KTH SOLID MECHANICS SEMINAR; Thursday, September 25th, 13.00; KTH Solid Mechanics Seminar room

Leif Kari " Dynamic properties of ordinary and magneto-sensitive elastomers: experiments and modelling"

Leif Kari is a professor in Engineering Acoustics at KTH Royal Institute of Technology. He received a M.S. degree in Engineering Physics and a PhD in Engineering Acoustics from the same university. In addition to be involved in research and education, he is currently dean of the School of Engineering Sciences. Furthermore, he visits on regular basis Tecnun, Universidad de Navarra, San Sebastián, Spain, where he frequently participates in projects and supervises PhD students. His interests span from structure-borne sound, vibration isolator characterization, material acoustics, shock wave propagation in particle systems – including experiments and modelling – to pedagogical research and development.

Vibration isolators made of elastomers are used to decouple a source from receiving structure whereby the vibrations transmitted are reduced. Conventionally, the vibration isolator system is designed to meet the low-frequency requirements while its audible frequency properties are more or less unknown. Vibrations within the audible frequency range eventually radiates as noise. The dynamic properties of the vibration isolator component including the elastomer need to be determined to meet the audible frequency range requirements and thereby reduce the radiated noise. In this seminar, measurements and modelling are presented including energy flow and dynamic stiffness data. Furthermore, smart vibration isolation is presented where the ordinary elastomer is replaced by magneto-sensitive elastomer. Magneto-sensitive elastomers contain irregularly formed, magnetically polarizable iron particles surrounded by an ordinary elastomer matrix. They can rapidly and reversibly change their stiffness by applying an external magnetic field. Measurements and constitutive modeling are presented. In particular, the influence of magnetic field strength, frequency, dynamic amplitude, static preload and temperature on the dynamic shear modulus are shown. Physical explanation of the magneto-sensitive effect is presented. Moreover, practical magneto-sensitive vibration isolation systems are shown. Finally, the energy flow transmitted into a receiving structure using magneto-sensitive vibration isolators is measured and modelled.