

Stop to recharge will be a thing of the past

An explorative and problem-solving study on implementing an electric road system in ports

Imagine a world where roads not only serve as pathways for vehicles but also act as power sources, transferring energy to electric vehicles simultaneously while they are in motion. This groundbreaking concept, known as electric road systems, has gained momentum as a promising technology for a greener future. This green transformation is essential for various industries, there among ports, a critical hub for global trade.

Presently ports represent an essential pillar in the global economy but are also accountable for emissions and pollutions worldwide. The industry therefore has great potential to become more environmentally friendly by transitioning to electricity-driven operations using electric road systems. An investigation of ports compatibility of implementing an electric road system was therefore explored since little to no previous research on this topic has been conducted.

By analyzing the two previously unrelated topics of electric road systems and container terminals separately, key insights could be extracted which formed the basis for how an electric road system could be implemented in a container terminal. These insights led to the creation of a framework containing of four factors and thirteen underlying parameters, corresponding to the most relevant aspects to consider when implementing an electric road system in a container terminal. The parameters covered a wide range of perspectives, including management and stakeholders, financial feasibility, environmental concerns, and operational compatibility. Further, the parameters proved to be applicable to not only container terminals but proved to be extendable to other types of port operations.

However, container terminals proved to vary significantly in regard to features such as the quantity of cargo handled, the size of the vehicle fleet and the area in which they operate on. Hence, a necessity exists to highlight how container terminals differ in compatibility based on the thirteen identified parameters. To achieve this, the framework and its underlying parameters were used as a foundation for creating a tool used for identifying differences in the compatibility of an electric road system implementation between various container terminals. Further, a pilot test was conducted on the tool to evaluate and demonstrate the usefulness and applicability of the tool. This test showed that different container terminals were variously suitable for an electric road system implementation when examining them using the thirteen identified parameters. Further, by using this tool, it was possible to map the varying conditions and implications for ports to implement an electric road system. Additionally, this tool's versatility allows it to be easily modified and serve both ERS developers seeking the most suitable ports to market their solutions to, and port operators wanting to assess how suitable their operations are for an implementation.

With further research, ports have the potential to become pioneers within a novel sustainable transportation technology, promoting improved operational efficiency while also preserving the environment. As the technology of electric road systems continues to evolve, the vision of integrating the technology with ports is getting closer to becoming a reality, with the potential of guiding the world into a new era of sustainable transportation and making fossil fuel a thing of the past.