



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research

Vol. 15, Issue, 06, pp. 68516-68518, June, 2025

<https://doi.org/10.37118/ijdr.29622.06.2025>



REVIEW ARTICLE

OPEN ACCESS

DESIGN DEVELOPMENT USING JACQUARD ON HANDLOOM-POWER LOOM & CAD

***Mohammad Javed**

Associate Professor NIFT Mumbai

ARTICLE INFO

Article History:

Received 15th March, 2025

Received in revised form

03rd April, 2025

Accepted 20th May, 2025

Published online 28th June, 2025

Key Words:

Indian textile industry, Handloom weaving, Power-loom sector, Jacquard design, Computer Aided Textile Designing (CATD), Damask weave, Reversible fabric, Damask weaving, Traditional vs. modern weaving.

*Corresponding author: *Mohammad Javed,*

ABSTRACT

This industry is uniquely characterized by the coexistence of three distinct weaving sectors—cottage handloom, unorganized power-loom, and modernized mill sectors—each contributing to the diversity and richness of textile production. Unlike developed countries where only modernized mills dominate, India continues to preserve and utilize traditional weaving techniques alongside modern technologies. This paper highlights the strengths and challenges of the handloom sector, particularly its ability to produce intricate and cost-effective woven structures that are unfeasible on mechanized looms. It explores the creative potential for textile designers to experiment with new weave structures using handlooms, enhanced by mechanical jacquard machines and evolving shedding technologies. A novel concept, ‘Two-in-One’ reversible fabric, damask weaves, demonstrates innovative approaches to double-weave design, offering both aesthetic and functional advantages. Additionally, the paper discusses the integration of Computer Aided Textile Designing (CATD) tools such as Tex Graphics and Ned-Graphics in jacquard graph and color pattern designing. However, the high cost of such software limits accessibility for the cottage and unorganized sectors, highlighting the need for more affordable technological solutions to bridge the digital divide in textile design.

Copyright©2025, Mohammad Javed et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Mohammad Javed, 2025. "Design development using Jacquard on Handloom-Power Loom & Cad". *International Journal of Development Research*, 15, (06), 68516-68518.

INTRODUCTION

Indian handloom industry: It includes three weaving sectors, namely cottage handloom, un-organized power-loom and modernized mill sectors. These three sectors have to co-exist with the strength of their own products by overcoming the weaknesses. India is the only country where all the modern as well as traditional technologies are used in one form or the other at some corner of the country to produce products as per the requirement of both domestic and export markets. In the developed countries known for textiles, only the modernized mill sector exists and the other two sectors have become insignificant there. Hence, the literatures of fabric structure from these countries were written, mostly emphasizing the fabric structure and its production techniques of organized power-loom weaving machines and equipment. Very little has been written on handloom weaving techniques. The strength of the handloom sector stays in their identity and exclusivity of methodology to weave fabric structures of intricate designs both in warp and weft way at affordable cost. Producing similar designs is not cost effective on mechanized and modern looms. Handlooms have no limitations to produce woven structures of any intricate design.

Possibilities for textile designers: They can carry the experimental weaving in handloom to produce unlimited new structures as desired

and required. This is being achieved by developing various kinds of shedding technologies. Even today, the handloom and decentralized power-loom sector are mostly using coarse and fine pitch mechanical jacquard machines of smaller hooks capacity ranging from 120 to 400. Any techniques which increase the figuring capacity of jacquard machines and are easy to operate with simple modifications are always beneficial to these sectors. As far as graph preparation is concerned, all the three weaving sectors use either manual or Computer Aided Textile Designing (CATD). But depending upon the cost effectiveness, they choose suitable graph designing techniques to manufacture jacquard fabrics. Generally now-a-days, the organized sector uses CATD and the cottage sector uses manual designing techniques for generating graph designs. Most of the woven figured fabrics have a figure with two or more colour and weave effect on one side. The figure is the same on the other side but the colours and weave get interchanged. Thick reversible printed fabrics are developed by printing two different figures one for face and other for back. Experiments were conducted to produce a figured fabric in the name of ‘Two- in - one’ containing two images, elephant on one side and horse on other side, one backing the other. The purpose of this type of fabric is to use the fabric, by reversing, one time looking with one image and next time with the other one. To quote an example, the ordinary thick floor carpet, used at least for a decade, gives a monotonous look. Instead, the carpet woven with the said two in-one

