Life cycle evaluation of railway turnout crossings' impact attenuation methods using soft fasteners and composite sleepers

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LIFE CYCLE EVALUATION OF RAILWAY TURNOUT CROSSINGS' IMPACT ATTENUATION METHODS USING SOFT FASTENERS AND COMPOSITE SLEEPERS

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This paper focuses on the effectiveness of noise mitigation measures at railway turnout crossings located in urban environments. It highlights the practical methods for mitigating impact noise and vibration, which are often observed along railway corridors. The excessive impact vibration can cause structural damage of safety-critical turnout components. Therefore, this paper is devoted to systems thinking approach and life cycle assessment in resolving railway crossing vibration problems. The life cycle of fifty years has been selected as it is coincide with the majority of common design life for railway tracks catering freights, heavy haul trains, mixed traffics and heavy suburban trains globally. Based on assumptions commonly derived in rail industry, the life cycle analyses under variant extreme weather conditions reveal that the using noise reduction materials in composite sleepers seems to be the most efficient method for mitigating impact noises, whilst the noise barrier seems to be the worst counterpart in railway switch and crossing section.

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