

Improvement in the Texture of Handmade Paper – A Review

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Abstract

Handmade paper industry is one of the growing industry in India. Paper can be made either synthetically or naturally. Synthetic papers are mostly preferred for work but these papers have adverse effect on the environment and this can be replaced by handmade paper. This paper represents how the texturing of handmade paper can be done using various techniques and also standardize the whole paper manufacturing process without addition of any other machinery.

Keywords: Handmade paper, Texturing, Germination Paper, Methods of texturing paper, Cylinder mould, Hydraulic press.

1. Introduction

Handmade paper is a layer of entwined fibers held together by the natural internal bonding properties of cellulose fibers by hand, sheet by sheet on mould in suspension of fibers in water with or without sizing. It is always found that life of any handmade paper is more 100 years. The handmade paper making in India goes as far back as to the 3rd century BC. Handmade paper making is a traditional art that has been practiced by a particular class of people for generations together. This art has been passed on from one generation of craftsmen to another. These craftsmen are known as "Kagzi's". Their name is derived from the Urdu word 'kavas', which means paper. The size of this community has dwindled over the years. There is a small settlement of 'Kagzi's' in Sanganer near Jaipur, where a section of this community settled thousands of years ago.

The Germination paper is one such textured paper. Seed Germination Paper has become an accepted standard in the seed industry, providing nontoxic moisture holding paper to assure consistent tests. 76 lb. Heavy Weight Seed Germination Paper for larger seeds is twice the weight of the regular weight. Priced/1000sheets Packaged 2000/Cartron. In Sanganer the 'Kagzi' community is the primary owner of the handmade paper industry in the town. Their history goes back to the 14th century when the ruler was Feroze Shah Tughlaq. Even in those days the royalty used handmade paper made by them for official

documents, miniature paintings, calligraphy, and to make copies of the Holy Quran and

to maintain account books. In the 16th century the then ruler of Amber, Raja Man Singh

brought the Kagzis to Sanganer and settled them on the bank of the river Saraswati, where clean water was

easily available. Thus, the town emerged as one of the biggest paper producing centers in north India.

2. Paper Components and their Composition

- 1)Cellulose- 85-90%
- 2)Sizers-1-2%
- 3)Filler-1-2%
- 4)Colour-1-2%

3. Paper Making Process

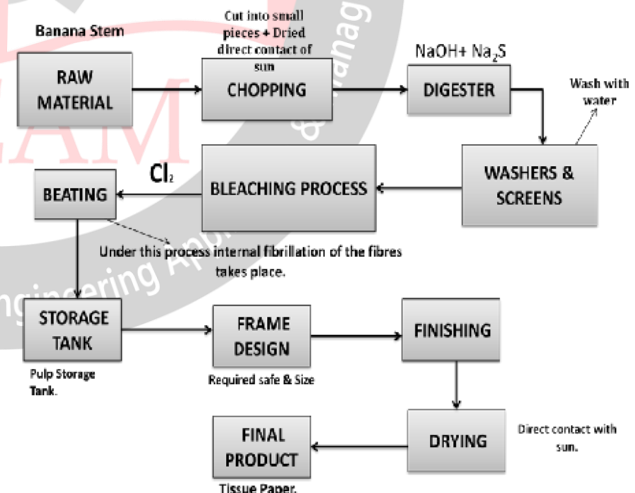


Fig.1 Paper Making Process.

The sequence of the process is as follows

- 1.Sorting and dusting.
2. Rag Chopping.
3. Beating and Pulping.
- 4.Dipping or Lifting.
5. Couching.
6. Pressing.
7. Drying.

8. Cleaning and Sizing.
9. Calendaring.
10. Finishing.
11. Cutting.

4. Paper Texturing Methods

The textured paper can be obtained on following machines:

1) Cylindrical mould paper machine

This machine is basically used to manufacture plain paper without any texture on it. But by just modifying the cylinder mould surface we can get texture on the handmade paper. It is type of calendaring machine in which one of the roll used to act as mould. It is a concrete mould which has a diameter of around 40 Inches. Concrete mould surface is made in such a way that the paper pulp easily adheres to it. This mould is partly dipped into the paper pulp hence due to rotation the paper pulp adheres to the cylinder mould. The thickness of pulp which adheres to mould have approximately 8mm thickness. One of the cylinder which is above the mould cylinder is wrapped with mesh of steel wire of the required texture and due to rotation, the texture of the mesh gets embossed on the paper and the texture is obtained on paper. This machine is used for continuous production of textured paper. The thickness of the paper decides the thickness of the steel wire mesh on the cylinder mould. For thin papers the wire mesh is thin and vice versa. The adoption of this technique can lead to high production rate of textured paper in the industry

