JACOB H. DOUMA

Jacob ("Jake") H. Douma concluded a long and distinguished career in the U.S. Army Corps of Engineers when he retired on January 12, 1979. His retirement merely marked the formal end of his civilian service with the Corps of Engineers after more than 41 years. He continued on at full tilt for another 12 years, until 1991, before he finally decided to halt his active consulting career. Thus ended his 61 years of active involvement in engineering and hydraulics that had begun with his enrollment in the College of Engineering at the University of California at Berkeley in 1930.

Born in Hanford, California, on May 30, 1912, Jake Douma's interest in civil engineering and hydraulics was sparked by his summer job of irrigating alfalfa fields. As he toiled in the fields, young Jake kept thinking "there must be a better way to irrigate ..." His thoughts about irrigation led him to read about the Bureau of Reclamation and the Central California Project. He decided that to learn the better ways of irrigating he had to get an engineering education. So off he went to study engineering at the University of California at Berkeley, then one of the preeminent schools of engineering in the country. After five years at the University, where he studied under Morrough P. O'Brien and Bernard Etchevary, he graduated with the Bachelor of Science in Civil Engineering and majors in hydraulics and irrigation.

After graduation, he accepted a position at the US. Army Corps of Engineers Waterway Experiment Station (WES) at Vicksburg, Mississippi, in the summer of 1935. There he worked on the Mississippi River Model and did model research on Conchas Dam, New Mexico, before moving to the Bureau of Reclamation in Denver, Colorado, in 1936. Jake Douma soon tired of the routine of tabulating rainfall and runoff records to determine flow hydrographs in the Project Investigation Branch and maneuvered himself into a position working for Jacob E. Warnock in the Bureau's Hydraulic Laboratory in Denver. Here he became familiar with the Bureau's hydraulic model studies and design standards for dams, canals, and irrigation structures and came to know many of the leading hydraulic engineers in the country.

In 1939, Jake Douma joined the Los Angeles Engineer District as a hydraulic engineer in the Hydraulic Design Section of the Hydraulics Branch of the Engineering Division. Before he even settled himself, he was off to the Nashville Engineer District for a short, three-month assignment as a hydraulic designer on the Wolf Creek Dam project. Soon back in the LA District, he rose to be Chief, Hydraulic Design Section, and was responsible for hydraulic model testing and design of high-velocity flood channels, flood and debris dams, and appurtenant hydraulic works in the Los Angeles area. He did pioneering work on the Tujunga Wash channel for which he developed the design criteria for spiral, super-elevated, high-velocity flood channels.

At the personal request of Chief of Engineers, Lt. Gen. Raymond Wheeler, and Gail Hathaway, Special Assistant to the Chief of Engineers, Jake Douma moved to the Office, Chief of Engineers (OCE), to work as a hydraulic engineer. For the next 15 years he worked in the Hydraulic Design Section of the Structural Branch in the Engineering Division of Civil Works. He was responsible for the final review of the hydraulic design of the Corps' water resources projects and for the development and coordination of hydraulic research programs that supported hydraulic design. He played a major role in the Corps' major hydraulic design and construction projects and was instrumental in the organization and operation of a number of Corps-wide committees and research projects.

From 1961 through 1975, Jake Douma was Chief, Hydraulic Design Branch. In this job, his duties included the final review and approval of all hydraulic design and research programs. He was the Corps' top technical advisor to the Engineer Divisions and Districts and hydraulic laboratories on hydraulic planning, research, design, and operation of multi-purpose dams, flood control channels, inland waterways, navigation locks and dams, and coastal engineering projects. From 1975 through his retirement in 1979, he headed the Hydraulics and Hydrology Branch where he was responsible for both hydraulic and hydrology activities of Civil Works.

