



## ABSTRACT

The condition assessment of concrete railway sleepers in South Africa presents a significant challenge for two reasons. The first is owing to the sheer scale of the measurements required, with an estimated 35 million sleepers currently installed along the main lines of South Africa. The second is related to difficulties in accessing the sleepers within a ballast structure that limits visual inspections. Despite the critical role played by concrete sleepers in these systems, most maintenance efforts are limited to corrective measures and lack preventative or routine maintenance. The importance of routine, detailed condition assessments is to understand the remaining life of the sleepers and to prioritize those most in need of replacement. The operational demands placed on the railway system during such assessments make it essential to consider the methods selected for use carefully. The interplay between railway infrastructure components, their failure mechanisms, the condition assessment methods available, and the limitations of performance requirements of South African railway networks represent the key areas of research to be considered in this assessment. A comprehensive literature review is required to establish a consensus on these topics and to evaluate and refine the leading deterioration methods with a view to determining the most effective, efficient, and resource-compliant methods for concrete sleeper condition assessment in South Africa.

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