

**INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH
TECHNOLOGY****A SURVEY OF AUTOMATION TECHNIQUES COMING FORTH IN SHEET-FED
OFFSET PRINTING ORGANIZATIONS****Mr. Ramesh Kumar^{*1}, Mr. Bijender² & Mr. Sandeep Boora³**^{*1,2&3}Department of Printing Technology, Guru Jambheshwar University of Science & Technology,
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ABSTRACT

Sheet-Fed offset is one of the premier processes in India as well as abroad. To cope up with customers large quantity demands automation has become mandatory. From prepress to post press a wide range of automation techniques exist and coming forth for sheet fed offset presses. Objective of this paper is to throw light on various sheet-fed offset automation techniques existing today and their futuristic implications. The data related to automation was collected with the help of survey conducted in 15 printing organizations situated at Delhi NCR and Baddi (Himachal Pradesh) region. The data was collected with help of questionnaire consisting of 9 questions. Results indicated that in prepress the DI (Direct Imaging) presses can be the future. Drip-off, spot UV (Ultra Violet) effects job, UV double cotter machines, PDCS (Palomar distant cluster survey) automatic density measuring system, latest rotary machines, ACME folders and gluers and photopolymer plate for online spot UV are another few automation techniques which can play a big role in sheet-fed offset printing industry market.

KEYWORDS: Sheet-Fed Offset, Automatic Plate Changing, Computer to Plate, Automatic Ink Keys Setting, Automatic Sheet Insertion, Automatic Cutting, Folding.

I. INTRODUCTION

Printing is an art and science to reproduce text and image with the help of suitable printing process on desired substrate/surface. In earliest time printing was done with the help of wooden block. Modern printing presses typically use ink on the paper. Printing is also done on fabric, clothes and different type of metals and composite materials. Large scale industrial processes printing often done on paper and as they required.[1]

Sheet-fed offset presses widely used printing process. It is cost effective and gives excellent output. To reduce make ready time, modern presses have many advance set up and automation techniques. T high quality product can be delivered in short time, sheet fed follow with prepress, post press and press.[2] Printing unit contain a fountain solution tank which separate image area and non-image area and ink on offset plate, which distribute on image area, transfer the image on the blanket cylinder and then to the paper. Then paper delivered to the delivery unit.[3]

Today sheet-fed printing machine are used for highly productive system for producing advertising material, like brochures, posters, catalogs and packaging material made for paper, foil or metal. Bigger sizes are becoming smaller, short start up times for product changes are a major requirement on automation i.e. production on demand. The use of single drive technologies in order to reduce start up times has been increased. By these steps both flexibility and efficiency can be significantly increased.[4]

Today sheet fed presses are fully automated with internal computerized system to assist the press operator. Sheet fed offset presses today have automatic plate changing, blanket washing, auto ink keys setting, auto plate scanning, auto delivery setting and automatic density reading systems.[5] Automation is the use of different type of control system for operation in printing presses. Some processes have been completely automated and computerized. The biggest benefit of automation is that it saves labour, save energy, materials and to enrich quality, accuracy and precision.[6]

Industrial automation deals with the automation of manufacturing of product, quality control and automatic material handling processes.[7] Industrial automation is to replace the hand handling and traditionally activities with use of mechanizes equipment and logical programming commands. Automation techniques provide consumers with systems and services required to make operations more effective and profitable. Automated techniques acts as a mission to be successful by effectively utilizing philosophies of high quality, advanced automated techniques and customer satisfaction service.[8]

Sheet fed offset printing machine for automated changing of a printing plate, plate carried by plate cylinder, a gap extending in axial direction the plate cylinder and blanket cylinder being formed, set in cooperative engagement with the plate cylinder and a clamping device disposed in the plate cylinder gap including a pair of movable disposed clamping rails the insertion device being disposed in the gap formed in blanket cylinder and having a thrust body formed with a thrust movable radially out of the cross sectional contour of the blanket cylinder against the trailing end of the printing plate on the plate cylinder.[9]

II. RESEARCH OBJECTIVES

Sheet fed offset printing industry continues to grow, and a lot of effort is put into the development of new and improved automation technologies and increase productivity. With this increased growth the need for quality assessment also increases. New automatic techniques are coming forth in the field of sheet fed offset about which small scale printers are not much aware of. The objective of this research work is:

- To observe and analyse automatic techniques coming forth in sheet fed offset printing presses.

III. RESEARCH METHODOLOGY

A questionnaire was prepared (Appendix-I) to know answer of some questions having relationship with research. For filling the questionnaire fifteen printing industries were visited in NCR Delhi and Baddi (Himachal Pradesh) regions. A questionnaire was given to collect data. The source of data includes feedback from various printing presses. The entire data was analysed using suitable statistical tools and techniques like bar graphs and charts. The result and discussion will help in what kind of automation techniques available in market and adopted by printing presses.

