



## Unit – IV: Style and Methods of Printing Textiles

### Unit Overview

In this unit students will be informed about different styles and methods of printing designs. The designers should be aware of all style & methods of printing to explore each technique effectively.. Printing advantages and disadvantages will also be discussed to understand printing selection for quality production.

### Objectives of the Unit

- To introduce styles and methods of printed textiles and its effect on design.
- To learn the process involved in printing textiles.
- To gain knowledge of evolution of printing process.
- To understand the origin and history of styles and methods.

### Learning Outcomes

After completing the unit, the students shall be able to –

- Understand the different styles and methods involved in printing Textiles.
- Identify the correct method and style for printing Textiles.
- Recognize the difference between different kinds of prints.
- To get an overview of printing methods.

### Printing

The term 'textile printing' indicates the patterning of cloth by means of printing, dyeing or painting. The printed fabrics are categorized in four different classes or styles: the 'resist' style, the 'dyed' style, the 'discharge' style and the 'direct' style. The resist style and dyed style are the oldest form of decorating textiles. All four styles can be used in conjunction with a great variety of tools and devices to decorate the textile surface. The students of textile design need to explore and experiment with the styles of printing to develop innovative and decorative surfaces.

The tools and devices used in these styles give ample scope of mixing of the simplest brush techniques to the most elaborate and sophisticated modern screen printing machinery.

Man's urge to decorate his clothing and the fabrics of his environment, by means of printing, dates from the very earliest times, and fabrics so patterned existed before woven or embroidered ones. For, although the earliest examples are from the fifth- to sixth-century Coptic period in Egypt, various records show that printed fabric did exist about 2500 BC. Patterned garments are shown on wall-paintings in Egyptian tombs and Herodotus mentions similar findings in the



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Caucasus of 2000 BC. Whether the people of China or India were the first to make simple blocks for the printing of cotton cloth is debatable but it seems certain that textile printing was a fairly extensive industry in India.

### 4.1 Styles of Printing

#### 4.1.1 The resist style

The principle of this method is that the pattern area is painted or stamped with a 'resist' made from rice paste, clay or some type of wax. Then the cloth is dyed, so leaving the pattern areas reserved in white against a dyed background. As far as the Coptic cloths were concerned, the patterns were stamped with small block in geometric shapes, several being used in different combinations, the fabric then being passed through a dye-bath or woad, indigo or other blue dye. There are also Coptic fabrics which were painted with resist. *Example: Batik and Tie & Dye*



Fig. 4.1.1 Batik (Resist style)

#### 4.1.2 The dyed style

Here also dyeing was used, but this time in conjunction with a 'mordant'. The colouring matter obtained from animal and vegetable sources needs to be used in conjunction with a fixing agent (mordant), usually in the form of a metallic oxide or acetate, in order to make the dye insoluble





Fig. 4.1.2 (a) Batik (Resist style)

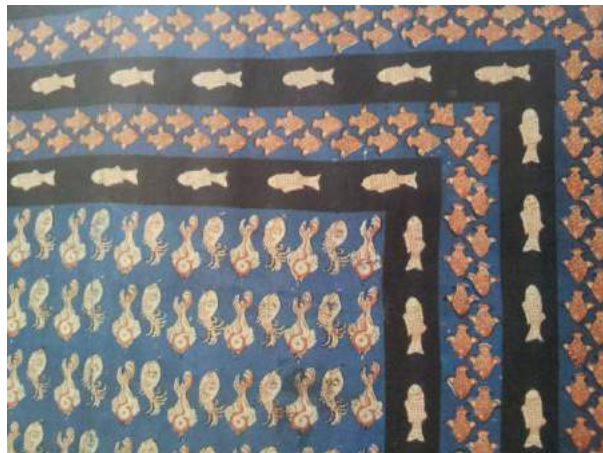


Fig. 4.1.2 (b) Bagru (Resist style)

when washing and fast when exposed to light. When the cloth was dyed, only those areas of pattern so painted took the colour, the mordant and vegetable colouring matter forming an insoluble colour after fixing in the open air, and the unmordanted parts washes off clear and clean in water.

### 4.1.3 The discharge style

In the early part of the nineteenth century it was discovered, that it was possible by chemical means to bleach out or 'discharge' a pattern from an already piece-dyed cloth. This discharging process enabled fairly intricate and fine patterns to be printed, giving the effect of resist dyeing.



