

Dynamic analysis of battery box

How to improve the dynamic performance of a battery box?

By analyzing the modal characteristics and the harmonious response to vibration characteristics of the battery box, the dynamic performance of the battery box has been comprehensively mastered. Finally, based on the static and dynamic analysis results of the battery box, the weak points and unreasonable points are improved.

What is a static strength analysis of a battery box?

At the last, the static strength analysis is carried out on the battery box. By analyzing the modal characteristics and the harmonious response to vibration characteristics of the battery box, the dynamic performance of the battery box has been comprehensively mastered.

What is the dynamic behaviour of a battery?

As the dynamic behaviour depends on the actual state of charge (SOC) and the state of health (SOH), it is possible to gain information on the battery state by analysing the dynamic behaviour. High dynamic loads can influence the battery temperature, the battery performance and the battery lifetime. ...

Is a battery box a good structural improvement scheme?

Finally, based on the static and dynamic analysis results of the battery box, the weak points and unreasonable points are improved. The results show that the modified model has a good improvement effect and has basically reached the established design requirements, which verifies the rationality of the structural improvement scheme.

How can Ansys reduce the weight of a battery box?

Based on this, the ANSYS software's topology optimization tool was utilized to successfully reduce the weight of the box by 6.8%. Following finite element analysis, the battery box's performance satisfies the necessary standards in all aspects, demonstrating the viability of the lightweight solution. Content may be subject to copyright.

Why is battery box important in electric vehicles?

Sci. Eng. 688 033082 DOI 10.1088/1757-899X/688/3/033082 As an important device to protect batteries in electric vehicles, the dynamic and static performance of the battery box is closely related to the safety of the whole vehicle.

The effects of different drop height, drop angle and extrusion direction on the dynamic response of battery pack box were analyzed. According to the analysis result, with the safety...

Specifically by taking RAV4 V5 EV as a baseline and all analysis was done on it, the static, dynamic and static impact (crush analysis) on finite element (ANSYS) is performed, battery thermal management system in the transient analysis by using EXCEL and ANSYS FLUENT is identified, and finally, prototype fabrication

is carried out to demonstrate the shape of the ...

The analysis results show that the battery box saves about 42% weight compared to the aluminum alloy. The methods and consideration in this paper may also provide some ways to design and strength analysis

This study takes a new energy vehicle as the research object, establishing a three-dimensional model of the battery box based on CATIA software, importing it into ANSYS finite element software, defines its material properties, conducts grid division, and sets boundary conditions, and then conducts static and modal analysis to obtain the stress ...

Dynamic and static analysis of the battery box structure of an electric vehicle. *Materials Science and Engineering* 688, 3, 033082. Google Scholar Yuan, L., Zhao, Q. H. and Zhang, H. X. (2019). Multi-objective topology optimization design of electric vehicle battery box considering collision conditions.

A finite element intensity analysis was performed to calculate the intensity of battery box in two running conditions of sudden braking and turning on bumpy road by using software of Workbench as ...

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At first, this paper establishes the three-dimensional entity model and finite element model, and the stress state of battery box under extreme conditions of steep turning and braking on uneven...

Power battery is an important part of electric bus. With the standardization of electric bus manufacturing, a standardized power battery has been formed. In this paper, the standardized power battery box chassis of electric bus is taken as the research object, and the finite element analysis method is used to simulate its mechanical ...

The topics of this research are as follows: We analyze the static and dynamic characteristics of the battery pack under different operating conditions through advanced 3D modeling and finite element analysis (FEA), and propose a series of structural optimization schemes aimed at achieving weight reduction while ensuring the strength and ...

Dynamic analysis of battery box

In order to improve the impact resistance of the battery pack box, the battery pack of a certain logistics vehicle was taken as the research object, and the dynamic analysis of the battery pack under drop and extrusion conditions was carried out. The effects of different drop height, drop angle and extrusion direction on the dynamic response of battery pack box were analyzed. ...

Therefore, it is very important to study the stress and displacement distribution of the battery box under specific working conditions to optimize the design of the weak parts of the battery box's stiffness and strength. At first, this paper establishes the three-dimensional entity model and finite element model, a

Finite element analysis of power battery box based on Ansys Workbench. Power world, 11, 33--35. Google Scholar [9] Guiting Tang (2008). Structural optimization design of aluminum alloy battery box. Times automotive, 7, 101--102. Google Scholar [10] Xiaowei Leng, Zuoqiang Dai, Lili Zheng et al (2013). Research on fatigue life of battery box based on ...

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