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An innovative approach to managing demolition waste via GIS: A case study in Shenzhen city, China

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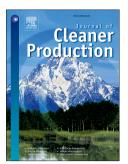
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1	An innovative approach to managing demolition waste via GIS: A
2	case study in Shenzhen city, China
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9	Abstract: A large amount of demolition waste was generated due to the rapid urbanization. Prior
10	to designing corresponding management measures, it is imperative to understand the amount,
11	composition, and flows of the generated waste. This study proposes a novel approach to
12	quantifying the demolition waste from generation to final disposal and, consequently, formulates
13	corresponding strategies to managing the demolition waste, by using spatial and temporal
14	dimensions in the Geographic information system. Specifically, a GIS-based model is proposed
15	and consequently applied to a case study. Results show that over 135 million tons of demolition
16	waste will be generated in the Nan Shan District between 2015-2060, and the recycling potential
17	is valued at \$ 6,072 million under the optimistic scenario. By contrast, under the worst-case
18	scenario, over 54 million m3 of land area which equals to approximate \$ 218 billion could be
19	needed for landfill. Compared to the worst-case scenario, the optimum scenario would reduce
20	the amount of waste to be disposed in landfills by 80% and increase the value of recycling by 65%.
21	The results revealed that, as a rapidly developing city, Shenzhen would likely experience the peak
22	in the generation of demolition waste. Therefore, it is imperative to improve the recycling rate as
23	it helps to raise the potential economic benefits and to reduce the landfill demand. This research
24	is innovative in terms of the systemization, visual representation and analysis of quantifying the
25	demolition waste flows via a novel method. The findings about the generation trends, economic
26	values and environmental effects provide valuable information for the future waste management
27	exercises of various stakeholders such as government, industry and academy.

- 28 Key words: Demolition waste; Geographic information system; Waste management; Landfill
- 29

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