

Kazimierz Thiel, the Creator of the School of Scientific Rock Mechanics in Poland

Kazimierz Thiel was born on the 25th of January, 1924 in Doruchów, Kalisz voivodeship. Therefore in 1994 he celebrates his seventieth birthday, which gives occasion to summing up his hitherto scientific achievements. Knowing the vitality and energy of the Professor I am convinced, that his further research work will be equally active and accompanied by new achievements.

Kazimierz Thiel graduated from Wrocław Politechnics in 1949 and received the degree of Master of Civil Engineering. After one year of employment at Warsaw Politechnics he was in 1951/58 a scientific employee of The Institute of Organization and Mechanization of Building Industry in Warsaw, where he carried out scientific research within a scope of organization and mechanization of construction and technology of concrete and concrete constructions. In 1958 he received at Warsaw Politechnics the scientific degree of Doctor of Technical Sciences on the grounds of doctor's thesis on theoretical bases of constructing ferroconcrete halls of shell covers with the slidable shuttering method. In 1959/60 he served the scientific training at Centre Experimental de Recherches et d'Etudes du Batiment et des Travaux Publics in Paris. In 1960/63 he was the director of the department of this Institute in Casablanca. After his return in 1964 he received the degree of Qualified Doctor at Warsaw Politechnics on the grounds of his thesis "The concrete rheological strains in the light of research on prestressed bridges statically determined".

During his work at the French Institute Kazimierz Thiel took an interest in research problems of rock mechanics. Entirely devoted himself to this subject area after he began working in The Institute of Hydro-Engineering Polish Academy of Sciences (PAS) in 1966. Rock mechanics as a speciality in scientific discipline "building engineering" evolved not long ago. Geology-engineering research is the fundamental source of information in this speciality. Without good knowledge of geological structure of rock massif it is not possible to forecast the behaviour of such technical objects as a tunnel, road or dam, during and after their realization. Good knowledge of methods of design and realization of these objects is also crucial. The analysis methods are the methods of mechanics of solid bodies and hydraulics of flows in rock cracks. Practical methods were already known in antiquity. Building an amphitheatre on a rocky slope is a good example here. For

a very long time it was a skill, and not designing based on justified and proved scientific formulae. Still a rock massif as a heterogeneous and cracked body is a subject of experimental research and still, experiences from realization are essential to expertise work for the needs of designing and building new objects. Still in rock massifs of various geological structure, different analytical models are applied and scientific recognition is far from perfection. Research themes of rock mechanics are of general and regional nature. Research works of Prof. Thiel and his team are concerned above all with the recognition of mechanical properties of the Carpathian flysch.

The Laboratory of Rock Mechanics created by Prof. K. Thiel at The Institute of Hydro-Engineering PAS in 1967 is engaged in research within a scope of rock mechanics related in particular to analysis of mechanical behaviour of rock massifs under external and internal loads, determination of conditions of equilibrium and means enhancing the stability of structures. The experiments are of cognitive and applicational nature. They are associated with the foundation and stability of water plants such as dams, slopes of water reservoirs, drifts, tunnels and underground chambers. Researches rely on looking for a description of composite structures of rock massifs in a form of models, methods of determining their basic physical and mechanical properties, methods of defining their stability, methods of observation of the structure behaviour during its realization and exploitation. There are three kinds of tests in use: field tests in situ, laboratory and theoretical tests. Field tests apply to the recognition of the structure of a medium (geological and geophysical tests), the definition of properties of rock massifs (internal stresses, deformability, shear strength, water absorbability), and the behaviour of the structure in time. Laboratory tests are concerned with the determination of physical and mechanical properties of a bed-rock. Theoretical tests include analyses of stress patterns and analyses of stability. In these tests numerical methods of mechanics are used such as methods of finite elements, finite differences and edge elements.

Research works were and are held in regions where structures are being designed and realized and which, in this way, become experimental objects in a natural scale. Until now tests were made on eight dams, six slopes and some tunnels making up constituent elements of three dams. Research results were directly used in designing and realization of several structures. Simultaneously they provided basis and initial material to basic cognitive works. Researches allowed for obtaining series of results of cognitive nature in a form of models of geotechnical cracks, permeability, mechanical properties. Two geotechnical classifications and an empirical criterion of rock massif destruction were worked out. Scale effect in determining mechanical properties of a rock massif was studied and methods of forecasting stability of slopes were proposed.

Prof. Thiel is the author of many considerable reports in the scope of sealing screens in bases of dams, stability of slopes, conditions of foundations of dams and breaking down of tunnels, including several abroad (Algeria, Iraq, Marocco).

Prof. K. Thiel summed up his own achievements and those of his team in a monograph "The Rock Mechanics in Hydroengineering" published in 1980 by The State Scientific Publishing House, Warsaw. It is the first academic textbook in Polish scientific literature on this subject. This monograph was published in English in a broadened version entitled "Rock Mechanics in Hydroengineering" by PWN, Warsaw and Elsevier, Amsterdam-Oxford-New York-Tokyo in 1989. This monograph, against the background of world achievements, displays scientific achievements of the Polish school of rock mechanics, which was created by Prof. Kazimierz Thiel.

The scientific and organizational activity of the Professor within The Section of Soil and Rock Mechanics and Foundation Engineering of The Civil and Hydroengineering Committee PAS and Subcommittee of Rock and Foundation Mechanics of The Polish Committee of The Big Dams International Committee is very wide and fruitful. The scientific achievements of Prof. K. Thiel are known and were distinguished with a series of prizes by The Secretary of Sciences PAS. In 1991 Prof. Kazimierz Thiel was elected to be a corresponding member of the Polish Academy of Sciences.

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