

# SEM History

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## Dr. Edward Wenk, Jr.



Engineer, Presidential Advisor, Author, Teacher  
SESA President 1957-58  
By C. E. Taylor, SEM Historian

Ed Wenk, currently an active SEM member, was the fifteenth President of the SESA and was a member of the SESA Executive Committee during an all-important period when the Society decided to hire professional staff and create a monthly journal. Moreover, it was he who was the chairman of the search committee to find a person to fill the new position. Thus, Ed Wenk was instrumental in hiring Bonney Rossi to be the first Executive Secretary of the SESA, an extremely fortuitous choice. Dr. Wenk's distinguished professional life can best be described as three sequential careers. They may be called The Navy Years, The Washington Scene, and Academia.

### **The Navy Years**

Armed with a B.S. degree in civil engineering from Johns Hopkins and some graduate work in architecture at Harvard University, Ed began his long association with the Navy at the Boston Naval Shipyard in 1941. Soon after Pearl Harbor he moved to the David Taylor Model Basin near Washington DC and stayed there from 1942 to 1956. Most of the time there he was a civilian scientist, but briefly during World War II, he was in uniform and assigned to the Model Basin as a naval officer. While associated the Model Basin he continued his graduate studies and received a M.Sc. in Applied Mechanics from Harvard University in 1947 and a Dr. Eng. from Johns Hopkins in 1950.

I first met Ed Wenk in 1952 when I reported to work at the Model Basin as a very junior engineer. He was my boss and the Head of the Structures Division, one of the most active groups on the base. His division was responsible for the theoretical and experimental analysis of strength and stability of all structures of interest to the Navy. Many of the most urgent problems then were associated with the strength analysis of the pressure hull for the NAUTILUS, the first nuclear powered submarine, which was being designed at that time. Submarines have very low safety margins, 1.7, far less than conventional pressure vessels. This increased risk accompanies an imperative of conserving hull weight while meeting requirements for buoyancy and for war-fighting capabilities. NAUTILUS was a radical departure from precedent because the nuclear boiler required a hull diameter fifty percent greater than traditional, and conical transition

shells between cylinders of different diameters. Existing criteria were found limited and even wrong, so new design theories had to be generated from scratch for such submarine hulls. Ed led an outstanding group conducting basic research on shell theory, and also had developed a very sophisticated experimental laboratory. In addition, the group also conducted tests onboard submarines, instrumented with hundreds of strain gages, during their initial dives to maximum operating depth (a good reason to double check all theories and calculations!). When the theoretical and experimental solutions showed poor agreement, all-out attacks were launched to find out why. To supplement his own competent group, Ed engaged world known experts on shell theory to spend days consulting at the Model Basin. Nicholas Hoff, Eric Reissner, Henry Langhaar, Lloyd Donnell, and others spent many productive days with Ed and his colleagues. The atmosphere was very “academic” and the sessions were extremely effective in identifying and finding solutions for many of the Navy’s most pressing problems. I feel extremely fortunate to have been a part of that effort. During those years I was impressed by two of Ed’s special gifts, (1) he is quick to learn new concepts and to grasp their significance and (2) he has the unusual talent to explain complex technical phenomena accurately and understandably to individuals who do not have an engineering or scientific background. Of course those two talents were exactly what is needed for Ed’s career in the Washington Scene. More about that later.

While at the Model Basin, Dr. Wenk and many of the people in his Division were very active in the SESA. He was a member of the Publications Committee, and in 1953 he was elected to serve on the SESA Executive Committee. Several people in the Structures Division presented papers at national SESA meetings in the early 1950s and published them in the Proceedings of the SESA. Bill Nash, Gerry Galletly, Joe Brock, E.E. Johnson, Bernie Goldhammer, Bob Slankert, Tom Reynolds, and Mills Dean III, are included in that group. Joe Brock was a competent photoelastician and Mills Dean III developed a method for waterproofing strain gages (no easy task for gages mounted on the external surface of a submarine pressure hull submerged several hundred feet under saltwater).

In 1956 Dr. Wenk became the Chairman of the Department of Engineering Mechanics, Southwest Research Institute, San Antonio, TX. Among other duties there he continued his interest in submarines. He designed the ALUMINAUT, then the world’s deepest diving true submarine. While at SWI Ed served as SESA President. I remember vividly Ed’s remarks at the beginning of the Spring 1958 SESA meeting in Albany. As a new immigrant to the Lone Star State, he followed tradition and opened the meeting with a Texas joke. That set the tone of the meeting and afterwards all subsequent session chairmen and authors were scurrying around, trying to find a Texas joke that surpassed all preceding ones.

