Applied Mechanics Division Award

Professor Carl T. Herakovich

Applied Mechanics Program
University of Virginia

The Applied Mechanics Award is given to an outstanding individual for significant contributions in the practice of engineering mechanics; contributions may result from innovation, research, design, leadership or education.

Professor Carl T. Herakovich obtained a B. S. in Civil Engineering in 1959 from Rose-Hulman Institute of Technology, an M.S. in Mechanics from the University of Kansas in 1962, and a PhD in Mechanics from the Illinois Institute of Technology in 1968. Between his M.S. and PhD he served as Athletic Director, Head Football Coach, Head Track Coach, and Assistant Professor of Civil Engineering at Rose-Hulman. His dissertation was a finite element solution to the problem of elastic/plastic torsion of multiply connected cylinders. Using a minimum rate principle of plasticity, the problem naturally reduced to a quadratic programming problem.

After taking a position as Assistant Professor in the Engineering Science and Mechanics Department at Virginia Tech, he spent the summers of 1969 & ’70 at NASA’s Langley Research Center where he was introduced to fibrous composite materials. Since then he has worked on a wide variety of problems in mechanics of composites. His initial work showed that the low failure strain of aluminum reinforced with boron-epoxy was an edge effect.

This naturally led to further investigation of edge effects in composites and demonstration that the classic interlaminar stress, free edge effect in laminated composite coupons could be formulated as a two-dimensional finite element problem.

Over the course of his career, he has worked on a wide variety of composite materials including boron-epoxy, carbon-epoxy, glass-epoxy, aramid-epoxy, boron-aluminum, borsic-aluminum, silicon carbide-titanium and alumina- porous alumina fibers in a nickel matrix. Test methods employed include: tension, compression, shear, combined axial/torsional loading of resin matrix and metal matrix tubes, acoustic emission, thermal loading, radiation exposure and moiré interferometry. The experimental work was complimented by analytical and computational studies over a range of scales including micro, meso, lamina, laminate and structural. He has investigated the effective mechanical and thermal properties of fibrous composites, developed improved tests methods, studied interlaminar stresses near regions of local material and geometric discontinuity, and studied damage development in resin and metal matrix composites. He has published one hundred thirty-one papers to date. John Wiley and Sons, Inc. published his text *Mechanics of Fibrous Composites* in 1998.

Herakovich conceived the idea of the NASA-Virginia Tech Composites Program and developed it into a major contributor to the U. S. efforts in the field of composite materials. He has served as the graduate advisor for fifty-four students. He served as assistant head of the ESM department at Virginia Tech for two years, was the initial Director of the (state-wide) Materials Institute of the Virginia Center for Innovative Technology, and was Director of the Engineering School’s Applied Mechanics Program at the University of Virginia from 1987-98. He is now Professor Emeritus at the University of Virginia.

He is a Fellow of the American Society of Mechanical Engineers, the American Academy of Mechanics, and the American Society of Civil Engineers. He has been Secretary, Member of the Board and President of the Society of Engineering Sciences. His contributions to ASME include Member and Chair of the Applied Mechanics Division's Executive Committee, and ASME Vice President of Basic Engineering. He continues to be a Member and Secretary of the U. S. National Committee on Theoretical and Applied Mechanics, and a U. S. Delegate to the International Union of Theoretical and Applied Mechanics. For the past two years he has served as a consultant to the National Materials Advisory Board of the National Academies.