

Dušan Milović

Dušan Milović was born on 28 March 1925 in Nova Varoš, Serbia. He finished his primary school in Niš and grammar school in 1943 in Belgrade. He graduated in 1954 from the Faculty of Civil Engineering, on the subject of concrete bridges, at Belgrade University. In 1959 he defended his doctoral thesis entitled "Engineering properties of loess soils in Yugoslavia" and he was the first who received Ph.D. Degree in the field of soil mechanics and foundations in Serbia.

From 1959 he worked at the Serbian Institute for Testing Materials, Department of Soil Mechanics and Foundations in Belgrade. He remained there until 1966 working as Science Associate and as Senior Science Adviser. From 1966 until 1971 he worked in Québec, Canada, where he occupied various functions at the University of Sherbrooke, as Invited Professor, Associate Professor and the Head of the Department of Soil Mechanics and Foundation Engineering. In 1969 he was selected Full Professor. After his return from Canada, in the period from 1971 until 1980, he was Counsellor at the Institute of Civil Engineering in Vojvodina (Subotica) and Full Professor and the first Dean of the newly opened Faculty of Civil Engineering. From 1980 until 1992 he was Full Professor at the Institute of Industrial Building at the Faculty of Technical Sciences in Novi Sad, Director of the Institute and Head of the Soil Mechanics Department. He retired in 1992.

He was elected Corresponding Member of the Vojvodina Academy of Sciences and Arts in 1981 and in 1987 he became its Full Member. In 1991 he was elected Full Member of the Serbian Academy of Sciences nad Arts.

During the long period of active work he taught Soil Mechanics and Foundation at the Faculty of Technical Sciences in Novi Sad, Faculty of Civil Engineering in Subotica, Faculty of Agriculture in Novi Sad and at the Faculty of Civil Engineering in Sherbrooke, Canada, where he had held post graduate courses. He headed for several master's thesis and doctoral dissertations in Serbia and Canada.

He speaks English and French, and has a considerable knowledge in German.

Working conditions in this field were extremely difficult, because in the middle of XX century the Soil Mechanics was the youngest branch in Civil Engineering in Yugoslavia and Serbia and this subject was not yet included in the regular study programme for several postwar generations. Therefore, in order to be able to solve the current problems in civil engineering practice, due to the complexity of these problems, it was essential to develop the theoretical solutions and to verify the validity of these solutions by means of the experimental investigations. Dušan Milović directed his activity towards to scientific and research works. He was the

leader and principal investigator of 16 research projects, financed by the Scientific Research Fund of Serbia, Scientific Research Fund of Vojvodina, National Research of Canada, American National Science Foundation and Scientific Research Fund of the Academy of Sciences and Arts.

In his theoretical studies he used double Fourier's series, power series method, boundary element method, finite difference method and finite element method. Numerous original theoretical solutions represent one of the most important achievements in his research works. He published 15 monographs and textbooks, 137 papers have been published in Yugoslav and Serbian journals and congress volumes, 73 in international journals and congress proceedings, with over 3500 pages. These papers have been cited 194 times until 2007 in 18 countries (Science Citation Index, textbooks in foreign countries and in doctoral theses in the USA and Canada).

In the field of shallow foundations he considerably broadens the application of the Theory of Elasticity. His solutions, obtained by means of the finite element method for calculation of component stresses and displacements for various shapes and for any relative stiffness of foundations, for any type of loading and for very complex soil models, including multilayer systems, anisotropic properties, limited thickness of the compressible layers, have been estimated as pioneer works. Papers presented at international congresses in London (1957), Paris (1961), Wiesbaden (1963) and Paris (1963) are the first Serbian papers. Also, his original solutions, obtained by the finite element method, published in the country (6 papers in the period 1971 – 1974), and in the international scientific journals (8 papers in London, Paris, Berlin and Moscow in the period 1970 -1973) are among first with the solutions obtained by finite element method in the field of Soil Mechanics. It is also worth mentioning that his book "Stresses and Displacements for Shallow Foundations" is the only Serbian book published in English (Ed. Elsevier), which gives the theoretical solution related to Soil Mechanics.

In the field of deep foundations Dušan Milović developed the procedure for the determination the bearing capacity of piles, subjected to a vertical compression load, using the results of the cone penetration tests in the field. By means of the finite difference method, he solved theoretically the problem of calculation the horizontal displacements, bending moments, rotation and shear forces for any relative rigidity of free head or fixed head piles, produced by horizontal load and bending moment. The agreement between the theoretical and field test results was performed using field load tests in the scale 1 : 1. Experience gained in engineering practice confirms that his method provides more precise results than those obtained by static or dynamic methods and represents considerable improvement in prediction of pile behaviour subjected to vertical or horizontal load. During the long period of time it has been noticed that seismic forces can cause the liquefaction in sand layers with catastrophic consequences. Studying the behaviour of sand deposits under the influence of cyclic load, he found that severe damages and the collapse of structure very often take place due to degradation of skin friction of piles.

