



차량구조



위험운전 행태를 고려한 무공해 어린이 통학버스 도입 효과 분석

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Analysis of the Effect of Implementing Eco-Friendly School Buses Considering Reckless Driving Behavior

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Key Words : School bus(어린이 통학버스), Vehicle safety(차량 안전성), Carbon emission(탄소 배출량), Reckless driving behavior(위험운전행태)

ABSTRACT

In aiming for a complete transition to eco-friendly vehicles in the future, school buses need to consider both driving behavior and precise carbon emissions per unit distance for a safe and environmentally friendly transformation. Currently, there is a lack of research on driving behavior and carbon emissions per unit distance specifically targeting school buses. This study utilized DTG data to calculate the driving behavior and carbon emissions per unit distance of 67 school buses in Hwaseong City. The results showed that compared to the average vehicle operating speed of 45 km/h in Hwaseong City, school buses exhibited a slower speed of approximately 35.5 km/h. The average daily driving distance was calculated as 114.26 km/bus/day, with a carbon emission of 57,259 gCO₂eq/bus/day. The carbon emissions of buses with pronounced reckless driving behavior were analyzed to be higher compared to those with safe driving behavior, indicating the need for the development and implementation of automobile safety devices that can alter reckless driving behavior.

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5인승 차량 내 소화기의 인간공학적 위치에 관한 연구

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A Study on the Ergonomic Location of Fire Extinguishers within Five-Passenger Vehicles

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Key Words : Car fire(차량화재), Initial extinguishing(초기 진화), Vehicle fire extinguisher(차량용 소화기) Search time(탐색 시간), Ergonomic Location(인간공학적 위치), Standardization(표준화)

ABSTRACT

Each year, approximately 5,000 car fires result in significant personal and property damages, underscoring the importance of initial extinguishing using vehicle fire extinguishers. To address this, Article 11 of the Fire Protection Facilities Act will extend its requirements for installing vehicle fire extinguishers from seven-passenger vehicles to five-passenger vehicles, starting December 1, 2024. However, the lack of specific standards regarding the in-vehicle location of fire extinguisher leads to its inconsistent placement within production cars, potentially causing delays and failures in initial extinguishing. Hence, this study aimed to determine the ergonomic location of fire extinguishers within five-passenger vehicles. Five potential locations were selected based on a series of criteria: under the driver's seat, under the passenger seat, under the glove box, on left side of the trunk, and in the storage compartment under the trunk. 200 drivers participated in an experiment where they sat in the driver's seat of a vehicle with a fire extinguisher placed in one of the five locations and performed the task of 1) searching for the extinguisher, 2) detaching it from its bracket, and 3) moving it to the bonnet as quickly as possible upon receiving a fire signal (flashing light/alarm) from the vehicle bonnet. The time taken to perform of the three subtasks (searching, detaching, and moving) and the entire task (task completion time), the initial search area, and the task success/failure (completion within 5 minutes) were measured. After the experiment, participants provided subjective evaluation scores (intuitiveness, memorability, ease of detachment, rapidity, safety, space utilization, aesthetics, preference) and their most preferred location. The study found that 1) search time accounted for about 80% of the task completion time, highlighting the need for standardization in the location of vehicle fire extinguisher, and 2) the location under the passenger seat was superior across various measures, while the storage compartment under the trunk, despite being the most frequently adopted location in production cars, was the only location where participants failed to complete the task, confirming it as inferior option.

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AL압출 블록형 배터리 케이스 차체 플로어 통합 구조 연구 (Cell To Vehicle)

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A Study on the Body Floor Structure of AL Extruded Block Type Integrated with Battery Case (Cell To Vehicle)

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Key Words : Lithium-ion Battery(리튬이온배터리), Design Optimization(설계 최적화), Cell To Vehicle, Cell To Body, Block Type Floor(블록형 플로어), Crash(충돌), NVH, Static Stiffness, Flow Stir Weld(마찰교반용접)

ABSTRACT

In electric vehicles, increasing battery range is a major performance development goal, and in order to achieve this, a structure that can achieve weight reduction by integrating the vehicle body floor and the upper case of the battery while securing the battery space as much as possible in the limited space of the vehicle is called a cell to vehicle (CTV). In this paper, we developed a cell-to-vehicle (CTV) structure that integrates battery structures based on the body floor to ensure the level of maintenance and assembly facilities of the existing method, while simplifying parts. The purpose of this study is to discuss the integrated structure of CTV body floor and the structure of battery lower module, which have secured watertightness, airtightness, collision, NVH, and stiffness performance by using AL extrusion method that can be configured in multiple sections to ensure battery safety and basic vehicle performance.

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IIHS 부분 정면 충돌 시험에 대한 연구

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Study on IIHS Moderate Overlap Frontal Testing

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Key Words : IIHS(미국 고속도로 안전 보험 협회), Moderate overlap frontal testing(부분 정면 충돌 시험), Hybrid III(정면 충돌시험에서 사용되는 인체모형)

ABSTRACT

The European New Car Assessment Program began partial frontal crash testing in 1997 and introduced occupant safety ratings for rear seat passengers in frontal crashes in 2015. However, the U.S. crash test programs conducted under the Federal Motor Vehicle Safety Standards, the U.S. NCAP and IIHS, do not yet evaluate rear seat passengers in frontal crash tests. As a result, advanced seat belt features such as pretensioners and load limiters, as well as airbags that improve occupant safety, are less common in the back seat. In 2008, all new cars in the U.S. were equipped with pretensioners and load limiters for front-seat occupants, but in 2020, less than 40% of vehicles evaluated by Consumer Reports had advanced seat belt technology in the back seat. Thus, in the U.S., the safety of rear-seat passengers in vehicles lags behind front-seat safety to the point where they are considered less safe than front-seat passengers. In late 2022, the IIHS updated its partial frontal crash test to address the safety of rear seat passengers. The second new dummy is the Hybrid III 5%ile dummy, which is sized to represent a small woman or an average 12-year-old child. This dummy is placed in the second row of seats behind the driver, and the updated assessment incorporates new metrics that focus on the most common injuries to rear-seat passengers.

This paper describes the injury assessment methodology and injury calculation process for second-row occupant dummies during the New IIHS Moderate overlap front test. Several types of sled tests were conducted to improve safety performance, and the sled test results are expressed as a percentage of the IIHS injury requirements to represent a measure of severity for each test.

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