Fig. 4.1.3 Discharge style





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Subsequently, these white areas could be reprinted in colour. Nowadays, colour discharges are produced in which a range of dyestuffs unaffected by the discharging agent are added to the discharge past, so while the one is taking out the colour of the dyed ground, the other is being deposited in its place.

### 4.1.4. The direct style

Until the advent of chemically produced dyestuffs there was very little direct printing (that is, printing with a paste containing both the colour and the fixing agent). The exceptions were almost all pigment colours. These colours, unlike dyestuffs which stain the fibre of the cloth, merely coat the outside of each warp and weft thread, which comes in contact while printing.

Example: Screen printing, Block printing and Roller printing.



Fig. 4.1.4 Direct style

In order to identify fabric printing styles, following tabular information could be used.



Table 4.1.4

S. No.	Style of printing	identification
1.	Resist Style	Clear boundaries; and distinct special effects
2.	Dyed Style	Tints and shades of single colours are visible.
3.	Discharge Style	The background colour is as prominent as on the face of the fabric; In case of thicker fabric, hints of original colours are visible on the back of the fabric even after discharge
4.	Direct Style	Mostly the background is white/light colour In case of thicker fabric, the print is prominent on surface then the back of the fabric;

## 4.2 Methods of Printing

### 4.2.1 Block printing

Block printing is the oldest form of printing where-in a wooden block with a raised pattern on the surface is dipped into the printing colorant and then pressed down on to fabric to achieve design on the fabric. In Block printing, the pattern is generated by repeating the process of block application on the fabric. For a design of four colours, four separate blocks are developed. Due to manual process, this printing is time consuming and provide flexibility of changing the pattern placement.

#### Advantages:

- Due to simple printing method, this style of printing does not require expensive equipments.
- Provides flexibility in repeat sizing
- Prints produce have greater decorative value and stamp of craftsmanship

#### Disadvantages:

- Slow production as it involves manual methods.





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Fig. 4.2.1 (a)



Fig. 4.2.1 (b)

### Block printing

#### 4.2.2 Roller printing

In this method (can be called a machine counterpart of block printing,) engraved copper cylinders or rollers are used in place of hand carved blocks. The required designs are engraved on the surface of copper roller, to which dye is applied and excess colour is scraped off the roller's surface, leaving dye in the engraved sections. When rollers come in contact with a fabric, the dye on the roller gets transferred to the fabric surface.

#### Advantages:

- Large quantity of fabric can be produced using this method of printing
- Due to precision achieved in aligning the roller, repeats marks are not visible and hence clear designs are achieved.

Due to engraving, sharp outlines can be obtained which is extremely difficult to achieve in Block printing.

#### Disadvantages

- Not economical for short run of Fabric
- Repeat of the design is limited to circumference of the roller and width of the roller.
- Setup cost of roller, engraving and printing machine is high.

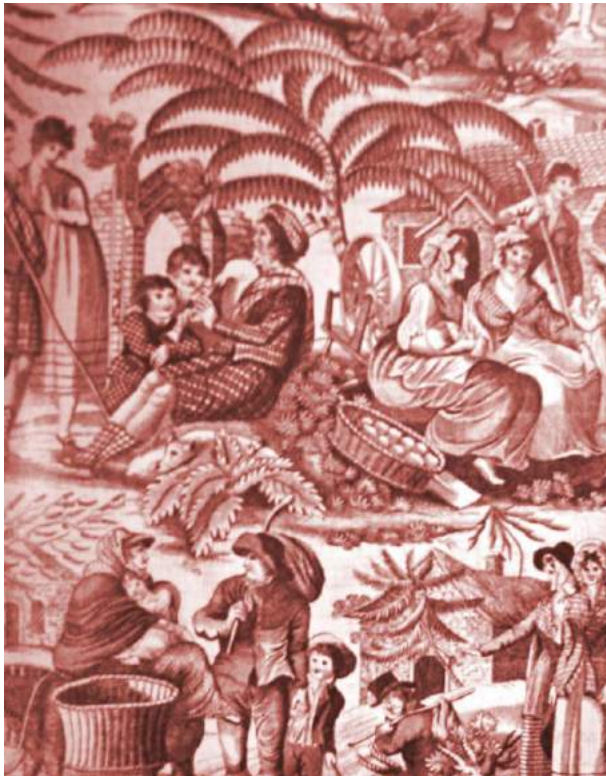


Fig. 4.2.2 (a)



Fig. 4.2.2 (b)

Roller printing

### 4.2.3 Stencil printing

Stencil printing is one of the oldest methods of printing for achieving the required design on to the fabric. In this method, first stencil is prepared by cutting out a design from a flat sheet of paper, metal or plastic sheets. The colour is applied to the fabric by brushing or spraying the interstices of a pattern cut out from a flat sheet of metal, paper, plastic sheets.

