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Sustainable cleaner production of concrete with high volume copper slag

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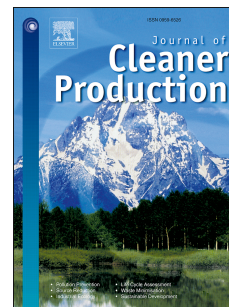
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1 Sustainable cleaner production of concrete with high  
2 volume copper slag

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5 **Abstract**

The present paper details about the application of high volume copper slag in concrete. The study leads towards cleaner production by, utilizing the land- lled or stockpiled industrial by-product copper slag as an alternative to natural river sand in concrete. The current global production of copper slag is about 40 million tonnes which if utilized properly will be a sustainable substitute for tremendous demand of natural aggregate, worldwide. In literature, several studies have highlighted promising aspects of copper slag in developing it as a valuable resource. However, there are very limited studies available on the performance of copper slag in concrete at the structural level and its possible life cycle effects in concrete construction. The present research is aimed to bridge the aforementioned gap. The contributions from the paper are a comparative evaluation on the effect of substituting 100% natural sand with copper slag in terms of (i) load capacity, ductility and failure behavior in all failure modes such as shear, flexure and mixed (ii) total embodied energy and the global warming potential. From the overall studies, it is concluded that high volume copper slag with 100% replacement as fine aggregate in concrete structures is technically viable.

6 *Keywords:* copper slag, natural sand, structural performance, life cycle

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