
Defence Seminar

Seminar Title	: An Experimental and Numerical Study on the Free Vibration and Viscoelastic Properties Identification of Sandwich Structures
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Venue	: HOD OFFICE ROOM (ME Department)
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Abstract	: Sandwich structures, known for their high strength-to-weight ratio and excellent mechanical properties, have become integral in various engineering applications. The present study focuses on the free vibration and damping behaviour of sandwich structures, specifically emphasizing on three-layer sandwich beams, plates and shells with a core of viscoelastic material. The experimental aspect of the current research involves fabricating three-layered sandwich specimens and performing vibration tests using the impact hammer method to capture their modal characteristics. Numerical models are simultaneously developed using finite element method to obtain the natural frequencies and modal loss factors of the sandwich structures. The viscoelastic material is characterized using a complex modulus approach that takes into account both the storage and loss modulus. The viscoelastic material properties of the core layer are identified through inverse techniques using the structural responses of the sandwich structures. The influence of cut-outs on the free vibration response of sandwich plates and shells is investigated under various boundary conditions. ANN models are developed to predict the free vibration and damping properties of sandwich plates and shells with cut-outs. Moreover, graphical user interfaces are designed using the developed ANN models to provide user-friendly tools for predicting the modal characteristics of the sandwich structures with cut-outs. The combined approach of experimental study, numerical analysis and ANN modelling provides a comprehensive understanding of the complex dynamics associated with these sandwich structures.