

**FINAL PROJECT**

**INFLUENCE OF SILICA DERIVED FROM RICE HUSK  
ASH COMPOSITION IN POLYSILOXANE COMPOSITE**



A thesis submitted in  
fulfilment of the requirement for the award of the  
Degree Bachelor of Mechanical Engineering with Honours

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COMPOSITION IN POLYSILOXANE COMPOSITE

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AUGUST 2019

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## ABSTRACT

Composite are a combination of two or more component materials on a macroscopic scale to produce new materials that are stronger than individual component material. The materials composite consisting matrix and reinforcement. Polysiloxane filled with rice husk silica are fabricated by using compression moulding technique with pressure 100kPa for 2 hours and cure at room temperature. The polysiloxane material as component matrix while the rice husk silica material as component reinforcement. The content of rice husk silica in polysiloxane composite ranging from 0wt%, 2wt%, 4wt%, 6wt%, 8wt%, 10wt% and 12wt%. The characterisation, physical properties and mechanical properties of polysiloxane, rice husk silica and composite body will be determine by using scanning Electron Microscopy (SEM), X-ray Diffraction (XRD), Fourier Transformation Infrared Spectroscopy (FTIR), Density and tensile test. The SEM result shows the particles in composite body are irregular geometry and spherical shape. The XRD result shows that the structure of rice husk silica is amorphous. The FTIR result detects the existence of rice husk silica in the composite body. The Density result shows sample with composition 12% of silica fillers in composite body has the highest density. The tensile result shows composite body with composition 10wt% of rice husk silica fillers in composite body has the maximum tensile strength.

## ABSTRAK

Komposit adalah hasil gabungan dua atau lebih komponen bahan yang berskala kecil yang boleh menghasilkan jenis bahan baru yang lebih kuat berbanding bahan komponen yang tidak digabungkan atau secara individu. Bahan komposit terdiri daripada matrik dan bahan penguat atau bahan sokongan. Polysiloxane yang diisi dengan silika sekam padi dibuat dengan menggunakan teknik pengacuan mampatan dengan tekanan 100kPa selama 2 jam dan dipulihkan pada suhu bilik. Bahan polysiloxane sebagai komponen matrik manakala bahan silika sekam padi sebagai komponen penguat. kandungan silika sekam padi dalam komposit adalah seperti berikut 0wt%, 2wt%, 4wt%, 6wt%, 8wt%, 10wt% dan 12wt%. ciri-ciri fizikal dan sifat mekanikal bahan bagi polysiloxane, silika sekam padi dan composite keseluruhannya ditentukan menggunakan mesin pengimbasan Mikroskop Elektron (SEM), mesin Difraksi X-ray (XRD), mesin Spektroskopi Inframerah Transformasi Fourier (FTIR), ujian ketumpatan dan ujian tegangan. Hasil penggunaan mesin SEM menunjukkan zarah-zarah yang terkandung di dalam badan komposit adalah berbentuk geometri yang tidak teratur dan berbentuk sfera. Keputusan daripada mesin XRD menunjukkan bahawa struktur silika sekam padi adalah dalam keadaan amorfus. Hasil daripada penggunaan mesin FTIR mengesan terdapat silika sekam padi dalam tubuh komposit. Keputusan ujian Ketumpatan menunjukkan sampel yang mengadungi 12% silika di dalam komposit adalah mempunyai ketumpatan paling tinggi. Hasil daripada ujian tegangan, menunjukkan komposit yang mengandungi 10wt% silika sekam padi mempunyai kekuatan tegangan yang paling maksimum. Kesimpulan kajian mengenai komposit polysiloxane yang diisi dengan silika sekam padi menunjukkan penambahan 10wt% silika di polysiloxane terkuat selepas ujian tegangan

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## LIST OF SYMBOLS AND ABBREVIATIONS

RH	-	Rice Husk
RHA	-	Rice Husk Ash
BRHA	-	Black Rice Husk Ash
WRHA	-	White Rice Husk Ash
PDMS	-	Polydimethylsiloxane
FTIR	-	Fourier Transform Infrared
XRD	-	X-Ray Diffraction
XRF	-	X-Ray Fluorescence
SEM	-	Scanning Electron Microscopy
Wt%	-	Weight Percent

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