#### Advantages

- Easy and simple method

#### Disadvantages

- Sharp and detailed designs are difficult to achieve
- Not suitable for large scale of production
- Cutting stencil is laborious process.

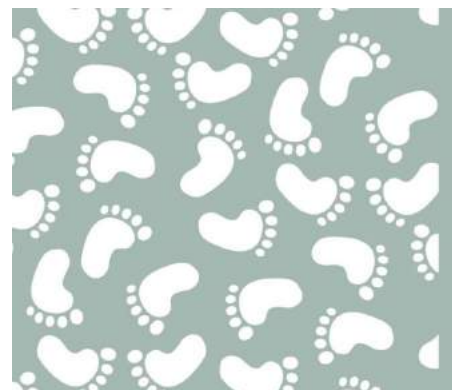


Fig. 4.2.3 Stencil printing





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### 4.2.4 Screen printing

This style of printing is popular because of wider scope for achieving desired results. In this technique, the printing paste passes through a fine fabric stretched on a wooden or metal frame. The design is created in reverse on the screen by blocking areas of the screen with a light sensitive chemical. The screen is then placed over the fabric and the printing paste is forced through the open areas of the screen using a flexible synthetic rubber or steel blade. It is done either with flat or cylindrical screens made of silk threads, nylon, polyester, or metal. Based on the type of the screen used, it is known as 'Flat Screen Printing' or 'Rotary Screen Printing'.

#### Advantages:

- Due to flexibility of achieving the desired result, this printing style is a popular method of printing.
- Provide flexibility in setting varied repeat sizes

#### Disadvantages:

- Difficult to achieve fine line designs
- Screen clogging is a common issue
- Not advised for large production quantity.



Fig. 4.2.4 (a) Manual screen printing



Fig. 4.2.4 (b) Flat screen printing





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Fig. 4.2.4 (c) Rotary screen printing



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#### 4.2.5 Transfer printing

In this indirect style of printing, dyes are transferred from paper to a thermoplastic fabric under controlled conditions of temperature, time and pressure. The image is first engraved on a copper plate and then pigment is applied on these plates. The image is then transferred to a piece of paper. The paper is then placed on the fabric and heat pressure is applied to fix the image on the fabric.

##### Advantages

- Simple operation
- No after treatment of fabric required
- Excellent print quality
- Excellent design possibility

##### Disadvantages

- High cost of printed paper
- Not economical for small orders.

