packing, roller. 4. Impression setting or impression cylinder problem. 5. Clanging of plate cylinder slot.
Type	Suggest and Action Plan for Plat tear.
Men (Operator)	Provide the Sufficient training to operator person. Provide maintains person machine setting instruction to avoid mistake
Machine (measurement)	Preventive strip down schedule Maintenance of every stack of machine to ensure machine is in good working condition and avoid breakdowns
Material	Roller And Blanket, Packing check proper.
Method	Standard Method To Every Plate Fitted To Clean The Slot Cylinder
Action:	To every preventive strip down schedule proper roller and plate setting and ensure proper fitting plate on slot of the cylinder. Proper checking on day blanket life.
Why is that?	Problem Statement – Ink key setting or zero setting. 1. To proper opening and closing ink key on printing. 2. Dust of duck and ink. 3. Season wise ink not use. 4. Key setting not proper. 5. Skills persons.
Type	Suggest Action Plan for defect ink zero setting.
Men (Operator)	Provide the Sufficient training to worker ink key opening during printing. Give each machine work guidance to specialist to stay away from mistake. Must have good attitude toward quality improvements so Dust free ink drop up duck
Machine	Proper ink setting check maintains person to zero to full ink key setting.
Material	New and season wise ink drop duck. Dust free ink drop on duck.
Method	Every strip down seduces operator take fresh ink duck.
Action:	Skills person on tower make printing opening and closing key. New and season wise ink drop on duck.
Why is that?	Problem Statement – solid problem. 1. Roller quality 2. Roller setting. 3. Blanket and packing. 4. Dust on roller.
Type	Suggestion and Action Plan for defect solid problem.
Men (Operator)	Provide the Sufficient training to worker Provide every machine work instruction to worker to avoid mistake
Machine	Roller diameter and Hardness and Roller Quality, Impression Setting proper measurement

(measurement)	tools used.
Material	Roller and Blanket, packing check parameter.
Method	Clan the blanket to every start up of machine.
Action:	Roller blanket and packing all suggestion kept on regularly day and night shift.
Other defect	Suggest Action Plan for defect
Blanket/packing	Blanket life packing & related parameter checking by day shift
Doubling	To avoid the doubling problem belt vibration, blanket tilting, brake setting all parameter check.
Pneumatic leakage.	To avoid the pneumatic leakage in environmental change so old pipe replace it and necessary to check on off cylinder all machine.
Impression seating.	Proper setting to blanket to blanket & blanket to plate. (Proper gauges use for setting.)
Gear failure, RIG	Preventive Maintenance of every Equipment to ensure machine is in good working condition and avoid breakdowns to calibration of motor and related parameter
Belt	Preventive Maintenance schedule every month.
Action	Preventive, Prediction Maintenance, Scheduled Maintenance kept regularly time.

4. Result and Discussion

The Most significant parameters affecting the quality of products includes speed, wastage of money, wastage paper, wastage of time delivery also importance. The plate tear are most occurring defect among other defects solid problem, Ink duck zero setting, doubling etc. The defect analysis after adopting the guidelines & the outcomes of the Why-Why analysis mentioned in the suggestion action plan to analysis next month daily log book data to minimizing related problem. The stepwise approach was developed implement on machine working condition so all minimizing defect to avoid the occurrence of all defects. But mainly focus on plate tear, ink key setting and solid problem to plan different setting adjustment to effective solution and implement regularly production department.

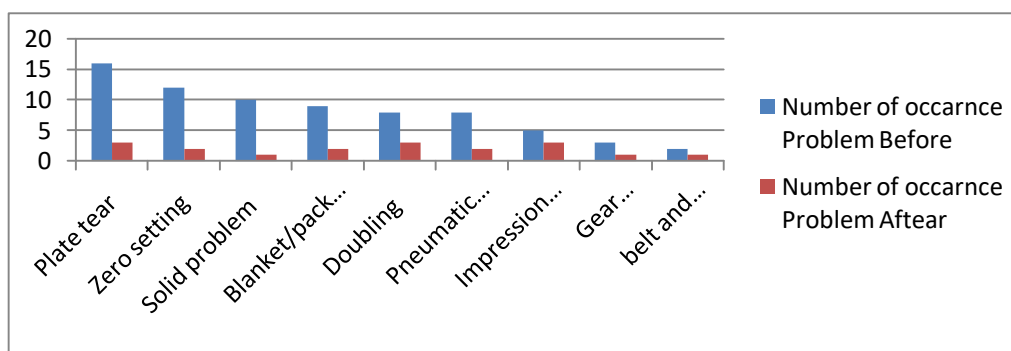


Figure 3: Comparison of defect web offset Machine before and after.

5.CONCLUSIONS

Quality prompts to improvement in productivity and it likewise upgrade the consumer satisfaction. Study has been conducted to implement quality control tools and techniques in Web offset Printing Machine. The fundamental objective of this investigation is to identify the defect and suggest a better solution to improve the production line performance. Pareto chart and Cause and effect diagram are utilized to identify and evaluate different defects and causes for these defects responsible for

rejection/rework of materials at different stages. Quality Control Tools could improve process performance by reducing product variability and improves production efficiency by decreasing scrap and rework.

ACKNOWLEDGEMENT

Authors acknowledge the support provided by "DB CORP LTD."

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