

# TRAINING IN ISOTOPE TECHNIQUES FOR THE WATER MANAGEMENT

by

Zs. ERDÉLYSZKY

Institute of Water Management and Hydraulic Engineering, Technical University, Budapest

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Presented by Prof. I. V. NAGY

Recent experience showed the use of radioisotopes in industrial, agricultural and other research programs to be highly efficient for the national economy and the sciences.

Practical introduction of new methods of modern physics depends on the combined effect of several factors, among them the problems of instruments, specialists, national economy and organization are the most important. The necessity to introduce nuclear techniques, especially in the field of water management, is obvious, just as to widen the relevant knowledge of our actual and future hydraulic engineers.

Foreign universities establish e.g. isotope laboratories specially for water management education, to help students to acquire the fundamentals for their special tasks. This requisite is offered by the Nuclear Reactor of the Technical University, Budapest, together with the assistance offered by the National Atomic Energy Commission, the Institute of Isotope of the Hungarian Academy of Sciences and similar organizations.

Initiating such a course is bound to the acquisition of fundamentals both in hydrology and in nuclear physics. A condition is to begin this subject at some higher year to be continued in specialist and in post-graduate engineering education.

In addition to classroom lectures and laboratory exercises, in-situ tests will be offered, to ensure a perfect correlation between theory and practice.

Tracer technique is intended to be introduced as a facultative subject with obligatory examination to be assumed as an ordinary subject only after some years, after conclusion of the educational reform.

Lectures are intended to make the students familiar with fundamentals of nuclear technique and especially with measures to assure safety of isotope operations, as well as with their fields of application.

Practical exercises include the presentation of the most important nuclear instruments and their use in this special field. In addition, field tests primordial for hydrological research will be made, in view of Hungarian conditions, and connected to the work of the Research Institute of Water Resources and the Municipal Laboratory of Hygienics and Epidemiology.

Introduction of the subject Nuclear Technique Uses in Water Management is likely to help solving difficult water problems, and to develop materialist thinking, dialectic approach in the students.

In the frames of specialist engineering education, isotope techniques will be offered as major, with special emphasis laid on those parts within the general scope which are directly related to our speciality.

Special courses held by the Institute of Post-Graduate Engineering Education will partly consider comprehensive application problems in special fields, and partly present recent or established achievements, test methods and instrumentation.

Scope of this subject consists of three parts: the first part will be concerned with fundamentals of nuclear technique, characteristics of radio-active and stable isotopes, instrumentation, metrology and shielding.

The second part will present tracer and similar radiation-based techniques in the research fields of surface and subsurface waters, water balance and water pollution. Last but not least, their uses in hydraulic engineering will be treated.

The third part will involve practical education and field measurements.

Education will be facilitated by a notebook — as educational aid — including the description of the laboratory exercises to be held. By now, isotope research and routine tests are done by several research institutes. Visits to these institutes will be organized to make the students acquainted with them in order to widen their theoretical and practical knowledge.

Of course, our water management organs take advantage of the high qualifications, experience and scientific readiness of our teaching staff, possessing, in addition, far-reaching professional relations helping them to organize teams for more important research programs and to co-ordinate their work. This fact is favourable both for the shortening of research times and for the turnover of research funds.

We are convinced this feat will raise the niveau of engineering education by offering specialists a tool for their research and tests that cannot be replaced by other ones.

### Summary

Scientific research work is a requisite of the University education program.

In view of the conditions, features in this country, and of the interests of the national economy, education of nuclear techniques in hydrology is likely to be imperative, in order to make graduates in hydraulic engineering familiar with this accessory science, to qualify them for an efficient use of isotope techniques in our speciality. This University will be among the first to introduce this kind of special education.

Dr. Zsigmond ERDÉLYSZKY, 1111 Budapest, Műegyetem rkp. 3, Hungary