

# A Study on Foot Space for increasing Rear Passenger Comfort in Small Car

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Fuel efficiency is a major factor in purchasing a vehicle. In particular, automobile sales in emerging markets, where fuel efficiency is important, are mostly focused on small cars. However, Small cars inevitably lack rear-seat space in basic vehicle specifications, and in particular, rear-seat passengers have to endure inconveniences in terms of foot space. On the other hand, emerging markets are rapidly increasing in population, and the frequency of rear-seat passengers is higher than that of other regions. This can be an important sales point in terms of customer satisfaction. Especially, the leg room is used for the space of the rear seats, and the key is whether sufficient footspace in the front and rear directions can be secured. SAE J1100 Motor Vehicle Dimensions also defines it under the code name L51. However, If the length of each car is similar, it is difficult to make a big difference in the L51 item. However, the rear seat of a small car has a H-point inside compared to the front seat, and the interior footspace is insufficient due to styling, collision performance, and chassis structure of the vehicle. Therefore, customers in the rear seat of a small car generally lack the inner footspace. In the actual vehicle development process, the issue of foot space may also be raised. However, this may be defined as a problem of lack of inner foot space caused by asymmetric structures in the same space, not a lack of space from the inherent limitation of a small car. In this study, in order to improve the lack of inner foot space, many small vehicles compared and analyzed and reviewed the guide for inner foot space in the rear seat in terms of passenger comfort.

The most problematic part related to the foot space of a passenger is the left and right spaces fixed by the front seat rail mounting. This is because the area is defined by the mechanism for sliding the seat, which is a functional part. In particular, in a small car, the foot space is greatly affected by the shape of the cross member with the rear mounting part of the front seat, and in particular, the inside is more unfavorable than the outside.

Therefore, it can be said that the footspace of the rear seat passenger is closely related to the inner rear mounting part of the front seat, and the difference in package OFcompetitors was reviewed by comparing and evaluating the specifications related to this area. For quantitative measurement, it is used the data measured using 3D scanning equipment. In addition, the J826 dummy was used to compare the left-right difference between the front and rear seat H-points. Our model was measured by CATIA V5 using design 3D data. The qualitative evaluation was conducted on a group of experts (10 people) in the seat comfort test area of our company to assess the main influencing factors and the level of each model in a political state.

The evaluation vehicles were selected from 15 models including competitors from our company in consideration of B~C Segs and sales areas. As a result of the analysis, the most important factor influencing foot space is sufficient front and rear space (㉔). It can be seen that there is sufficient front and rear leg room to prevent the foot from entering between the front and rear mounting spaces. The second priority is the physical left and right foot space (㉕). Even if there is a slight difference between the front and rear seat hip points, if the absolute space is wide, it is difficult to make complaints about foot space. The third priority is the difference between the front and rear seat hip points (㉖). Even if the physical left and right foot spaces of the lower part of the front seat are somewhat narrow, if the front and rear seat hip points match, both feet can be opened equally, so the satisfaction with foot space is not bad. The last item is judged to be almost the same as the third. It is the height (㉗) of the mounting part. The physical footing space is narrow, and the height of the mounting part is low even though there is a slight difference between the front and rear seat hip points. If you can raise your feet comfortably in this area, your satisfaction with the space of your feet improves. It is judged that this space is a hidden space that can absorb the problem of foot space shortage caused by collisions or styling depending on the use.

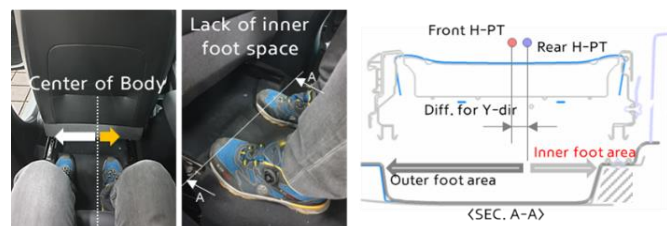


Fig. 1 Lack of rear inner foot space

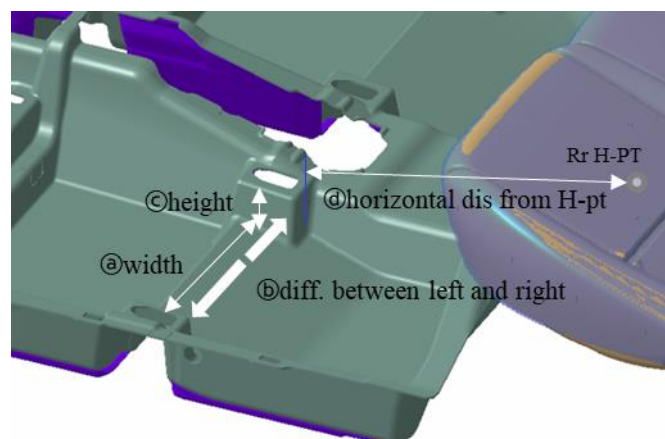


Fig. 2 Influencing factors