concept will serve dual purpose. One is added thickness due to stitched double fabric and other is its double side usage with differently looking colour and image to break the monotonous. The principle of producing two - in - one fabric was based on only one weave that is a figured self-stitched double cloth for the last three decades with two limitations. One is the rough feeling of fabric when woven with coarser counts because of the twill and sateen weave bindings and other is the lifting of huge numbers of ends for back picks. Damask fabrics woven with satin weave as ground and sateen weave as figures are called 'True Damask'. 'Twill damasks' also called 'False Damask' includes a twill-woven ground and figure. To produce true damask fabric having large size designs, economically, pressure harness technique has been devised. There is also scope to discuss the weaving techniques of twill Damask.

CAD intervention: In the Indian Textile industry, many jacquard graph designing software and colour pattern designing software are used. Tex Graphics, Textronics, Cad Vantage Win Jacquard, Ned-Graphics, Pointcarre and Auto Tex are a few examples. These software are commonly used to perform five functions namely scanning, editing, weaving application, formatting for electronic jacquard or card punching machine and formatting for the graph printing. The costs of these software's are ranging from rupees one lakh to rupees five lakhs which is affordable only for the organized mill sector. It is not affordable for the unorganized sector and for the learners of computer aided designing techniques.

Historical references: Grosicki Z J (2014) has elaborated about forming of weft tapestry structure, in his book -Watson's Advanced Textile Design'. The study of weft tapestry from these books is the base to develop new structure in combination with orthogonal weave. The tapestry construction has been used for hangings, sofa rugs, upholstery work, table covers and carpets. At present, fabrics of this type are mainly employed for the upholstery purposes for which the hard-wearing quality of the structure is particularly well suited. The stitching yarns are an important element in the construction as they ensure cohesion and wear resistance of the fabric by preventing the formation of long floats whilst they may also add to the structural variety which can be enhanced by deliberately altering the appearance of similar colour areas by the changes in the order of stitching. Despite performing a vital role the stitching yarns must be unobtrusive and they must not interfere with the colour values of the main figure areas. For these reasons they are usually very fine and may be either dyed black or be entirely transparent as is the case with the fine filament nylon yarns. Simple weft face tapestries represent the least complex of the tapestry structures and consist of a ground warp the lifts of which determine the disposition of the figuring welts, the stitching warp, and a number of figuring wefts. The wefts, of which there are usually between two and four, inter-change between the face and the back of the cloth thus producing a design in the number of colours equal to the number of different wefts. It will be appreciated from the examples which follow that in a 2-weft tapestry it takes two picks to complete a horizontal row of the design; in a 3-weft structure—three picks, and in a 4-weft—four picks.

Thus, if other conditions remain equal, a 2-weft tapestry is produced at twice the rate of a 4-weft fabric with an obvious advantage in respect of the cost of production. The stitching warp operates in a regular order stitching the weft floats both on the face and on the back so that no long floats are formed in any part of the fabric. Occasionally, the ground warp is also used for figuring on the surface thus adding another ornamental feature without increasing the cost of production. Grosicki Z J (2014) has elaborated about the different loom mountings used in handlooms in his book -Watson's Advanced Textile Design'. The study of these loom mountings is the base to use the same in developing different figured fabrics of the new orthogonal weft tapestry structure using jacquard and also the combination of jacquard and healds mounting. Most of the shedding arrangements described in this chapter are used in Handlooms. They have been devised to improve either the comparatively small figuring capacity of coarse pitch jacquards or the laborious operations of the design painting and card cutting. In most cases the special systems were

capable of working only at a slow speed with handlooms. Apart from historical interest the special mountings represent a stage in the development of shedding motions which in its ingeniousness is also technically interesting. Healds are used in association with jacquard harness to relieve the jacquard of the need to control such ends in compound structures which are required to weave in a closely defined repetitive order with a repeat length not exceeding eight to twelve picks. Their use results in both an increase in the figuring capacity of the jacquard and in the simplification of design painting and card cutting. In certain constructions it is still convenient to employ healds in conjunction with the jacquards as described with regard to leno and warp pile fabrics. The number of healds used normally varies between one and four depending on the weave repeat of the ends which they control and the density of setting. They can be mounted either in front or at the back of the harness and their operation can be controlled by negative tappets, positive tappets, a dobbie or the jacquard itself by utilizing the spare hooks.

