Dr. Maurizio Guadagini

Dr. Maurizio Guadagnini is a Senior Lecturer in the Department of Civil and Structural Engineering of the University of Sheffield. He has more than 20 years of research experience in the field of experimental mechanics and advanced modelling of concrete elements utilizing both conventional and novel enforcing systems. He is an active member of the International Federation for Structural Concrete (fib), within which he serves as secretary of Task Group 5.1 on FRP Reinforcement for Concrete Structures and contributes to the dissemination activities of Commission 9 of fib. Dr. Guadagnini was the chair of COST Action TU1207 (Next Generation Design Guidelines for Composites in Construction), which coordinated the activities of more than 150 participants from 33 countries, and coordinator of the European funded MC ITN Network endure for Durable Reinforcement and Rehabilitation Solutions, which comprised 13 academic partners and 11 industry partners.

SEISMIC STRENGTHENING OF SUBSTANDARD BUILDINGS WITH COMPOSITE MATERIALS

Abstract: This paper discusses the results from experimental programmes including shaking table tests on full-scale one-bay two-storey RC frames with poor detailing in the beam-column joints. The tests were performed on the AZALEE shake table at the Commissariat à l'Énergie Atomique (CEA) Laboratory in Saclay, France, as part of two EU-funded Projects that aimed to investigate the effectiveness of externally bonded carbon fibre reinforced polymer (CFRP) reinforcement in improving the seismic behaviour of substandard RC buildings. To simulate typical substandard construction, the reinforcement of columns and beam-column joints of the full-scale structures had inadequate detailing. After an initial series of shake table tests were carried out to assess the seismic behaviour of the bare buildings, columns and joints were repaired and subsequently retrofitted using CFRP for the ECOLEADER building, and a retrofitting solution consisting of CFRP and Post-Tensioned Metal Straps for the BANDIT building. The buildings were then subjected to incremental seismic excitations to assess the effectiveness of the retrofitting solutions at improving the global and local building performance. Whilst the original bare buildings were significantly damaged at a peak ground acceleration (PGA) of 0.15-0.20g, the retrofitted buildings resisted severe shake table tests up to PGA=0.50-0.60g without failure. Moreover, the retrofitting intervention enhanced the interstorey drift ratio capacity and has proven to be very effective at addressing the seismic deficiencies of substandard buildings.