ADVANCES IN COMPOSITE MATERIALS

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# Table of Content

## Chapter 1
A Critical Review of Metal Matrix Composite Brake Rotor

*Md Abdul Maleque*

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## Chapter 2
Technology of Moulding for Composite Auto Brake Rotor

*Md Abdul Maleque*

---

## Chapter 3
Fabrication of Nickel Aluminide (Ni$_3$Al) by Hot Isostatic Pressing (HIP)

Fatizal Abu Zarim, Iraj Alaei, I.I. Yaacob

---

## Chapter 4
Investigation of Mechanically Alloyed Nd-Fe-B Powder

I.I. Yaacob and H.K. Jun

---

## Chapter 5
Synthesis And Characterization Of Nanocrystalline Ni$_3$Al Intermetallic Produced by Mechanical Alloying And Reaction Synthesis

*R. Ismail and I.I. Yaacob*

---

## Chapter 6
The Effect of Hard Nanofillers on Mechanical Properties of PVC Nanocomposites

*Noorasikin Samat, Muhammad Alif Mohd Yusoff and Mohd Shahrul Rizal Bin Zakaria*

---

## Chapter 7
Fatigue Fracture Mechanism of PVC/CaCO$_3$ nanocomposite

*Noorasikin Samat, Alan Whittle and Mark Hoffman*

---

## Chapter 8
Mechanical Behaviour of Eco Core Composite Sandwich Structure

*Norhasnidawani Johari, Safiyah Hazwani Abd. Rahim and Zahurin Halim*

---

## Chapter 9
Characteristics of Oil Palm Biomass via Mixture of Empty Fruit Bunch (EFB) Fiber and Mesocarp Fiber

*Zahurin Halim, Nabiha Mohd Noh and Nurshazana Mohamad*

---

## Chapter 10
Mechanical Behaviour of Oil Palm Empty Fruit Bunch (OPEFB) Albumen-Composites Concrete
Chapter 11
The Influence of Biopolymer and Natural Fiber on the Physical and Mechanical Properties of Cement Composite
Norshahida Sarifuddin and Zuraida Ahmad

Chapter 12
Thermal and Morphological Study of Biopolymer Cotton-Albumen Clay (BCAC) Composites
Zuraida Ahmad, Teoh Swin Le and Kumaran A/L Samannamuthalier

Chapter 13
Effect of Compaction Time on the Properties of Coir Fiber Reinforced Cement-Albumen Composite
Amir Zakwan Roslin, Nur Humairah A. Razak and Zuraida Ahmad

Chapter 14
Oil Palm Empty Fruit Bunch (OPEFB) for Lightweight Composites Concrete
Afiqah Omar, Nur Humairah A. Razak and Zuraida Ahmad

Chapter 15
Fabrication of Metal Matrix Composite Automotive Brake Rotor (Part 1)
Md Abdul Maleque

Chapter 16
Fabrication of Metal Matrix Composite Automotive Brake Rotor (Part 2)
Md Abdul Maleque

Chapter 17
Wear of Aluminium Matrix Composite – Effects of Reinforcement Combination
Md Abdul Maleque and Rezaul Karim

Chapter 18
Mechanical Properties of Wood Plastic Composites
Ooi Chong Jin and Shahjahan Mridha

Chapter 19
Properties of Wood Fiber Reinforced Polypropylene Composite
Shahjahan Mridha and Nafis Sarwar Islam
Chapter 20
The effects of chemical and mechanical treatments on coir fibre to mechanical properties of coir-albumen-concrete

Zuraida Ahmad and Nurizan Omar

Chapter 21
Architecture of Chopped Fiber Glass in Plastic Composite Processed Under Different Loads

Ahmed Nazrin Md Idriss and Shahjahan Mridha

Chapter 22
Variation of Fiber Architecture on Loads applied in Fabrication of Epoxy/Woven Fiber Glass Composite

Ahmed Nazrin Md Idriss and Shahjahan Mridha

Chapter 23
Impact Behavior of Carbon/ Epoxy Composite in Moisture and Temperature environments

