

## MEMORIAL RESOLUTION

### LYDIK SIEGUMFELDT JACOBSEN (1897 – 1976)

Lydik Jacobsen, a member of the faculty of Stanford University since 1924, died on December 22, 1976, at the age of 79. He was born in Nyborg, Denmark and came to Stanford as a student in 1917. After obtaining a B.A. degree in Mechanical Engineering in 1921, and spending three years with Westinghouse Electric Corporation in East Pittsburgh, Pennsylvania, he was persuaded by Professor Durand to return to Stanford as a member of the Mechanical Engineering faculty. He obtained a Stanford Ph.D. degree in Physics in 1927 while developing courses and teaching the theory of elastic body behavior and mechanical vibrations. His interest in vibrations provided the basis for much of his teaching and professional engineering contributions during an active career of over 50 years.

He was Chairman of the Department of Mechanical Engineering during the war and post war period for 19 years until his retirement from the faculty in 1962. He then embarked on a more than full-time consulting engineering career with Agbabian-Jacobsen Associates in Los Angeles that lasted for six years. Only after his seventy-second birthday did he begin his retirement! Moving to Oakmont, near Santa Rosa, he continued as a consultant for several West Coast industrial concerns as well as for the Atomic Energy Commission on its underground nuclear blast activities. He returned to Palo Alto for a three-year period before moving to Newport Beach in 1975.

Lydik Jacobsen's talents as an engineer were grounded in his love for solving problems. General methodologies were his tools and practical solutions the fruits of his labors. For a three year period during World War II, he was stationed at Mare Island as a Commander USNR. His contributions to the war effort were solutions to noise and vibration problems on over 270 naval vessels ranging from aircraft carriers and battleships to oilers and garbage lighters. These efforts required going to sea on about 140 of these ships. In his words, "It was a wonderful practical experience for a professor".

After the war he continued his work on the dynamic response of structures to earthquakes and other transient excitations in his Earthquake and Vibration Laboratory at Stanford. Under sponsorship by the Office of Naval Research, during the period 1948-54, he and his co-workers documented many studies covering their analytical and experimental investigations.

As early as 1927, he had already become involved with the resistance of structures to earthquake excitation, a topic which he was to develop throughout his career. He and his students built and tested various models of buildings, such as the present Alexander building in San Francisco. These early experiments on a shaking table had a great influence on the thinking of engineers and architects. He developed particular expertise in the study of the influence of earthquakes on dams due to hydrodynamic forces. As a consultant to the U.S. Coast and Geodetic Survey, the Tennessee Valley Authority, and the U.S. Army Engineers he was involved in decisions concerning many large dams.

His contributions to analysis included techniques for analyzing the response of multispan beams to investigate their complex resonance peaks. He also extended the phase-plane method to allow convenient evaluation of the response of nonlinear multi-degree of freedom systems including the influence of friction. These analytical and graphic methods provided powerful tools for assessing the resistance of structures to earthquake damage. Lydik Jacobsen always maintained a balance between analyses and experiment to ensure that his theoretical studies were soundly based. His earliest research, started at Westinghouse, concerned stress concentration in shafts of varying section and was inspired by design problems he encountered as a practicing engineer. A mathematical problem requiring the solution of a partial differential equation beyond the means then available for convenient numerical evaluation, he devised an electrical analogue and produced results which have become standard design data. His thirty-five published papers comprise an integrated grouping of analytical developments with experimental investigations which test the theories. Topics range from vibrations of buildings, structural elements, soil and liquid containers to ship-board machinery – and all have found application in the solution of challenging engineering problems.

Because of his broad range of activity in earthquake engineering he was elected President of the Seismological Society of America, 1953-55 and Chairman of the Earthquake Engineering Research Institute, 1950-53. He was a Fellow of the American Society of Mechanical Engineers and a member of the National Academy of Engineering.

Lydik Jacobsen was a teacher who held the interest of his students with his great enthusiasm for his subject and his skill as a lecturer. He expected them to fully utilize their theoretical knowledge, but also insisted that they use good judgment in application of the results of their analysis. He brought together the analytical methods, which he utilized so effectively in his teaching, research and consulting endeavors in the book, "Engineering Vibrations" which he co-authored with Robert S. Ayre, a former Ph.D. student and colleague in the Earthquake and Vibration Laboratory research program.

As Chairman of Mechanical Engineering during the postwar ferment, Lydik Jacobsen's influence in faculty selection was responsible for the development of an outstanding Mechanical Engineering Department and a preeminent Engineering Mechanics Program.

He was a skilled and intelligent craftsman. When funds were low, he made his own laboratory models. He enjoyed working with his hands as a respite from intellectual effort. His interest in nature led to a collection of butterflies and beetles; his interest in history led to fine collections of coins, ancient seals, guns, edged weapons, and armor. He enjoyed conversation. A strong believer in intellectual honesty, he was a witty and sharp critic of the pretentious in intellectual life. By his example he leaves us all a legacy of a full and productive life.

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