9th INDES 2020

LIMITLESS MIND:

EMPOWERING INNOVATION THROUGH VISUALIZATION

UNIVERSITI TEKNOLOGI MARA

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PROGRAM
PROCEEDINGS
ABSTRACTS BOOK

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PALF-CRETE

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ABSTRACT

Natural fibres appear to be outstanding materials which are viable substitute for the expensive and non – renewable synthetic fiber. Pineapple Leaf Fiber (PALF) has good potential as reinforcement in foamed concrete. In this study, PALF of specific aspect ratio will randomly be dispersed in foamed concrete mortar for the preparation of test specimens and tested with compressive strength test, flexural strength test and indirect splitting tensile strength test. Tests used are all based on ASTM Standards.

1. INTRODUCTION

Natural fibres appear to be outstanding materials which are viable substitute for the expensive and non – renewable synthetic fiber. Pineapple Leaf Fiber (PALF) has good potential as reinforcement in foamed concrete. In this study, PALF of specific aspect ratio will randomly be dispersed in foamed concrete mortar for the preparation of test specimens and tested with compressive strength test, flexural strength test and indirect splitting tensile strength test. Tests used are all based on ASTM Standards.

2. METHODOLOGY

In this study, PALF of 0%, 1%, 2%, 3% and 4% fiber to volume of PALF-CRETE ratio is randomly dispersed in foamed concrete mortar for the preparation of test specimens and tested with 3 mechanical strength tests which are Compressive Strength Test, Tensile Strength Test and Flexural Strength Test.

The standards for materials and tests used are all based on the American Standard for Testing and Materials (ASTM) which are ASTM C1329 (2012), ASTM C778 (2013), ASTM C150 (2012) for the mix design of PALF-CRETE, ASTM C109 (2011) for Compressive Strength Test, ASTM C496 (2011) for Indirect Splitting Tensile Strength Test and ASTM C348 (2008) for Flexural Strength Test.

Figure 1.

3. RESULTS

Figure 2 obtained shows highest performance for 600kg/m³ PALF-CRETE at 2% fiber content equivalent to 65.5% improvement when compared to 0% fiber content PALF-CRETE. The second highest performance is at 4% fiber content for 1500kg/m³ PALF-CRETE which is an increment of 7.1% stronger than 0% fiber content PALF-CRET

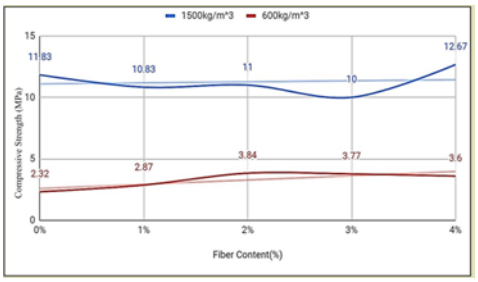

Figure 2. Compressive Strength (MPa) against Fiber Content (%)

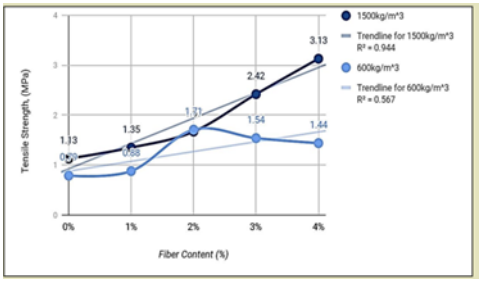

Figure 3. Tensile Strength (MPa) against Fiber Content (%)

Figure 3 obtained shows highest performance for 600kg/m³ PALF-CRETE at 2% fiber content equivalent to 116% improvement when compared to 0% fiber content PALF-CRETE. The second highest performance is at 4% fiber content for 1500kg/m³ PALF-CRETE which is an increment of 177% stronger than 0% fiber content PALF-CRETE

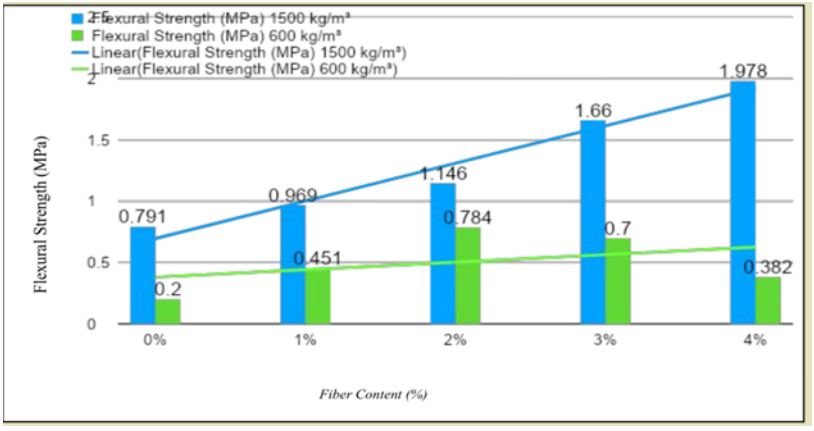

Figure 4. Flexural Strength (MPa) against Fiber Content (%)

Figure 4 obtained shows highest performance for 600kg/m³ PALF-CRETE at 2% fiber content equivalent to 116% improvement when compared to 0% fiber content PALF-CRETE. The second highest performance is at 4% fiber content for 1500kg/m³ PALF-CRETE which is an increment of 177% stronger than 0% fiber content PALF-CRETE.

4. CONCLUSION

The pineapple leaf fiber shows promising improvements in terms of compressive strength, tensile strength and flexural strength when incorporated into the matrix of PALF-CRETE especially at 2% and 4% fiber content ratio to 600kg/m³ or 1500kg/m³ PALF-CRETE respectively.The PALF-CRETE shows a promising future for stronger floating structure applications and reducing ecological waste in Malaysia and possibly around the globe.

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Tarikh : 30 Ogos 2022

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Kelulusan daripada pihak YBhg. Profesor dalam perkara ini amat dihargai.

Sekian, terima kasih.

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