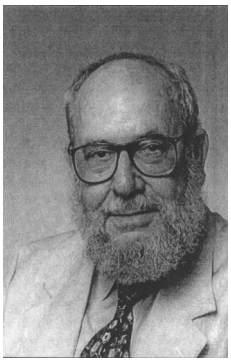
Journal of Vibration and Acoustics

Obituary



Thomas K. Caughey Professor Thomas K. Caughey passed away rather suddenly on 7 December 2004, at the age of 77.

A Scotsman, Tom Caughey graduated in 1948 from the University of Glasgow with two undergraduate degrees, one in Electrical Engineering and the other in Mechanical Engineering, focused more on vibrations and dynamics. A slight indication of his future contributions is the fact that, while an *undergraduate* student in Scotland, he solved all the problems in the famous 1940 textbook ''Mathematical Methods in Engineering'' by Theodore von Karman and Maurice Biot, a book used in the 1950's as a reference for a *graduate* course at Caltech.

After working from 1947–1951 at Jas. Howden & Co. in Glasgow, he attended Cornell University and earned a master's degree in mechanical engineering in 1952. He started his long association with Caltech as a graduate student in 1952, earning his PhD in 1954. His faculty duties at Caltech started in 1953 when he was appointed as instructor in applied mechanics; he was promoted to assistant professor in 1954, and full professor in 1962.

While at Caltech, Caughey participated in the development of the famous Feynman basic physics courses as a recitation section instructor accompanying Feynman's lectures. His groups performed extremely well, and—though an engineer—he often gave midnight advice on problem-solving to other instructors who were physicists! His colleagues appreciated and were familiar with his many contributions in a broad variety of fields such as applied mathematics, dynamics, and control theory. But most of his colleagues were unaware of his vast practical knowledge concerning the design of mechanical, electrical, and electronic devices. One of his many lasting contributions in the early 1960s was the design of the Caltech eccentric-mass vibration generator that gave rise to the current generation of shaking machines that are widely used to predict the earthquake response of extended civil infrastructure components.

Because of his vast knowledge of the dynamics of complex systems, Caughey's insights were eagerly sought out by colleagues in a very broad range of technologies. In the 1980s, for example, Tom worked with his Caltech colleagues in fluid mechanics, who were studying the dynamic instabilities of centrifugal pump impellers. He helped in the design of a system to measure the fluid forces in such machines. As a designer, Tom was precise, inventive, authoritative, and immensely practical, and the results of his efforts on impellers have been copied in many laboratories elsewhere.

Caughey took an active leadership role in the area of stochastic nonlinear systems, a field which he helped to start. His work on parametrically excited random systems laid the foundation for this important field. He was the first investigator to develop exact solutions of the Fokker-Planck equation applied to nonlinear dynamic systems. He was especially active in the control of randomly excited systems. His studies of piecewise linear systems, which predate the discovery of strange attractors and chaos in engineering systems, were fundamental in guiding later investigators in their studies of chaotic behavior of impact oscillators. His consulting work for Jet Propulsion Laboratory led to important developments in the dynamics and control of spacecraft and flexible structures. His style was renowned for its elegance. He was recognized in a special issue of the Journal of Probabilistic Engineering Mechanics commemorating his sixty-fifth birthday. He was also awarded the Freudenthal Medal by the American Society of Civil Engineers. In recognition of his momentous contributions to the broad field of applied mechanics, the American Society of Civil Engineers awarded him its prestigious von Karman Prize in 2002.

Professor Caughey was, for many years, heavily involved in ASME activities. He was a former editor of the Journal of Applied Mechanics. In recognition of his enduring contributions to the field of vibration engineering, he was honored with the ASME Den Hartog Award in 1995.

His never-fading enthusiasm for the fields of vibration and control is clearly demonstrated by his drive to launch the journal of the International Association for Structural Control and Monitoring (IASCM). Professor Caughey was the Associate Editor of the Journal who used his prestige and vision to make the new Journal become, within a span of a few years, the premier technical journal in the field of structural control and monitoring of infrastructure systems.

Professor Thomas K. Caughey was, without a doubt, one of the most, if not the most, influential members of the vibration community. His contributions are without equal, and have touched every engineer currently working in the field.

Contributed by the IASCM

