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**Geotechnical investigation and  
testing — Testing of geotechnical  
structures —**

Part 4:  
**Testing of piles: dynamic load testing**

*Reconnaissance et essais géotechniques — Essais de structures  
géotechniques —*

*Partie 4: Essais de pieux: essai de chargement dynamique*





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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 341, *Geotechnical investigation and testing*, in collaboration with ISO Technical Committee TC 182, *Geotechnics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 22477 series can be found on the ISO website.

## Introduction

This document establishes the specifications for the execution of dynamic load tests in which a single pile is subject to an axial load in compression to measure strain, acceleration and displacement under dynamic loading and to allow an assessment of its compressive resistance. This document outlines how a dynamic load test is defined and specifies the equipment and testing procedures required. Informative non-prescriptive guidance is included on the analysis of dynamic load test results required to determine mobilized or ultimate measured compressive resistance of a pile.



# Geotechnical investigation and testing — Testing of geotechnical structures —

## Part 4: Testing of piles: dynamic load testing

### 1 Scope

This document establishes the specifications for the execution of dynamic load tests in which a single pile is subject to an axial dynamic load in compression.

This document outlines the methods of testing required to allow assessment of pile resistance to be determined from the following methods and procedures described in EN1997-1:2004+A1:2013:

- a) dynamic impact testing – determination of pile compressive resistance by evaluation of measurements of strain and acceleration and or displacement at the pile head with respect to time;
- b) pile driving formulae – evaluation of pile compressive resistance from blow counts and hammer energy during pile driving;
- c) wave equation analysis – evaluation of pile compressive resistance from blow counts by modelling of the pile, soil and driving equipment;
- d) multi-blow dynamic testing – evaluation of pile compressive resistance from a series of blows designed to generate different levels of pile head displacement and velocity.

This document is applicable to piles loaded axially in compression.

This document is applicable to all pile types mentioned in EN 1536, EN 12699 and EN 14199.

The tests considered in this document are limited to dynamic load tests on piles only.

NOTE 1 ISO 22477-4 can be used in conjunction with EN1997-1:2004+A1:2013. Numerical values of partial factors for limit states from pile load tests to be taken into account in design are provided in EN 1997-1. For design to EN 1997-1 the results from dynamic load tests will be considered equivalent to the measured compressive resistance  $R_{c,m}$  after being subject to appropriate analysis.

NOTE 2 Guidance on analysis procedures for dynamic load testing results is given in [Annexes A, B, D, E](#) and [F](#).

This document provides specifications for:

- i) investigation tests, whereby a sacrificial pile is loaded up to ultimate limit state;
- ii) control tests, whereby the pile is loaded up to a specified load in excess of the serviceability limit state.

NOTE 3 Generally, an investigation test focuses on general knowledge of a pile type; a control test focuses on one specific application of a pile.