

OBITUARYProfessor Kiyoshi Muto

Dr. Kiyoshi Muto, Professor Emeritus of the University of Tokyo, died on the 12th of March, 1989, at the age of 86, in his house in Tokyo due to heart imperfection.

Professor Muto was born on January 29, 1905 in Ibaraki Prefecture. After graduating from the Department of Architecture of the Tokyo Imperial University (former name of the University of Tokyo) in 1925, he was immediately appointed to lecturer, promoted to assistant (associate) professor in 1927, and then to professor in 1955 at the age of 32. For 58 years until he retired from the professor of the University of Tokyo in March 1963, he was devoted to education and research in structural engineering, particularly for earthquake resistant structures. In this period, he also served the university management as a Trustee of the University Senate (1958-60), and the Dean of the Faculty of Engineering (1960-62).

The principal work of Professor Muto at the University of Tokyo was structural dynamics and its application to earthquake resistant design. Starting the study of structural dynamics right after the Great Kanto Earthquake of 1923, he developed methods of structural analysis, static as well as dynamic, exact as well as practical. The frame analysis, called D method, is internationally known and applied to a wide range of structures. He also founded a basis for the dynamic design for earthquakes by a series of experimental works into the restoring force characteristics of structural components and nonlinear response analysis.

He introduced a 2000 ton structural testing machine (1958) and a seismic response analyzer (1960) to the Faculty of Engineering, the University of Tokyo. The former was widely used for large scale testing of structural members and subassemblages, while the latter was the most advanced analog computer of the day, capable of performing nonlinear seismic analysis up to five degrees of freedom.

After retirement in 1965, Professor Muto joined the Kajima Corporation as an Executive Vice-President (1963-77), and established the Muto Institute of Structural Mechanics, Inc. in 1965, of which he was the president until his last day. He developed highly sophisticated earthquake resistant design theories in order to realize highrise buildings and nuclear power plants in an earthquake country like Japan and applied them to the practical design of numerous structures. The most typical example of his work was the structural design of 36-storied Kasumigaseki Building, Japan's first skyscraper, for which he invented the slitted shear wall of reinforced concrete.

Throughout his life, he endeavoured after the popularization of earthquake resistant design generally to the structural engineering profession. Now the state of the art of earthquake resistant design in

Japan is such that it has prevailed to any structures and people can live in Japanese cities almost completely forgetting about the fear of earthquake disaster.

Professor Muto's activities extended also to the advancement of science and engineering, by serving as a member of the Science Council of President of the Architectural Institute of Japan, President of Japanese Society of Soil Mechanics and Foundation Engineering, and President of Japan Concrete Institute. Internationally, he was the first President of the International Association for Earthquake Engineering, and an outstanding leader of earthquake engineering in various international conferences, symposiums and seminars.

He was the recipient of an Imperial Prize from Japan Academy (1964), Commendation by the Minister of State for Science and Technology (1968), Medal with Purple Ribbon (1968), International Award of Merit in Structural Engineering, International Association for Bridge and Structural Engineering (1976), Order of Culture (1983) and Grand Condon of the Order of the Sacred Treasure (1989). He was elected a Member of Japan Academy (1975), a Nominated Lecturer at the New Year's First Lecture to His Majesty Emperor (1977), Person of Cultural Merits (1979). He was also elected a foreign associate of the National Academy of Engineering, USA (1978).

He was the author of numerous books and papers. Representative of books are:

"The Aseismic Design of Structures" (Five Book Series, Maruzen Co., Ltd.)

"Aseismic Design Analysis of Buildings (in English)", (Maruzen Co., Ltd.),

while those of papers are:

"Frame Analysis against Earthquake Load -- D-Value Method", AI.1, 1933,

"Special Requirements for Design of Nuclear Power Stations to Withstand Earthquakes", Proc. , Institute of Mechanical Engineering, Nuclear Energy Group, UK, Vol.177, No.7, 1963,

"Earthquake Resistant Design of 36-Storied Kasumigaseki Building," Special Report, IV WCEE, Chile, 1969,

"Newly-Devised Reinforce Concrete Shear Walls for High-Rise Building Structures," Invited Paper, SEAC Convention, Hawaii, 1969.

It was a sad news for those who knew Professor Muto and his family personally, that his wife, Mrs. Yoshiko Muto, who had been under medical treatment, followed him to heaven on the 11th of April, 1989.

Professor Hiro Aoyama