

How to improve side pole collision safety performance in battery pack design?

Crash safety performance is always a priority for battery pack design of electric vehicles. In this study, for enhancing side pole collision safety, we put forward staggered layout of battery cells for battery pack configuration.

Does a battery pack have structural problems?

The structural problems have already been considered in the published literature. Luttenbeger and co-workers developed a study concerning the safety behavior of a battery pack in case of impact. They have considered both the frontal impact and the pole side impact according to EuroNCAP standards.

Do staggered battery layouts reduce damage in side pole collisions?

Crash safety performance is one of the key requirements in battery pack layout design. In this study, we put forward staggered layout of battery cells for mitigating damage in side pole collisions. Using numerical simulations, we analyzed and explained why staggered layouts can alleviate battery damages.

What is a staggered battery pack design?

In the battery pack design, some weak areas from battery layout, for example, middle areas of battery cells, may be placed behind the strong areas of vehicle side structure. In this way, the safety effect of staggered layout may be further increased. Moreover, the safety enhancement of staggered layout is more significant in severe collisions.

Why should a battery pack layout be staggered?

Staggered layout provides additional load path for radiating out deformation. Staggered layout can better disperse impact load and reduce damage concentration. Staggered layout has good chance of enhancing crash performance by 5% or higher. Crash safety performance is one of the key requirements in battery pack layout design.

Do battery cells improve side pole impact safety?

Our previous study has concluded that, increasing the discrete degree of battery cells (e.g., using thin or short battery cells) would be beneficial to side pole impact safety. However, it might be opposite to the trend of using large size battery cells for higher energy density in battery pack.

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The battery pack of electric vehicles is highly susceptible to failure and may catch fire under side pole collision. To accurately and rapidly evaluate the safety of battery packs under such conditions, this paper introduces a local region refined battery pack model that can effectively characterize the deformation and mechanical response of the jellyroll of battery.

Data sheet DS0963190-0049601, Battery pack side connection. Data sheet DS0963191-0049610, Battery pack side connection power only. Data sheet DS0960301-0403920, Cable set for 0049601 2m. Installation Manual IM0973490 Battery pack side connection. Version Details Version R2-0. Layout changed from A4 to A5, July 2014 Version A 01.

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