



# **SPECIFICATION**

## **INTEGRITY TESTING OF FOUNDATIONS BY THE TDR TEST METHOD**

**Date Issued : Feb. 2006**  
**Written By : HTW**  
**Pages : 02**

### **1 GENERAL**

The TDR method involves impacting the pile head with a hand held hammer and measuring both impact force and pile velocity response as a function of time. These two sets of data are processed to yield a Mobility/Frequency plot. The results can be interpreted to give information about both the pile shaft integrity and the surrounding soil conditions.

### **2 TEST PROGRAMME**

- 2.1 All piles shall be tested by the Transient Dynamic Response (TDR) method.
- 2.2 Testing will be carried out by Testconsult Limited or another similar approved specialist. The testing company shall hold UKAS accreditation for the Transient Dynamic Response method of assessing foundations and shall be approved by the Engineer.
- 2.3 The contractor shall make available to the testing organisation's representative on site a plan showing the layout and the constructed length of the piles to be tested. These piles shall be indicated to the testing team on site and numbered. The basic information regarding the materials, from which the pile is made, the dimensions of the pile including under-reaming, the age of the pile and the ground conditions through which the pile penetrates shall be made available to the testing team.
- 2.4 Prior to any testing being carried out the contractor shall provide the testing organisation with all information as in 2.3 above for each group of piles, to enable the testing house to carry out a computer simulation to give a predicted mobility/frequency plot.
- 2.5 Testing shall not be carried out on a pile within 7 days of casting. The pile head of a vertical pile shall be prepared by removing all loose material and debris to expose sound concrete over an approximately horizontal top surface, and be kept free of standing water. The central 150 mm diameter area and one (or more as directed) peripheral 100 mm diameter area shall be bush hammered flat and level, without bending out of the way or otherwise damaging reinforcement. The pile head shall be kept free from close contact with blinding during the test and the top surface kept a minimum 50 mm above the blinding unless directed otherwise by the Engineer. Any raking pile heads shall be prepared similarly, but the exposed surfaces shall be normal to pile centre lines.
- 2.6 Where a separate trial pile is provided and the geometry of the pile and the surrounding soil conditions are similar to that of the working piles, it is expected

that the TDR results and in particular the dynamic stiffness of the trial pile will be similar to those of the working piles.

### 3 TEST EQUIPMENT

The TDR test equipment shall consist of an instrumented hammer containing a load cell capable of measuring the force applied to the pile head. The pick up shall be a velocity transducer or geophone, which shall be in direct contact with the pile top. Both hammer and geophone shall be connected to a signal acquisition and processing unit with the following characteristics to ensure accurate and well-defined results.

<i>Analogue to Digital sample rate</i>	<i>Min 40 KHz</i>
<i>Analogue to Digital accuracy</i>	<i>Min 14 bit</i>

The equipment shall be capable of producing mobility/frequency plots up to 5,000 Hz.

Analysis software should be capable of modelling mobility plots by computer simulation using soil and concrete parameters. Analysis software should also be capable of producing impedance profiles of the pile shaft from site data.

### 4 REPORTING

The test report shall contain the following:

4.1 Copies of all mobility/frequency plots. Each plot shall have marked on it:

*Date of test and Site Name*  
*Pile Number*  
*Operator*  
*Hammer and Geophone Serial Numbers*  
*Pile Head Dynamic Stiffness and Response Depth, if any*

4.2 A brief description of pile type, soil conditions, etc.

4.3 A Table of Results, giving pile number, dynamic stiffness, response depths and comments if necessary.

4.4 An interpretation of the results. This should include comments on any detected shaft irregularities and a clear statement of the limitations of the test method pertaining to the particular pile type and soil conditions.

4.5 Should any of the working piles have an outstandingly low dynamic stiffness value or otherwise be considered untypical of the group or the trial pile for the group then this shall be stated in the report.

4.6 Intermediate responses shall be analyzed using computer simulation and impedance profiling techniques to determine the cause. In addition the Engineer may require that the pile be full scale proof tested using either a static or dynamic test.

\*\*\*\*\*