



Holistic Risk Management: 첨단차의 운행 안전 전략



전기자동차 충전구 절연저항 검사 개선에 관한 실증 연구

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Empirical Study on Improving Insulation Resistance Testing of Electric Vehicle Charging Ports

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Key Words : Periodic technical inspection(정기검사), Electric vehicles(전기자동차), Technical inspection(검사기술), Empirical(실증), Insulation Resistance(절연저항)

ABSTRACT

Globally, the development of electric vehicle technology has been actively pursued due to carbon neutrality policies. Accordingly, the number of electric vehicle registrations has also increased rapidly. Although electric vehicles have become widely available, methods regular inspection of electric vehicles have not been developed. In this paper, we developed an automatic insulation resistance inspection device for the charging port of an electric vehicle and conducted a verification study. A feasibility study was conducted on 10 electric vehicles at an automobile inspection center, and a comparative analysis was conducted with existing equipment.

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전기자동차 관리체계 활성화를 위한 제도화 방안 연구

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Proposals for Legal System Measures to Activate the Electric Vehicle Repair & Management System

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Key Words : High-voltage batteries(고전압배터리), Mandatory training(의무교육), Legal system(제도화)

ABSTRACT

With the recent increase in the number of high-capacity, high-voltage battery-equipped vehicles, such as electric vehicles and hydrogen fuel cell vehicles, there is a pressing need for thorough and safe maintenance by skilled maintenance personnel.

Currently, maintenance and training for high-voltage electric devices in electric vehicles are left to the discretion of maintenance businesses. However, the government must ensure the safety of not only electric vehicle maintenance personnel but also electric vehicle users. To achieve this, standards for facilities and equipment necessary for the safety of maintenance personnel performing high-voltage electric device maintenance should be established, and maintenance personnel should be required to complete mandatory training.

Therefore, we seek legal system measures to ensure consumer safety and revitalize the automobile management system.

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전기차와 수소전기차의 기술경영 전략 및 경제 혁신 비교 연구

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A Comparative Study on Technology Management and Economic Innovation between Electric Vehicles and Hydrogen Fuel Cell Vehicles

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Key Words : Electric Vehicle(전기차), Hydrogen Fuel Cell vehicle(수소전기차), Technical Management(기술경영) Strategy(전략), Economic Innovation(경제혁신), Hydrogen(수소), Response to Change(변화대응), National Policy(국가정책)

ABSTRACT

The global response to the climate crisis and the ongoing energy transition are driving a rapid restructuring of industrial systems worldwide. In the transportation sector, Battery Electric Vehicles (BEVs) and Hydrogen Fuel Cell Vehicles (FCEVs) are emerging as central technologies for achieving carbon neutrality and sustainable mobility. This study conducts a comparative analysis of BEVs and FCEVs from the perspectives of technology management and economic innovation. It further examines domestic and international policy responses and industrial strategies to assess the competitiveness and sustainability of each technology. Based on the findings, this paper offers strategic insights for securing competitive advantage in the global eco-friendly vehicle market.

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자동차검사소 안전사고 예방을 위한 현장형 기술개발과 실증적 성과분석 연구

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Development of On-Site Safety Technologies for Accident Prevention in Vehicle Inspection Stations and Analysis of Empirical Outcomes

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Key Words : Automotive Inspection Station(자동차 검사소), Safety Accident Prevention(안전사고예방) On-site Technology Development(현장형 기술개발), Field Application(현장적용), Empirical Performance Analysis(실증적 성과 분석), Safety Device Innovation(안전장치 개발), Case Study(사례 중심 연구)

ABSTRACT

This study aims to develop field-oriented safety devices to prevent industrial accidents in automobile inspection stations and to analyze their empirical performance. Conventional inspection tasks are characterized by limited workspace and repetitive operations, which inherently increase the risk of worker injuries and equipment damage. To address these issues, this research presents the design and development process of safety devices and evaluates their effectiveness through on-site implementation. The empirical results indicate that the introduction of safety devices significantly reduced the likelihood of accidents, decreased worker fatigue, and enhanced operational efficiency. This study is expected to provide fundamental insights for the development of safety technologies that can be applied not only in automobile inspection stations but also in related inspection and maintenance industries.

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일본 자동차 정비·검사 제도 개선 사례 연구: 특정 정비 및 OBD검사 제도 도입·시행을 중심으로

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Implications of Japan's Automotive Maintenance and Inspection System Reform: Introduction of Specified Maintenance and OBD Inspection

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Key Words : Automotive maintenance(사용후 배터리자동차 정비), OBD inspection(OBD검사), Specified maintenance(특정정비), Vehicle inspection(자동차검사), Regulatory reform(규제 개혁)

ABSTRACT

Japan's vehicle management system assigns maintenance responsibilities to owners through daily and periodic inspections, while ensuring roadworthiness through regular government inspections (shaken). With the proliferation of advanced driver assistance systems—including collision mitigation braking, lane-keeping support, and automated driving systems—across all vehicle classes including kei-cars, the Japanese government, industry, and academia established the "Study Group on Advanced Automotive Maintenance Technology." This led to implementation of the specified maintenance system in April 2020, integrating on-board diagnostics (OBD) with traditional disassembly-based practices dating from 1951, followed by OBD inspection in periodic inspections (shaken) in October 2024.

This study investigates the development process and implementation framework of Japan's specified maintenance and OBD inspection systems through systematic policy analysis and industry data review. The research examines regulatory evolution, stakeholder consultation mechanisms, and technical infrastructure requirements. Comparative analysis with Korea's current maintenance and inspection regime identifies critical implications for domestic policy reform: (1) establishment of automotive maintenance information sharing platforms between manufacturers and service providers, (2) integration pathways for OBD-based diagnostics in periodic inspections, and (3) capacity-building strategies for under-resourced maintenance facilities. The findings provide evidence-based recommendations for modernizing Korea's automotive safety infrastructure to accommodate increasingly complex vehicle technologies.

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사용후 배터리 3단계 안전관리 기술 개발에 관한 연구

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A Three-Step Safety Management Strategy for EOL Battery

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Key Words : Eol battery(사용후 배터리), Safety management(안전관리), Electric vehicle(전기차), Circulation system(순환 체계), Legislation(법제화)

ABSTRACT

The widespread adoption of electric vehicles (EVs) is leading to a surge in the generation of EOL batteries, necessitating the vitalization of the remanufacturing and reuse market to realize a circular economy. Although remanufactured batteries hold significant economic value, the absence of a standardized safety management system acts as a major impediment to the growth of the related industry.

This study proposes a '3-Step Safety Management System for EOL Batteries' to ensure full-lifecycle safety, from the initial generation of a EOL battery to the operation of an EV equipped with a remanufactured one. This system consists of three stages: Step 1, 'Performance Evaluation before dismantling'; Step 2, 'Safety Inspection before distribution'; and Step 3, 'Periodic Inspection'. It comprehensively covers the entire process, from the initial application grading of EOL batteries to the continuous safety management of vehicles with remanufactured batteries installed.

Additionally, by integrating a 'Remanufactured Battery Management Platform', this study aims to build a highly complete, data-driven management system that manages the histories of the remanufactured battery and the EV—such as the battery's repair history and the installed EV's history—and links them with the battery's full-lifecycle history

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