Title: Strategies for Corrosion Mitigation in Concrete Structures

Duration: April 2023 to March 2026

Objectives*:*

WP1: Studies on alternative rebars for corrosion mitigation in concrete structures

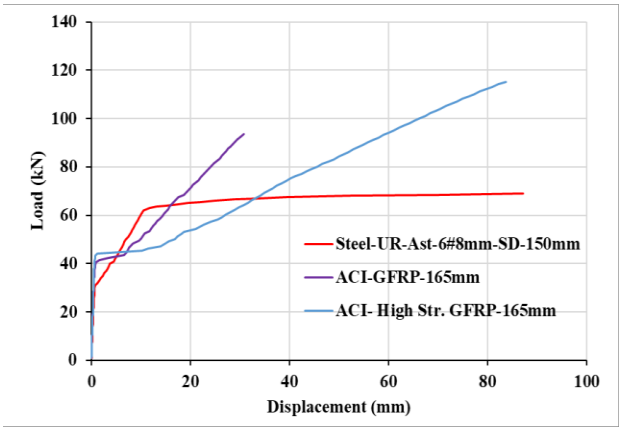
- Development of Steel-FRP composite reinforcement (SFCR) bars
- Evaluation of mechanical, bond and durability parameters of SFCR and other alternative reinforcement bars
- Investigation on the strength and durability characteristics of members with SFCR and comparative evaluation with conventional / alternative rebars
- Evaluation of strength and durability parameters of alternative rebars in special concretes
- Formulation of guidelines for concrete structural members with alternative rebars

WP2: Performance evaluation of mechanical connectors in concrete structures

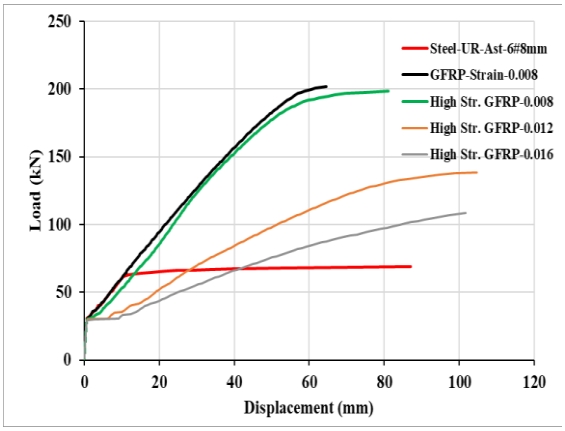
- Studies on mechanical properties of rebar connectors
- Durability characteristics of RC beams with rebar connector system
- Formulation of guidelines for use of rebar connector system in concrete structures

Progress Highlights:

- ❖ Comparative performance evaluation of slab reinforced with high strength and normal strength reinforced GFRP rebars
- ❖ Numerical investigations demonstrated that over-reinforced GFRP slabs exhibited load-displacement behavior similar to steel-reinforced slabs
- ❖ Studies initiated to understand the bond behavior of different alternate rebars such as steel, stainless steel, GFRP rebar and epoxy coated rebar
- ❖ Evaluation of mechanical properties of corroded threaded rebar coupler subjected three levels of corrosion (5%, 10% and 15%)
- ❖ Evaluation of mechanical properties of grouted rebar coupler of different diameter



Load vs Displacement of slab designed as per ACI



Load vs Displacement of slab by restricting the strain of GFRP rebar

Casting of pull-out specimens

Pull-out test on GFRP rebars

Failure pattern of threaded couplers

Failure pattern of grouted couplers

Future Programme:

- Evaluate bond, mechanical properties and durability performance of different alternate rebars
- Study the effect of UV radiation, temperature and different environmental conditions on mechanical properties of GFRP rebars
- Assess the behavior of special concrete slabs with GFRP rebars
- Evaluate tensile property of Crimped and Grouted Couplers with different diameter rebars.
- Study the tensile behavior of bolted and Grouted couplers subjected to accelerated corrosion
- To carry out monotonic and cyclic load tests on RC beams with different diameter threaded couplers

PI and Co-PI

Dr. A. Kanchana Devi (PI)
Dr. S. Sundar Kumar (Co-PI)

Team:

Dr. J. Prabakar
Dr. S. Bhaskar
Dr. K. Sivasubramanian
Mr. A.K. Farvaze Ahmed
Dr. T. Hemalatha
Mr. G. Ramesh
Mr. Vimal Mohan
Dr. K.N. Lakshmikandhan
Dr. V. Bhashya
Mr. E. Ashok Kumar
Ms. G. Nasima

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