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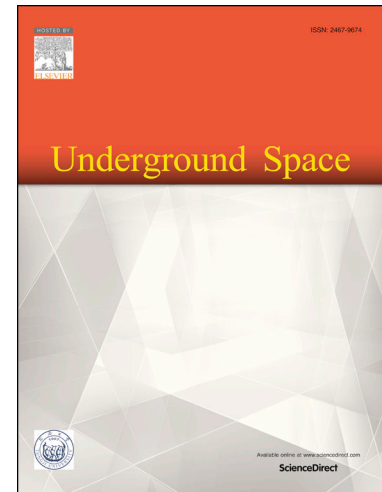
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Robustness Evaluation of Cutting Tool Maintenance Planning for Soft Ground Tunneling Projects

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Abstract

Tunnel boring machines require extensive maintenance and inspection effort to provide a high availability. The cutting tools of the cutting wheel must be changed timely upon reaching a critical condition. While one possible maintenance strategy is to change tools only when it is absolutely necessary, tools can also be changed preventively to avoid further damages. Such different maintenance strategies influence the maintenance duration and the overall project performance. However, determine downtime related to a particular maintenance strategy is still a challenging task. This paper shows an analysis of the robustness to achieve the planned project performance of a maintenance strategy considering uncertainties of wear behavior of the cutting tools. A simulation based analysis is presented, implementing an empirical wear prediction model. Different strategies of maintenance planning are compared by performing a parameter variation study including Monte-Carlo simulations. The maintenance costs are calculated and evaluated with

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