

Ligno Cellulosic Materials for Automotive Interiors

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Abstract- Nonwoven materials have been manufactured using needle punch, thermal and chemical bonding. Therefore, currently waste recycled materials present good alternative to synthetic material. Interior application by innovative material in experimental approach becomes a new area. Based on result the natural fiber based nonwoven is suitable for automotive interior applications. Natural fibers are nowadays increasingly employed for making nonwovens, replacing the synthetic materials due to economic and/or environmental considerations. Extracted natural fibers present satisfying mechanical properties that allow it to be an important source for nonwoven textiles materials. The interest in using natural fibers such as different plant fibers and wood fibers as reinforcement in plastics has increased dramatically during recent years. The purpose of this study is to show the feasibility to of making nonwoven textiles with natural fiber. Therefore, the natural fibers: bamboo, jute, banana blended together in the required proportion. Webs are prepared using this natural fiber using cards in regular width. Then the needling is used to consolidate the fibrous structure. These nonwoven can lead to different useable products in automobile in order to improve the value. Synthetic fibers are majorly used in automotive interiors. In order to reduce the usage of synthetic fibers we developed natural fiber composites for interior applications. Productions of nonwoven fabric from synthetic yarns can reduces problems generated by manmade fibers. In this report it is described how the natural fibers are used as an alternate for synthetic fibers. Therefore, currently waste recycled materials present good alternative to synthetic material. Further we will study the properties of the yarn and its application in different field. In this project report I am going to discuss about the usage of natural fiber in automotive interior. Based on the result the natural fiber-based nonwoven is suitable for automotive interiors.

INTRODUCTION

Non-woven fabric is a fabric-like material made from staple fibre (short) and long fibres (continuous long), bonded together by chemical, mechanical, heat or solvent treatment. The term is used in the textile

manufacturing industry to denote fabrics, such as felt, which are neither woven nor knitted. Some non-woven materials lack sufficient strength unless densified or reinforced by a backing.

Non-woven fabrics are broadly defined as sheet or web structures bonded together by entangling fiber or filaments (and by perforating films) mechanically, thermally or chemically. They are flat or tufted porous sheets that are made directly from separate fibres, molten plastic or plastic film. They are not made by weaving or knitting and do not require converting the fibres to yarn. Typically, a certain percentage of recycled fabrics and oil-based materials are used in non-woven fabrics. The percentage of recycled fabrics vary based upon the strength of material needed for the specific use. In addition, some non-woven fabrics can be recycled after use, given the proper treatment and facilities. For this reason, some consider non-woven a more ecological fabric for certain applications, especially in fields and industries where disposable or single use products are important, such as hospitals, schools, nursing homes and luxury accommodations. Nonwoven fabrics are engineered fabrics that may be single-use, have a limited life, or be very durable. Nonwoven fabrics provide specific functions such as absorbency, liquid repellence, resilience, stretch, softness, strength, flame retardency, washability, cushioning, thermal insulation, acoustic insulation, filtration, use as a bacterial barrier and sterility. These properties are often combined to create fabrics suited for specific jobs, while achieving a good balance between product use-life and cost. They can mimic the appearance, texture and strength of a woven fabric and can be as bulky as the thickest paddings. In combination with other materials they provide a spectrum of products with diverse properties, and are used alone or as components of apparel, home furnishings, health care, engineering, industrial and consumer goods.

The interest in using natural fibers such as different plant fibers and wood fibers as reinforcement in

plastics has increased. The need for materials having specific characteristics for specific purposes, while at the same time being non-toxic and environmentally friendly, is increasing, due to a lack of resources and increasing environmental pollution. Studies are ongoing to find ways to use lignocellulosic materials in place of synthetic materials as reinforcing fillers.

Thus, research on the development of composites prepared using new fibrous. When they have to choose between varieties of products, manufacturers consider following criteria: economics, durability, aesthetics, process ability, mould ability, added benefits, which are main driving forces of nonwoven in construction industry worldwide.

Composites are heterogeneous in nature, created by the assembly of two or more components with fillers or reinforcing fibers and a compactable matrix. Composites are one of the most widely used materials because of their adaptability to different situations and the relative ease of combination with other materials to serve specific purposes and exhibit desirable properties. The main aim of the project is to give broad outlook about the textile materials used in automotive interior applications.

