InSIS

First Dr. S. R. Valluri Memorial Lecture

Title: **In Pursuit of Excellence in the Advancement of the Science & Technology of Structural Integrity**

To be delivered by Dr. Ramasubbu Sunder

Research Director, BiSS-ITW, Bangalore, India

The **Indian Structural Integrity Society (InSIS)** is proud to initiate the **Dr. S. R. Valluri Memorial Lecture** to honour a doyen of aerospace technology in India.

Sitaram Rao Valluri, born in Eluru (Andhra Pradesh) on 25th June, 1924, received his Bachelor's degree from the Banaras Hindu University (BHU), Master's degree from the Indian Institute of Science and PhD from the California Institute of Technology (CalTech). Following short stints at Douglas Aircraft Company, where he was awarded the coveted Wright Brothers Medal in 1963, and at Indian Institute of Technology Madras, he joined National Aerospace Laboratories (NAL) as its second and youngest Director to date in 1964.

Dr. Valluri set the stage for much of NAL's development over the ensuing decades, in terms of setting up new Divisions, World class experimental facilities, such as the 4 ft trisonic wind tunnel and the full-scale fatigue test facility that are unique to India. He initiated composite technologies that led to NAL's first small plane HANSA development. He connected the NAL scientists with natural partners: Indian Air Force (IAF), Hindustan Aeronautics Limited (HAL), Indian Space Research Organization (ISRO) and Defence Research Development Organization (DRDO). The Folland Gnat life extension programme, and later the Ajeet, MiG-21 aircraft life extension studies were carried out using the full scale fatigue test facility developed at NAL. He had set up the Failure analysis Group in NAL that was responsible for root cause analysis of HF-24 wing root joint failure and Caravelle (1972) crash that was traced to defective turbine disk. The failure analysis group made significant contributions to the Air India's Kaniskha aircraft accident investigation. Under his guidance, the first National Workshop on Fatigue, Fracture and Failure Analysis, was conducted in 1979 as a precursor to the Structural Integrity research and education in India. Under his leadership as a Co-chair along with Dr. David Taplin and Prof. P. Rama Rao as other Chairs, the sixth International Congress on Fracture (ICF'6) was held at New Delhi in 1984, which brought the World researchers to India.

His tireless effort while in NAL resulted in the initiation of the Light Combat Aircraft (LCA) programme. In 1983, he took charge as the first Director General of the Aeronautical Development Agency. He was instrumental in the setting up of materials evaluation lab – battery of test systems on which several indigenously developed materials were type certified for LCA. He initiated collaborative agreements with DFVLR (later DLR) leading to development of composites technology in NAL and ADA. Dr. Valluri was elected **Fellow of the Indian Academy of Sciences** and received the **Padma Shri** in 1974 and the **Vasvik Award** in 1978.

About the speaker:

Dr. Ramasubbu Sunder (DoB: 08-08-1953) has devoted nearly half a century of his career to the advancement of the science and practice of Structural Integrity. His contributions cover both fundamental and applied research through the development of sophisticated experimental techniques and test technology. Sunder's unique experiments suggesting the independent action of crack closure and near-tip residual stress coupled with electron microscopy studies enhanced the understanding of crack extension, resulting in the improved analytical modelling of fatigue crack growth. Sunder developed a test method to characterize the relationship between intrinsic threshold stress intensity range and near-tip residual stress based on numerous studies on multiple metallic materials tested in lab air and vacuum. The novel test method is proposed as a Standard at the American Society for Testing and Materials.

Sunder's entrepreneurial instinct while pursuing high calibre research led to the development of a truly 'Made-in-India' digital test controller (along with late CS Venkatesh) for universal testing machines; he established the Bangalore Integrated System Solutions (P) Ltd (BISS) in 1992. Today, this technology development venture is one of the largest in the country dedicated to the development, manufacture and support of equipment related to Structural Integrity. BISS has over the three decades, supplied over seven billion rupees worth of test equipment serving customers worldwide on a wide variety of applications related to the strength, durability and performance of materials and components. These systems are used to qualify safety critical components of space launch vehicles, nuclear power reactors, wind energy systems, railways and aero-engines. BiSS Test lab is the only one qualified by Nadcap for fatigue and fracture tests on both metals and composites. Its services are routinely used by leading multinationals as well as national institutions. He contributed to the setting up of the BISS-IISc Centre of Excellence at the Indian Institute of Science. Sunder is a founding member of the Indian Structural Integrity Society. As an office bearer in its formative years, he contributed to the growth of its membership and continues to support its activities.

Dr. Sunder obtained his Master's degree in 1975 and PhD in 1978 both from the Kiev Institute of Civil Aviation; served as a NRC Research Associate at the Wright-Patterson Air Force Base (WPAFB) during 1986-88 and is a **Fellow of the Indian Academy of Sciences** and **Indian National Academy of Engineers.**

WELCOME TO THE FIRST Dr. S.R. VALLURI MEMORIAL LECTURE.

Date: 22nd October 2024 **Time: 11:15 a.m.**

Venue: Auditorium, VNIT, Nagpur