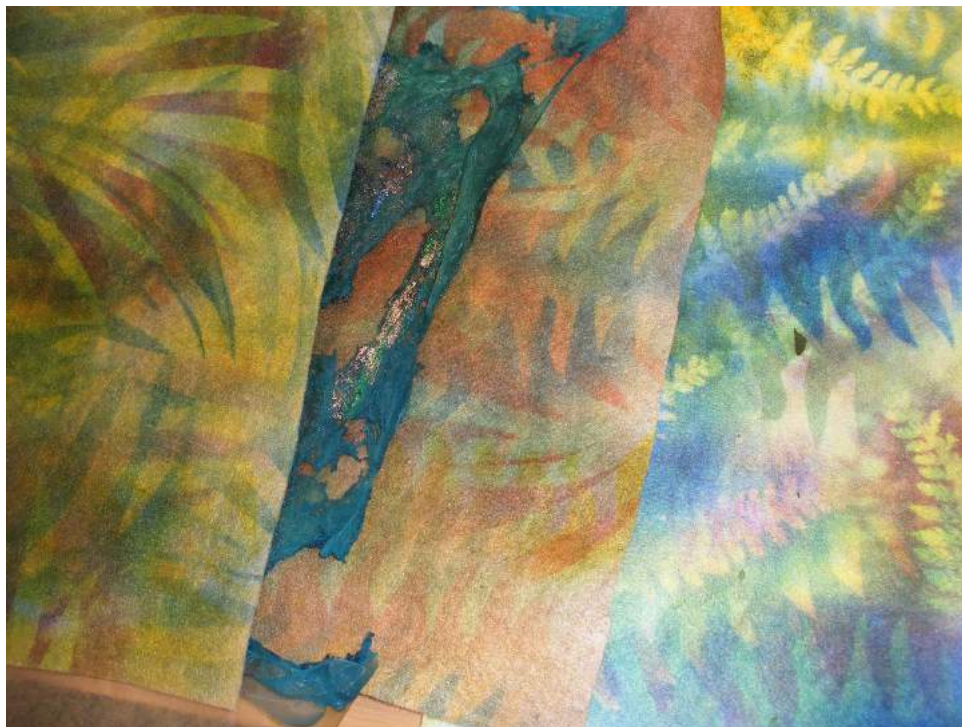


Fig. 4.2.5 Transfer printing





#### 4.2.6. Digital printing

In textile Industry, with the invention of digital design, digital printing methods have also become popular. This printing allows designers to achieve unlimited colour options. With a popularity of digital practices, most of the design houses have installed digital printing units to generate short runs of fabric. This style of printing is very popular with Designers as it provides ample scope of design manipulation for improving design output.

This is the latest development in textile printing and is expanding very fast.

##### **Advantages:**

1. Ability to print high quality full color
2. Photographic images printing
3. No minimum quantity required for an order
4. Accurate printing

##### **Disdvantages**

1. Digital printing can currently only be used on white or light colored garments.
2. Difficulty in achieving exact colour matching
3. Difficulty in achieving sharp fine lines.

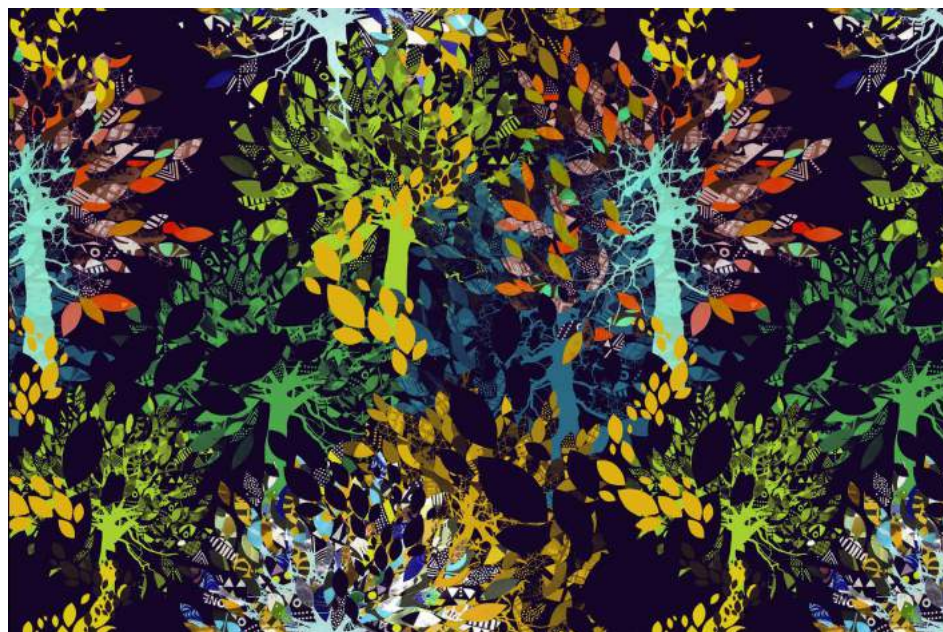


Fig. 4.2.6 Digital printing



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### 4.2.7. Foil printing

Foil printing, allows pattern printing with foil on the fabric. The process creates a shiny surface. The pattern is printed by a foil/transfer adhesive on the fabric, and then pressed with foil paper using hot steel roller. The pressure is generally 5-6 bar on printed portion and at 190 degree Celcius on fusing machine for 8-12 seconds.

In foil printing, the quality of the adhesive is very important. The adhesive is made up of acrylic co-polymer and is diluted by mixing water. Cheaper qualities of foil printed fabric shows very poor stretch, loss of softness and smoothness after five washes. The foil should not stick to cure inks under pressure. Normally a matting agent is added to avoid sticking.

In the second method, printing is done on the foil paper first, and then foil is pressed on the fabric with hot steel roller or iron.

Foil paper is called the stamping foil paper. Actually it is not the paper but the detachable foil film on the plastic base. Generally, it is PET film of 15 micron thickness, available in widths of 640 or 1500mm.

#### Advantages:

- Ability to print shiny surfaces
- No minimum quantity required for an order
- Accurate printing

#### Disdvantages

- Available in limited metallic colours.
- Safety must be observed when changing type sets to prevent one from being burned.
- Slow process of printing.



