Title : Mine waste dump planning based on carbon footprint vs NPV

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Abstract:

The escalating concerns about haulage costs and carbon footprint in surface mine operations have catalyzed research into efficient waste dump planning. Traditional approaches predominantly target haulage cost minimization, Net Present Value (NPV) maximisation, or equipment utilisation, often overlooking the environmental implications especially on carbon footprint. This study aims to bridge the gap betweeon NPV and environmental (carbon cost) considerations in waste dump planning and design. By developing a comprehensive model, we seek to illuminate the interplay between financial performance and environmental impact in surface mining operations. We propose a Mixed Integer Programming (MIP) framework, uniquely designed with two distinct models: the first is dedicated to maximizing Net Present Value (NPV), while the second focuses on minimizing carbon costs. This framework has been applied in a case study, allowing for a comprehensive comparison of the results.