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CONSOLIDATING THE FUTURE
Education, Management, Technology



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Preface

On behalf of the Central Working Committee, it is a great pleasure for me to welcome all colleagues to 2nd International Conference on Science, Engineering and the Social Science (ICSESS 2016) held at Universiti Teknologi Malaysia, Johor Bahru, Malaysia from May 29 - June 1, 2016.

The conference is organized by the International Students Society- Nigeria (ISS-Nigeria), Universiti Teknologi Malaysia with the main theme: **Consolidating the Future; Education, Management and Technology** The main aim of organizing this conference is to provide a platform for researchers to showcase their research findings and most importantly, to further encourage interactions amongst researchers to boost networking and collaborations in the field of sciences, engineering, the social sciences and humanities. A total of 256 papers were received. 162 papers were accepted for the oral presentations while 19 were selected for poster presentation. These accepted and presented papers will undergo a second round of review for publication in a SCOPUS-indexed journal known as **Indian Journal of Science and Technology**

In the course of the conference, four keynote speeches will be delivered by four distinguished scholars in the field of research and development. Conference presentations (both oral and posters) have been grouped according to the following sub-themes: Agriculture Computer and Sciences, Earth and Environmental Sciences, Biosciences Biomedical and Medical Engineering, Engineering as well as Humanity Management Education and the Social Sciences

Once again, on behalf of the conference organizing committee, a very warm welcome to all ICSESS 2016 participants, and I hope this conference will have a lasting impact in your careers as researchers and academics.

Best Regards.

Dr. Yakubu Aminu Dodo

Chairman

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PRELIMINARY INVESTIGATION OF KENAF BIO FIBROUS CONCRETE COMPOSITES

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ABSTRACT. Low tensile strength and low energy absorption capacity of concrete apparently expose it to collapse. This adversely limits the performance of concrete under loading. The inclusion of short discontinuous randomly oriented fibres has remained a practice among others towards contributing to the improvement of low tensile and brittleness of concrete. The concept of sustainability, such as the inclusion of natural biodegradable fibre in concrete has been one of the focuses of the construction industry. This is due to the current global challenge of carbon foot print. The use of biodegradable product, such as kenaf bio fibrous concrete is being advocated for. This paper reports the fresh and hardened properties of kenaf bio fibrous concrete composite. A mix of strength 30N/mm² at 28 days was made. A mix proportion that has a high workability and rheology suitable for the inclusion of two fibre length (25mm and 50mm) at varying fibre volume fraction each (0.5,0.75 and 1%). A total of six mixes were made for which workability, Toughness, Flexural strength, splitting tensile strength and compressive strength results were recorded. The optimum fibre length and fibre volume fraction was established as 50mm fibre length and 0.5% fibre volume fraction.

Keywords: Kenaf fibre; Fibrous concrete composite; Low tensile strength; Low energy absorption; Workability.

INTRODUCTION

In recent years, improvements have been made concerning the practice of fibre reinforcement for improving concrete components performance for structures, but most of this works as been on steel fibre and non- renewable materials^{1,2}. The outcome of this research is anticipated to make contribution towards an elaborate understanding of the influence of kenaf fibre in reinforcing concrete structures.

RESULTS AND DISCUSSION

The results presented below are the initial outcome of an ongoing research in the faculty of civil engineering, University Teknologi Malaysia. Table 1 presents the fresh concrete properties of both the Plain concrete (PC) and kenaf biofibrous concrete composite (KBFCC) at fibre geometry of 25 and 5mm long. The fibre was included in the concrete at varying volume fraction of 0.5%, 0.75%, and 1%.

In this study the slump, compacting factor and Vebe time tests were conducted to investigate workability of PC and KBFCC. The slump value, compacting factor value, and the Vebe time of all the concrete mixes for different fibre length (l_f) and fibre volume fraction (V_f) are tabulated in Table 1. As shown in Table 1, slump and compacting factor values of concrete decreased as the l_f and V_f increased. Meanwhile, Vebe time of concrete increased as the l_f and V_f increased. For fibre volume of 1%, the workability of concrete drastically decreased and became very stiff. It was noted that the knitting of fibres resists the flow of fresh concrete affecting the workability of concrete. This agrees with some existing findings^{3,4}. The result on the unit weight of concrete, presented in the same table reveals that concrete unit weight decreased uniformly with the increase in fibre volume fraction. This negates the outcomes of a study done using steel fibre³. This may be due to the low density of kenaf fibre which is lower than most constituent of the concrete. Regardless of fibre volume, it was further observed that the unit weight of KBFCC decreased as the fibre length is increased as a result of air content in the concrete due to fibre orientation and the distribution of long fibres in concrete.

