



INDIAN SOCIETY FOR NON-DESTRUCTIVE TESTING (BENGALURU CHAPTER)

*ISNT Bengaluru chapter is pleased to host its
Virtual Technical Webinar
on*

“Structural Health Monitoring of Composite Structures – Offline & Online Approach”

Dr Ramesh Kumar M

Chief Scientist & Dy. Head - Advanced Composites Division
CSIR - National Aerospace Laboratories

Date & Time : Saturday, SEP 17th 2022 @ 5.00pm

ABSTRACT

Modern composite aircraft structures govern by a damage tolerant and fail-safe design philosophy, requiring substantial inspection time and maintenance costs. Over the past two decades, the aircraft industry, research organizations and academia have been trying to alleviate the periodic inspection and maintenance by implementing condition-based structural health monitoring (SHM) technologies for such applications. Fiber optic sensors (FOS), including quasi-distributed and distributed technology, are potential candidates for aircraft SHM. The successful and state-of-the-art sensing technology used in the aircraft industry, such as fiber Bragg grating (FBG) base quasi-distributed and Brillouin/Rayleigh scattering-based distributed sensing system (DSS) along with the implementation challenges discussed.

FOS-based SHM technology developed at Advanced Composites Division (ACD), CSIR-NAL, including online and offline SHM to solve existing industry challenges, Online SHM, localization of low-velocity impact (LVI), which causes barely visible impact damage (BVID) - is discussed.

In offline SHM, a ground-based methodology to detect damage/disbond using distributed fiber optic sensing system (DSS) in a typical aircraft wing test-box structure is presented in the paper.

Also, we have explored the capability of the DSS system for full-field strain and buckling measurement in a stiffened panel under compressive load and cure residual strain (CRS) during manufacturing. Such measurement data was validated with standard reference for comparison.

About the Speaker

Dr. Ramesh Kumar M is a Chief Scientist and Deputy Head of Advanced Composites Division, also accomplishing the Quality Assurance of Aircraft Composite Structures as Head of Quality Assurance approved by DGAQA.

He has obtained Ph.D in the Department of Aerospace Engineering, Indian Institute of Technology, Kharagpur, Master degree by research (M.Sc Engg) at Visveswarya University, Belgaum and B.E in Electrical and Electronics Engineering from Mepco Schlenk Engineering College, Anna University.

He has joined CSIR-National Aerospace Laboratories in 1991 and worked extensively in Non Destructive Testing and Evaluation (NDT&E) of aircraft composite structures. His research interests pertaining in development and analysis of NDE of porosity in composite monolithic and secondary bonded aircraft structures. Advanced NDE method like Air coupled Ultrasonic, Guided wave ultrasonic, Eddy current for inspection of Composite Structures. Other research area is Structural Health Monitoring (SHM) of aircraft structures in online and offline monitoring of defects.

He has to his credit of twenty-five publications in International journals, International and National Conferences.

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