### **The Washington Scene**

In 1959 Dr. Wenk was appointed as the first science and technology advisor to Congress. The position was created in the aftermath of the Soviet Space initiative and President Eisenhower’s appointment of Dr. James Killian as his Special Assistant. In the absence of precedent, it was necessary to establish methods of providing objective

advice on a wide variety of topics, and as appropriate, to solicit help from specialist in various fields. Reports were prepared for Members of Congress so that they could use facts in evaluating their positions and designing legislation. There were many lawyers and businessmen, and practically no engineers or scientifically trained persons in Congress. Ed's solid engineering background, his special talents as a quick learner and his communications skills were ideal for this new responsibility.

In 1961 Ed moved to the Kennedy White House as the Executive Secretary, Federal Council on Science and Technology. He served both Presidents Kennedy and Johnson and was responsible for proposing new initiatives in civilian Science and Technology, reviewing budgets, and coordinating programs for 23 agencies. In 1964 Ed became the Founding Head, Science Policy Division, in what is now the Congressional Research Service. He provided advice and council to members of Congress of both parties in both Houses for their Constitutional duties to set policy, budget funds, and monitor the Executive. Two years later Ed was appointed by Presidents Johnson and Nixon as first Executive Secretary of cabinet-level National Council on Marine Resources and Engineering Development, Executive Office of the President. Ed was responsible for advice to the President and for creating a long range program in marine affairs covering all civilian aspects of ocean-related activity.

When asked who his mentors were, Ed included Hubert Humphrey, saying, "Senator Hubert H. Humphrey was one of my clients in the post of first science and technology advisor to Congress. Then by another spin of fortune, he became my immediate boss as Vice President when President Johnson appointed me as director of presidential advisory staff concerned with marine affairs. In my daily contacts, in fulfilling staff support, and in informal conversations when traveling, I observed a person of extraordinary intelligence and devotion to the creed and the mechanics of democracy, a willingness to take risks of political battle and also a model of integrity and trust in a milieu not often so regarded. From him, I learned that politics is not simply partisan battles but the public life of a nation. I observed how the policy machinery works, how to be effective as an activist, and how humor serves as a social lubricant. When I left the Washington arena after twenty-six years, eleven in advisory roles, I considered running for Congress from Washington State. It was Humphrey who advised me against a race as a Democrat in a district that had not elected a Democrat for 20 years. So, ever a bridesmaid, never a bride."

Although Ed's SESA activities had to be scaled back during this phase of his career, his influence could still be felt. President Kennedy sent a letter to SESA at the opening of its 1961 International Meeting in New York (see *Experimental Mechanics*, Dec. 1961, p.19A) and President Johnson sent a similar greeting to SESA for its 1965 International Meeting in Washington D.C. (see *Experimental Mechanics*, Nov. 1965, p. 28A). I have always suspected that Ed Wenk played a key role in arranging for those letters.

### **Academia**

In 1972 Dr. Wenk was appointed by the University of Washington in Seattle, WA to joint posts as a Professor of Engineering and Professor of Public Affairs. He carried to

academia a unique experience as an engineer working in a policy environment, breaking in new ground in science policy with interdisciplinary seminars for students from engineering and other professional schools and drawing on fields of engineering, natural and behavioral sciences, economics, political science, sociology, and history. There he supervised the first graduate research in this field. Ed has been an active consultant and a prolific author. He has written five books, the last two of which are: *Making Waves-Engineering, Politics and the Social Management of Technology*, 1995, Univ. of Illinois Press, and *The Double Helix: Technology and Democracy in the American Future*, 1999, Ablex Publishing Corporation. He has lectured in the U.S. and abroad to a wide range of audiences on the importance of understanding the role of technology in society, what it does to people as well as for people, especially to foresee its future importance.

When asked about the challenges of his multifaceted career, he replied: "My greatest challenge has been to understand the critical connections of engineering with people and with politics, then to provide elected officials and those who elected them with objective technical advice on the risks they face, the options, the costs, benefits, unintended consequences and tradeoffs in each, the criteria for a prudent choice. In every important case, there were conflicts among parties at interest. Part of my role has been to challenge conventional wisdom, often tainted by self-serving advocates, and to balance such interests against the broader public interest. Responsibilities required intense learning in technical field beyond my expertise, and in behavioral sciences about which I learned little in formal education."

### **Professional Recognition**

Dr. Wenk was the William M. Murray Lecturer in 1966. Among his extensive list of honors is election to the National Academy of Engineering and the National Academy of Public Administration. He was awarded honorary doctorates by Johns Hopkins University and the University of Rhode Island, and in 1999 Dr. Wenk received the Ralph Coats Roe Medal from ASME.

### **Update**

As we move into the 21st century, I am pleased to report that Ed Wenk, now a Professor Emeritus at the University of Washington, still is as energetic and vibrant as always. He and his wife Carolyn live on the shore of Lake Washington in Kirkland, WA. Although Ed has not been a regular attendee of SEM meetings in recent years, he did attend the Past Presidents dinners in Portland (1988) and Bellevue (1998). Many young SEM members may not be familiar with Ed Wenk and his accomplishments. However, they should know that more than four decades ago Ed's vision and leadership profoundly and beneficially influenced the Society that we know and love today. - CET