International Journal of Scientific Research in Science, Engineering and Technology
Print ISSN: 2395-1990 | Online ISSN : 2394-4099 (www.ijsrset.com)
doi : https://doi.org/10.32628/IJSRSET

Breakdown Eradication on Flexography Printing Process

Shaikh Jabbar Mohammad[1], Kashid Komal Rajendra[2], Ladkat-Patil.Akshada Dattatray[3], Prof. Divekar S.N.[4], Rajendra Joshi[5]

Student[1-3], Department of E&TC, Parikrama College of Engg. Kashti, Ahmednagar, Maharashtra, India
Head of Department[4], Department of E&TC, Parikrama college of Engg. Kashti, Ahmednagar, Maharashtra, India.
Maintenance Executive[5], Tetra Pak India Pvt Ltd.

Article Info
Volume 9, Issue 3

Page Number : 243-246

Publication Issue :
May-June-2022

Article History
Accepted : 10 May 2022
Published: 24 May 2022

ABSTRACT

This work is on the MTBF (Mean time between failure) improvement of a flexographic printing machine by reducing number of breakdowns with the help of a total productive maintenance tool called as 12 step kaizen methodology. The methodology is comprised of calculating MTBF (Mean time between failure) of the machine before and after identifying the causes of the problems. Printing process breakdown deployment is used to prioritize main problem areas and 12 step kaizen approach is used to identify the root cause of the breakdowns. Improvement in OEE & MTBF (Mean time between failure) of the printing process for a 6 months' period. It is concluded that 12 step kaizen techniques are useful in improving effectiveness of the equipment and for the continuous process improvement.

Keywords : Kaizen Methodology, Keyence camera, Flexography printing Process.

I. INTRODUCTION

Flexography is one of the conventional printing techniques used for printing logos, images, and contact information onto plastic films, corrugated boards, and fabrics.

Flexography is a modern high-speed printing process suitable for most packaging and label applications. It allows for fast, cost-efficient, high-quality label printing for a variety of mass-produced goods.[1]

Our team have decided and choose to do project on printing process machine.

Our project aims to study the flexography printing process & help to reduce the breakdowns on printing machine.

II. BLOCK DIAGRAM – VT FLEX PRINTING MACHINE

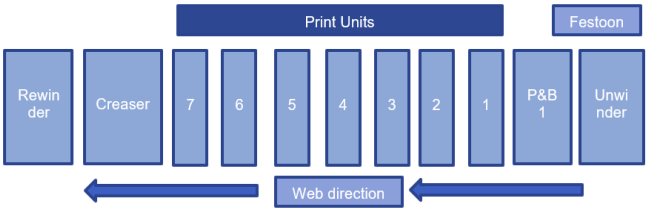


Fig.1 Block diagram of VT Flex Printing machine

III. METHODS AND MATERIAL

SYSTEM DESCRIPTION - FLEXOGRAPHY PRINTING PROCESS

The printing process flow is explained in the schematic. load a paperboard roll on the unwinder.

The paperboard moves from unwinder to the rewinder through the 7 printing units where the design is printed with printing inks overlapping one colour over another.

In the printing units the inks are transferred to the paperboard through an anilox roller and plate cylinder. When one paper roll is completed, a new roll is added automatically at full machine speed 600 mtr/min without stopping the machine. This process is called splicing.

To facilitate splicing at full speed, the unwinder accumulates paperboard in a unit called Festoon acting like a buffer.

And at rewinder, printed roll is winded back.

flexible plates. In the next step a doctor blade removes an excessive amount of ink pasted in the previous step. In the next step uniform distribution of ink is achieved using a soft rubber like printing plate. The process completes when a pressure is applied by the last cylinder called Impression cylinder. The schematic of process under study.[2]

There are five basic steps involved in flexographic printing. Ink pump is dipped in ink tray that ink is transferred to anilox roller. Anilox roller transfers the ink to the

IV. HARDWARE REQUIREMENT

4.1. Keyence sensor IV2-G300CA

The IV2 Series includes a built-in VGA, a high-performance lens, and proprietary lighting. Using a combination of optimised brightness and focus provides a clear representation of the target workpiece.[3]

High-speed processing of images captured by the camera is possible thanks to the dedicated image processing IC built into the head and the high-performance CPU built into the amplifier. This not only enables faster and clearer imaging but also ensures stable detection over a wide field of view and at a distance from the target

