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## Green Materials for Concrete Production

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### 10.1 Introduction

As the world population increases, the use of natural resources and energy grows proportionally, becoming one of the major environmental concerns of our times. Several economic sectors are already pursuing a solution to this problem, by analysing the added-value potential of reusing their own wastes. The conventional methods of constructing and demolishing buildings and concrete structures are implemented in such a way that most of the resulting waste is sent to landfills, instead of being recycled or reused in new constructions. This becomes a serious concern since construction and demolition wastes (CDW) are among the heaviest and bulkier wastes generated by all economic sectors.

Numerous studies have shown the feasibility of using recycled aggregates (RAs) in various construction applications, specifically concrete, mortar, and road construction. However, due to the deficient or even inexistent waste separation and sorting techniques, during construction or demolition activities, the RA produced from these CDW often have poor quality and are limited to low grade applications. Indeed, by applying a selective demolition methodology (also known as deconstruction), it is possible to highlight specific components that can be reused in new constructions, as well as to efficiently separate materials by type. This forward thinking allows the production of high quality RAs, which can then be used in high-grade construction applications such as structural concrete.

The possibility of using RA in concrete opens a whole new range of possibilities in terms of recycling materials in construction. This could be an important breakthrough for society in its endeavour towards sustainable development, as it is significantly beneficial in terms of environmental protection, as well as preservation of natural resources. There are several studies mainly engaged in the processing of demolished concrete, mix proportion design, mechanical properties, durability aspects, and materials improvement. Recently, the structural and environmental