NUMERICAL EVALUATION OF SEISMIC RETROFITTING OF MASONRY-INFILLED RC FRAMES FOR MID-RISE BUILDINGS STRENGTHENED BY CFRP.

HERIOT WATT UNIVERSITY
UK | DUBAI | MALAYSIA

Mohammed Ashraf Moustafa Mohammed
PhD Candidate (Civil Engineering)
School of Energy, Geoscience, Infrastructure and Society
Heriot-Watt University Dubai
Campus Dubai, UAE
mam2003@hw.ac.uk

Research Abstract

This research focuses on the seismic retrofitting of masonry-infilled reinforced concrete (RC) frames in mid-rise buildings using Carbon Fiber Reinforced Polymers (CFRP). In light of the widespread structural damage observed during recent seismic events particularly the 2023 Turkey–Syria earthquakes the study addresses the vulnerability of existing RC frame structures lacking adequate seismic design. A finite element model will be developed exclusively in ANSYS to evaluate the structural behavior of masonry infill walls retrofitted with fully or partially bonded CFRP strips under cyclic loading. A detailed parametric study will be conducted to investigate the influence of various geometrical configurations and strengthening strategies on the seismic performance of these systems. The study aims to develop a robust analytical framework and assess structural safety through performance-based criteria. The novelty of this research lies in its exclusive use of ANSYS for 3D numerical modeling, application of realistic seismic loading scenarios, and the integration of parametric analysis to expand the understanding of CFRP-retrofitted RC frames in seismic regions.

Supervisors

Dr.Mustafa Batikha

Dr. George Vasdravellis

Publications