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**Development of an Uncertainty-Based Road Project Scheduling Method
Incorporating Activity Production Rates**

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ABSTRACT

Effective scheduling is critical to the successful delivery of road construction projects, where uncertainties in productivity, resource availability, weather conditions, equipment performance, and site constraints often lead to schedule overruns. Traditional scheduling techniques generally assume fixed activity durations, which may not adequately capture the variability encountered during project execution. This study proposes an uncertainty-based road project scheduling method that incorporates activity production rates to improve the accuracy and reliability of project duration estimation. The proposed methodology integrates activity-specific production rates with uncertainty analysis to estimate realistic activity durations and develop a more robust project schedule. By accounting for variations in productivity and external influencing factors, the method enables project planners to evaluate potential schedule risks, identify critical activities, and assess the likelihood of project completion within the planned timeframe. The framework supports informed decision-making by facilitating resource optimization, risk mitigation, and proactive schedule management. The proposed scheduling approach is applicable to a wide range of road construction projects and provides a practical tool for improving project planning, minimizing delays, and enhancing overall project performance under uncertain conditions.

Keywords: Road Project Scheduling, Activity Production Rates, Uncertainty Analysis, Project Duration Estimation, Construction Project Management.