Fig. 4.2.7 (a)



Fig. 4.2.7 (b)

Foil printing





### 4.3 Special Effects Printing

Apart from above printing methods, following methods are also popular for achieving special effects through printing.

- **Duplex Printing**

In this method Printing is done on both sides of the fabric either through roller printing machine in two operations or a duplex printing machine in a single operation.

- **Airbrush (Spray) Painting**

In this method, the dye is applied with a mechanized airbrush which blows or sprays color on the fabric.

- **Electrostatic Printing**

In this method a dye- resin mixture is spread on a screen bearing the design and the fabric is passed into an electrostatic field under the screen. The dye- resin mixture is pulled by the electrostatic field through the pattern area onto the fabric.

- **Photo Printing**

In this method the fabric is coated with a chemical that is sensitive to light and then any photograph may be printed on it.

- **Jet Spray Printing**

In this method the designs are imparted on to the fabric by spraying colors in a controlled manner through nozzles.

- **Flocking**

Flocking is the technique of depositing many small fiber particles, called "flock" onto a surface of a fabric to produce design. Instead of dyes, an adhesive is used to affix the flocks on the fabric. Then, roller printing produces design on its surface. Nowadays, this is done by the application of high-voltage electric field too. Flocks of cotton, wool, rayon, nylon and acrylic are all used for the purpose.



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## Exercise

### 4.1 Fill in the Blanks:

1. The term \_\_\_\_\_ indicates the patterning of cloth by means of printing, dyeing or painting.
2. \_\_\_\_\_ fabrics existed before woven or embroidered ones.
3. In \_\_\_\_\_ style of printing, the pattern area is painted or stamped with a \_\_\_\_\_ made from rice paste, clay or some type of wax.
4. \_\_\_\_\_ printing is the oldest form of printing.
5. \_\_\_\_\_ printing methods allows unlimited colour options.

### 4.2 Describe the following

- Digital printing.
- Block printing.
- Roller printing.
- Foil printing.





## GLOSSARY

- **Cotton** – Cotton is a soft and fluffy staple fiber that grows as a protective capsule around the seeds of cotton plant. The fiber is most often spun into yarn or thread to make soft breathable textiles.
- **Art movement** – An Art movement is a tendency or style in art with a specific common philosophy by a group of artists during a restricted period of time. Study of Art movements is important for understanding art development over various period.
- **Forecast** – Forecasting is the process of identifying and announcing fashion directions based on emerging events.
- **Trends** – A general direction in which fashion tends to move. A designer gets inspiration from future trends to develop new design collection.
- **Inspiration** – A source that stimulates imagination for visual representation and design development.
- **Design research** – A research carried out for ideating design idea.
- **Form** - The shape of a 3 dimensional object, usually represented by line or tone in a 2 dimensional drawing.
- **Ground** - The area in a design which acts like the background.
- **Hue** - The basic name or description of an object's or design's color, such as red, yellow, green.
- **Oil pastel** - Crayons bound by oil to give a typical transparency when used on paper.
- **Resist** - A method of preventing paint from coming into contact with the paper, or other paint layers by inter posing a paint resistant coating such as wax, fevicol or oil.
- **Wax crayons** - Pigment bound into sticks or crayons with wax. Their marks are water resistant and can create interesting textures on paper.
- **Collage** - An art form in which a new image is built, out of paper and other materials like photos, cloth etc.
- **Windows** - Gaps or open spaces created by cutting off areas from the ground paper.
- **Cartridge paper**- Thick rough textured paper used for drawing and painting.
- **Psychedelic** - Denoting or having an intense, vivid colour or swirling abstract pattern.
- **Upholstery** - Soft, padded textile covering that is fixed to furniture such as armchairs and sofas.



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- **Wall paper** - Paper that is pasted in vertical strips over the walls of a room to provide a decorative surface.
- **Layout** - The way in which the parts of something are arranged or laid out.
- **Rendered sketch** - A drawing in perspective of a proposed structure.
- **Coverlets** - A bedspread.
- **Hangings** - A decorative piece of fabric or curtain hung on the wall of a room or around a bed.
- **Draperies** - Cloth, curtains, or clothing hanging in loose folds.
- **Monotones** - Different shades of a single color.
- **Exotic** - Intriguingly unusual or different.
- **Fonts** – Style of writing.
- **Printing** - A method of application of dyestuff on a Fabric.
- **Repeat** - Size of one set of design.
- **Pattern** - Motifs are repeated to form a pattern.
- **Dyestuff** - A chemically composed paste to achieve colour on fabric.