Fig 2. Keyence Sensor

4.2. Siemens S7 300 PLC

The SIMATIC S7-300 is used in many applications worldwide and has been proven successful millions of times. The SIMATIC S7-300 universal Controllers saves on installation space and features a modular design. A wide range of modules can be used to expand the system centrally or to create decentralized structures according to the task at hand, and facilitates a cost-effective stock of spare parts. SIMATIC is known for continuity and quality.[4]

Fig 3. Siemens PLC S7 300

4.3. Simatic HMI MP 377

The SIMATIC HMI device "MP 377 15" Touch daylight readable" offers a special display and touch technology. This technology offers a brighter display that lets operators monitor and operate even under

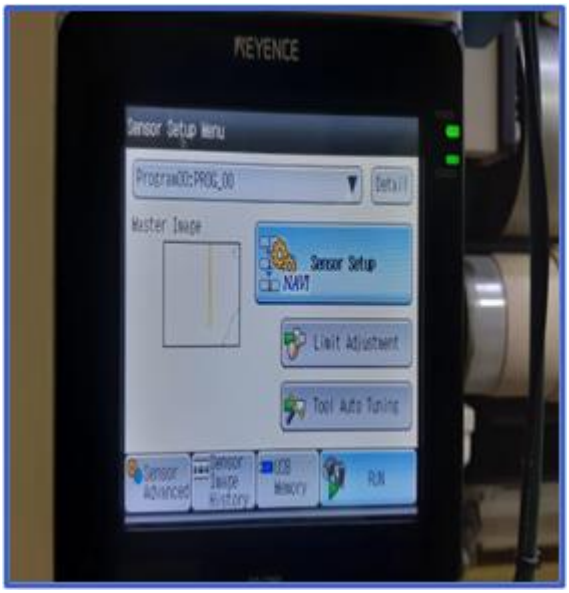
very bright light conditions. Good readability is ensured even in direct sunlight due to the translative properties of the display. You can dim the backlighting of the display on the display itself as well as externally and centrally via process value (tag), for example by means of a potentiometer via the PLC [5]. This means you can use the panel in control cabins for drilling rigs and in control stations onboard ships. You can operate the HMI device outdoors if it is installed in a suitable control cabinet. The necessary, extended ambient temperature range during operation can be created with the help of active heating and cooling in the control cabinet. We recommend that you consult an experienced control. Cabinet designer for appropriate sizing. Intelligent control of heating and cooling is available with the retrofit panel option "TEK - Temperature Extension Kit".[6]

V. RESULT AND ANALYSIS

Fig 4. Results

We check our result; we feel proud to say that there are zero breakdowns on unwinder section after implementing improvements & actions from this team. Also, printer machine MTBF is increased by 45 hours in which 15 hours contribution is from eradication of issues in Printer Unwinder area and 1st rank in unwinder MTBI among 25 Tetra Pak worldwide factories.

VI. HARDWARE RESULT



VII. CONCLUSION

Implemented all countermeasures on other printer machine & results are meeting our expectations. Also, planned to implement these on other similar unwinder sections in factory. Our machine knowledge is improved by running this team. All team members have learned 12 steps kaizen methodology and we will utilize this learning to improve other areas.

VIII. REFERENCES

[1]. Tetra Pak VT Flex Operational & Maintenance Manual v0.1 2012

[2]. https://www.sciencedirect.com/topics/engineering/flexographic-printing

[3]. https://www.keyence.co.in/products/vision/vision-sys/
[4]. Programmable Logic Controllers (English) 5th Edition: George Bolton
[5]. Human machine interface by Samuel Gaccione
[6]. Mobley R K 2002 An Introduction to Predictive Maintenance, A Volume in Plant Engineering (Elsevier Science, New York) 2 nd ed.

Cite this article as :

Shaikh Jabbar Mohammad, Kashid Komal Rajendra, Ladkat-Patil. Akshada Dattatray, Prof. Divekar S. N., Rajendra Joshi, "Breakdown Eradication on Flexography Printing Process", International Journal of Scientific Research in Science, Engineering and Technology (IJSRSET), Online ISSN : 2394-4099, Print ISSN : 2395-1990, Volume 9 Issue 3, pp. 243-246, May-June 2022.
Journal URL : https://ijsrset.com/IJSRSET2293109