

Editorial

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This issue of *Structures and Buildings* includes six technical papers dealing with diverse and interesting topics varying from seismic risk to structural behaviour, damage and repair of concrete structures, maintenance of steel runway beams, and timber characterisation studies.

The first paper, by Vargas *et al.* (2014), proposes a simplified methodology for assessing the seismic damage to reinforced concrete buildings using Monte Carlo simulation. The study focuses on the non-linear seismic response of a building in Spain, where uncertainties in the mechanical properties of materials are taken as random variables and the seismic actions as random signals, using accelograms. These correspond to seismic events from Spanish and European databases. A noteworthy conclusion is that uncertainties increase in the non-linear range.

The second paper, by Huang *et al.* (2014), describes the behaviour of concrete beams with large-diameter steel reinforcement during bending tests carried out using 47 mm and 57.3 mm steel bars. Flexural behaviour, failure mode and bond performance were observed during the tests. The flexural behaviour was observed to be similar to that for smaller diameter bars until yielding, after which the deflection behaviour changes and ductility is reduced because of earlier bond failure.

The third paper, by Arya *et al.* (2014) investigates corrosion damage on concrete structures, such as bridges, car parks and maritime structures, exposed to cyclic wetting and drying with chloride solutions. Cubes of 100 mm were used in the tests to determine the required concrete cover for a working life of 100 years. The tests were designed to develop a better understanding of the influence of capillary absorption in chloride penetration due to cyclic wetting and drying of concrete. In particular, the influence of water to cement ratio, type of cement and percentage of ground granulated blast furnace slag affecting the pore pressure in concrete was studied. It was established that surface chloride content is the most significant factor in determining long-term corrosion depth. The required concrete cover is given for various levels of surface chloride content, as well as the time to corrosion for a concrete cover of 55 mm.

The fourth paper, by Tayeh *et al.* (2014), relates the roughness parameters of existing concrete surfaces to adhesion strength for an overlay of ultra-high-performance fibre concrete. The surface textures investigated were as cast, wire brushed and sand-blasted surfaces. Pull-off tests, splitting cylinder tensile tests and slant shear tests were used to quantify adhesion strength at 3, 7, 28 and 180 days. It is concluded that specimens with a

sand-blasted surface closely resemble normal monolithic samples. However, the pull-off tests always fail in the existing concrete.

The fifth paper, by Echaveguren *et al.* (2014), proposes a 'condition index' for the maintenance of runway beams fabricated at a steelworks in Chile. The condition-based maintenance philosophy is based on systematic visual inspection and condition ratings. Visual inspection and expert judgement were used to estimate the current condition of a type of infrastructure, for which a linear model and a dichotomic model were developed, with high correlation coefficients of 0.9 and 0.88, respectively.

The sixth and final paper, by Raftery and Harte (2014), describes a programme of tests to assess the relationship between mechanical properties and physical characteristics in the longitudinal direction of fast-grown plantation spruce cultivated in Ireland. Density, knot area ratio, elastic modulus and ultimate strength were studied. The study concluded that the elastic modulus is the most highly correlated parameter for the tensile strength of the fast grown spruce for both clear and in-grade specimens. The knot area ratio considerably influences timber strength in compression and in tension. Density is found to be a much more accurate predictor of the compressive strength of clear wood specimens. The test results were deemed to be useful in the further development of engineered wood products using fast-grown spruce.

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