While construction activities improve the quality of human live, they also have significant impact on the environment. The production of construction materials requires energy and generates greenhouse gases. The reduction of carbon footprint for construction materials can start at the production phase, where energy efficient processes can be developed and waste or recycled materials can be employed. However, it is just as important to increase the life of built facilities, so the frequency of construction activities can be reduced. Experience over the last few decades has shown that poor material durability is often the cause of pre-mature deterioration of structures, resulting in the need for large scale repair and even reconstruction. Better understanding of the loading and environmental effects on material deformation and failure is required for more durable materials to be designed. Sensing and non-destructive techniques are useful as they enable better quality control and early identification of damages. With the proper repair/strengthening materials and methods, structure life can be extended with little cost and low carbon emission. When structures are built to resist extreme loading (e.g., earthquake, hurricane), the innovative use of high performance materials can effectively control damage and prevent collapse. For buildings, carbon footprint will also be greatly reduced if indoor/outdoor heat exchange is decreased. Material with improved thermal insulation, which is an example of functional materials, can be very useful.

The RILEM International Conference on Advances in Construction Materials through Science and Engineering, held in Hong Kong, China from Sept.4-7, 2011, provides a forum for recent knowledge on the above topics to be shared and discussed among researchers and practitioners with interest in the scientific investigation, development and application of construction materials. At the Conference, there are 4 keynotes and around 140 papers categorized into the following themes:

1. Microstructures and Hydration
2. Admixtures
3. Rheology and Self-Compacting Concrete
4. Shrinkage
6. Material Damage and Durability
7. Strengthening and Repair
8. Steel Corrosion and Life Prediction
9. Environmental Friendly Construction Materials
10. High Performance Construction Materials
11. Special Binders and Materials for Special Applications
12. Wood, Metals and Asphalt
13. Sustainability and Life-Cycle Analysis

All papers presented at the conference are included in the present proceedings, which can hopefully serve as a useful reference for researchers and engineers interested in the recent advancements in construction materials.

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