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Self-sensing FRP composites for infrastructure intelligence

Intelligent infrastructure has become increasing attractive for civil engineering structures. On the other hand, fiber-reinforced-polymer (FRP) composites are increasingly used as structural materials and reinforcements, especially in the aircraft industries and civil engineering, due to their light weight, high strength, high stiffness and good environmental compatibility with concrete. This work highlights the health monitoring and smart material technologies to ensure the safety and longevity of civil infrastructure structures, as well as the latest developments and research achievements. It is concerned with the presentations of following: 1)- Background and Overall Considerations: the necessity of achieving structural safety and long-life maintenance and the requests of precise monitoring technology are introduced. 2)-Advancements of Sensing Technology: Base on the effect of global and local sensing, the progress and current status of structural health monitoring and damage identification technology are discussed. Aiming at the bottleneck problem of structural health monitoring technology, this section introduces the concept of area-wise distributed sensing technology, and advanced optical /carbon fiber based long-gauge strain sensing technology. 3)-Advanced FRP Technology: this section presents a look at some of the novel research application of FRP composites. Latest study works and practical engineering application are present.4) Challenge of Infrastructure Intelligence and Self-sensing FRP Composites: this section focuses on how to establish an effective intelligence system and specific solutions for various types of self-sensing FRP composites, such as self-sensing FRP rods, sheets, cables, and grids. Finally, the presentation concludes with brief comments on future directions and opportunities of self-sensing FRP composites for infrastructure intelligence.

Biography

Huang HUANG is serving at the Ibaraki University, Japan. This presentation is part of a collaboration he continued with Zhishen WU, a professor of civil engineering and the founding dean of the International Institute for Urban Systems Engineering, an interdisciplinary and major center of excellence, as well as a Special Assistant to the President at Southeast University, China. He is also a professor of civil engineering at Ibaraki University in Japan and the Director of the Center for Disaster Prevention and Security. He has published 8 books and over 1,000 international journals and conference's papers including over 60 keynote or invited papers. His total citation is over 11,000 times, and his publication H-index is 53. He was awarded the JSCE Research Price, the JSCM Technology Award, and 2009 SHM person of the year Award from SHM, National Prize for Progress in Science and Technology of China in 2012, and IIFC medal in 2016. He is the chairman or board member of numerous national and int. societies, such as China chemical fibers association committee on basalt fibers as chairman, ISHMII as a president.

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