During his career in OCE, Jake Douma was instrumental in the establishment of a number of important programs, organizations, policies, and committees, including:

Hydraulic Design Branch, Engineering Division, Civil Works
Hydraulic Design and Analysis Division, Hydraulic Laboratory, Waterways Experiment Station
Tidal Hydraulics and Channel Stabilization Committees
Corps-wide Hydraulic Design Conferences
Numerous Engineer Regulations, Manuals, and Technical Letters that provided design guidance, criteria, and procedures for all phases of hydraulic design and coastal engineering
Training programs at U.S. and foreign universities for the continued education and development of hydraulic design and coastal engineering engineers

His overall guidance and concern were critical to the development of the WES, North Pacific Division, Mead (Omaha District) and San Francisco Bay hydraulic laboratories into recognized world leaders in the use of physical and mathematical models as engineering tools for designing complex water resources projects. His activities in this area led to the development of less costly and more efficient planning, design, and maintenance procedures and improvements in the functional adequacy and cost effectiveness of flood control channels, spillways and outlet works, navigation locks and dams, navigation channels and control works, shore protection measures, ports and harbors, and water quality studies.

Drawing on his Bureau of Reclamation experience, he pioneered the development of hydraulic design standards and criteria for the Corps of Engineers by outlining a long-range program of literature review, prototype measurements, data analysis and publication of hydraulic design charts on standards and criteria. Many counties around the world have accepted these design criteria as standard and use them as the basis for their water resources development projects.

His extensive experience and knowledge in planning, design, operation, and research made Jake Douma a highly valued advisor and consultant throughout the Corps and the world. His advice was often sought by U.S. and foreign governmental and engineering agencies as well as by commercial engineering and construction firms. Jake attained a national and international reputation in hydraulic research and design. He made many significant contributions to engineering science--he personally developed the design for spiral, super-elevated, high-velocity flood channels, under designed spillways, sloping bridge nose piers to reduce flow constructions and shed trash, stilling basins with upstream baffle blocks and end sill and a trouble-free 45-degree lip for vertical high-head reservoir outlet works gates. These and other developments were adopted as standard practice in the Corps of Engineers and throughout the world.

He also helped to organize the Tidal Hydraulics and Channel Stabilization Committees to bring together the experts in the Corps and outside consultants to solve complex and difficult technical problems. These committees developed research programs and advised field agencies on major tidal hydraulic and channel stabilization projects. The numerous reports of the committees and their advisory work have substantially advanced engineering and scientific knowledge in both areas.

Jake Douma's outstanding and continuing contributions to the Corps of Engineers were acknowledged in his numerous Sustained Superior and Meritorious Civilian Service Awards. In 1971 he was elected to membership in the prestigious National Academy of Engineering. In June 1982, Jake Douma was inducted into the U.S. Army Corps of Engineers Gallery of Distinguished Civilian Employees in recognition of his many contributions to the Corps of Engineers.

Biographical Information

Professional Societies and Affiliations:

American Society of Civil Engineers (1935)
- Life Member (1977)
- Task Committee on Gates and Valves (1954-61)
- Research Committee (1959-64)
- J.C.D. Stevens Award Committee (1958-61)
- Task Committee on Standardization of Hydraulic Structures (1963-65)
- Executive Committee of the Coastal Engineering Research Council (1967-87)
- Member and past Chairman, Hydraulics Committee
- Hydraulic Division Executive Committee (1969-75)
- Member, Waterways and Harbors Division

U.S. Committee, International Commission on Large Dams (1948-)
- Technical Activities Committee (1969-73)
- Hydraulics Committee (1975- 1987)

U.S. Committee, International Commission on Irrigation, Drainage and Flood Control (1948-)
- Technical Activities Committee (1969-72)
- Hydraulics Committee (1972-75)

International Association for Hydraulic Research (1948-)
- Committee on Gates and Valves for Dams (1966-72)

Permanent International Association of Navigation Congresses(1948-)
- Paper Selection Committee (1965-68)

Council on Wave Research
- Member

National Academy of Engineering (1971-)
- Marine Board (1972-79)
- Committee on Safety of Existing Dams (1982-84)

