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Study On Quality Of Material Made By Waste Agriculture And Packing Paper Materials

Shipra Gupta[1], Vijay Kumar[2*], Akash Behera[3]

1 Associate Professor, School of Management, Graphic Era Hill University, Dehradun, India. Email: drshipragupta16@gmail.com

2. Professor, Department of Physics, Graphic Era Hill University, Dehradun, India , Email: drvijaykumar.geu@gmail.com

3. Department of Civil Engineering, Graphic Era Deemed to be University, Dehradun-248002, India.

*Corresponding Author: Dr. Vijay Kumar

Abstract

Traditional papers are made from the wood pulp of trees and plants. Trees are cut for obtaining documents throughout the whole world. Paper mills are the world's third-largest industry and are responsible for many types of pollution. The paper industries are responsible not only for air pollution and water pollution but also for land pollution. If we encourage people to recycle, we can also save trees and, subsequently, the environment. At the time of crop cutting, much agricultural waste is produced each day on farming fields in the whole world. Right now, no one knows how we should utilise these agricultural wastes.

Similarly, the utilisation of packing materials is also a big problem. It has been experimentally proved that the quality of handmade paper may be improved by mixing agricultural waste with the pulp of used paper. The blending of waste

and agricultural material with waste paper produces good quality, smooth, and surfaced papers.

Keywords: Recycling; waste agricultural; waste papers; waste packing materials; environment protection.

1. Introduction

The students generated waste paper using notebooks, books, answer scripts, and assignment notes. In our homes, waste paper is developed in the form of newspapers and magazines. To protect the goods, online orders such as Amazon, Flipkart, and courier services use a variety of packing materials. After unpacking, the packing materials become waste. These waste materials can be recycled and reused after processing. The recycling process is a need in today's scenario of the whole world. One tonne of recycled waste paper can save the lives of 30 eucalyptus trees, 7000 gallons of water, 380 gallons of oil, 3.3 cubic yards of landfill space, and 400 kW of energy. Natural resources are decreasing continuously. To produce new papers, the wood of eucalyptus trees is always required. From the wood of one tree, only 30–35 kg of paper can be manufactured by the paper mills. Paper mills emit harmful CO_2, CO, and many types of polluted gases during manufacturing [6, 8]. A large amounts of fuel, oil, and water are required in these industries. Right now, the recycling of used and waste papers is the manufacturing of new papers. If we recycle one tonne of waste paper, it can save the lives of 24-28 green trees, prevent the dispersion of 36 tonnes of CO2 and weigh 267 kg. Pollutant gases hold about 4100 kWh of electric power, 1750 litres of fuel oil, 38.8 tonnes of water, 3–4 m^3 of waste landfill area, and destroy about 85 m^2 of forest area. The use of foreign dependency is also reduced, which helps to save foreign currency [1,2,3].

Similar to waste paper, agricultural waste is also a problem. Most farmers have burnt the farm waste, and this waste has become a problem of air pollution. The smoke from the burning of this agricultural waste becomes harmful to asthmatic patients [7,9,10]. Farm waste is disposable; we can dope the pulp of agricultural waste in the pulp of waste packing materials. In this manuscript, the authors described the need for recycling waste papers and revealed how

we can improve the quality of handmade papers by using agricultural waste [4,5,6,16].

2. Review of Literature

From the day it is invented till today, paper is a part of human life in various ways, and it is gaining even more popularity as years go by. As the consumption of paper has been increasing, the problem of sourcing raw material is emerging. As a result, natural resources are being exploited. Recycling paper has become vital since the demand for paper has increased, and natural resources are being exploited [11,12,13]. In this study, the paper industry is analyzed concerning Recycling, and the process of producing paper in a recycling factory, and weighted proportional costs of Recycling are presented. Thus, it is intended to assist managers of waste paper recycling factories in making strategic plans and those who will start up new factories. The study concludes that the weight of waste paper as a raw material within the factory's costs is 43% [14,15].

3. Material and Methods

The surfaces of handmade papers are generally rough. The strength of papers made from pure paper pulp is usually weak. By the use of fibre of agricultural waste, the strength of the papers may be increased. The surfaces of papers are also becoming neat and clean. In doing this, mixing other material like dry leaves, useless branches of plants, and waste agriculture is made with the pulp's waste paper. All types of waste materials are shredded by shredding machine and pulp of shredded. The pulp of disposable agriculture is mixed with the pulp of waste papers in various ratios, and samples are prepared. Ten samples of varying ratios of agriculture and papers are made. The percentage of waste, agriculture in the pulp of waste papers in all ten samples is kept 5% to 50%. To prepare the samples, firstly, the scat agricultural will be washed in washing areas so that mud and other like materials available on the surface of agricultural wastes vanish. After drying, the farm waste, the used hard packing paper material shred by a shredding machine, and both shredded materials mix as the above-given ratio. These materials must dip about 6 hours inside the water and blend mixture by the beater or pulping machine.

After preparing the pulp, remove the excess water. We can prepare samples in rectangular form and dry it under the sunlight. We can also use the dryer to dry the pulp of the mixture. Repeat the process to make the more sheet of Handmade Paper of different ratios. The properties of handmade papers are analyzed by the hardness test, photometry test, and moisture test.

3.1 Hardness test

To determine the hardness of each sample, the hardness machine is used. To find out the hardness of the paper sample, a hardness machine is used (fig.). The hardness test represents handmade paper's strength. The hardness value (HRB) of each sample is illustrated in table 1.

