The use of composites to improve the performance of railway switches and crossings

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The recent developments in composite materials for railway switches and crossings have been presented. The presentation highlights the field test measurements and experimental studies into the application of fibre reinforced foamed urethane (FFU) composites as the safety-critical component in railway switches and crossings. The field measurements demonstrate the practicality and compatibility of the FFU composites for use in railway turnout systems, in terms of track stiffness, dynamic damping, stability, noise and vibration, as well as constructability, maintainability and resilience. A numerical study using 3D finite elements has been established and validated to demonstrate the failure modes and dynamic performance of the full-scale FFU bearers. The results exhibit the pathway to optimize the design of FFU composites and to develop functionally graded composites that enhance frictions between bearers/sleepers and ballast.

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References:


