

BOOK REVIEW — BUCHBESPRECHUNG

Electric Power Transmission by L. VEREBÉLY, Vols. I-IV

Forty years of creative effort and university teaching have been concentrated in this comprehensive work edited by Prof. Dr. László Verebely in the years 1946—1950. In addition to the material delivered by the author during the past 25 years before students of electrical engineering at the Technical University, Budapest, the four volumes include detailed information on problems electrical engineers may come across in design work or industrial practice. In order to attain this aim a theoretical basis has been adopted. The methods of discussion have been chosen with a view to presenting the material in logical order so as to provide a valuable aid for electrical engineers engaged in both research and scientific work.

Volume I has been sub-titled Practical Electrostatics (University Press, Budapest, First edition 1946, 472 p., 367 figs., 26 tabs.). The introduction is devoted to the development of various theories on electricity from ancient times up to the present, surveyed in the light of the general evolution of natural sciences. The theoretical discussion of fundamental concepts of electrostatics meets the requirements of the practical engineer as well. This is followed by a detailed treatise on the dielectric strength of materials constituting the basic knowledge for up-to-date insulating techniques. Notes on the production of insulating materials comprise both theoretical and practical data relating to gaseous, liquid and solid insulating materials. A special section is devoted to insulators (pin insulators, bushings and line insulators) with the description of a wide range of both commonly used and special shapes. The Chapter entitled Insulator Testing deals with routine and special laboratory tests of insulators made of porcelain, glass, steatite and up-to-date synthetic resins. Equipment and measuring methods used in high-tension laboratories are discussed in the last part. Detailed information on insulators and insulating materials has been compiled in tables annexed to the volume.

Volume II sub-titled High- and Low-Tension Power Transmission Lines (University Press, Budapest, First edition 1947, 452 p., 304 figs., 15 tabs.) is devoted to the theory of electrical characteristics and performance calculations of high- and low-tension power transmission lines. An interesting survey of the history of electrical power transmission and of Hungarian contributions thereto is given in the Introduction. The general aspects of electrical power transmission are outlined and presented in a coherent system in Part I. The detailed discussion of low-tension D. C. and A. C. lines is followed by a chapter on the electrical characteristics of high-tension overhead lines as well as on vector diagrams and performance conditions of power transmission lines. Disturbing effects of high-tension lines upon neighbouring conductors are dealt with in conclusion in a manner to furnish practical advice on the basis of theoretical relationships. Analytical and graphical methods used for the study of A. C. circuits as well as a coherent summary of the symbolic method are given in the annex. The use of both methods is enlightened by practical examples. Fifteen tables containing data on overhead lines and cables are to be found at the end of the volume.

Volume III has been sub-titled Cables and Overhead Lines (University Press, Budapest, First edition 1948, 520 p., 438 figs., 29 tabs.). While the general theory of low- and high-tension power transmission lines is dealt with in Vol. II., special, mainly practical problems of cables and overhead lines are summed up in this volume. The material has been grouped under the following headings: High-Tension Cables, Overhead Lines, Transmission Towers, Construction and Mounting of Overhead Lines, Heat Effects in Transmission Lines. The treatment exceeds by far the scope of a university textbook, yet renders the book suitable to satisfy the needs of the engineer engaged in practical work. An entire section has been devoted to economic aspects and to D. C.

power transmission. The copious material compiled in 29 tables is a valuable aid for students and engineers designing overhead lines and cable network.

Volume IV carried the sub-title Switchgears and Protective Equipment, Overcurrents, Voltage Surges (Scientific Publishing House, Budapest 1950, 590 p., 634 figs., 33 tabs.). As conceded in the preface by the author, the selection of the material for this volume was not without difficulties due to the scope, divergence and constant evolving of this subject. The limits to be observed in a similar comprehensive work have been successfully determined without however obscuring the picture of the present state of development or of the trend of future evolution. Main headings of individual parts again give an indication of the material: Bus Bars, Disconnecting Switches, Fuses, Circuit Breakers, Drives for Circuit Breakers, Tripping Elements and Relays. A clear summary of theoretical knowledge on the electric arc and its extinction has been inserted before the discussion of circuit breakers. Protective systems are dealt with under the following headings: Selective Protection of Equipment and Line Protection. The description of short circuits, their analysis and methods of limiting their effects constitute a separate chapter. Preceding the section on protection against voltage

surges author expounds the characteristics of line instability phenomena and travelling waves as well as the sources of voltage surges. The discussion of problems concerning the earthing of the neutral point, the advantages and drawbacks of several commonly applied systems constitute the last part of the volume. The 22 tables contain data mainly on bus bars made of various materials and mounted in various arrangements.

Extensive references on the subject under consideration are given at the end of each volume.

Volumes I. and II. have arrived to third edition, in 1956, enlarged to 586 and 584 pages. Second edition of volumes III. and IV. is prepared for 1957.

The four volumes running into well over 2400 pages have greatly contributed to the successful education of Hungarian electrical engineers. The coherent manner of treatment and the systematic summary of the vast subject on electric power transmission have aroused the interest of foreign experts as well. Vol. II. has already been published in Czechoslovakia as a university textbook in 3200 copies sold out within a few months. Translation of Vol. I. under way.

F. TAKY

Dr. Prof. EMIL MOSONYI: Wasserkraftwerke Vol. I.

