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Research Areas
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• Development of Shock Calibration System

Shock accelerometers are used in the areas of automobile compliance test, mechanical shock test of cellular phone components and the payload fairing separation trial test in ground etc. ISO 16063-13 specifies the instrumentation and procedure to be used for primary shock calibration of rectilinear accelerometers, using laser interferometry. The calibration system consists of the shock generation section, shock transmission section, laser interferometer section, signal processing section, isolation system.

Two types of shock calibration systems will be developed by the end of year 2004 in KRISS. The one shock calibration system will be applicable in a shock pulse duration range 0.2 ms to 10 ms and a range of peak values of 100 m/s² to 5000 m/s². The other shock calibration system will be applicable in a shock pulse duration range 0.01 ms to 1 ms and a range of peak values of 1000 m/s² to 100000 m/s².

• Stable Microphone Positions for Determining Sound Absorption Coefficient with ISO

When measuring the acoustic properties in a reverberation room a microphone position is one of the sensitive parameters for error. In the case of ISO 354, "Measurement of sound absorption in a reverberation room", the microphone position was referred to "the measurements shall be made with at least four microphone positions which are at least 1.5 m apart, 2 m from any sound source and 1 m from any room surface and the test specimen". The reverberation time with and without specimen is key parameter. If the room is filled with specimen, the pressure distribution may differ from that of empty room. It means one has to know status of reverberation room conditions. Therefore we firstly focused on the microphone position relative to the distance against the test specimen. The pressure level and reverberation time for the selected positions which is 0.5 m apart from each other for 3 planes (1 m, 1.5 m, 2 m above the empty floor and specimen) were measured and compared.

• Comparison and Validation of Determining Precision Sound Power Level in Reverberation Room

Sound power level has been regarded as one of the most important indices in the radiated noise from the source. The measurement technique of sound power level radiated from a noise source was early standardized. The relevant international standards are so many, but the precision methods useful in the laboratory are ISO 3741 and ISO 3745. ISO 3745 determines the sound power level in an anechoic room or semi-anechoic room very precisely. But it requires many measurement points and they should be fixed around the source. Because ISO 3741 is easier and less strict to measure and also it is precise, it is widely used in practice. Such flexibility in measurement sometimes invokes measurement error without careful consideration about the

measurement conditions. In 1999, ISO 3741 was revised more strictly to guarantee the precise results. Our laboratory is preparing the service of measuring sound power level following the revised standard. For this purpose, the method is validated and compared with the old standard and also ISO 3745 including the uncertainty evaluation. The test instruments and facilities are also reviewed.

• **Effects of Noise and Vibration Exposed to Human and Their Assessment**

It aims to understand fundamentals underlying behind the human responses of exposed noise and vibration, specifically transferred from the modern transportation systems. It includes setting-up the noise and vibration simulation/reproduction systems and the exposed noise and vibration measurement systems. The sound reproduction system enables the generation of the same sound field at both ears as human hears in real. Vibration environments are generated by the six degree-of-freedom vibration exciter. Those sound and vibration reproduction systems are used to test qualitatively and quantitatively human responses to simulated noise and/or vibration stimuli. These experimental attempts has allowed to gain the nationwide response databases of Korean, which has played significant roles in designing such new automotive-related products as seats, suspension units and tires. The nationwide response databases are found to unfold what components of noise and/or vibration exposed to passengers are comparatively less satisfied for customers. Industrial sectors expect that those response databases, including the measurement and test systems, should be updated continuously for development of new products.