

## **PROVA TEORICO PRATICA – TRACCIA 1**

Il candidato descriva i metodi per il prelievo di carote dal calcestruzzo indurito e per la determinazione della resistenza a compressione secondo le norme En 12504-1 ed EN12390-3.

## **PROVA TEORICO PRATICA – TRACCIA 2**

Il candidato descriva le prove di compressione richieste dalle Norme Tecniche per le Costruzioni (NTC 2018) per il controllo di qualità e accettazione delle opere in calcestruzzo gettato in opera

### **PROVA TEORICO PRATICA – TRACCIA 3**

Il candidato descriva un piano d'indagine finalizzato alla conoscenza delle caratteristiche significative per valutare lo stato di salute degli elementi strutturali di un edificio in cemento armato, con riferimento alle norme di prova.

## PROVA ORALE – TRACCIA 1

- 1) Il candidato descriva il metodo per la determinazione della velocità di propagazione degli impulsi ultrasonici e indichi la normativa di riferimento
- 2) Il candidato traduca dalla lingua inglese il seguente testo (tratto dalla norma EN 12504-4)

### PRINCIPLE

A pulse of longitudinal vibrations is produced by an electro-acoustical transducer held in contact with one surface of the concrete under test. After traversing a known path length in the concrete, the pulse of vibrations is converted into an electrical signal by a second transducer and electronic timing circuits enable the transit time of the pulse to be measured.

### APPARATUS

The apparatus consists of an electrical pulse generator, a pair of transducers, an amplifier and an electronic timing device for measuring the time interval elapsing between the onset of a pulse generated at the transmitting transducer and the onset of its arrival at the receiving transducer. A calibration bar is provided to provide a datum for the velocity measurement.

Two forms of the electronic timing apparatus are available:

- a) an oscilloscope on which the first front of the pulse is displayed in relation to a suitable time scale.
- b) an interval timer with a direct reading digital display.

*Note* An oscilloscope provides the facility for monitoring the wave form of the pulse, which can be advantageous in complex testing situations or in automatic system measurements.

## PROVA ORALE – TRACCIA 2

- 1) Il candidato descriva l'esecuzione di prove di determinazione dell'indice sclerometrico: modalità operative e apparecchiatura
- 2) Il candidato traduca dalla lingua inglese il seguente testo (tratto dalla norma EN 12504-3)

### Scope

This document specifies a method for the determination of the pull-out force of hardened concrete using a cast-in disc insert and rod, or a similar device installed afterwards by drilling into the hardened concrete.

NOTE The test method is not intended as an alternative for the determination of the compressive strength of concrete, but with suitable correlations it can provide an estimate of in situ strength.

### 2 Normative references

Non applicable.

### 3 Principle

A small metal disc, with a rod fixed centrally on one side is installed into concrete, so that the rod protrudes from the surface of the concrete. The force required to pull the disc out of the concrete is measured.

### 4 Apparatus

4.1 Disc and rod device cast into the concrete (see Figure 1, a))

4.1.1 The disc shall have a circular head of diameter  $(25 \pm 0,1)$  mm;

4.1.2 The rod shall have a diameter not more than 0,6 times that of the disc;

4.1.3 The length of the rod, measured from the surface of the concrete to the nearest surface of the disc, shall be equal to the diameter of the disc;

4.1.4 The sides of the rod shall be smooth and tapered, with the largest diameter nearest to the surface of the concrete, to minimize friction during testing;

4.1.5 The device may be coated with a release agent to prevent bonding to the concrete and may be notched to prevent rotation in the concrete if the rod is to be unscrewed. Disc and rod device installed after the concrete has hardened