PILETEST
Take a Deeper Look

Committed to safer deep foundations and structures - since 1996

METHOD STATEMENT FOR BOREHOLE INCLINATION TEST PROCEDURE

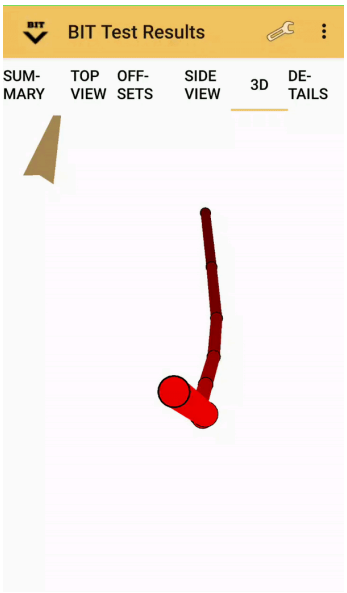
1. General

This method statement covers the requirements and procedures for Inclination Testing in Borheloes by the gyro-based sensor and depth meter.

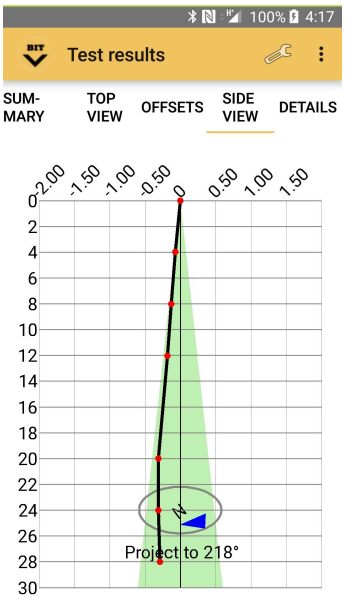
2. Test Method

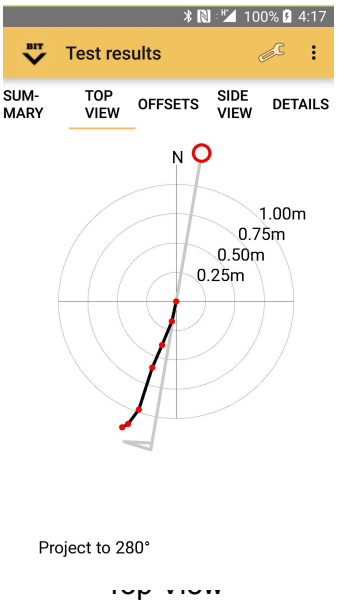
The gyro-based inclination test method is a non-destructive test (NDT) method performed in any borehole or cored drill without installing special grooved plastic tubes. The test is performed with a Borehole Inclination Tester (BIT) device consisting of an inclination sensor, a centralizer, and a depth meter. The BIT inclination sensor is mounted on top of a centralizer, which keeps the sensor at the center of the borehole. Before lowering the sensor into the borehole, it is rotated to point to the set North (or true North). When lowered into the borehole, the BIT inclination sensor measures the deviations of the centralizer in the borehole, while the depth meter measures the depth of the centralizer. Measurements are taken at fixed points (i.e., every 5 m [15']). The same is done while the centralizer is pulled out of the borehole, stopping for measurements at the same fixed points. When the BIT sensor is finally pulled out of the borehole, the BIT software collects all the BIT sensor measurements. Then, it calculates the inclination of the borehole and presents it in multiple graphical ways. The inclination is presented as displacement from the axis of the borehole in a side view and a top view. The side view shows the

deviation value (i.e., 0.3 m) vs. depth, while the top view shows the deviation value and heading. (see screenshots below)
In addition, the borehole inclination can be viewed in AR 3D, which helps to compare the borehole position to the top landscape in cases of very high inclination values.



AR 3D view





3. Applicability

This test method applies to deep boreholes or wells from 5m to 500m (the current BIT works up to 160m) in wet or dry borehole conditions. It can also measure the inclination of piles or pile walls using access tubes attached to the reinforcement cage.

4. Codes and Standard

The borehole inclination test of the BIT is conducted in compliance with ASTM D8232-18 Standard

5. Equipment

The equipment to be used in this test is:

A. The main unit inside the cable drum
B. Inclination sensor
C. Centralizer
D. Depth meter
E. Computer/Tablet/Smartphone with Bluetooth
F. Optional - Sensor base when a drill bucket is the centralizer.
G. Optional - Compass, if set North, needs to align to the earth north
H. Optional - Over the borehole hook to hang the depth meter of the BIT

6. Preparation

For best results, a tightly coupled centralizer must be used. In the case of a smooth-cased whole, a centralizer with spring-clipped wheels ensures that the sensor follows the borehole axis. In noncased boreholes, the auger's drill bucket or a long (twice the diameter) centralizer can be used. In that case, a sensor attachment base should be mounted (welded) to the centralizer, ensuring it is well leveled vs the centralizer horizontal line (using a level instrument).
The centralizer base allows calibration per measured borehole to the set North as a reference point for the inclination direction. It is recommended that the set North be aligned with the Earth north using a compass.
Calibrate the depth meter according to the depth meter calibration method.

7. Execution

A. Place the sensor in the sensor base
B. Lock it in the direction of the set North
C. Start lowering the centralizer with the attached sensor, stopping at the present positions for measurement.
D. When reaching the borehole bottom, start pulling the centralizer, stopping at the same measurement point used on the way down (the BIT sw controls this)
E. When reaching the top, save the sensor direction (displacement from the set North)
F. Let the BIT sw calculate and display the borehole inclination.