The best inclinometer measurements are obtained by using good ABS inclinometer casing with grooves that have similar shapes to the wheels of the inclinometer probes that will be used. The shapes of the wheels is important because some inclinometer probes have square shaped wheels whilst some have wheels with bevelled edges. Using a square shaped wheel in a groove with bevelled edges can result in the wheel running along the bevel of the groove and popping out of the groove, which is not good for accuracy and repeatability. Geotechnical Observations use Slope Indicator’s Quick Connect (QC) casing for most installations and Slope Indicator’s Classic Inclinometer Probes, with matching grooves and wheel sets.

Vertical inclinometer casings are important because an inclined casing reduces the accuracy of measurements and introduces problems if the alignment of the sensor changes during the life of the inclinometer probe that is being used. Inclinometer casings are generally buoyant in grout even when they are filled with water. The inclinometer casing should never be weighed at the top to prevent it floating up unless it is contained in a narrow, straight and vertical hole because holding the inclinometer casing at the top will cause the casing to buckle and that can also cause problems if the alignment of the sensor changes during the life of the inclinometer probe. The buoyancy can be avoided by part filling the borehole with grout and waiting for it to set before filling the borehole to the top. Always install the inclinometer casing with one set of grooves aligned in the direction of the expected movement but if the casing falls out of this alignment during the installation process do not attempt to rotate the casing to restore the grooves to the correct alignment because doing so could introduce spiral into the grooves.

The first set of inclinometer readings should be undertaken using at least two independent inclinometer probes (a routine probe and a back-up probe). The casing should be read at least twice with each probe and the readings for each probe compared with one-another to confirm that they lie within the measurement uncertainty for the inclinometer casing. When two successive runs of each probe agree within the measurement uncertainty of the inclinometer casing, one of the runs is assigned as the reference set for the respective inclinometer probe. Subsequently the inclinometer casing is read with just the routine inclinometer probe and the other (back-up) inclinometer probe is kept secure and not used for any other routine measurements. The back-up inclinometer probe can be used if unexpected displacements are recorded or if the routine inclinometer probe is unavailable for some reason.

All Geotechnical Observations’ Technicians are taught how to compare the latest readings with previous readings to ensure there are no gross errors in the measurements they have taken before they site. If they are uncertain about the quality of the measurements they can email the results to our office for a second opinion or they will repeat the measurement for confirmation.

It is good practice to record the check-sums for inclinometer probes in a fixed, stable tube under laboratory (repeatability) conditions at least once a week. Doing this will help to identify problems such as misaligned and worn wheels. All Geotechnical Observations’ inclinometer probes are inspected and calibrated at regular (e.g. weekly, monthly, quarterly and annually) intervals. Checks are performed on our UKAS calibrated rotary table.

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