

THURSDAY, JANUARY 11, 1917.

CIVIL ENGINEERING CONSTRUCTIONAL WORK.

- (1) *Elementary Strength of Materials*. By Ewart S. Andrews. Pp. viii+216. (London: Chapman and Hall, Ltd., 1916.) Price 4s. 6d. net.
- (2) *Costruzioni di Strade e Gallerie*. By Prof. Salvatore Rotigliano. Pp. xxiii+808. (Milano: Ulrico Hoepli, 1916.) Price 18 lire.

(1) THIS book is an abridged edition of the author's larger work on the subject, and has been specially arranged for the practical man as well as for students in engineering colleges. It is one of the best arranged and most complete of the smaller treatises which have appeared on this subject, and as the author has made use of the latest published results of research on the strength of materials, the book is thoroughly up to date. The book deals very successfully not only with the various problems involved in the calculations of the stresses and strains produced by different kinds of loads, but also with the methods now adopted for carrying out tests of all kinds on the materials used by engineers and architects. The author gives valuable advice as to the precautions which must be taken in order to secure trustworthy results when tests are made, and as to the most suitable types of machines for different classes of tests. Mr. Andrews is to be congratulated on having produced an excellent text-book, which will be of considerable use to both engineers and architects.

(2) The author of this work, Prof. Rotigliano, is engineer-in-chief to the city of Palermo, and the book is based on the lectures delivered by him as professor of road construction at the Royal School for Engineers at Palermo. The book is divided into four sections, the first section dealing with the laying out of roads and railways, the second with the necessary earthworks, the third with the construction and maintenance of roads, and the fourth with the construction of tunnels.

In the first section, after a general introduction, the author deals with the subject of traction on roads and railways and the frictional and other resistances which have to be overcome, giving a number of useful formulæ which enable the tractive force to be determined under known conditions for animal and mechanical traction; the limiting values for gradients and curves are also fully discussed. The third chapter deals with the setting out of curves, both circular and parabolic, and there are a number of practical rules as well as a full theoretical treatment of the subject. The remaining chapters of this section deal with topographical surveys, the laying out of roads and railways in various classes of country, and the general considerations which decide the best route to adopt in a given case. In dealing with the laying out of railways in mountainous districts, as was to be expected in the case of a book written by an Italian engineer, much atten-

NO. 2463, VOL. 98]

tion has been paid to the subject of spiral curves, reverse curves, and zigzags.

The first chapter of the second section is devoted to the necessary mensuration for determining cross-sectional areas and volumes of excavation; a number of formulæ are given for the various calculations which have to be made. Chap. viii. deals with the problem of equalisation of cuttings and banks, and the factors which determine the distances through which it is economically possible to transport excavated material. The next chapter deals with the various hand tools which are employed in the work of excavation in ordinary soft ground, and the methods adopted for preparing the shot-holes when explosives have to be employed. The tenth chapter is devoted to an account of the methods usually adopted for transporting the excavated material by wagons running on temporary lines of rails. Chap. xi. deals fully with mechanical excavators and steam navvies, with the employment of aerial lines for the transport of material, and with the utilisation of machinery in modern constructional work. In the final chapter of this section the author discusses the numerous practical problems which the engineer has to solve, more especially when roads have to be constructed in mountainous districts.

The third section is devoted to a description of the various materials employed in constructing the road surfaces of main and district roads and of urban and suburban streets, of the modern methods of testing and preparing these materials, and of the work of laying them on the prepared road-bed. The questions of road maintenance and of the influence of the various classes of traffic on the wear of the road surface are fully discussed.

The fourth and concluding section of the book is devoted to the laying out and construction of tunnels; the author gives a complete treatment of the whole problem. After a brief explanation of the various systems adopted for the setting out of the centre lines, the methods of carrying out the work of driving the tunnels are fully described, and the latest types of compressed-air and hydraulic machinery for operating rock-drills are explained and discussed. One chapter is devoted to a careful account of the timbering which is needed when tunnels are driven in soft ground, and the work concludes with a description of the construction of sub-aqueous tunnels, with an account of the special difficulties which have to be overcome in such work, and with details as to the various systems adopted for the ventilation of long tunnels.

The book is extremely well illustrated, and is one of the most comprehensive text-books which have been published on the subject of earthwork construction. As probably few British engineers are able to read Italian, it is to be hoped that some British publishing firm will undertake the work of producing a translation of this book for the benefit of British engineers. T. H. B.

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