NEWSLETTER

JULY

Best Technical Paper Award

Gokul Santhosh S, guided by Prof. Benny Raphael and Prof. Manu Santhanam, received the Best Technical Paper Award for his work on "Optimization of Concrete 3D Printed Beams with Nature - inspired Voronoi Patterns for Symmetrical and Unsymmetrical Loading Conditions" in Third International Conference on Construction Materials and Structures (ICCMS 2025) organized by IIT Tirupati last week. Congratulations Gokul.

TLC2 Workshop at IIT Tirupati

Participants and speakers at TLC2 workshop

TLC2 Workshop speakers (L to R) Dr. Prasanna Kumar Behera, Dr. Deepak Kamde, Dr. Surender Singh, Dr. Radhakrishna Pillai, Dr. Manu Santhanam, Dr. A. V. Rahul and Dr. Tamali Bhowmik

TLC2 workshop at IIT Tirupati was conducted as post-conference workshop of Third International Conference on Construction Materials and Structures (ICCMS 2025). We extend our heartfelt gratitude to Dr. Bijily Balakrishnan, Chair person of ICCMS 2025, Prof. Suresh Jain, Patron of ICCMS 2025 and Prof. Satyanarayana Kalidindi, Director IIT Tirupati, for facilitating and hosting the workshop, as well as to our esteemed speakers for imparting their invaluable knowledge on alternative binders, suitability of construction and demolition waste, corrosion mechanism & protection, and innovations in 3D concrete printing.

Prof. Aslam Kunhi Mohamed and his PhD students Ms. Shefali Aggarwal, Mr. Dipendra Das and Mr. Adarsh Pathiyath attended the conference "Shaping the fate of low-carbon cement science" in Ascona, Switzerland (https://lccs.epfl.ch/) in July.

✨ Adarsh talked on C-S-H nucleation at molecular resolution

✨Shefali presented on Influence of Low Carbon Concrete Pore Solution on Passive Film Formation with Corrosion Inhibiting Admixtures

✨Dipendra presented his work on Molecular Level Interactions of Chemical Admixtures during Initial Stages of Cement Hydration

In last frame, TLC2 team is with Dr. Patrick Julliand at Sika Technology AG in Zurich.

Dr. Aritra Pal delivering lecture at 2025 European Conference on Computing in Construction at Porto, Portugal.

In frame, Dr. Aritra is with Prof. Mirosław J. Skibniewski and Dr. Varun Kumar Reja, an IIT Madras alumnus and faculty member in IIT Bombay.

New Publications

Experimental evaluation of size effect on the fracture response of glass textile reinforced concrete

R Samanthula, R Gettu, S Paul - Materials and Structures, 2025
https://doi.org/10.1617/s11527-025-02584-2

Textile Reinforced Concrete (TRC) is a strain-hardening cementitious composite that integrates bi-directional fabric reinforcement within a fine-grained concrete matrix, enabling the development of thin, lightweight structural and non-structural systems. This study investigates the influence of specimen thickness on the uniaxial tensile behaviour of TRC panels, using panels of varying thicknesses—10, 20, and 40 mm, reinforced with coated E-glass textiles. Two sets of TRC panels were analysed: (i) panels with a constant reinforcement ratio and (ii) panels with the same number of textile layers. The displacement and cracking behaviour including crack patterns, spacing, and openings at different strain levels, were assessed using axial extensometers and 2D Digital Image Correlation. The findings reveal a reduction in the first-crack stress with increasing panel thickness, which is consistent with the Weibull model. Additionally, a decrease in ultimate stress and textile efficiency is observed in larger panels though the reinforcement ratio is constant. Such reduction is attributed to a shift in failure mechanisms, from textile fracture to extensive debonding in some of the specimens, as the number of reinforcement layers increases, possibly due to the increase in defects with larger interface (bond) area. Thinner panels exhibit higher crack density, reduced crack spacing, and finer crack widths, at comparable strain levels. For the same number of layers, thicker panels experience wider cracks at a given nominal strain; longer yarn lengths that bridge the cracks are mobilised leading to a Weibull-type size effect, which reduces the load-carrying capacity of the textiles.

Vision-based volumetric estimation of localized construction and demolition waste

A Jaiswal, K Jha, N Bugalia, QP Ha - Waste Management, 2025
https://doi.org/10.1061/JCEMD4.COENG-15046

Abstract: Accurate estimation of the quantity of localized construction and demolition waste (CDW) is critical for optimizing the upstream operations of the CDW's reverse supply chain (RSC). However, existing studies extensively focus on downstream RSC operations with approaches that quantify large-scale material stockpiles through semi-automated workflows relying on expensive, non-portable devices. These approaches are impractical for upstream operations such as quantifying small-scale, localized CDW stockpiles scattered around urban environments, requiring frequent estimations. In contrast, this study proposes a novel vision-based framework that enables automated, fast, and accurate volume estimation of small-scale localized CDW using a consumer-grade imaging device. The framework incorporates a hybrid segmentation technique involving a ground plane identification process through a novel rule-based modification to the Random Sample Consensus (RANSAC) algorithm, followed by a clustering process. A new Multi-View Classification Model (MVCM) based on ResNet-50 architecture is also developed to recognize CDW clusters. A Delaunay triangulation-based approach estimates the volume of recognized CDW clusters. The framework is developed and validated using one of the most extensive datasets comprising 184 scans from the laboratory and the field environment. The MVCM achieved a high F1 score of 0.97 for identifying CDW using 3500 images. The framework demonstrates high accuracy for volume estimation, achieving an absolute percentage error (APE) of 8.97% compared to manual measurements. The overall process achieves an end-to-end processing time of 11 min, underscoring its efficiency and suitability for field deployment. The proposed framework is of significant practical value for localized CDW quantification and decision-making in upstream RSC operations.