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Geotechnical investigation and testing - Laboratory testing of soil - Part 10: Direct shear tests (ISO/TS 17892-10:2004)

Reconnaissance et essais géotechniques - Essais de sol au laboratoire - Partie 10: Essai de cisaillement direct (ISO/TS 17892-10:2004)

Geotechnische Erkundung und Untersuchung - Laborversuche an Bodenproben - Teil 10: Direkte Scherversuche (ISO/TS 17892-10:2004)

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Foreword

This document (CEN ISO/TS 17892-10:2004) has been prepared by Technical Committee CEN/TC 341 “Geotechnical investigation and testing”, the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 182 “Geotechnics”.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

CEN ISO/TS 17892 consists of the following parts, under the general title *Geotechnical investigation and testing — Laboratory testing of soil*:

— Part 1: Determination of water content.

— Part 2: Determination of density of fine-grained soil.

— Part 3: Determination of particle density - Pycnometer method.

— Part 4: Determination of particle size distribution.

— Part 5: Incremental loading oedometer test.

— Part 6: Fall cone test.

— Part 7: Unconfined compression test of fine-grained soils.

— Part 8: Unconsolidated undrained triaxial test.

— Part 9: Consolidated triaxial compression tests.

— Part 10: Direct shear tests.

— Part 11: Permeability tests.

— Part 12: Determination of Atterberg limits.

Introduction

This document covers areas in the international field of geotechnical engineering never previously standardised. It is intended that this document presents broad good practice throughout the world and significant differences with national documents is not anticipated. It is based on international practice (see [1]).

1 Scope

This document specifies laboratory test methods to establish the effective shear strength parameter for soils within the scope of the geotechnical investigations according to prEN 1997-1 and -2.

The test method consists of placing the test specimen in the direct shear device, applying a pre-determined normal stress, providing for draining (and wetting if required) of the test specimen, or both, consolidating the specimen under normal stress, unlocking the frames that hold the specimen, and displacing one frame horizontally with respect to the other at a constant rate of shear-deformation and measuring the shearing force, and horizontal displacements as the specimen is sheared. Shearing is applied slowly enough to allow excess pore pressures to dissipate by drainage so that effective stresses are equal to total stresses.

Direct shear tests are used in earthworks and foundation engineering for the determination of the effective shear strength of soils.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

prEN 1997-1, *Eurocode 7: Geotechnical design — Part 1: General rules.*

prEN 1997-2, *Eurocode 7: Geotechnical design — Part 2: Ground investigation and testing.*

CEN ISO/TS 17892-1, *Geotechnical investigation and testing — Laboratory testing of soil — Part 1: Determination of water content (ISO/TS 17892-1:2004)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
direct shear test
test whereby a square or circular prism or annular specimen of soil is laterally restrained and sheared along a mechanically induced horizontal plane while subjected to a pressure applied normal to that plane

3.2
shearbox test
direct shear test whereby a specimen is placed in a rigid container (shearbox) which is square or circular and divided horizontally into two halves.

NOTE Shearing is applied by displacing the two halves of the shearbox relative to each other (see Figure 1)

3.3
ring shear test
direct shear test whereby an annular specimen is subjected to rotational shear while subjected to vertical stress (see Figure 2)

3.4
friction angle
φ'
angle of friction, as determined from effective stresses

3.5
cohesion
c'
cohesion intercept, as determined from effective stresses