



# 전라남도 개조전기차 규제자유특구사업 1





## 차량 중량 변화에 따른 차체 고유진동수 해석

김민규\* · 김강민\*\* · 이태희\*\*\*

### Modal Analysis of the Vehicle Body's Natural Frequency According to Changes in Vehicle Weight

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**Key Words :** Modal analysis(고유진동수 해석), Finite-element analysis(유한요소해석), NVH(소음, 진동), EV Conversion  
(개조전기차), Regulation-free special zone(규제자유특구)

#### ABSTRACT

In this study, finite element analysis was used to examine the changes in natural frequency due to variations in weight during the production of EV(electric vehicle) conversion. Analyses were conducted under various weight settings of the car body across low-frequency, mid-frequency, and high-frequency ranges to determine the car body's natural frequencies. The results of the analysis showed significant fluctuations in natural frequencies due to changes in weight, which are expected to affect passenger comfort and safety during high-speed driving. The findings of this study are expected to contribute as fundamental data for the design and development of EV conversion, facilitating the development of safer and more efficient vehicles.

본 연구는 2024년도 중소벤처기업부의 재원으로 개조전기차 주행안전성 실증 사업의 지원을 받아 수행된 연구임  
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## 최적의 압착 벨마우스 조건

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### Optimal Crimping Bell Mouse Conditions

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**Key Words :** Wire harness(와이어하네스), Bellmouet(벨마우스)

#### ABSTRACT

Crimping quality in wire harness is paramount.

In order to meet the optimum crimping quality, several crimping conditions must be met. The most important thing is the formation of the bell mouse of the pressed article. Without a bell mouse or less than the thickness of the terminal material, the operation of the terminal may be affected and the core wire may even be cut.

The strength of the tensile force decreases as the core wire is damaged, and to resolve this issue, it is necessary to ensure that the pressing mechanism is properly installed. It should also be verified by measuring the dimensions of the bell mouse.

Through the presence of the bell mouse, the crimping performance implementation method according to the size of the bell mouse, reproduction TEST, and accelerated environmental tests. The optimal bell mouse shape and appropriate dimensions are selected and applied to the field.

This ensures the crimping quality and reliability of the ideal wire harness.

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## 중형승용차 전기자동차개조 및 제작기술개발 연구

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### Research on Mid-Size Passenger Car Electric Vehicle Improvement and Production Technology Development

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**Key Words :** Converted electric vehicle(개조전기차), Internal combustion engine(내연기관), Production technology (제작기술), Weight change(중량변화), Electric-based drive system(전기기반 구동시스템), Demonstration of driving safety of modified electric vehicles(개조전기차 주행안전성 실증)

#### ABSTRACT

The research goal is to derive vehicle driving safety standards by demonstrating the driving safety of weight changes due to the production of modified electric vehicles. To develop technology for modifying and manufacturing internal combustion engine vehicles into electric vehicles, the engine, exhaust, and fuel systems of existing internal combustion engine vehicles are developed. This is a study to develop technology for converting and manufacturing electric vehicles by removing unusable parts such as motors and batteries and installing electric-based drive systems such as motors and batteries.

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# 인공지능 기반 초고속진단 기술을 이용한 전기차 상태진단 기술소개

장익황\* · 최용준\*\* · 정재우\*\*

## Ultra-Fast Diagnosis for EV Battery Condition Using AI

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**Key Words :** EV(전기차), Ultra-fast diagnosis(초고속진단), AI(인공지능), EIS(전기화학적 임피던스 분석)

### ABSTRACT

The unclear issue of EV fires is a major obstacle to increasing acceptance. In order to solve this problem, we propose an AI based ultra-fast diagnosis. The goal is to develop ultra-fast diagnostic technology by overcoming the long measurement time problem of existing diagnostic methods.

First, in the case of battery modules, detailed inspection is performed through defective code analysis and additional electrochemical impedance spectroscopy(EIS) measurement. the EIS measurement time can be significantly shortened using an AI-generated algorithm. The important state of health(SOH) evaluation of the battery pack would develop an estimation model with a 95% prediction rate using AI learning through micro-charge areas.

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