Bridge carbon emission based on fuzzy mathematics and grey correlation research and driving factor analysis and optimization

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In view of the rapid growth of global environmental contribution of the construction industry and the pollution of bridge structures, governments, and scientific research all over the world have paid attention to it. The endogenous characteristics of the construction industry cross industry, cross field, cross region, long production and operation cycle, large number of materials, etc., are the barriers to reduce the environmental contribution of the construction industry. In this paper, cast-in-place single tower cable-stayed bridge and fabricated arch bridge are selected as research cases, and scientific research methods such as multi-level fuzzy mathematics evaluation, middle end point data modeling analysis, flow chart comparative optimization and grey correlation analysis are applied to obtain bridge optimization decision-making method. More than 36860 sets of data impact analysis were completed in the study. The data showed that GWP (Global Warming Potential) contributed the largest amount of 400604.48 Tonnes and 347820.96 Tonnes, accounting for 98.5% and 98.2% of the total amount. Material manufacturing accounted for 67.4% and 68.3% of the total. Transportation has emitted a lot of greenhouse gases, generating 4604.3 Tonnes and 5959.7 Tonnes. The future trend of reducing carbon contribution of construction industry is to select renewable materials, research and develop low-carbon fuels, fine production, mechanical intelligent construction, big data optimization analysis and other measures.

Keywords: Environmental contribution; Life Cycle Assessment research; Fuzzy mathematics; Data modeling; Impact factor

Biography

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