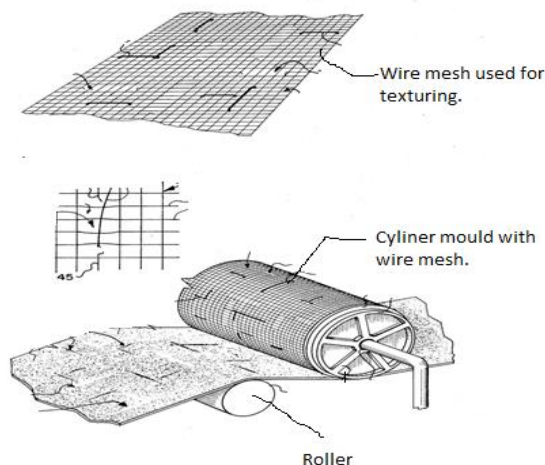


Fig 2. Cylinder mould Paper Texturing Machine.

2) Hydraulic press machine

The basic function of the hydraulic press in the handmade paper industry is to press the stack of paper up to some pressure to remove the water in it up to some extent. But by doing some modifications, the hydraulic press can also be used to texture the handmade paper. Raw paper is obtained on the watt machine. In watt machine the pulp is spread evenly on

the wire mesh with wooden frame. The excess water fall through the mesh and the wet paper remains on the wire mesh. The spread of the pulp on wire mesh arranges the fibers uniformly throughout the paper. The raw paper so formed is then stacked in such a way that they are separated by cotton cloth and steel wire mesh (texturing mesh) between them. This stack is then placed into the movable jaw of press machine. Pressure is applied on the stack of paper ranging from 0.5 tons to 2 tons. This gives the texture on the whole stack of papers. This is how the texturing of the handmade paper can be done on the hydraulic press. After the papers are pressed they should be carefully removed as they are still in semi dry conditions as they contain water and can get easily damaged. So the steel wire mesh is removed carefully from the stack of papers. To avoid the tearing of the papers, the steel wire mesh ends must be made smooth and while forming the stack of papers before pressing the cotton cloth sandwiched between the papers must be wet.

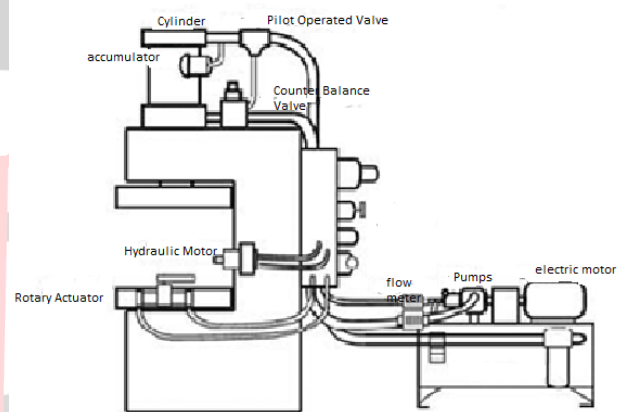


Fig.3 Hydraulic Press Machine.

5. Ream Weight Calculations

Table 1 Paper parameters with its ream weight.

S. No	Length	Breadth	Weight	Ream Weight
1	37.3	5.8	4.2	2.14
2	37	6	4	2.13
3	41	6.5	5.4	6.69
4	41	6	5.2	6.60
5	20.5	17	6.8	3.39
6	20.5	19.5	9	4.49

6. Conclusion

Handmade paper manufacturing is increasing day by day. The impact of synthetic paper on environment, pollution and other adverse effects has led to increase in the use of handmade paper. Nowadays handmade papers are manufactured in such a way that there will come a time where handmade paper will be in more

demand. Handmade paper is more wear resistant than many synthetic papers and have a long lifeline than any other paper. The texturing of handmade paper thus can be carried out on the above machineries without use of any additional machinery thus saving a lot of space and capital by just doing slight modifications mentioned in this paper.

7. References

Pratima Bajpai, Microbiological issues in Paper Making, National Institute Kanpur.

Christopher Biermann, Handbook of Pulping and Papermaking.

Hubbe and Bowden (2009). "Handmade paper, review," *BioResources* 4(4), 1736-1792.

Asim Kamate, "Design, Development and analysis of a 20-ton hydraulic press", *IJITR* Vol 4 Dec-Jan 2016 2560-2563.

Cookson, Lynda "How to Make Handmade Paper" eBook ISBN 0-9550272-0-9

Clark, James d'A. (1985). *Pulp Technology and Treatment for Paper* (2nd ed.). San Francisco: Miller Freeman Publications. ISBN 0-87930-164-3

Westerlund Leslie C. "How to Make a Papermaking Press" ISBN 978-1-876141-45-5, 2007; WES

