Multi-criteria risk analysis for railway vehicle maintenance

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Abstract

Multi-Criteria Risk Analysis (MCRA) is instrumental in railway vehicle maintenance, providing a structured approach to decision-making in the face of multifaceted challenges. The railway industry operates within a dynamic environment characterized by stringent safety regulations, reliability imperatives, cost considerations, and environmental concerns [1]. Traditional risk assessment methodologies often prove inadequate in capturing the intricate interplay of these diverse criteria. MCRA offers a systematic framework, concurrently evaluating risks across various dimensions such as safety, reliability, cost-effectiveness, and environmental impact. This method empowers decision-makers to prioritize factors methodically, ensuring a balanced and informed approach. In the context of railways, where inadequate maintenance can yield consequences beyond immediate safety hazards, extending to operational disruptions [2], financial ramifications, and environmental repercussions, MCRA emerges as a valuable tool. Implementing MCRA in maintenance planning equips railway operators with the foresight to identify and mitigate potential risks. It facilitates judicious resource allocation, aligning maintenance strategies with overarching organizational objectives. Consequently, MCRA is a proactive mechanism, preempting unforeseen disruptions and fostering resilience [3], thereby contributing to railway systems' sustained safety and operational efficiency.

References

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