Table 2 shows the influence of fibre content and fibre length on compressive strength. Compressive strength decreased with higher fibre content and increased with longer fibres. This may be caused by creation of air voids

because of fibres with relatively high fibre content. It was also observed that, as the fibre content increases, the value of UPV decreases. Though the UPV value of the PC and the KBFCC are within the range of 3798 - 4452 m/s, which is considered good based on the classification quality Criteria for Concrete on the basis of pulse velocity, as provided in BS, 1881, 1983 standard.

Splitting tensile strength (STS) and flexural strength (FS) decreases with higher fibre content, however it first increases and then slightly reduces with increasing fibre length (Table 2). In the case of increasing fibre content of longer fibres at 50mm, STS and FS are higher with the length of fibre. In general, the tensile strength of KBFCC was found to increase, having strength more than the PC with 50mm fibre length at 0.5% fibre content. Hence, in all mixes, concrete with fibres volume fraction of 0.5%, fibre length of 50mm (KBFCC-6) showed the maximum strength gain. The results obtained in this study are consistent with previous studies^{4,5}.

Table 1: Slump, Vebe time and unit weight of concrete mixtures.

Mixture code	l_f (mm)	V_f (%)	Slump (mm)	Vebe time (s)	Compacting factor	Unit Weight (kg/m ³)
PC	0	0	120	3	0.98	2362
KBFCC-1	25	0.5	90	4	0.92	2307
KBFCC-2	25	0.75	70	11	0.91	2289
KBFCC-3	25	1.0	40	16	0.90	2222
KBFCC-6	50	0.5	70	12	0.91	2350
KBFCC-7	50	0.75	55	15	0.90	2345
KBFCC-8	50	1.0	25	33	0.87	2280

Table2: Mechanical properties of different concrete mixes.

Mixture code	l_f (mm)	V_f (%)	Comp. Str. (N/mm ²)	Spl. Ten. Str. (N/mm ²)	Flexural Str. (N/mm ²)	UPV (m/s)
PC	0	0	36.025	3.676	4.850	4452
KBFCC-1	25	0.5	30.955	3.665	4.815	4388
KBFCC-2	25	0.75	21.910	2.907	4.119	4325
KBFCC-3	25	1.0	15.351	2.878	3.933	4075
KBFCC-6	50	0.5	31.035	3.950	4.977	4400
KBFCC-7	50	0.75	25.512	3.257	4.243	4281
KBFCC-8	50	1.0	21.841	3.016	4.034	4267

CONCLUSION

The study examined the short term behavioural properties of concrete reinforced with kenaf bio fibre. The outcomes are summarized as follows:

1. Kenaf fibre inclusion in PC, significantly affects the workability of concrete. The workability of concrete mixes decreased with the increase in fibre length and volume fraction (V_f) of fibre.
2. Kenaf fibre has been found to improve the tensile strength of concrete. Generally, the 50mm length fibre and 0.5% fibre volume fraction gave the optimum performance.
3. There has been a good co-relation between compressive strength and ultrasonic pulse velocity of concrete. Like that in other reinforced concrete, the ultrasonic pulse velocity of this concrete was found to increase with the increase of compressive strength and vice versa. These studies suggest that the kenaf fibre has a good potential as reinforcing material.

REFERENCES

1. Suji D, Natesan S. C., Murugesan R. Experimental study on behaviour of polypropylene fibrous concrete beams. *J Zhejiang Univ Sci A*. 2007; 8(7):101–19.
2. Buratti, N., Mazzotti, C. and Savoia, M. Post-cracking behaviour of steel and macrosynthetic fibre-reinforced concretes. *Constr Build Mater*. 2011; 25(5):13–22.
3. Awal, A. S. M. A., Yee, L. L., Hossain, M. Z. Fresh and hardened properties of concrete containing steel fibre from recycled tire. *Malaysian Journal of Civil Engineering*. 2013; 25(1):20-32.
4. Hasan, N. S., Sobuz H. R., Auwalu, A. S., and Tamanna, N. Investigation into the suitability of kenaf fiber to produce structural concrete. *Adv. Mater. Lett*. 2015; 6(8):731-737.
5. Lam T. F. and Jamaludin M. Y. Mechanical properties of kenaf fibre reinforced concrete with different fibre content and fibre length. *Journal of Asian Concrete Federation*. 2015; 1(1):11- 20.