

**INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH
TECHNOLOGY****AN OVERVIEW OF CONVENTIONAL FLEXO PLATE MAKING & DIGITAL
PLATE MAKING PROCESS****Arohit Goyat^{*1}, Nishan Singh² & Gurmeet Singh³**^{*1}Assistant Professor, Department of Printing Technology, GJUS&T, Hisar (Haryana)²Assistant Professor, Department of Printing Technology, SITM, Rewari (Haryana)³M. Tech. (Print & Graphics Communication), SITM, Rewari (Haryana)

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ABSTRACT

Flexography is a modern version of letterpress printing. This traditional method of printing can be used on almost any type of substrate, including corrugated cardboard, cellophane, plastic, label stock, fabric and metallic film. Flexography uses quick-drying, semi-liquid inks. In this new age of digital printing, flexography holds its own in the areas of large orders, particularly of packaging products and labeling. Flexographic printing uses flexible photopolymer printing plates wrapped around rotating cylinders on a web press. The inked plates have a slightly raised image and rotate at high speeds to transfer the image to the substrate. Flexography inks can print on many types of absorbent and non-absorbent materials. Flexography is well-suited to print continuous patterns, such as for gift wrap and wallpaper.

I. INTRODUCTION

First type of flexo press is the stack press. The stack press has individual color stations that are stacked one over the other. Because of their configuration, stack presses are easily accessible, making on-press changes and servicing easy and economical. Another kind of flexo press is the common impression, or CI, press. The CI press supports all of its color stations around a single impression cylinder. The primary advantage of this press is its ability to hold excellent register, which is the placement of one color in relation to others. In-line presses contain multiple printing units that are arranged in a horizontal row, each standing on the floor. In-line presses are commonly used to print pressure-sensitive labels, corrugated board, and newspapers. One advantage of an in-line press is that additional operations such as die cutting can be done between color stations on the press.

II. ADVANTAGES OF FLEXOGRAPHY

- Runs at extremely high press speeds
- Prints on a wide variety of substrate materials
- Low cost of equipment and maintenance
- Relatively low cost of most consumables
- Ideally suited for long runs
- All printing, varnishing, laminating and die cutting done in a single pass

III. DISADVANTAGES OF FLEXOGRAPHY

- The cost of the flexo printing plates is relatively high, but when they are properly cared for, they last for millions of impressions.
- It takes several hours to set up complex jobs that print, varnish, laminate and die cut.
- Takes a large amount of substrate to set up the job, potentially wasting expensive material.
- If version changes are necessary, they are time-consuming to make.



IV. TYPES OF FLEXOPLATES

- **Rubber Plates**

The original flexographic printing plate was composed of rubber. There are several steps to make molded rubber flexographic printing plates. A master pattern (or engraving) is made by exposure through a photographic negative. A photographic negative is imaged and developed by using traditional black and white silver halide film and chemistry (i.e., developer, fixer, and wash water).

- **Photopolymer Plates**

Photopolymers are ultraviolet (UV) light sensitive materials. Photopolymer plates used for flexographic printing plates are similar to rubber plates in that they are flexible and resilient. Photopolymer plates are either viscous liquids or solid sheets of appropriate thickness.

- **Dry Thermal Photopolymer Plates**

Dry thermal plate processing eliminates the use of solvents, reduces plate making time and improves plate quality. This system eliminates the need for conventional chemical solvent or aqueous washout.

- **Digital Photopolymer Plates**

Digital photopolymer flexographic plate imaging uses no film, and is not actually part of the traditional prepress process. Conventional plate making generates chemical waste from film processing and solid waste from the films. Multiple generations of films are usually produced during job approval and for conventional analog proofing. Digital plate making only generates a thin black integral mask as waste. It promotes the transition to an all-digital workflow that employs digital proofing for job approval and final proofs.

V. CONVENTIONAL FLEXO PLATE MAKING PROCESS

Traditional Prepress

Traditional prepress consists of image preparation and plate making.

Image Preparation

Image preparation begins with camera-ready (mechanical) art/copy or electronically produced art supplied by the customer. Images are captured for printing by camera, scanner, or computer. Components of the image are manually assembled and positioned in a printing flat when a camera is used. This process is called stripping. When art/copy is scanned or digitally captured, the image is assembled by the computer with special software. A proof is prepared to check for position and accuracy. When color is involved, a color proof is submitted to the customer for approval.

Traditional Plate making

Printing plates are the device that transfers picks up the ink off the metering roller and transfers the image onto the substrate. A film negative is produced by using a photographic film process. The film is then used to expose the plate material, which is coated with light sensitive chemicals, to UV light. The plate is then chemically developed using water or solvent to remove the unexposed image areas of the plate ultimately producing a plate with raised image that is identical to the artwork. One plate is made for each ink color used on the job.

Digital Flexo plate making Process

Digital photopolymer flexographic plate imaging uses no film. Conventional plate making generates chemical waste from film processing and solid waste from the films. Multiple generations of films are usually produced during job approval and for conventional analog proofing. Digital plate making only generates a thin black integral mask as waste. It promotes the transition to an all-digital workflow that employs digital proofing for job approval and final proofs. For digital photopolymer plates, a photo tool is created directly on the unimaged photopolymer plate surface from a black layer that is manufactured on top of the plate. The black layer covers the entire plate. It absorbs ultraviolet radiation like film and it also is sensitive to infrared radiation. An imaging device (much like an image setter) uses a high-power infrared laser or lasers to remove the black layer corresponding to the image to be transferred to the plate, revealing the unimaged photopolymer underneath. This removal process is called laser ablation and it creates the photo-tool or integral mask. The underlying photopolymer does not absorb the infrared laser radiation. Thus, it is not affected by the laser ablation.

After laser ablation imaging, the digital plate receives ultra-violet exposure through the integral mask. The remaining black layer absorbs the ultraviolet radiation. The ultraviolet radiation polymerizes the photopolymer



where the black layer has been removed. The plate is washed, dried, and finished with the same process as a conventional plate.

VI. RESEARCH OBJECTIVE

The objective of this study is to analysis flexo plate making process and compares conventional and digital plate making process in conventional and Digital press houses.

VII. RESEARCH METHODOLOGY

The whole study has been divided in 3 sub parts with complete understanding of flexographic plate making process along with the cost, efficiency, consumption of time in conventional and digital plate making process and advantage of digital flexographic plates.

The following methodology will be adopted during the study.

1. Study of conventional plate making process, equipment and materials.
2. Study of Digital plate making process, equipment and materials.
3. Comparison between conventional flexo and Digital plate making process.

Data collection will be done during the study.

VIII. FUTURE SCOPE

This research focuses on critical analysis and comparison between conventional flexo plate making process and digital flexo plate making process. In this we will analysis the plate cost, processing cost and difference between qualities of both plates which we will help to flexography printer to improve their printing qualities and increase efficiencies of printing machine. To implement the suggestions properly we generate a check list in form of table to check the different factors before all jobs to be handled on particular Machine on daily basis. And the check point helps to reduce the consumption of job processing time along with optimum utilization of resources to complete the plate making process. The study may be concluded in a manner that, if all suggestion were implemented in matter of practice on plate processing technology. The result may vary depending upon type of Machine/Technology, and skill man power.

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