

SPECIFICATION – TAKING INCLINOMETER READINGS USING THE DURHAM GEO / SLOPE INDICATOR DIGITILT AT SYSTEM

1. General

This specification covers the procedures and requirements for acquiring inclinometer readings using the Digitilt AT Inclinometer System, which includes:

- MEMS-based Digitilt AT probe
- AT lightweight control cable with indexing crimps
- Bluetooth reel with internal rechargeable battery
- Cable gate (depth alignment device)
- Android tablet loaded with the Digitilt Reader App
- Optional DigiPro2 software for advanced processing

The Digitilt AT system is designed to streamline inclinometer surveys, providing stable readings, automated depth control, and robust data handling.

2. Equipment Requirements

2.1 Digitilt AT Probe

- MEMS dual-axis inclinometer probe.
- Compact wheel carriages provide excellent tracking accuracy, even through tight curves.

2.2 Control Cable and Bluetooth Reel

- Control cable contains large, clearly marked depth graduations every 0.5 m, with indexing crimps for the cable gate.
- Bluetooth reel powers the probe and provides wireless communication with the Reader App.
- Reel battery provides approximately 40 hours of operation on a full charge.

2.3 Cable Gate

- Mounts on casing top and aligns the cable's indexing crimps for precise depth measurement, eliminating potential depth errors.

2.4 Reader Device

- An Android tablet running the Digitilt Reader App, used to manage installations, take readings, view real-time profiles, and transfer data.

3. Pre-Survey Setup

3.1 System Preparation

- Ensure the Bluetooth reel is fully charged.
- Inspect the probe wheels, cable crimps, and connectors for damage.

- Open the Digitilt Reader App and confirm the inclinometer installation profile is loaded or create a new one.

3.2 Pairing and Connectivity

- Power on the Bluetooth reel.
- Confirm reel connection in the Reader App via Bluetooth status indicators.

3.3 Initial Checks

- Place the cable gate onto the top of the casing.
- Zero the starting depth with the probe just above the bottom cap coordinate recorded in prior surveys.

4. Measurement Procedure

This section outlines the standard procedure for acquiring inclinometer readings using the Digitilt AT system.

4.1 Lowering the Probe

1. Lower the probe slowly to the bottom of the inclinometer casing.
2. Ensure the probe's orientation mark ("+" side) aligns with the reference groove during the initial pass. durhamgeo.com
3. For the first hole in the project leave the probe at the bottom of the casing for 15 minutes to allow for temperature correction.

4.2 Taking Readings (0.5 m or 2 ft Intervals)

At each depth increment:

1. Pull the cable upward until the indexing crimp seats in the cable gate, establishing the exact survey depth.
 - a. This eliminates human depth judgment error.
 - b. The Reader App automatically recognizes depth position.
2. Wait for the Reader App to indicate that the reading is stable.
 - a. The app prompts when a stable reading can be recorded.
3. Record the reading.
 - a. The reading is stored in the tablet's non-volatile memory.
4. Move to the next depth by pulling the cable upward until the next indexing crimp clicks into the cable gate.

Repeat until reaching the top of casing.

4.3 Reverse (180°) Pass

After the upward pass ("A-axis orientation"), the probe shall be rotated 180° and the survey repeated:

- Ensures systematic error cancellation
- Required to generate complete A-axis and B-axis tilt profiles

This two-pass method is standard for Digitilt surveys. (Supported by general inclinometer practice and DGSI procedure descriptions.)

5. Data Validation

Upon completing both passes:

1. The Reader App automatically computes:
 - a. Checksums
 - b. Tilt plots
 - c. Displacement profiles
2. Review the checksum plot to confirm reading consistency.
3. If out-of-tolerance values are detected, repeat the affected depths or the full survey.

6. Data Transfer

Data may be exported using:

- Email (with automatic attachments)
- Dropbox / cloud sync
- USB cable transfer

The Reader App supports all these methods for onward transmission to office personnel.

7. Data Reduction and Reporting

7.1 DigiPro2 Software (Optional)

For advanced analysis, the survey files shall be imported into DigiPro2, which provides:

- Database management
- Cumulative and incremental displacement plots
- Time-history analysis
- Error checking and systematic correction routines

8. Quality Assurance Requirements

- All readings must be taken with stable probe orientation and depth alignment.
- Cable crimps must engage the cable gate at every reading depth.
- Both forward and reverse passes must be completed for every survey.
- Any anomalies observed must be re-read before leaving the site.

9. Safety and Handling

- Ensure reel battery is properly charged to avoid mid-survey shutdown.
- Maintain firm control of the probe to avoid shock or cable damage.
- Follow manufacturer guidelines for proper handling and inspection.

10. Manufacturer

Durham Geo Slope Indicator (DGSI)
Digitilt AT Inclinometer System