Honors and Awards:

Chi Epsilon Civil Engineering Honor Society
Tau Beta Pi Engineering Honor Society
National Academy of Engineering
Who's Who *in Engineering*

Selected Consulting Services:

1951-61	Technical advisor to hydraulic engineers of India on the design of gates for dams.
1954-55	Consultant to Tibbetts, Abbott, McCarthy, and Stratton (TAMS), New York, on hydraulic design of Peligre Dam, Haiti.
1958-65	Consultant to National Institute de Obras Sanitarias, Caracas, Venezuela, on development of comprehensive plans and design of flood control channels and dams for the protection of the City of Caracas.
1961-69	Consultant to CASECO, Consultants, Ltd., Vancouver, Canada, on Mica Creek Dam.
1967-71	Consultant (Member of Board) to New Brunswick Power Commission, Frederickton, Canada, on Mactaquac Dam.
1967-71	Consultant to Quinones Associates, San Juan, Puerto Rico, on design of flood control channels.
1967-73	Consultant to TAMS, New York, on Tarbela Dam, Pakistan.
1973-78	Consultant (Member of Board) to Water and Power Development Authority, Pakistan, on Tarbela Dam.
1976-82	Consultant (Member of Board) and Special Hydraulic Consultant to Engineering Consultants, . Inc., on Magat Dam, National Irrigation Administration, Philippines.
1978-79	Consultant to Harza Engineering Company of Reza Shah Kabir Dam, Iran.
1978-85	Consultant (Member of Board) to Saskatchewan Power Corporation, Canada, on Nipawin and Saskatchewan Forks Dams.

1980-83	Consultant to Corps of Engineers, Los Angeles District, on the San Jacinto and Batista Creek levee failures.
1980-91	Consultant (Member of Board) to C .A. De Administracion Y Fomento Electricio (CADAFE), Venezuela, on Uribante-Caparo Project of four dams and three hydroelectric plants.
1980-83	Consultant (Member of Board) to Alaska Power Authority on Susitna Project consisting of an 800-foot high earth dam, a 640-foot high concrete dam, and two hydroelectric plants.
1982-83	Consultant to Cadillac-Fairview Homes West on flood protection for a large urban development in Riverside County, California.
1982-84	Consultant to Riverside County, California, on a court case involving claims for $20 million in flood damages.
1984-86	Consultant to the World Bank on Kalabagh Dam, Pakistan.
1985-87	Consultant (Member of the Board) to East Bay Municipal Utility District, Oakland, California, on the safety of Pardee Dam and Spillway.
1985-88	Special hydraulic consultant to the Salt River Project Authority, Phoenix, Arizona, on spillway erosion problems at Horse Mesa Dam.
1986-91	Consultant (Member of Board) to Saskatchewan Power Corporation, Canada, on two multi-purpose dams on the Souris River.

Selected Professional Publications:

"Model Study of Green Mountain Dam Spillway," *Civil Engineering,* March 1940.

"Testing Theoretical Losses in Open Channel Flow," *Civil Engineering,* November 1947.

"Hydraulic Design of Slide, Vertical-Lift and Tainter Gates for High-Head Reservoir Outlets," *Proceedings, International Commission on Large Dams,* 1951.

"Tidal Hydraulic Problems of the Corps of Engineers," *Journal, Hydraulic Division,* ASCE, 1953.

"Hydraulic Design Criteria for Reservoir Outlets," *Proceedings, International Association for Hydraulic Research, 1965.*

"High-Velocity Flow in Open Channels," *Proceedings, International Association for Hydraulic Research, 1965.*

"United States Lock Design Practice," *Proceedings, International Association of Navigation Congresses, 1969.*

Contributions to Davis and Sorenson, *Handbook of Applied Hydraulics (1969)* and National Research Council, *Safety of Existing Dams (1983).*

Registration:

Registered Professional Engineer in the State of Virginia.

JACOB H. DOUMA