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Material properties necessary for strengthening

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Maintenance and repair of accumulated infrastructures to prolong their service lives is a major challenge by construction field to achieve sustainability. Strengthening is often needed for deteriorated and inappropriately constructed structures. Structural ways and materials for strengthening are in a big variety, implying that we have not known the optimum way for strengthening. External bonding, as a strengthening way, has introduced a new type of failure mode, debonding (peeling). Material properties to improve debonding strength are new to structural engineers. Strengthening materials as a substitute of steel, such as fiber reinforced polymers (FRP), have quite different material properties. Conventional concepts for structural design and material are no longer true for those materials. As a structural material, durability is important, but we do not have enough data for durability of the new strengthening materials. This talk explains the material properties necessary for strengthening and suggests the necessity of closer collaboration between material scientists and structural engineers.

Biography: UEDA Tamon is a Professor at Division of Engineering and Policy for Sustainable Environment of Hokkaido University. He obtained his Doctor of Engineering from University of Tokyo in 1982. His research interests are in numerical analysis of concrete and hybrid structures, prediction of life cycle of structures, upgrading of structures, seismic design and structural design methodology. He has received various national and international awards on his research achievements, such as JSCE Awards, JCI Awards, JPCI Awards, and Awards from international journals (ASCE JCC, Journal of Advanced Concrete Technology, and Advances in Structural Engineering). He is currently Technical Council Member of the International Federation for Structural Concrete (*fib*), Advisory Committee Member of International Institute of FRP in Construction (IIFC), President of Asian Concrete Federation (ACF), Chairman of ISO/TC71/SC7 (Maintenance and Repair of Concrete Structures), Chairman of Concrete Committee of Association for Civil Engineering Technology of Hokkaido, and Senior Director of International Activities Center of JSCE.