

Research Accomplishment Award

INTEGRATED RESEARCH ON SHEAR ISSUES IN REINFORCED CONCRETE STRUCTURES



Dr. Junichiro NIWA
(Graduate School, Tokyo Institute of Technology)

This award is for publications forming part of an investigation carried out by Dr. Niwa into shear problems with reinforced concrete structures. In his research papers, which combine experimental and analytical approaches and brought together knowledge of fracture mechanics with concrete image analysis results, the author demonstrates research achievements of great novelty and practicality. Specifics of this work are as outlined below.

- Quantitative clarification of the mechanism by which RC members sustain shear load under dynamic repetitive external forces by means of analysis using proposed grid models.
- Experimental investigation of the effects of steel fibers and shear reinforcing steel in RC beam members containing steel fibers and proposal for a combination of the two reinforcing materials that provides maximum reinforcement efficiency.
- Prediction of the shear load bearing limit of concrete in RC beams containing steel fibers by identifying the degree of opening between the surfaces of diagonal cracks using image analysis and elucidation of the distribution of resistance forces on the crack surface from the tensile softening curve of the concrete.
- Presentation of calculation formulas for the capacity of RC members to withstand diagonal compressive fracturing, with applicability as far as the high-strength range.
- Clarification of the shear load bearing mechanism of RC deep beams with circular cross sections.

In addition to these particular achievements, Dr. Niwa has worked unstintingly and with great energy on problems of shear in RC structures. His important contribution to concrete engineering in both academic and practical areas is highly regarded and he is recognized as worthy of this Research Accomplishment Award.