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Paper Concrete: A Step towards Sustainability

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Abstract : Every year a huge amount of paper gets discarded of which only a minute fraction is being recycled and the rest gets dumped as landfills. Paper fibres can be recycled only a limited number of times before they become too short or weak to make high quality recycled paper. This eventually adds to the already big figures of waste paper that is being generated and not recycled. It would be advantageous if this prodigious amount of waste can be utilized as a low-cost sustainable construction material and make it as a value added product. The generic term for the material under investigation is paper-concrete. This is a fibrous mix made of Portland cement, water and pulped paper and/or other aggregates. The advantages of this material include light weight, good heat and sound insulation capability and resistance to flame. The disadvantages include low strength compared to conventional concrete and its hydrophilic nature. The properties vary with the variation of cement and paper content in the mix. In the present study, Portland Pozzolona Cement and news print paper were used for the preparation of paper concrete cubes. Initially, investigations were performed to determine the minimum soaking period required for the softening of the paper fibres. Further different methodologies were explored for proper blending of the pulp with cement paste. The properties of paper concrete vary with the variation of cement to paper to water ratio. The study mainly addresses the parameters of strength and weight loss of the concrete cubes with age and the time that is required for the dry paper fibres to become soft enough in water to bond with the cement. The variation of compressive strength with cement content, water content, and time was studied. The water loss of the cubes with time and the minimum time required for the softening of paper fibres were investigated .Results indicate that the material loses 25-50 percent of the initial weight at the end of 28 days, and a maximum 28 day compressive strength (cubes) of 5.4 Mpa was obtained.

Keywords : soaking time, difference water, minimum water content, maximum water content
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