(Publishing House of the Hungarian Academy of Sciences, Budapest, 1956.

372 p. (B/5) + 598 Figs. + 6 Annexes)

The first volume of this exhaustive, abundantly illustrated comprehensive work on the general, engineering, mechanical, electric as well as economic aspects of water power utilization has recently been published by the Publishing House of the Hungarian Academy of Sciences. The work is planned to appear in two volumes by the author Dr. Emil Mosonyi B. C. E., D. Sc., Corresponding Fellow of the Hungarian Academy of Sciences, Professor of Hydraulics at the University of Technical Sciences, Budapest, Director of the Institute for Hydraulic Planning. The second volume is to be published this year.

The German edition in based on the first edition of the book "Water Power Utilization" published in Hungarian, in 1952., and received most favourably by the international technical literature. Here are some extracts

from scientific journals: Water Power, January, 1954: "... it appears to be as fully exhaustive of the subject as the acknowledged standard works previously published in Europe and America..." or the Österreichische Wasserwirtschaft 1954: "The work is destined in the first place for students of civil engineering at the universities, nevertheless it can serve as an excellent book of reference for practicing civil engineers." The Bulletin Technique de la Suisse Romande writes: "The author makes his readers acquainted with the latest achievements of technical literature on the one hand and with the results of his own studies and investigations on the other. The entire work is of very high standing."

The German edition is not a mere translation of the Hungarian original. Maintaining the structure of the book unaltered,

the author, by including the latest scientific issues and practical examples, has considerably enlarged the extensive and divergent material of Vol. I., dealing with low-head developments. The illustrative material has been enriched by numerous photographs of water power stations built in recent times all over the world. The latest trends of water power development are being dealt with in detail. Thanks to this thorough revision the text as well as the number of figures have been increased by about 50 per cent as compared to the first Hungarian edition. The *Gospodarka Wodna 1956/12.* writes of this thoroughly revised edition: „In comparing Prof. E. Mosonyi's book with works of similar character it must be stated that this work is very exhaustive, problems are dealt with on a wider basis and definitions given are more correct... The subject is being presented in the most lucid way...”

In comparing the German with the first Hungarian edition the chapters dealing with tidal energy, water power resources, various types of run-of-river hydroelectric plants (block type station arrangement, twin power plant, pierhead plant, submersible plant) have almost completely been revised, while chapters on the history of water power utilization, the general layout of diversion canal type of developments and run-of-river power plants, economic aspects, intake works, water losses from the power canal, vertical shaft setting of wheels, rack heating, head gates, wheel efficiency, flow condition in the draft tube, determination of main dimensions for preliminary design purposes, propeller wheels, governors, generators and other electric equipment and machine halls have been enlarged considerably.

The importance of scale-model tests is repeatedly pointed out. The author devotes considerable space to the subject of the development of the new-type wheels, the tubular turbines and also indicates the trends of progress in other fields. The first Hungarian edition of the work was noted for its excellence in giving clear concepts and accurate definitions in every respect. The revised German edition also gives the precise determinations important concepts such as e. g. the effective head, slot loss and energy losses in flow entering the wheel, etc.

While the first Hungarian edition had been prepared primarily for educational purposes for university students and only in the second place for researchers and experts engaged in solving theoretical and practical problems of water power utilization, the revised German edition — following unaltered educational principles — is meant in the first place for specialists but is at the same time also a suitable text-book for universities,

owing to its lucid and unequivocal arrangement. It is a very valuable guide for specialists besides civil engineers, for whom it is primarily meant, mechanical engineers engaged in the field of water power utilization, furthermore for economic experts. Besides civil engineering problems in the strict sense of the word also problems of mechanical and electric as well as of economic character are being dealt with in detail.

As already mentioned, the original arrangement of the Hungarian edition has been left untouched in the German edition. Besides general problems of water power utilization low-head power plants are extensively discussed. The principal chapters are the following: I. Utilization of water power — A) Resources of mechanical energy in water — B) History of water power utilization. II. Low-head power plants: A) The power curve — B) Types of development — C) The power canal and appurtenant structures — D) Types and parts of run-of-river power stations — E) The powerhouse. The chapter mentioned last deals besides the substructure of the powerhouse with the question of turbines, alternators, gates and closures and architectural construction as well as with the structural dimensioning of the power station. At the end of the individual chapters well chosen examples are given in order to facilitate the application of the material discussed for engineers of less experience. The large number of illustrations and figures is supplemented by 6 large explanatory drawings of details of Kaplan wheels, regulation, static dimensioning of power stations and reinforcement of structures. The practicability of the book is greatly enhanced by ample bibliography, list of symbols, conversion tables of units and author and subject index.

Volume II now in press leaves the original arrangement of chapters of the Hungarian edition untouched. It extends to high-head plants, midget plants, pumped storage systems and economic aspects of water power utilization covering the latest achievements and data, dealing with the material as fully exhaustively and accurately as Vol. I.

It should also be mentioned, that Vol. I of the English edition including data and material up to the beginning of 1957, is also in press.

The vast scientific material published, the flowing style and impeccable translation, the excellence of illustrative figures and constructional designs as well as the attractive appearance of the book meeting every possible demand ensures also internationally the first line for this book of great conception.

I. PAP