

MAKING HAND-MADE PAPER FROM LINEN WASTE – AN INITIATIVE TO CONTRIBUTE TOWARDS GREEN ENVIRONMENT

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ABSTRACT

As the concern over ill-effects of high emission of Carbon is rising all over the world, as responsible citizens of this country, we need to make every effort to contribute towards improving the Carbon footprint through imbibing “Green practices” in all our activities. In order to do our bit for achieving the goal of making our country “Green”, an initiative has been taken to produce Hand-made papers out of the Linen Waste produced by Linen manufacturing industries. The article deals with an experiment conducted to make Hand-made paper and the superior properties achieved.

I INTRODUCTION

Carbon footprint is defined as "the total set of Greenhouse gas emissions caused by an individual, event, organisation or product expressed as CO₂e". For example, Carbon footprint of a person or group of persons is simply the amount of carbon di-oxide (CO₂) and other greenhouse gases those are released by the person(s) over a given time period. As for a product, it is the amount of carbon di-oxide (CO₂) and other greenhouse gases those are released during the sourcing, production, distribution, use and disposal of that product. For an activity or process, it is the amount of carbon di-oxide (CO₂) and other greenhouse gases those are released during the occurrence of the activity or process.

Due to rapid industrialisation and misuse of natural resources, there has been uncontrolled emission of Carbon dioxide. On the contrary, oxygen produced by the trees through photosynthesis is reducing day by day due to cutting of trees. As a result, the net effect is imbalance between carbon di-oxide and oxygen in the atmosphere, which is posing great threat to the existence of life on the earth.

There is a growing concern in the world to reverse the order and reduce Carbon footprint by restricting polluting industries. One of the most polluting industries in the World is the Paper & Pulp industry. This sector takes a mixture of raw materials (wood/non-wood) & processed materials (chemicals/fuel) and converts them into a mixture of furnished and partially finished goods. At all stages of the processing chain, wastes products are generated. Moreover, the paper industry is forest based and depleting forest cover is a major cause of concern. Examples from other industrialized nations indicate that it is already too late for the Indian pulp and paper industry and we shouldn't wait any longer to take action. The present, environmentally unfriendly production

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technology and raw material are two basic issues, which must be addressed for survival. It's time for policy makers to think and decide the future trends of the industry in the coming years. One of the alternatives is to make Hand-made paper, production process of which is eco-friendly and environmentally cleaner.

Hand-made papers have several advantages over the papers made from Wood pulp. Some of these are:

1. The raw materials used in handmade papermaking are the waste products of the textile industry, different bast fibres available locally and recycled secondary fibres.
2. Pulping of these raw materials is based on the use of non-polluting chemicals such as lime, soda ash, caustic soda, oxalates, oxygen, and peroxides. It is not necessary to use harmful chemicals like alkali sulphide and sulphite, chlorine and chlorine compounds for the delignification processes. There is hardly any pollution or negative impact on environment.
3. Handmade paper shows a better strength isotropy than machine paper. The fibres of handmade paper are shaken in 4 different directions, while fibres of machine made paper are only from shaken side to side or their movement is frozen immediately on the twin wire type of paper machines. Improved formation can be achieved in handmade paper. There are less direction-oriented fibres on the sheet.
4. Hand-made papers are dried without any restraint and hence have natural shrinkage.

Keeping the above in the backdrop, an attempt has been made to produce Hand-made papers from Linen wastes from a Linen manufacturing industry, which have big potential of commercialisation. The steps followed to make the Hand-made papers are described below.

II PRODUCTION OF HAND-MADE PAPERS

Raw materials for the experiment, Linen Fibre waste (both unbleached and bleached varieties) were collected from a reputed Linen manufacturer. The raw materials were subjected to a digestion process followed by beating and refining. Two varieties of papers, viz., 90 gsm and 130 gsm, were made using the process. Due to high strength of Linen fibres, the papers obtained through the process are very strong.

In addition to the raw materials being waste, which are being recycled, the processes adopted to make papers are environment friendly. The materials are subjected to minimum pre-treatment with low energy and chemical consumption. The drying process is natural with no energy consumed.

This way, waste generated from an industry making Linen yarn have been recycled to make useful products and that too using an environment-friendly process.

Bags have also been made using these papers. These bags, once properly designed, can be used by various retail chain stores. It can be a unique CSR initiative by the corporates to give away these bags to the customers, who visit the stores.

We have also done costing for making the papers. As per the costing, approximate cost of A1 size (24" x 34") papers would be:

- 90 gsm bleached Rs 8.50 per sheet

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- 90 gsm unbleached Rs 8.00 per sheet
- 130 gsm bleached Rs 9.00 per sheet
- 130 gsm unbleached Rs 8.50 per sheet

III CONCLUSION

Time has come to rise to the occasion and find & adopt eco-friendly and sustainable ways of making things, which are regularly required by us. In our attempt of making Hand-made Bags from Linen waste, we have moved a small step forward, which has got tremendous potential of reducing Carbon footprint if commercialised properly. The product developed by us has got higher strength and better aesthetic look than papers made from pulp, thus adding higher value to it.