

The Engineer's Library

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BOOK REVIEWS.

Overhead Transmission Lines and Distributing Circuits; Their Design and Construction. By F. Kapper. Translated by P. R. Friedlaender, M.I.E.E. Published by Constable & Company, London. First edition, 1915. 300 pages; 297 illustrations; 7 x 10 ins.; cloth. Price, \$4.50. (Reviewed by J. H. Mackay, engineer of transmission work, Toronto Power Company.)

This volume, while written from the standpoint of European practice, should nevertheless prove a desirable acquisition to the library of most engineers interested in the design and construction of transmission lines in America.

While the fundamental principles underlying European design and construction are dealt with in a satisfactory manner throughout the subject matter of the volume, it is interesting, however, to note that the competent American engineer of to-day has paved the way in the matter of efficient long-distance, high-tension construction and transmission. The American engineer, however, gives due credit to his Swiss, French and Italian brothers who were among the pioneers in successfully undertaking and carrying out the tasks of designing, building and operating transmission lines for voltages up to 50,000 or 60,000.

The subject matter of the volume covers the entire field of operations, from the survey for the right-of-way to the completion of the line, and a careful study of the various chapters of the book cannot help but be of interest and value to the reader.

One of the most important matters in conjunction with the successful operation of high-tension transmission lines, is discussed, and illustrated by several cuts showing the various pin and suspension types in general use. The

author makes the statement that the mechanical safety of the installation is increased when suspension insulators are used, as their flexibility enables equalization of stresses to take place on straight stretches and at corners, and in case a line breaks on one side of a tower, the tower will not be subjected to much stress, as the chain of insulators will set itself in a slanting position and virtually lengthen the line, thus relieving the tension in it. This statement, while true, is, however, offset by the fact that with suspension insulators the risk from a combination of sleet and wind is much in excess of that which would arise were the same line equipped with insulators of the pin-type. The former line sag depends on, or is governed by, the loading of adjacent spans, and in this connection, the present-day suspension insulator string is not an ideal arrangement.

One notes that in Europe a private right-of-way is seldom secured, and wayleave has to be obtained from possibly hundreds of small property owners before actual construction work can commence; here in America, however, after the generating and distributing points are located, the power company will make a preliminary survey of the most direct route and then purchase outright a strip of property of sufficient width to meet their present and future requirements. After the engineers have decided upon the types of supporting structures, most desirable from the points of strength and economy, then the actual survey for the tower locations is gone ahead with.

Some curves are given, based on European practice, showing approximate costs of a 20,000-volt three-phase line some six miles in length, using various types of construction with span lengths from 130 feet up to and including spans of 650 feet in length. These curves are valuable only in comparison with known cost data obtained under conditions peculiar to America.

In Europe, the initial construction work in connection with a transmission line, or distributing system, is apparently, as a rule, undertaken by contractors, rather than by the company itself, and a chapter deals with forms of agreements and schedules of prices for the various operations to be performed. This method of procedure would, on this continent, however, be open to question, as every large company has its own staff of competent engineers and workmen under its direct supervision and control.

In summing up the work as a whole, it can be said that the book is well illustrated, and the subject matter divided into proper chapters, these chapters again being subdivided under proper headings. The descriptions and numerical examples are such as can be readily understood, thus being of value to the engineer.

In conclusion, it may be noted that we in America, however, must design and build our transmission lines to meet conditions peculiar to our own continent, where the market for the energy produced may be hundreds of miles from its source, thereby necessitating voltages greatly in excess of European requirements, and again, where the temperature may be much below, or greatly in excess of that encountered in middle Europe.