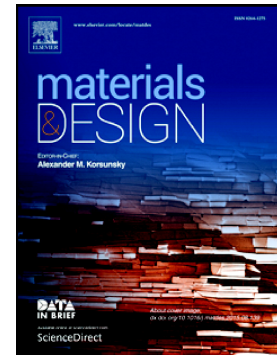


Accepted Manuscript

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PII: S0264-1275(17)31108-5
DOI: [doi:10.1016/j.matdes.2017.12.003](https://doi.org/10.1016/j.matdes.2017.12.003)
Reference: JMADE 3554
To appear in: *Materials & Design*
Received date: 8 September 2017
Revised date: 30 November 2017
Accepted date: 1 December 2017

Please cite this article as: Asad Hanif, Muhammad Usman, Zeyu Lu, Yu Cheng, Zongjin Li , Flexural fatigue behavior of thin laminated cementitious composites incorporating cenosphere fillers. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. *Jmade*(2017), doi:[10.1016/j.matdes.2017.12.003](https://doi.org/10.1016/j.matdes.2017.12.003)

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Flexural Fatigue Behavior of Thin Laminated Cementitious Composites Incorporating Cenosphere Fillers

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ABSTRACT

Flexural fatigue behavior of thin laminated cementitious composites (LCCs) is evaluated in this paper. LCCs were developed by incorporating fly ash cenosphere (FAC), as lightweight filler material, in various weight fractions of 40 %, 50 %, and 60 %. The composites were reinforced with continuous reinforcement (welded wire mesh and woven glass fiber mesh), and discontinuous reinforcement (PVA fibers). Both single and double layer reinforced composites were cast. The developed composites were tested for static flexural strength as well as flexural fatigue strength under three – point flexural loading. The fatigue lives of LCC were determined at various stress levels and stress ratios. The results thus obtained are used to develop S-N relationships, and equations have been proposed to predict the flexural fatigue strength of LCC. The results indicate that the probabilistic distribution of fatigue life of LCC can be modeled by two-parameter Weibull distribution. The Weibull distribution has been employed to incorporate the failure probabilities into the fatigue life of LCC. The fatigue lives corresponding to different failure probabilities have been calculated and the data so obtained have been used to generate Pf-S-N diagrams. It is found that FAC is useful in producing structural lightweight composites with enhanced ductility and improved flexural fatigue characteristics.

Keywords: Flexure; Fatigue; Lightweight; Cement-based composite; Laminated composite; Fly ash cenosphere;

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