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Utilization of plastic waste in civil engineering construction materials: A comprehensive review

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Abstract:

The accumulation of plastic waste has emerged as a critical environmental concern, with significant impacts on ecosystems and human health. Addressing this challenge requires multifaceted approaches, including the development of sustainable solutions for plastic waste management. One promising avenue is the utilization of plastic waste in civil engineering construction, which not only provides an alternative outlet for waste streams but also has the potential to enhance material properties and promote sustainability in the construction industry. This comprehensive review critically examines recent research efforts focused on incorporating various types of plastic waste into concrete, asphalt, soil stabilization, and other construction applications. The techniques, performance characteristics, economic considerations, and environmental impacts associated with utilizing plastic waste in construction materials are evaluated. Additionally, the review discusses emerging technologies, challenges, and future research directions in this field, providing a holistic perspective on the potential of plastic waste as a valuable resource for the construction industry.