Shahjahan Mridha

Chapter 24
Impact Strength Behaviour of the Woven and Chopped Fiber Glass Composites at Different Temperatures

Ahmed Nazrin Md Idriss and Shahjahan Mridha

Chapter 25
An Investigation of Hybrid Composites Tubes Subjected to Quasi-Static Loading

Farrah Yussof and Zuraida Ahmad

Chapter 26
Mechanical Behaviour of Biopolymer Cotton Albumen Clay (BCAC) Composites

Teoh Swin Le, Kumaran A/L Samannamuthalaiar and Zuraida Ahmad

Chapter 27
The Effect of Processing Parameters on Tensile Properties Empty Fruit Bunch (EFB) Fiber Reinforced Thermoplastic Natural Rubber Composites

Noor Azlina Hassan, Norita Hassan, Sahrim Hj. Ahmad and Rozaidi Rasid

Chapter 28
Manganese Doped Hydroxyapatite Powder through Hydrothermal Method

Asep Sofwan Faturrohman, Alqap, Iis Sopyan and Nur Izzati Mazmaa
Chapter 29
Synthesis and Characterization of Sol-Gel Method Derived Zinc Doped Hydroxyapatite Powder

Asep Sofwan Faturohman Alqap, Nor Hidayu and Iis Sopyan

Chapter 30
Synthesis and Characterization of Nickel Iron–Silicon Nitride Nanocomposite

Iskandar I. Yaacob

Chapter 31
Fabrication of Nickel Aluminide Intermetallic-Alumina Nanocomposite

Roslina Ismail and Iskandar I. Yaacob

Chapter 32
Investigation on the Effect of Water Immersion on Cotton Albumen Composite

Zahurin Halim, Zuraida Ahmad and Fauziah Md Yusof

Chapter 33
Numerical and Experimental Investigation of Peel Strength of Composite Sandwich Structures

Zahurin Halim, Shahnor Basri and Mohd Ramli Ajir

Chapter 34
Finite Element Analysis of Interlaminar Stresses in Edge Delamination

Zahurin Halim and Meor Mohd. Adli Taib
Effect of Compaction Time on the Properties of Coir Fiber Reinforced Cement-Albumen Composite

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Abstract: The effect of compaction time on the physical and mechanical properties of the coir fibre reinforced concrete with utilization of egg albumen as the matrix material was the main focus of this chapter. The idea was to produce denser coir fiber reinforced cement-albumen composite (CFRCAC) with significant strength. The compaction test on the freshly placed cement composite was done via vibrating table (3000/3600 vpm, 50 Hz, 1 ph) for 5, 10, 15, 20 and 25 minutes. The optimum weight fractions of coir fibers, cement and albumen were 5 wt%, 30 wt% and 65 wt% respectively. Investigation resulted in denser CFRCAC and less moisture content compared to non-compacted samples with significant mechanical properties, namely flexural and compressive strength with longer compaction time.

Introduction

The versatility of coir fibers would be an excellent natural reinforcing material in the production of cement application [1-4]. Coir fibers contain a high lignin and hemicelluloses that makes the fibers stiffer and tougher. They are cheap, strong, and durable too [2,5]. Fortunately, this is an appropriate moment to consider a more efficient use of cement involving the use of coir fibers as reinforcement and biopolymer such as albumen as the matrix material.

It is essential for concrete mixture to completely fill the formwork, otherwise air pockets or honeycomb structure is introduce as an end result which ultimately enhances crack propagation. Compaction is one of the methods in developing high workability performance on fresh state concrete. The application of vibration in concrete mixture slightly increases the strength [6] as it makes the particles in the material to be bonded closely. Hence compaction eliminates material void content such as entrapped air which eventually produces a denser product [7]. Density is one of the important parameters which can control many physical properties in cement composite [8]. Furthermore, adequate and proper compaction method increases concrete abrasion resistance and durability.

One goal of this study is to gain better understanding on the influence of compaction period on the physical and mechanical properties of CFRCAC by varying the time of compaction as well as comparative test with non-compacted samples.