

WOW

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IGS Technical Note

CPTs in Very Soft Soils & Tailings

IGS does a lot of in situ testing in very soft soils and in mine waste tailings, ash, etc: CPT; DMT; Vane Shear; seismic Shear Wave and P-wave profiling; plus very high quality sampling. It's fair to say that we are good at it. Also that we think about it a lot.

This Technical Note is about one small but important part of that whole process; one that we think is often misunderstood by clients and data users; ie by some of our clients and some of their clients. Meaningful CPT in very soft materials; ie materials with shear strength less than 12.5kPa (by Australian standard definition) is not that easy to do.

At present the defacto international benchmark standard for CPT is ISO 22476-1-2012; and the highest assigned test quality within that standard is what is termed "Application Class 1". Note that the oft-quoted American ASTM D 5778 standard and the Australian AS 1289.6.5.1 standard should both simply be ignored – calibrations made or tests done under these standards are unlikely to be within a "bull's roar" of meaningful in very soft materials.

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ISO Application Class 1 Is It Good enough?

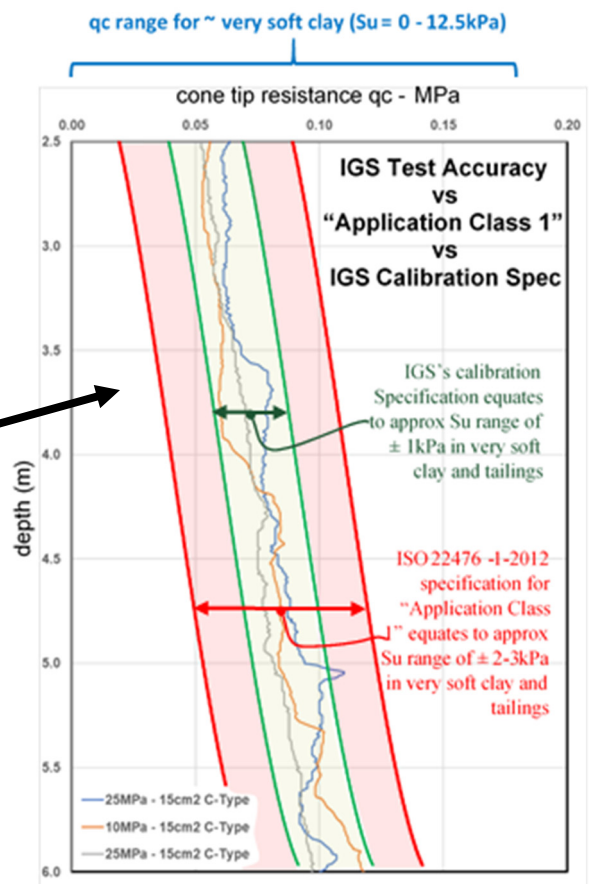
Look at the adjacent figure - the simple answer is no, assuming that you wish to define material strength properties (etc) to better than $\pm 2-3$ kPa (ie $\pm 20-30\%$ at 10kPa or $\pm 40-60\%$ at 5kPa shear strength).

The simple answer is yes, only if you don't really care very much.

Explaining The Figure

The adjacent figure is an extract from data from three recent CPT tests undertaken by IGS on a tailings dam.

- The three wiggly lines are qc from three different IGS cones; the three tests close to each other.
- The red "envelope" defines accuracy limits specified under ISO's Application Class 1.
- The green "envelope" defines the much tighter accuracy limits set by IGS under our own specification.



The Cones and The Process

The cones used for the tests shown above, were "lovingly" supplied by Geomil and were "even more lovingly" calibrated, maintained and cycled by IGS. All IGS cones are cycled; calibrated to our high standard before and after each job and swapped out after each week's testing during longer jobs. It's IGS business as usual. No-one else we know does this.



high quality in situ testing
high quality sampling

reducing geotechnical uncertainty