



International Journal of Home Science

ISSN: 2395-7476
IJHS 2016; 2(1): 28-30
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www.homesciencejournal.com
Received: 11-11-2015
Accepted: 13-12-2015

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A survey on the construction of country boat using nonwoven composite made of natural fibres

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Abstract

Human life is surrounded by hundreds of textile fibres either in the form of clothes, interior textiles or in the form of technical textiles made of conventional or high performance fibres for various applications. Natural fibres like banana, coir, cotton, sisal and jute have attracted the attention of scientists and technologists for application in consumer goods, low cost housing and other civil structure. Eco-friendly fully bio degradable composites based on natural fibres and resins are increasingly used for various applications as replacements for non-degradable materials points out Gupta (2001).

A study was conducted in three districts of Southern part of Tamil Nadu namely Thoothukudi, Tirunelveli and Kanyakumari to find out the preference of nonwoven and composites made up of natural fibres, such as Jute, Coir, Banana and blends, which are low cost and locally available fibres. A total number of 300 fishermen, boat company owners and company employees were selected randomly from three districts. An interview schedule was designed to elicit information from various fishermen community, boat company owners and employees of the company.

Natural fibre apart from low cost and renewable in nature, it is more attractive as reinforcing material in composites. A random study was done to find out the preference of the material regularly used to construct country boat and it was revealed that glass fibre was at practice. The study also revealed that three types of crafts are used for fishing in three district and they are kattamaram, vallam and mechanized boats. The study revealed that the country fishermen are concerned with marine environment and they preferred to select the natural fibre at affordable cost. The natural fibre such as Jute, Coir, Banana and blends were selected.

Keywords: Country Boat, Nonwoven Composite, Natural Fibre

1. Introduction

Natural fibres are suitable to reinforce plastics due to relative high strength, stiffness, low density, low CO₂ emission and biodegradability. Biodegradable composite reinforced by natural fibres provide an important environmental advantage in sailing industries. Natural fibres like Cotton, Wool and Linen found usage in certain specific technical textile applications. Compared with glass fibres, natural fibres are light weight and their mechanical process is less complicated. They are entirely biodegradable and do not present health hazards in anyway. They are many examples of the use of cellulosic fibres in their native conditions like Sisal, Jute, Coir, Banana, Hemp, Palm, Cotton and Paper for reinforcement with different thermoplastics and thermosetting materials like phenol formaldehyde, unsaturated polyester, epoxy, polyethylene, vinyl, cement, natural rubber says Mishra (2000).

Nowadays fibre reinforced composites are increasingly used in a very wide range of applications such as automobile construction, aircraft construction, construction of doors and boats. The natural fibre composites offer specific properties compared to those of conventional fibre composite points out Richardson (1998). However, in development of these composites, the incompatibility of these fibre and poor resistance to moisture often reduce the potential of natural fibre. Social science is evincing a new interest in the study of ethnic groups and tribal communities bound by particular geographical area, tradition, religious belief and modes of social interaction. The life of seamen is inseparably linked to the profession of fishing. Traditional fishing which is a job of high risk is their sole means of livelihood. They use Kattamarams and country boats made of glass fibres or wood for fishing stated by Stephen Gomes (1986).

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2. Methodology

Fishermen, boat company owners and employees were randomly selected for the study from the coastal areas of Thoothukudi, Tirunelveli and Kanyakumari District. Majority of the population selected are located in coastal areas, engage themselves in fishing using country boat. Hundred samples were taken from each category. Survey was conducted to gather information regarding the type of country boats preferred, their quality, design and the types of fibre preferred. The preference of company owners regarding the availability of the materials, cost, and their opinion on natural fibers in the place of glass fibers and the use of chemicals were studied. The natural fibers such as Jute, Coir, Banana and their combination were selected to prepare the nonwoven and seven samples were prepared. They were Jute (100%) Coir (100%) Banana (100%) as first samples JC (Jute Coir) (50:50), Coir Banana (CB) (50:50), Jute Banana (JB) (50:50) as second

samples and the combination of JCB (Jute, Coir and Banana) as 3rd samples in the ratio of 33:33:33 were selected.

3. Result and Discussions

The result of the survey conducted from hundred fishermen from three districts are presented in Table 4.1 – 4.9.

Table 4.1: Construction of Existing Country Boat Preferred by Fishermen

Sl. No	Model Preferred	Percentage
1.	Country Boat – Medium	32
2.	Country Boat - Larger	68
	Total	100

The table 4.1 shows that 32 percent of fishermen preferred country boat with medium size and 68 percent preferred large sized country boat to be constructed using nonwoven.