IV. DATA COLLECTION AND ANALYSIS

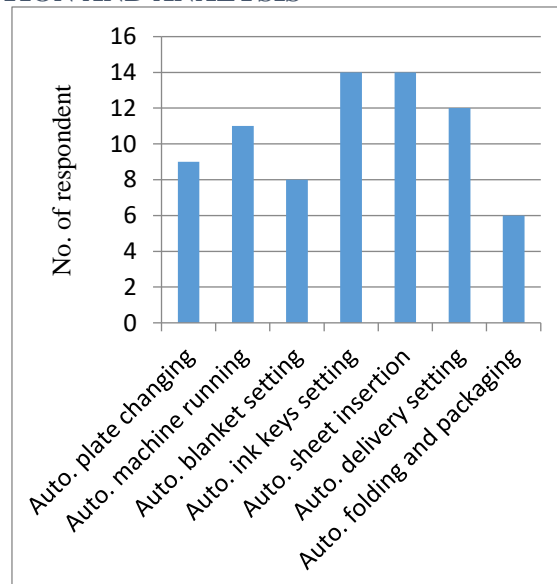


Fig.1. Kinds of automation techniques used in printing industries

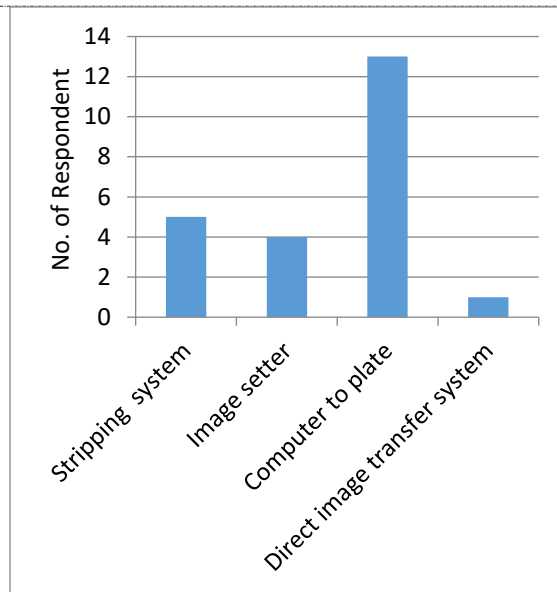


Fig.2. Advance automatic techniques in pre-press

The automation techniques are available in printing presses are shown in fig 1. The automatic plate changing, automatic machine running, automatic ink keys setting and automatic sheet insertion is most widely available techniques among various printers. On the other hand automatic folding and packaging is less adopted by printers because of higher initial investment.

The advance techniques available in prepress are computer to plate, stripping system, image setter and direct image transfer system. About 13 printers adopt computer to plate system, 5 printers adopt stripping system and 4 printers used image setter. Only one printer use direct image transfer system as shown in figure 2.

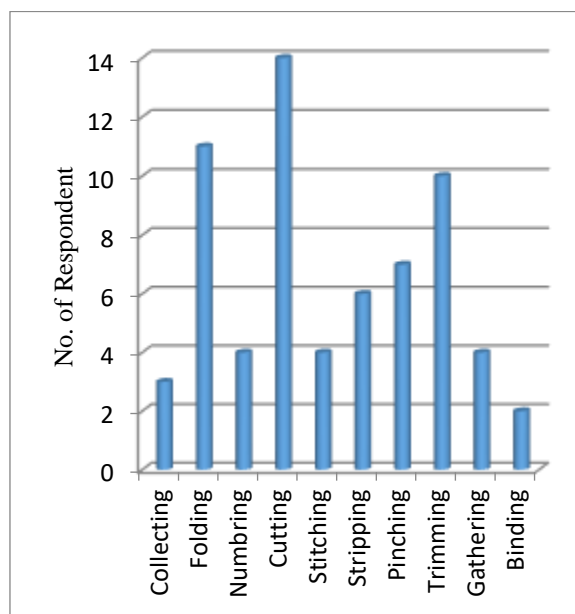


Fig.3. Advance automatic techniques in post-press

The folding, cutting, trimming techniques are most commonly adopted by printers. Pinching, stripping techniques are available as requirement in press. Collecting, numbering, stitching, gathering and binding are less adopted by printers. But innovative printer are adopted most of these techniques for speed and higher productivity.

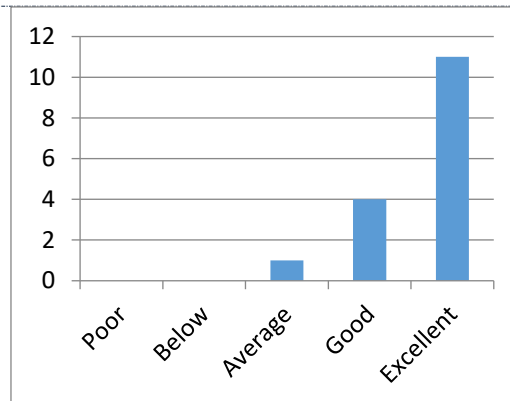


Fig.4. Facilities available for printing of latest job

The facility available for printing of latest job is excellent in 11 printing presses, good in 4 printing presses and average in only one printing press. The innovative printing presses have advance automation techniques for best quality and different type of jobs to be printing in the presses as shown in figure 4.

