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Development of Soft Touch Feel Interior Skin from Human Science

- 2nd Report Skin for Seat -

Motohiko Kuroda[1)] Daisuke Wakita[1)] Moe Yamazaki[1)] Kyosuke Takeshita[2)] Manabu Tachibana[1)]

1) NISSAN MOTOR Co., Ltd
560-2 Okatsukoku, Atsugi, Kanagawa, 243-0192, Japan (E-mail: Kuroda-m@mail.nissan.co.jp)
2) SEIREN, Co. , Ltd.
10-1 Keya, Fukui, Fukui, 918-8560, Japan

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Genuine leather specifications are often set for high-grade car seats. However, in recent years, from the perspective of life cycle assessment (LCA), there is a tendency to prefer synthetic leather, which has a relatively smaller environmental impact, than genuine leather. Synthetic leather, on the other hand, has an worth touch feel than genuine leather. Therefore, this time, by adding fine particles to the TOP coat to control the surface condition and improve the dryness and humidity, we try to develop a synthetic leather with a moist feel that is comparable to genuine leather. In the first report, we investigated a method to quantitatively measure four factors of tactile sensation: roughness,wetness, hardness, and warmness. We have developed a synthetic leather (Sofilez®) with a high tactile feel that exceeds genuine leather, but the problem was the cost increased as the tactile feel improved. Therefore, we will continue to follow the current skin without improving the hardness, which has a particularly large cost impact, and instead improve the wetness, thereby avoiding the cost up and obtaining a tactile feel comparable to that of genuine leather.

It is known that the wetness become better when the dynamic friction force (μd) is larger, and when the amplitude of the dynamic friction force (μd MD) is smaller. To control the friction force, it is common to optimize the grain shape, but since the grain has a shape that optimizes the feeling of roughness, it is necessary to increase the friction force without changing the grain.

Therefore, in this development, as a measure to increase the dynamic friction force, we investigated a method of adding fine particles with a particle size of 10 μm to the TOP coat of synthetic leather to create unevenness in the micro range.

The synthetic leather used this trial is based on Seiren's urethane synthetic leather made by dry process used for the seat. A sample was created with urethane-based fine particles (average particle diameter 10 μm, added amount 12 wt%).

Fig.1 shows the results of SEM observation for the surface of the synthetic leather of developed and current.

As a result of surface observation, it was confirmed that fine particles appeared on the surface as intended. The exposed fine particles are buried in the surface, and the size of the fine particles (average 10 μm) is smaller than the uneven size of the texture (approximately 20 μm). On the other hand, it is thought that the frictional force increases as intended because fine unevenness is formed.

As a result of measuring the wet and dry feel and the rough and slippery feel of the prototype sample, it was found that the wet and dry feel was improved as intended and the rough and slippery feel was maintained. As a result of the sensory evaluation, it was also confirmed that a moist feeling equivalent to that of genuine leather could be obtained.

Next, Fig.2 shows the measurement results of the frictional force. It can be seen that both the increase in the dynamic frictional force and the decrease in the amplitude of the frictional force are responsible for the improvement in wetness. It is speculated that the reason for the improvement in the dynamic frictional force is that the urethane fine particles increased the surface energy and increased the adhesive force. The decrease in the amplitude of the frictional force is presumed to be due to the fact that the static frictional force (μS) has become smaller, and Δμ (μs-μd) has similarly decreased, making the stick-slip phenomenon less likely to occur. The reason for the decrease in the static friction force is thought to be that the contact area decreased due to the formation of the uneven shape.

Developed Current

Fig.1 SEM observation for the surface

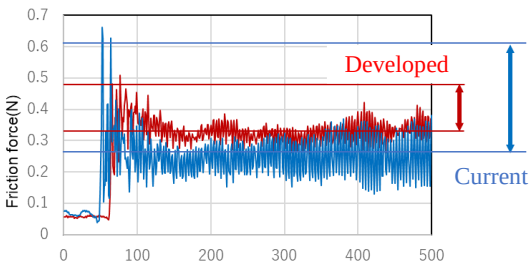

Fig.2 frictional force