INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: **Repairing and Strengthening of Reinforced concrete beam with web opening using alkali activated geopolymeric material**

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SHORT ABSTRACT

Transverse opening in the web of RC beam is a source of weakness which leads to early cracks when subjected to its service load and beam may collapse before its service life. The present work introduces and validates noble retrofitting technique for restoring damaged reinforced concrete beam with web opening using geopolymer-based retrofitting material (GM) and strengthening material (FRGC). Therefore 16 RC beams with transverse opening in the flexure zone (BMS) and the shear zone (BSS) are prepared along with a solid beam (SB) to study the effect of opening in RC beams. The beam specimens are initially tested to investigate the effect of the opening and are repaired and strengthened with different. The test result shows that GM as a repair material exhibits better adherence with the damaged beam. The noble retrofitting technique is capable of full restoration of all the structural integrity even on the 3rd day of repair. The load carrying capacity of the damaged BMS is enhanced by 18 %, while that of BSS is enhanced by 41 %. While the Jacketed beam of BMS types exhibits improved stiffness and with enhanced load carrying capacity of 1.3 times higher than the original beam. However, the effect of FRGC jacketing is found to be more effective in enhancing the load carrying capacity of the BSS type by 1.75 times higher than the original specimen. All the jacketed specimens exhibit improved deformation capacity leading to improved ductility.