V. RESULTS AND DISCUSSION

Automation Techniques Coming Forth in Sheet Fed Offset Press

1. Drip-off job, Spot UV job, Matt UV, Flesh varnish, UV gloss and Double cotter with UV are widely available in market in various printing presses. Braille technique now present in market for Pharmaceutical packaging which mainly used in USA and European country but rarely available in Indian printing industries.
2. Density measuring instruments installed onto machine on average basis and PDCSsystem are rarely available in market in printing presses. This helps in measuring even range of ink density over the sheet and measuring shade variation at variable press speed.
3. Photopolymer plates with metal base now available in printing presses and markets. This automation technology helps in online spot UV jobs. It is perfect example of hybrid printing available in market which is quite rare in India.
4. Automatic plate changing, automatic sheet insertion, auto ink keys setting, auto delivery setting, auto folding and packaging are widely adopted in market in printing presses but auto blanket setting is not much widely adopted in printing presses
5. Advance techniques in post-press are folding, cutting, pinching, trimming are widely used finishing operations but collecting, numbering, stitching binding are not much widely accepted automation techniques.
6. Various software used for making design in printing industries as required in job include ESKO, Illustrator, Adobe InDesign, Adobe Photoshop, Corel Draw, MS Excel etc. configured in market in printing presses.
7. Now a days companies use stripping system and computer to plate but future requirement are DI presses.
8. Now presses include variation in their jobs and print different type jobs at same time. Because of automation quality, speed and productivity increases in presses. Innovative presses have excellent facility for printing of latest jobs.
9. Latest type of multi light source for colour checking, Densitometer, Photo spectrometer, Glossometer, Ink flow meter are available in market.
10. Image controller, press sign direct to press, mellow colour and colour management software available in market and printing presses to better control/ink/measuring density etc.
11. Automatic proof cutter and scanner, online proof scanner techniques are equipped in only some high quality oriented presses.
12. Automatic press loading and unloading system is very common now days among all printers.

The result obtained from observation help in finding the latest type automation techniques adopted by sheet fed printing presses now days. Latest type of automation and value addition helps the printing press in increase speed, variation in jobs, quality and productivity.

VI. CONCLUSION

1. The drip-off, spot UV effect jobs, matt UV, flesh varnish and gloss UV density measuring device installed onto machine, six colour job with UV,PDCS system, rotary box making machine, automatic folder and gluer, auto roller wash, embossing, leafing, texture are widely accepted automation techniques among printers.
2. Photopolymer plate with metal base for online spot UV is rarely available in market.
3. The UV double coater machine not much widely used by printing presses.
4. In the prepress computer to plate and stripping system are most largely available techniques. On the other hand DI presses lack common because of lack of technologies transfer and higher initial investment.
5. The drip-off, spot UV, six and seven colour jobs with UV, latest software for designing, latest density measuring and colour control management system are the effects required by customer to be full fill by printers.
6. The drip-off, spot UV, gloss UV, matt UV, density measuring instruments installed onto machine, ink formulation and colour management software, Heidelberg six colour with coater machine, stripping during die punching, latest type of photo spectrometer (greytech) and glossometer (BYK), latest rotary box making machine are most widely value addition mechanism available among printers.
7. Heidelberg six colours with coater, stripping during die punching, auto proof cutter, printing with online proof scanner, image controller, ESKO software for designing, photopolymer plate with metal base for online spot UV are new value addition techniques only followed by innovative printers.
8. 67% of total printers surveyed were capable of printing latest jobs required by market.

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APPENDIX-I

QUESTIONNAIRE

Name of Your Organization:-

A. Total number of machines in your organization

B. Which kinds of automated techniques used in your printing organization :-

a) automatic plate changing b) automatic machine running c) automatic blanket setting d) automatic ink keys setting e) automatic sheet insertion f) automatic delivery setting g) automatic folding and packaging

C. Advance techniques in prepress :

a) Stripping system b) Image setter c) Computer to film d) Computer to plate e) Direct image transfer system f) All the above



D. Advance techniques in post press :-

- a) Collecting b) Folding c) Numbering d) Cutting e) Stitching
e) Stitching f) Stripping g) Pinching h) Trimming h) Trimming
h) Trimming i) Gathering j) Binding

E. Advance techniques in press :-

- a) Yes b) No
c. If yes then tell which kinds of techniques used

F. Latest type of job to be printed :-

- a) Yes b) No
c) If yes then tell about latest type of job

G. Facilities available for printing of latest job :-

- a) Poor b) Below c) average d) Good e) Excellent

H. Latest value addition mechanisms available in the press :-

- a) Yes b) No
c) If yes then tell about latest value addition mechanisms

I. Unique features of the press department of your organization :-

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