

DEVELOPMENT OF AN ENERGY HARVESTING SYSTEM FOR SMART FREIGHT WAGONS

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Summary: The integration of sensor systems in smart freight wagons is essential for improving operational efficiency and monitoring of cargo, environmental conditions, and overall train performance. However, powering these systems is a challenge, as they require a reliable energy source. Harnessing energy from the motion of the wagon itself presents a promising solution, reducing dependency on external power sources and ensuring the autonomy of the sensor systems. This paper presents an energy harvesting system consisting of a wind turbine installed on the underside of the wagon. The turbine generates power from the wagon's movement, which is then directed to a charge controller that charges a battery pack and supplies stable energy to the sensors. Both the controller and batteries are housed in a waterproof enclosure on the wagon platform. Wind tunnel tests were conducted to evaluate the turbine's performance under controlled wind speeds, confirming its efficiency for real-world applications. SMARTWAGONS:

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