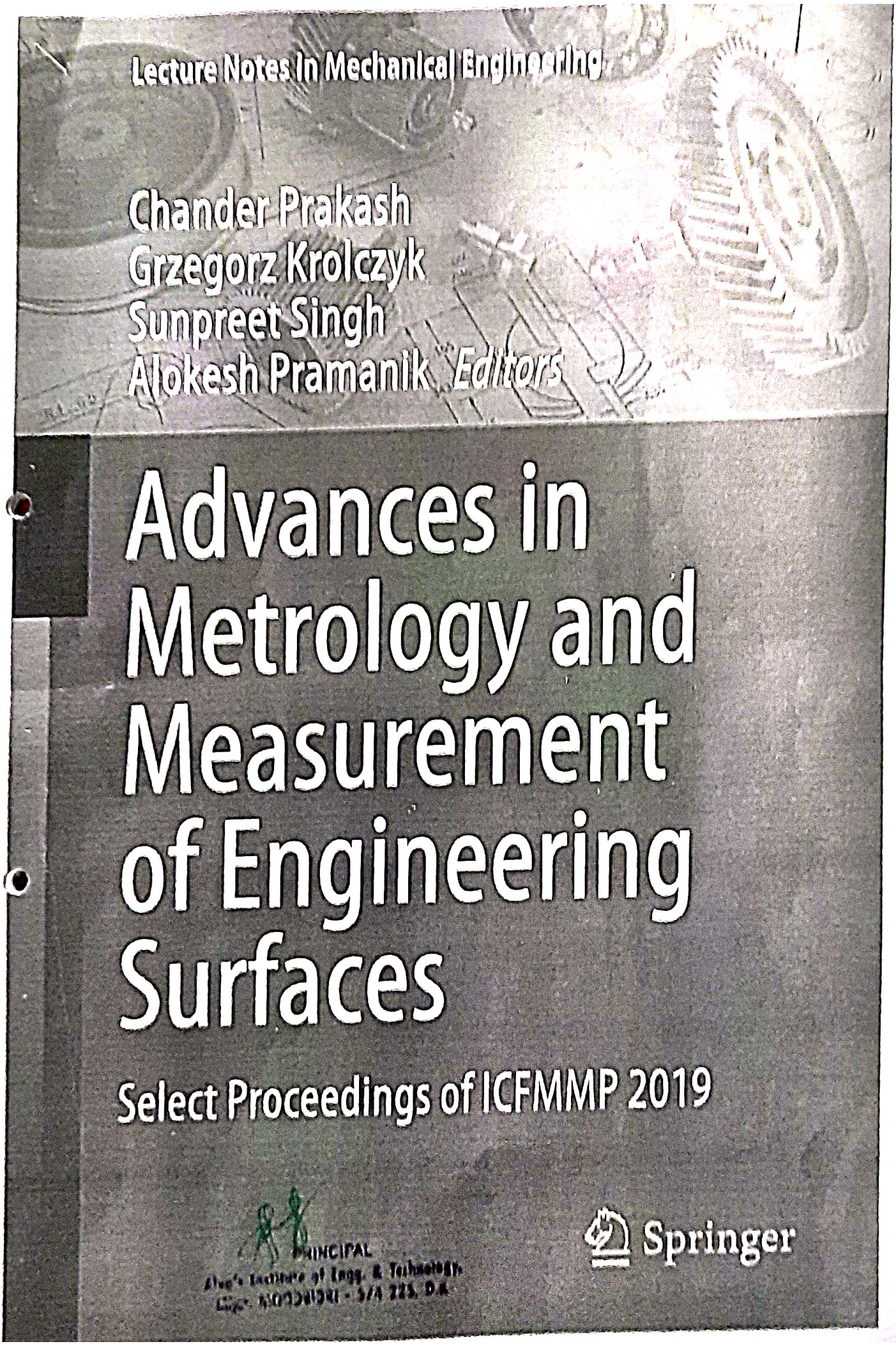
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Contents

Tensile and Flexural Behaviour of Areca Husk Fibre Reinforced Epoxy Composite

Sakshi S. Kamath, D. N. Punith, S. Preetham, S. N. Gautham, Janardhan, K. Lalith Yashwanth, and Basavaraju Bennehalli

Abstract Nowadays, because of the issues related to the environment, it is becoming mandatory for the usage of eco-friendly products for betterment of the people. Hence, here is an attempt made where the harmful synthetic fibre composites used for marine, automobile, constructive applications can be replaced by eco-friendly, biodegradable natural areca fibre composites. Physical properties of areca husk fibre were studied, and it revealed that maximum fibres have length range from 40 to 50 mm with the diameter ranging from 0.200 to 0.299 mm. These untreated and 1% NaOH treated fibres were used for composite fabrication at different fibre loadings like 45, 50, 55, 60, and 65%. It was found that 50% is the optimum fibre percentage. Tensile strength and flexural strength for untreated fibre composite at 50% fibre loading were found to be 7.40 N/mm^2 and 4.01 N/mm^2, respectively, and 54.91 N/mm^2 and 6.81 N/mm^2, respectively, for alkali-treated fibre composites.

Keywords Areca husk fibre · Mercerization · Linear density diameter method · Tensile testing · Flexural testing

1 Introduction

Increasing environmental awareness and decrease in fossil fuels are influencing researchers to use biodegradable natural material in composite manufacture as the substitute for synthetic fibres. The non-biodegradability, environmental impact and high cost of the synthetic fibres used as the reinforcing material in the composite manufacture is questioning the mankind about its usage and hence finding an alternative for using natural fibres as the substitute for composite fabrication [1]. The advantages

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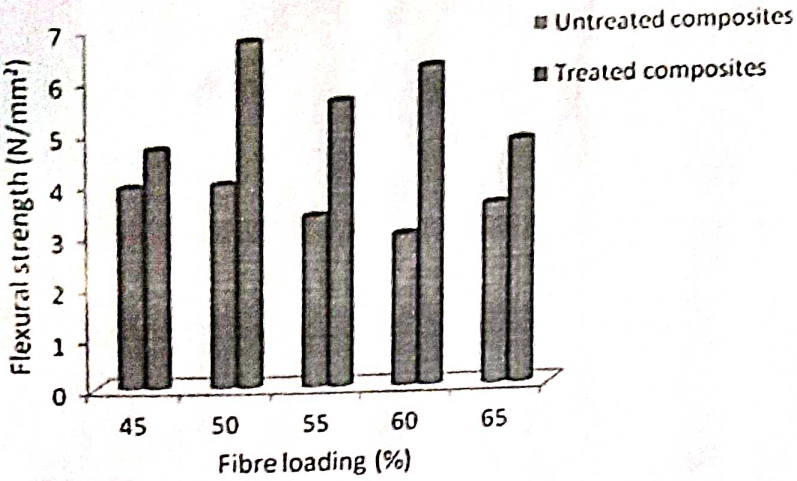

Fig. 7 Comparative study of flexural strength

50% fibre concentration. The reason for this is, at greater fibre concentration, clustering of fibre takes place which results in non-uniform transfer of stress from fibre to resin.

4 Conclusion

The tensile and flexural behaviour of raw and 1% NaOH treated fibres were studied at different fibre loadings from 45% to 65%. The study witnessed that in both the cases, strength is maximum at 50% fibre loading. Hence, 50% fibre loading is selected as optimum loading for future work. The comparative studies revealed that tensile strength and flexural strength of 1% NaOH treated fibre composites are elevated compared to untreated fibre composites. Hence, it proves that mercerization enhances the properties of composites and the need for the identification of different chemical treatments possible which would improve the strength of composites becomes necessary.

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