

Development of materials for seat cushions with greater ride comfort

**—Reduces 6 Hz vibration which makes people feel uncomfortable
Potential to contribute on realizing mobile workstations in fully automated vehicles—**

Sanyo Chemical Industries, Ltd. (Head office: Higashiyama-ku, Kyoto City; President: Takao Ando) has announced that it has developed a material for automobile seat cushions, "SANNIX KC-737" which can improve ride comfort.

"SANNIX KC-737" is a polyol successfully developed by our own manufacturing process. The seat cushion made of urethane foam using "SANNIX KC-737" can especially reduce the vibration around 6 Hz, which is known to generate occupants' sensation of discomfort. In addition, the seat cushion can provide adequate body support and minimize deflection even in sitting for long time. Thus it can support to keep posture and realize tireless and comfortable driving. It is said that inside a car will become a space of a mobile workstation enabling occupant to perform other tasks besides driving in the future, after vehicle changed in fully automated. We expect "SANNIX KC-737" will contribute to realize it.

【Background of the development】

Users' needs for automobiles are diversified, such as price, design, fuel efficiency, convenience, and safety. Under these circumstances, the need for improved comfort such as ride comfort is also increasing. Seat cushions are parts that touch the occupants and have a major impact on ride comfort. They have various roles such as

- to absorb the vibration transmitted from the road and the car body
- to fit the occupant's body and provide breathability and appropriate elasticity for a comfortable sitting,
- to hold occupant's body not to be displaced at curve
- to maintain posture and distribute seat pressure so as to reduce fatigue and prevent back pain, and
- to minimize deflection even in sitting for long time so as to reduce fatigue as well as maintain the driver's eye position for safe driving.

All these roles create comfortable ride.

Seat cushion is generally made of polyurethane foam. Polyurethane foam is made by mixing polyol(s) and isocyanate(s) and molding while foaming. In 1960, Sanyo Chemical produced the first polyols (polypropylene glycol) for polyurethane foam in Japan. By utilizing the accumulated knowledge since then, we have developed "SANNIX KC-737" to improve ride comfort.

【Features of the technology】

For a comfortable ride, less vibration transmitted to the occupants is important. In particular, it is effective to reduce vibration around 6 Hz, which is a frequency that people feel uncomfortable. For this purpose, there are two methods; to shift the frequency (resonance frequency) from the 6Hz and to reduce the vibration transmission rate of 6Hz. The resonance frequency in this case is the frequency where the seat cushion and the vibration of the road or the car body resonate and amplify. In addition to such dynamic comfort, it is also important the static comfort (sitting comfort). The seat cushion shouldn't be too soft or too hard. In order to improve sitting comfort, it is necessary to give a suitable cushioning property and to minimize the deflection after sitting for a long time.

All of these can be achieved by increasing the elasticity of urethane foam. For that purpose, it is necessary to make the polyol as high molecular weight as possible and to form an adequate network by the terminal hydroxyl groups and the urethane bonds. However, under major conventional manufacturing process, high molecular weight formation and network formation were insufficient due to the formation of by-products.

We succeeded in developing a high molecular weight with few by-product polyol "SANNIX KC-737" by reviewing the catalyst and manufacturing process. It is confirmed that the seat cushion using "SANNIX KC-737" can reduce the resonance frequency and the vibration transmission rate around 6Hz, and minimize the deflection as compared with the one using the conventional polyols. Thus the seat cushion using "SANNIX KC-737" can provide a greater ride comfort. Currently, we are not only promoting application development with automobile seat manufacturers, but also offering comfortable ride concept to automobile manufacturers through our products.

【Feature Plan】

In the next-generation mobility, it is said that if fully automated driving is realized, it will be possible to "make a mobile workstation" in the vehicle where occupants can perform other tasks besides driving. For that, a need for improving ride comfort is increasing more and more. We will expand "SANNIX KC-737" widely to meet such comfort needs as well as enhance the functionality of polyurethane foam through our raw materials to meet various needs.