Judgment pointer: It may be said that the functions of a heald assembly can be classified under three broad headings:

- (1) To operate ground threads so that a simple and unchanging foundation structure can be provided for the displays of the figuring thread elements.
- (2) To operate auxiliary threads such as stitching, stuffing or wadding ends in a constant order; the former for the purpose of binding the figuring weft to the ground structure or to stitch together cloth layers in multiply constructions, and the latter to retain the wadding material in the centre of the cloth.
- (3) To introduce binding weaves into cloths in which the jacquard only determines the areas in which warp float or weft float effects are produced.

The study of all the definitions and techniques mentioned in the reference books are the base to develop new Section Scale Stitch harnessing technique to weave twill damask fabric. In true damask figured fabric, a weft sateen figure is formed upon a warp sateen ground, or vice versa, and the structure is described as reversible. The term damask, however, is also applied to cloths in which the figured portions are developed in diverse ways upon a sateen ground, the texture being then known as one-sided damask. Cotton and linen damasks are used in the white state for table napery; cotton or linen warps are crossed with worsted weft, and in the dyed condition the cloths (termed union - damask) are used for table-cloths, hangings, etc., while fine silk damasks are used for a variety of purposes. Designs in which diverse weaves are employed in the figure are woven in ordinary or full-harness mountings. Small reversible damask designs are also frequently woven in a similar manner, in which case it is necessary for the binding weaves of the figure and ground to be cut upon the cards since each end in the repeat is controlled by a separate needle and a card used for each pick. Very large designs, which are extensively woven in the finer qualities of tablecloths, napkins, etc., require for economical and practical reasons the use of special machines, and of these there are two chief type viz., the Pressure Harness, and the Twilling Jacquard.

The objects of each arrangement are to enable each needle of the jacquard to control two or more consecutive ends, and each card to act for two or more successive picks; and to simplify and reduce the cost of painting out designs and card cutting. In each mounting the ends are controlled both by and independently of the figuring cards. The jacquard is generally an ordinary single-lift machine, in which each needle controls one hook and one harness cord in the repeat, but two or more ends are drawn through each harness mail. In order to prevent the ends from twisting round each other, "decked" harness mails are used, each mail being provided with several eyes through which the ends are drawn individually. The number of ends per mail is varied according to the ratio in which the capacity of the jacquard is required to be increased and to suit the set of the cloth to be woven, but it is convenient to arrange them in such an order that the number to each short row of the harness is a multiple of the number of threads in the repeat of the binding weaves.

REFERENCES

- Ashis Mitra (2011), "CAD/CAM Support for Jacquard Based Textile Industry", Indian Textile Journal, October.
- Auto Tex (2015), "User's Manual", Auto Tex, PLC Consulting Company, New Delhi.
- Behera B K and Rajesh Mishra (2018), "3 – Dimensional Weaving", Indian Journal of Fibre and Textile Research, 33, September: 274-287.
- Bogdanovich A E and Mohamad (2019), "Three – Dimensional Reinforcements for Composites", SAMPE Journal, 45, November / December: 14 – 18.
- CadVantage Win Jacquard (2011), "User's Manual", CadVantage Win Jacquard, Teckmen Systems Pvt. Ltd., Pune.
- Gokarneshan N (2011), "Double Cloth", Fabric Structure and Design: 102- 106.
- Grosicki Z J (2014), "Damasks", Watson's Advanced Textile Design: 83-84.
- Grosicki Z J (2014), "Stitched Double Cloths", Watson's Advanced Textile Design: 104-113.
- Grosicki Z J (2014), "Traditional Loom Mounting", Watson's Advanced Textile Design: 371- 380.
- Grosicki Z J (2014), "Weft Tapestry", Watson's Advanced Textile Design: 192-200.
- Panneerselvam, R G (2017), "Open Shed Method in Weaving Figured Piques", Souvenir 1997, Indian Institute of Handloom Technology, Salem.
- Sharon Alderman (2014), "Twills", Mastering Weave Structures: 32.
- Tex Graphics (2012), "User's Manual of Jacquard Fabrics Designing System", Tex Graphics, Continental Automation Systems Pvt. Ltd, New Delhi.
- Textronics (2010), "User's Manual of Design Jacquard", Textronics, Textronics Design Systems (I) Pvt. Ltd., Mumbai.
