

Challenges in Decarbonisation of Concrete Materials and Structures and Pathways to Achievement.

Dr. Stephen Foster

University of New South Wales, Australia

Abstract:

This presentation focuses on pathways towards the decarbonization of our most critical infrastructure and the pivotal roles of design innovation and the adoption of alternative materials in reducing the carbon footprint of concrete structures, with examples provided. We address the critical challenge of decarbonizing one of the most widely used materials in construction: concrete.

Emphasizing the importance of design in sustainable construction, we discuss how architectural and structural design strategies can be adopted to significantly reduce the environmental impact of concrete structures. We delve into the use of alternative binder concretes, which present a promising solution for lowering GHG emissions associated with traditional cement production, and provide examples of the development of standards and practices.

In addition to alternative binders, the presentation will highlight the role of high-performance materials, such as high-strength steels and UHPC, in enhancing the sustainability and efficiency of construction projects. These materials not only offer superior strength and durability but also enable the construction of more lightweight, material-efficient structures, further contributing to GHG reduction.

Finally, the presentation examines the barriers to the widespread adoption of these innovative materials and design approaches, as well as pathways to overcoming these barriers. It emphasizes the need for design codes and standards to be more responsive to technological advancements, facilitating the integration of sustainable materials and practices into mainstream construction and providing engineers, builders, and contractors with the tools needed to reduce the carbon footprint of concrete structures. The presentation concludes with a call to action, stressing the importance of collaborative efforts among researchers, governments, and industry stakeholders. It underscores the necessity for significant investment in research and development, clear policy direction, and the swift rollout of new codes and standards. This collective approach is presented as vital to achieving the ambitious goal of reducing the carbon footprint of the construction sector, paving the way for a more sustainable and environmentally responsible future.