

What happens if a battery pack is impacted by a collision?

During the period of 40 ms-60 ms, the maximum stress values of all lifting ears exceeded a certain limit and significant plastic deformation occurred. This means that in the case of bottom collision impact, the lifting ears of the battery pack will experience huge stress, and there is a high possibility of fracture failure.

What happens if a battery lug breaks?

This means that in the case of bottom collision impact, the lifting ears of the battery pack will experience huge stress, and there is a high possibility of fracture failure. This type of plastic deformation and stress exceeding the material's load-bearing limit can easily lead to the rupture of the lifting lug.

How to determine the protective effect of a battery box?

6.4. Impact protection strategy In order to evaluate the protective effect of the bottom structure of the battery box, the protective effect (PE) can be calculated by comparing the reduction of the maximum axial compression of the battery under the protective structure with the ratio under the condition of a homogeneous plate.

Does a battery pack undergo significant deformation under ball impact?

By analyzing the simulation results, the deformation, stress, and strain distribution at the bottom of the battery pack under ball impact were obtained, as well as the related variation patterns. It was observed that the battery pack underwent significant deformation under impact load, and stress concentration also occurred in certain areas.

Why is grid density important in a battery pack simulation?

When dividing the grid of battery pack components, the smaller the unit size and the more the number, the higher the grid density, which can improve the accuracy and reliability of the calculation and make the simulation results closer to the actual situation. Smaller unit sizes can better capture structural details and deformation situations.

What is a battery pack structure Grid?

For the battery pack structure grid, it belongs to a multi degree of freedom vibration system, where each grid unit represents one degree of freedom. Due to the possible number of grid cells reaching millions, the system also has a lot of degrees of freedom.

When the battery pack's bottom collides with an obstacle, it experiences a quasi-static or dynamic impact. This study presents a method for analyzing the factors ...

This paper presents an experimental and numerical analysis of the response of a scaled double-bottom structure with high and penetrated girders and floors impacted vertically by a rock-shaped indenter. The

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specimen, scaled from the bottom structure of the power-battery cabin of a new energy ship, is struck by a spherical indenter ...

To address the protective problem of the bottom power battery of electric vehicles when it is impacted by road debris, two new types of sandwich structures with an enhanced regular hexagonal structure and semicircular ...

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As the market share of electric vehicles continues to expand, fire accidents due to impacts from the power battery located at the bottom of the electric vehicles are receiving increasing attention. Lithium-ion batteries, as the mainstream choice of power battery for electric vehicles solving the problem that they are prone to thermal runaway due to damage when ...

When the battery pack's bottom collides with an obstacle, it experiences a quasi-static or dynamic impact. This study presents a method for analyzing the factors influencing the safety of the battery system's bottom structure. The proposed method involves using a rigid ball head to simulate the impact of road obstacles on the battery pack.

The rapid advancement of new energy vehicle technology has led to the widespread placement of battery packs at the bottom of vehicles. However, there is a lack of corresponding regulations and standards to guide aspects related to vehicle bottom safety. This lack of guidance obscures the relative importance of various parameters impacting the structural safety of battery packs ...

During the collision event, the first collision point on the battery pack absorbed the most energy, resulting in the most severe damage and the formation of a distinct dent at the first collision point. The results indicated that bottom collisions exert a substantial impact on the structural safety of battery packs, with stress concentration ...

In recent years, safety concerns regarding the bottom of new energy vehicles, particularly the traction battery system, have escalated due to potential severe safety incidents such as fires, owing to collisions and impacts from road obstacles. This study employed ...

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Electric vehicles equipped with an integrated power battery pack located at the bottom are particularly vulnerable to damage from raised objects on the road, such as debris and rocks. The bottom impact can

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compromise the structural integrity of power battery pack, potentially leading to mechanical failures. Moreover, the external forces ...

The installed capacity of power batteries in new energy vehicles is increasing rapidly with the advancement of technology [1, 2]. During usage, collisions at the bottom and other factors can potentially impact the structure of the battery pack, particularly leading to internal damage that may be difficult to detect [3, 4]. For instance, a collision with an electric vehicle in ...

Research on Bottom Collision of Battery Pack Based on the First Force Point. The rapid advancement of new energy vehicle technology has led to the widespread placement of battery packs at the bottom of vehicles. However, there is a lack of corresponding regulations and standards to guide aspects related to vehicle bottom safety. This lack of ...

NUE leads the development and distribution of proprietary, state-of-the-art, ruggedized mobile solar+battery generator systems and industrial lithium batteries that adapt to a diverse set of the most demanding commercial and industrial applications, delivering clean, renewable power wherever it is needed.

In general, energy density is a crucial aspect of battery development, and scientists are continuously designing new methods and technologies to boost the energy density storage of the current batteries. This will make it possible to develop batteries that are smaller, resilient, and more versatile. This study intends to educate academics on cutting-edge methods and ...

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