

# Development of Closer System Through NVH Sensivity Analysis

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There are many NVH-related studies of the chassis transporter, which are related to engines and electric motors, which can be called the heart of a vehicle. However, if you look at NVH's domestic and foreign research, you can see that the closing system, for example door glass, power trunk and sunroof, which are frequently used by consumers in vehicles, is almost nonexistent. In recent years, as consumers' automatic closing system needs have grown, automatic systems have been applied in many areas. However, it is true that it is difficult to provide improved products to customers due to lack of NVH accidents, lack of technical skills of domestic partners, difficulties in improving overseas partners and rising costs.

In this paper, we try to guide optimization design for each system through sound and vibration sensitivity analysis And to provide better products to customers through fine tuning. We also want to maximize the company's profits by simultaneously reducing costs and weight, which are the biggest challenges facing OEM.

The first task to do is to investigate consumer needs of consumers. I think accurate targeting is necessary by identifying the problems of the existing type and identifying the inferiority and strength compared to the products of other companies currently mass-producing. After targeting, we intend to set goals for each product and conduct research and development according to product dynamic characteristics.

First door glass. This is an evaluation method to analyze the dynamic characteristics of the 50-80Hz range used in door glasses by shaping the behavior of each resonance frequency using MESH 70 POINT in the inner panel. As a result of the EMA evaluation, it can be seen that the upper and lower inner panels of our company have reverse phase bending compared to another OEMs. In order to reduce reverse phase bending, the frame that can hold the upper and lower panels was benchmarked, and the analysis results to fix the frame position confirmed that the front frame has about 15% radiation power compared to other frames.

Second power trunk. The key to the new technology is to change the mounting to the lowest position of ATF and PM. The existing swing arm type fixing bracket is deleted and mounted as a seatback panel, which is directly connected to the hinge with the best dynamic characteristics. We also simplify the main arm and sub-arm mechanisms for cost/weight reduction. Hinge direct power unit can reduce cost and weight compared to existing technology, and at the same time, it can be robust to VIP noise improvement and durability deterioration noise, which was a problem despite bush deletion. In order to develop this structure, we intend to provide products with good commerciality to consumers through TPA to improve the structure vulnerable to noise.

Finally, both succeeded in mass production and are still satisfying consumers. I think it has contributed a lot to the development of the industry by developing various evaluation methods and development processes to provide products that meet various customer needs at the same time as operating sound and cost/weight.



Fig1. Optimal door design

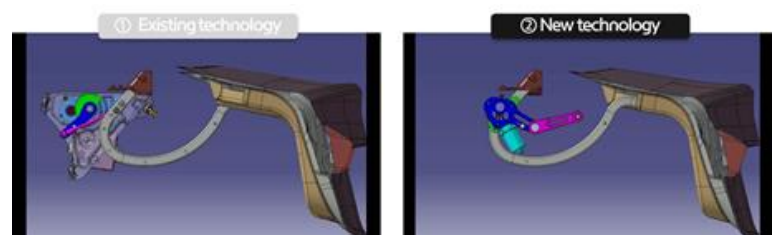


Fig1. Optimal power trunk design