Table 4.2 Comfort and Safety Preferred by Fishermen

Sl. No.	Comfort		Safety	
	Characteristics	Preference in Percentage	Characteristics	Preference in Percentage
1.	Spacious	42	Strong	38
2.	Appearance	10	Water Proof	30
3.	Water Proof	48	Structure	32
	Total	100		100

Table 4.2 reveals that 42 percent of fishermen preferred to have more space and 10 percent expressed to have good appearance whereas 48 percent desired to have water proof in country boat constructed with nonwoven.

Regarding the safety of country boat, 38 percent expressed to be strong and water proof by 30 percent and 32 percent told that the structure should be suitable for fishing. From the statement it was concluded that majority of fishermen preferred to have more space, water proof, strong and good in structure of the constructed country boat with nonwoven.

Table 4.3: Colour Preferred by Fishermen for Country Boat

Sl. No	Colour	Preference in Percentage
1.	Blue	35
2.	Blue Green	9
3.	Blue Yellow	40
4.	Blue Red	6
5.	Blue White	10
	Total	100

From the analysis it was found that 40% of the fishermen preferred the blue yellow and 35 percent blue color to be painted for country boat as the sea algae get less attracted by blue color which is revealed in table 4.3.

Table 4.4: Cost of Country Boat preferred by Fishermen

Sl. No	Cost of the Country Boat in Rupees	Preference in Percentage
1.	Rs.75,000	33
2.	Rs.75,001-Rs.1,00,000	28
3.	Rs.1,00,001 – Rs.1,25,000	23
4.	Above Rs.1,25,000	16
	Total	100

The cost of the country boat preferred by fishermen are presented in table 4.4 which reveals that they preferred to construct country boat to be less costly.

Table 4.5: Design Preferred by Fishermen

Sl. No.	Design Preferred Basic Pattern	Percentage
1.	Basic pattern with roof top	34
2.	Basic pattern without roof top	44
3.	Basic pattern with cabins	22
	Total	100

The study revealed that 44 percent of the fishermen expressed to design country boat without roof top which is given in Table 4.5.

Table 4.6: Durability Preferred by Fishermen

Sl. No.	Durability Preferred	Preference in Percentage
1.	Heavy	30
2.	Strong	20
3.	Durable	50
	Total	100

The table 4.6 shows that 50 percent of the fishermen preferred that the country boat should be durable to withstand strong wind and heavy rain and the characteristics changes of saline water.

Table 4.7: Acceptance of Natural Fibre by Fishermen

Sl. No	Acceptance of Natural Fibre	Preference in Percentage
1.	Natural Fibre	42
2.	Polyester	20
3.	Glass Fibre Combination	38
	Total	100

From the study (Table 4.7) it was noticed that 42 % of fishermen accepted to use natural fibres and the investigator selected the natural fibre which was low cost and locally available such as coir, jute, banana in order to prepare nonwoven and develop composite.

Table 4.8: Acceptance of Natural Fibre by Company Owners

Sl. No.	Acceptance of Natural Fibre	Percentage
1.	Natural fibre	35
2.	Polyester	10
3.	Glass fibre combination	27
4.	Wood	20
5.	Plastic	3
6.	Carbon / Kevlar	5
	Total	100

The opinion of company owners and their acceptance of natural fibers were studied. The table 4.8 reveals that 35 % of the company owners responded positively to use nonwoven prepared from natural fibres.

Table 4.9: Properties Preferred by Company Owners

Sl. No.	Properties	Preference in Percentage
1.	Strength	25
2.	Durability	26
3.	Wet ability	14
4.	Resistance to Heat	17
5.	Insulation Properties	18
	Total	100

The properties preferred by the company owners in the selected nonwoven and composite shows that the majority of the respondents expressed the need to have all the properties in the selected samples which is given in table 4.9.

4. Conclusion

The study revealed that fishermen preferred to construct the country boat with natural fibres because they are eco-friendly. It was also stated that the natural fibres selected to construct country boat should be water proof, durable, attractive in color with affordable cost, strong and have equal strength as that of glass fibre.

It was found that the employees working in boat companies were of the opinion that the natural fibres are best to construct country boat since they are healthy, eco-friendly, less harmful and conducive to work in the company and not irritable to skin. The study also revealed that the employees expressed their desire to carry out some future studies on the type of chemicals used and to add perfumes to the resins in order to overcome the strong odor which affects the health of the employees.

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