





Review on zero waste strategy for urban construction and demolition waste: Full component resource utilization approach for sustainable and low-carbon

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Highlights

- Existing CDW recycling techniques are systematically reviewed.
- The strategy of “zero waste” for CDW disposal is proposed.
- All components in CDW are reused in a classified, high-value approach.

The recovery and reuse of CDW not only has a positive effect on reducing or eliminating the potential environmental impact of CDW but also allows the industrialization of secondary construction materials made from CDW to provide economic benefits, thus enabling the development of a circular economy centered on the efficient use and recycling of resources [17]. Fig. 1(d) reveals that CDW usually originates from human activities and natural disasters, mainly concrete, bricks, glass, ceramics, etc., as depicted in Fig. 1(e). Concrete is also perceived as the most prevalent artificial building material owing to its positive plasticity and high compressive strength being used on a large scale [18], [19], [20], and the popularity of concrete makes it a major component in CDW [21]. In accordance with bricks being rich in silica and alumina, which play a vital role in the volcanic ash reaction, waste bricks are regarded as one of the primary raw materials for the regeneration of secondary cementitious materials. Waste glass is also often used as a volcanic ash material for alkali activation, on account of its high content of silica and calcium oxide relative to other wastes; in addition, the positive synergistic effect of silica and glass fibers can make the recycled product superior to the original building material in terms of mechanical properties [22]. As a material with favorable resistance to biological and chemical degradation, ceramic materials are produced in large quantities for use in different living scenarios. Still, in that, they are difficult to degrade, reams of land are taken up for landfilling of waste ceramics. In contrast, the proper use of CDW can “regenerate” these resources, which not only reduces the construction industry's dependence on natural resources but also provides a new and more environmentally friendly source of construction materials.