Zeitschrift: IABSE congress report = Rapport du congrès AIPC = IVBH Kongressbericht

Band: 2 (1936)

Artikel: General report

Autor: Ritter, M.

DOI: https://doi.org/10.5169/seals-3357

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. Mehr erfahren

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. En savoir plus

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. Find out more

Download PDF: 17.04.2026

ETH-Bibliothek Zürich, E-Periodica, https://www.e-periodica.ch

VIII

General Report.

Generalreferat.

Rapport Général.

Dr. M. Ritter,
Generalsekretär der I.V.B.H., Professor an der Eidg. Technischen Hochschule, Zürich.

The great number of contributions attracted to the discussion on the subject of "Foundation Research" makes it necessary that the general report should be brief. The papers by *Bretting, Casagrande, Hertwig* and the present writer which have appeared in the Preliminary Publication are concerned with small sections of this wide field. The papers by *Hertwig* and the present writer are mainly theoretical in scope while those of *Bretting* and *Casagrande* contain information of applications in practice which are equally important to the engineer. A brief summary of these papers will be given here.

1) The report on dynamic investigations of the ground by *Hertwig* has reference to the processes developed during the past seven years in the German Institute for Research on Foundations (Deutsche Forschungsgesellschaft für Bodenmechanik). The principle is as follows: a vibrating machine is erected over the ground to be tested, and the latter is thereby brought into a state of forced vibration. If the velocity of rotation of the machine is increased the amplitudes of vibration will increase also, at first slowly then faster, until finally resonance occurs or in other words the frequency of the exciter agrees with the natural frequency of the ground. Once this natural frequency is exceeded the amplitudes again diminish, as is easily understood from the theory of forced vibrations of a mass. From the curve of amplitudes obtained in the experiment, together with other data, the natural frequency and the "damping figure" of the ground can then be calculated. It has been established on the basis of a great many experiments that the natural frequency, expressed in *Hertz* units, provides a suitable measure of the permissible foundation pressure, while the velocity of propagation of waves affords an excellent criterion for the carrying capacity of the ground.

This method is no doubt capable of rendering valuable service, and by comparison with statical tests of loading it offers the great advantage of saving in time. It is true that the calculation is based on the differential equation applicable to a vibrating point mass whereas in actual fact the vibration is that of a complicated system of masses, but the error arising in this way is clearly unimportant, and moreover it has recently been investigated in detail.

2) The study of the limiting conditions for equilibrium in earth and in loose fillings which is presented in the Preliminary Publication derives from the

classical theory of stresses by *Rankine*. The idea of a slip plane is introduced and the equation for the pressure on such a plane is derived in a simple form. The first derivation of this interesting relationship is due to the Berlin mathematician *F. Kötter*, but so far as is apparent from the literature this work is scarcely known outside the range of the German language. The derivation of an equation for the pressure on the principal plane appears to be a still more important contribution as this opens up a simple way of dealing with important practical applications. The calculation of the maximum load on a strip of foundation, comparable with the equilibrium, has already been examined by Rankine and has led later to very extensive theoretical and experimental work. In the same category belongs also the determination of the earth pressure against a retaining wall under the limiting condition of the equilibrium making the assumption of a curved slip surface, a problem of which the final solution must be left to the future. The astonishingly simple definition of cohesion put forward by *Terzaghi* enables the theory to be extended to cover what is known as a "binding" material, wherein the stress conditions associated with hydraulic pressure are overshadowed by capillary pressure.

3) The paper by *Dr. L. Casagrande* entitled "Observations of settlement made on Bridges of the Reichsautobahnen" gives an account of extensive applications of foundation research in actual practice. The criteria of settlement appertaining to a large number of interesting structures on the Reichsautobahnen are determined by examination of soil specimens and by means of calculations in accordance with *Fröhlich*'s methods, and are compared with the results of actual observations as recorded up to the present time. The juxtaposition and comparison obtained in this way may be valuable for assessing the qualities of other foundations in which similar conditions are found.

4) *Bretting* reports on the foundations encountered in constructing the Storstrom bridge in Denmark. He gives many data, noted from practice, regarding methods of foundations, and also describes a device for obtaining undamaged samples from a foundation in addition to a new cone apparatus for testing the consistency of loam, and mentions some interesting statical investigations.

Nineteen speakers expressed a wish to take part in the discussion, a sign that the subject, already dealt with at the Paris Congress, has continued to arouse great interest. Some of the contributions to the discussion have reference to the application of what is known as the "foundation constant" *(Bettungsziffer)*, a concept which will be generally understood. We now know that this figure is useful merely as a guide, but calculations based upon it are nevertheless valuable and practical statics will not readily abandon its use.

Other contributions to the discussion relate to the distribution of pressure over the ground, to the theory of settlement on clay strata, and to geophysical methods of investigation. Particular interest will attach to those contributions which deal with the calculation of the settlement of foundations as a function of time.