Nonwoven materials are increasingly used in many industries such as Medicine and Healthcare, Household Domestic uses, Building industry, Agriculture, Horticulture & Aquaculture, Automotive and Transport, Geosynthetics, Clothing.

Jute, Banana and Bamboo plant fibers are used. This natural fiber offer an environmental friendly solution for manufacturing textile composite parts and components while providing performance better compared to other products.

Nonwoven materials have been manufactured using needle punch, thermal and chemical bonding. Therefore, currently waste recycled materials present good alternative to synthetic material. Interior application by innovative material in experimental approach becomes a new area. Based on result the natural fiber based non woven is suitable for automotive interior application.

NEEDLE PUNCHING

A needle punched nonwoven is a fabric made from webs or batts of fibers in which some of the fibers have been driven upward or downward by barbed needles. This needling action binding point is a set of fibers

with various orientation, which are bonded by friction forces. The needle board is the base unit into which the needles are inserted and held. The needle board then fits into the needle beam that holds the needle board into place. The feed roll and exit roll are typically driven rolls and they facilitate the web motion as it passes through the needle loom. The web passes through two plates, a bed plate on the bottom and a stripper plate on the top. Corresponding holes are located in each plate and it is through these holes the needles pass in and out. The bed plate is the surface the fabric passes over which the web passes through the loom. The needle scarry bundles of fiber through the bed plate holes. The stripper plate does what the name implies; it strips the fibers from the needle so the material can advance through the needle loom.

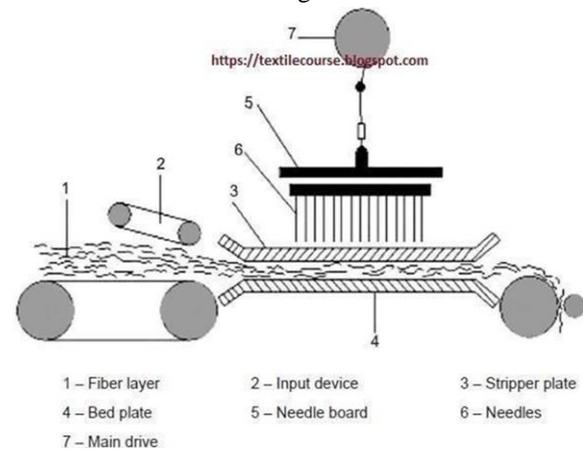


FIG NEEDLE PUNCHING PROCESS

MATERIAL USED AND METHODOLOGY

- In the study, Jute, Bamboo and Banana fibres are used as raw materials for the non-woven.
- Fabric production. Before production, the length, fineness, and cross-sectional appearance of the fibres.
- These fibres are used in the proportion of Jute (40%), Banana (20%), and Bamboo (40%).

EXPERIMENTAL PROCEDURE

- The interest in using natural fibres such as different plant fibres and wood fibres as reinforcement in plastics has increased dramatically during recent years. Jute, Banana fibres are used. This natural fibre offer an environmentally friendly solution for

manufacturing textile composite parts and components while providing performance better compared to other products.

- Jute is one of the most important natural fibre in terms of cultivation and usage. Jute fibre has some unique physical properties like high tenacity, bulkiness, sound and heat insulation property, low thermal conductivity, antistatic property etc. Jute fibres are always known as strong, coarse, environmental friendly, and organic.
- Banana are among the largest herbaceous plants. Appearance of banana fibre is similar to that of bamboo fibre and ramie fibre, but its fineness and spinnability is better than the two. It is highly strong fibre and it also has a smaller elongation property.
- Bamboo fibre is a cellulosic fibre. It has various micro-gaps, which make it softer than cotton and increase its moisture absorption. The fibre is bacteriostatic, antifungal, antibacterial, hypoallergenic and resistant against ultraviolet light.

CONCLUSION

- ❖ The synthetic materials cause more pollution and it leads to cancer like dreadful diseases so we replace it with natural fibers.
- ❖ Replacing of synthetic materials can reduce this type of problems and we can use as a textile product.
- ❖ Nonwoven fabric can be produced using natural lingo cellulosic materials which are produced into fabric.
- ❖ Nonwoven fabric are used for home textiles for carpets, rugs, cleaning towel etc.,
- ❖ The lingo cellulosic nonwoven are produced into fabric using needle punched technique.
- ❖ In this project we have reduced usage of synthetic materials which are pollutants.
- ❖ From this we can reduce pollution and problems.
- ❖ This project can be commercialized and also ecofriendly.

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