One of his very significant activities was directed toward to theoretical, field and laboratory studies of loess soils. This kind of soil covers about 9% of continent surface, reaching the thickness greater than 100 meters. Loess is widely spread not only in our country but also in countries such as Russia, China, the USA, among others. It has been reported that loess exhibits unusual properties. In many countries a great number of damaged or collapsed structures has been noticed, despite the fact that the applied load was relatively low. On the basis of the extensive laboratory and field investigations he defined the parameters which have the greatest influence on the loess behaviour. He modified the method of settlement calculation, involving the additional component of differential settlement, caused by wetting or saturation of loess soil and including the effect of anisotropy. During the laboratory testing of loess samples he established that the mechanical disturbance can lead to the quite erroneous results and conclusions concerning its bearing capacity and expected settlements. By means of the obtained solution it is possible to solve successfully foundation problems on loess soils in every country with loess deposits. These results have been estimated as exceptional achievement in this field, not earlier published anywhere else.

During his stay in Canada, Dušan Milović paid particular attention to the investigation of sensitive Leda clay in Québec. The essential property of this kind of clay is the complete loss of shear strength under the influence of cyclic loading and vibrations. In these cases movements and sliding of soil occur and endanger the stability of structures. In order to better understand the behaviour of these clays numerous field and laboratory tests have been performed. It has also been observed that the mechanical disturbance of sensitive clays has a considerable influence on the precision of the obtained results. Therefore, he introduced the static penetration test in engineering practice in order to get the results for clay in the natural state.

In the capacity of designer, expert and consultant he has made a considerable contribution in the field of foundation engineering, providing a safe and economical solutions to the geotechnical problems for more than 220 structures. Some of the most important are apartment buildings with 13 to 19 stories, silo groups, bridges, steel work, rolling mill building, factory of chemical products, halls of fair, hotels, sport centers, shipbuilding yard, harbours and other important structures. Also, solutions of the foundation problems were given for structures in Iraq, Poland, Czechoslovakia and Canada.

Papers have been published in Journals Glas (Serbian Academy of Sciences and Arts), Our Civil Engineering, Publications of the Institute for Testing Materials, Buildings, Road and Traffic, Materials and Structures. He took part with papers at 29 Yugoslav and Serbian Congresses on Soil Mechanics and Foundation Engineering.

Some papers were published in foreign countries in the most recognized international geotechnical journals such as Géotechnique (London, England), Soils and Foundations (Tokyo, Japan), Journal of the American Society for Testing and

Materials ASTM (the USA), Sol Soils (Paris, France), L'Ingénieur Constructeur (Paris, France), Le Génie Civil (Paris, France), Bauingenieur (Berlin, Germany).

His papers were presented at 11 World Conferences on Soil Mechanics and Foundation Engineering, in London (1957), Paris (1961), Montreal (1965), Mexico City (1969), Moscow (1973), Tokyo (1977), Stockholm (1981), San Francisco (1985), Rio de Janeiro (1989), Hamburg (1997), Osaka (2005).

His papers were also presented at 3 World Conferences on Engineering Geology, in Buenos Aires (1986), Lisbon (1994) and Vancouver (1998).

He participated with papers at 27 European Congresses, International Regional Congresses and Danube Congresses on Soil Mechanics and Foundation Engineering, Budapest (1963), Wiesbaden (1963), Chicago (1965), Haifa (1967), Belgrade (1970), Bangkok (1971), Budapest (1971), Paris (1971), Stockholm (1974), Vienna (1976), Bratislava (1977), Brno (1979), Paris (1980), Zurich (1982), Amsterdam (1982), Budapest (1984), Paris (1984), Nagoya (1985), Beijing (1986 and 1988), London (1989), Budapest (1990), Florence (1990), Vancouver (1991), Dallas (1992), Ghent (1993) and Copenhagen (1995).

He was invited to be Panel Member in Chicago (1965), Vice President of the Section for Collapsible Soils at the World Conference in Mexico (1969), Lecturer at Ecole Polytechnique in Montreal (1969), Panel Member and Lecturer at the Conference in Brno (1979), Invited Speaker in London (1989), Panel Member and General Reporter in Budapest (1990), President of Technical Section for Collapsible Soils at the International Conference held in Dallas (1992), Invited Speaker to deliver a lecture at the European Conference on Soil Mechanics and Foundation Engineering held in Copenhagen (1995).

Dušan Milović was President of the Serbian Society of Soil Mechanics and Foundation Engineering, Member of the Presidency of the Yugoslav Society of Soil Mechanics, Representative of the Yugoslav Society at the World Society of Soil Mechanics and Foundation Engineering, Member of the European Society of Numerical Methods, Member of the European Committee of Penetration Testing and Advisor in the Committee of World Society for Soil Sampling.