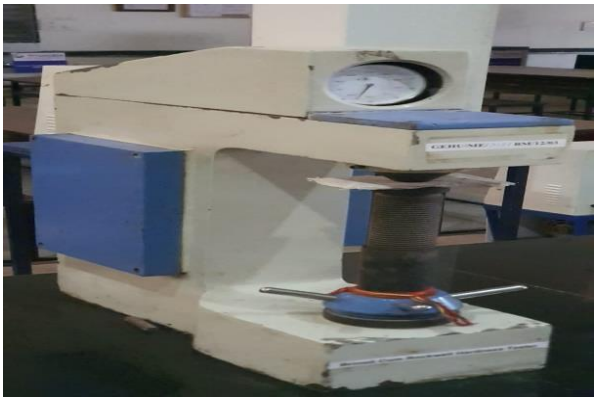
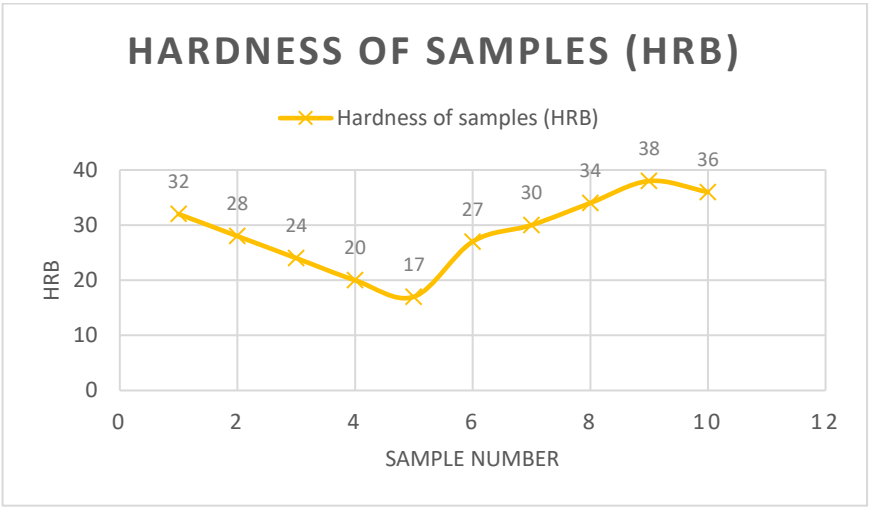


Fig. 2: Photo of the hardness test machine

Fig. 5: Variation of hardness with respect to different percentage of waste papers and waste agriculture



3.2 Description of hardness test machine

The above device depends upon the principle of the non-destructive testing method. It determines the hardness of the material by measuring the size of an indentation left by an indenter. At a defined ball diameter and test force, larger indents left in the Brinell Hardness Testing Machine's surface indicate a softer material.

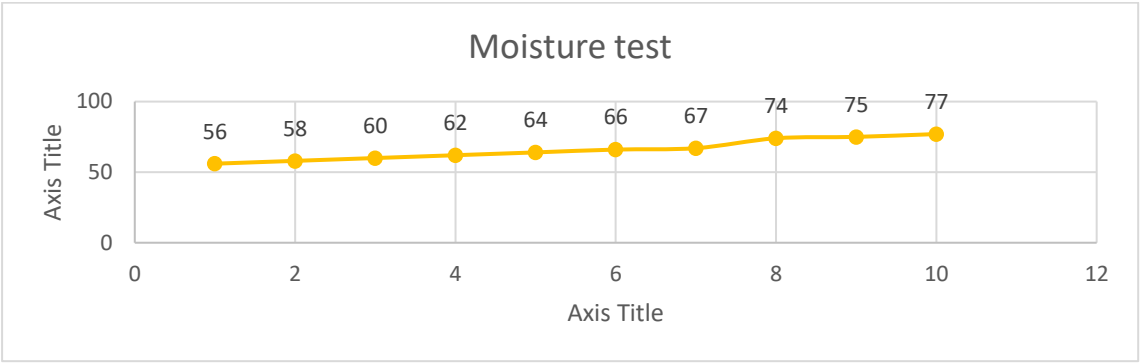
3.3 Photometry test

The photometry test of each sample is done in which light is Luxmeter observes incident on samples at different angles and intensity of reflected light from the samples. The intensity of reflected light represents how much light is absorbed by the sample, and at what angle it may increase or decrease. The photometry test shows the reflector and absorption properties of the paper. The intensity of reflected and incident lights is observed by the Lux meter.

3.4 Moisture test

The moisture test is done to determine the presence of moisture inside the samples. To do this, pieces are clamped, and weights are dropped on the sample from various heights.

Fig.: variation of moisture in samples of handmade papers



3.5 Importance of given tests

To find out the properties of samples made by waste paper pulps and agricultural waste, the above-given tests are performed. The hardness test and photometry test observe the strength, reflection, absorption properties of the papers. The moisture test observes the effects of moisture available in the sample. By these observations, it is decided that what percentage of doping of agricultural waste is useful for the paper's properties.

4. Conclusions

Recycling is one of the well-known methods of converting old waste material to new material. Our primary goal in this manuscript is to create awareness regarding the recycling of waste papers and agriculture waste. As per the above analysis, it is concluded that when the quantity of waste agricultural material is less, the hardness of handmade paper is greater. As the amount of agricultural waste is increased, the strength of handmade paper is continuously decreased until sampling 5. From sample 6 to 9, the hardness continuously increases, but in the last sample 10, the strength of the paper is a little bit reduced. It is concluded that the mixing of waste agricultural material in the pulp of paper increases the strength of handmade paper.

We can recycle the materials used in agriculture with the recycling of waste papers. We can make good-quality, handmade papers. From the above analysis, it is concluded that the quality of handmade papers is changed after mixing the waste materials of agriculture. It is an excellent use of waste

agriculture, which is in general responsible for air pollution as the farmers burn this waste material.

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