

Yoshida Award: Research Achievement Category

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Determination of the Adhesion Properties of Continuous Fiber Reinforced Concrete and Evaluation of Structural Performance

Reason for the Award

The recipient has conducted research into technology for repair and strengthening of concrete structures using continuous fiber reinforcement material, determining the adhesion properties between the reinforcement material and concrete, and evaluating the performance of the strengthened structures. His research results, which have been published in many academic journals both in Japan and overseas, have been reflected in design recommendations. In connection with the important adhesion properties when evaluating the strengthening effect of continuous fiber reinforcement material on concrete structures, the recipient determined the strain – slip – adhesive stress relationship from static and fatigue adhesion tests, which enables the adhesion properties to be evaluated for the material used. In addition, he determined the effect of supply of humidity and moisture on the adhesion properties based on microscopic degradation mechanisms of the adhesion layer. The results have been cited in many overseas papers. Also, he has conducted research using testing and numerical analysis into the strengthening effect when the main structural forms are strengthened with continuous fiber reinforcing material. In columns the deformation performance is improved by the constraint effect of wrapping with reinforcing material. The effect in beams of progressive loss of adhesion due to bending and anchorage at the ends, and the effect on the bottom of deck slabs of punching shear failure each has high academic value and the results have led to practical application. These results have pointed the way to research into new reinforcing materials using fiber with high extension properties, based on an understanding of the mechanical properties. As described above, it is recognized that the recipient has made significant achievements in the progress and development of concrete technology, so it is recognized that he is a worthy recipient of the Yoshida Award in the Research Achievement Category.