

In this issue...

- From the Chair
- 10 years of CETANZ pics
- Skid-Resistant Roads Reduce Crashes by 40%
- Safety Alert
- Competition
- NDM Calibration—Change of Standard
- Working Group Update
- CPT Testing - The notion it's rocket science muddies the process
- A word from the editor

Issue 31, October 2017

From the Chair...

Hello and welcome to the spring edition of CETANewZ.

Where did this year go? Winston has made up his mind and Labour day takes on a new meaning!

As the ground starts to dry, a lot of you will be gearing up for a big season of earthmoving while others will be focusing on pavements and asphalts. Whatever you are doing please make sure that you react to changing situations in the field, everyone is going to be under pressure and this is where mistakes and lapses of judgment can occur.

It was great to catch up with many of you at the 10 Year events held regionally around the country in August. I met some passionate people with interesting and innovative ideas in the industry. Thanks to the companies who hosted these events, it is appreciated. We are keen to hold more social/ technical events (and even some *technically* social events) like this more often so if you have a site/ technical paper/ or venue for one of these in your region, don't be shy, contact us about it.

The AGM in Auckland went well, with the team reporting on the year and the achievements that we have all made. It was great to have an open floor for suggestions and it became quite obvious to me that more can be done in the careers space so that is something we should concentrate more on in the coming year. Ideas for prizes to be awarded at the next conference were similar to those raised at the AGM the year prior and the group has already started to move on these. We also have a healthy looking bank account and are actively looking for good causes to promote our industry and the association's membership.

Speaking of the next conference, this will be held at the Heritage in Auckland on the 9th and 10th of August 2018 so book this in your calendars. The theme is yet to be decided and we are open to suggestions on this. We have booked a great offsite venue for dinner and are looking forward to another top notch event.

The CPT group met at the City Edge Alliance Offices in Hamilton on the 29th of August. Robust discussion was had around the Audit template and several good points were raised.



From the Chair cont...

The nominees for the Auditor were discussed and have since been agreed. I would like to thank everyone who attended and the work that they got through that day, the decisions being made here are important so all input is valued. The result of this vote is revealed by Marco further down in this edition, so you will have to read on!

During our committee in July, we covered off general business but as a representative from Connexis was there, the rest of the meeting was taken up with discussions on how the qualification is working practically, issues that have arisen, ways to improve the system and lastly development work for level 5 on this qualification.

In August the Careers and events group met again. Plans are well under way for the conference so keep an eye out for information, sponsorship opportunities and the call for papers so yes, We Want You (to present)!!


We have developed a set of guide lines for the use of our logo alongside your company's logo in email signoffs and promotional material, this has been emailed to all members. If you missed these guidelines contact us at info@cetanz.org.nz and we will happily resend these.

The Technical group has continued to provide great value to our members working on PSV control stone and M/6, M/4 Statistical acceptance, Ethylene Glycol, AS/NZS Joint Asphalt and Bitumen standards, NDM calibration standard and the potential forth coming review/ replacement of NZS 4402.

We have a great team working here for you and these guys are over pretty much onto all issues as they come up.

Regards

Danny



**Quality means
doing it right
when no one is
looking.**

Henry Ford



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- The role also involves heavy lifting of machinery, so you will need to be physically fit
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- A reasonable grasp of the Microsoft office suite of software
- Good communication skills

About us:

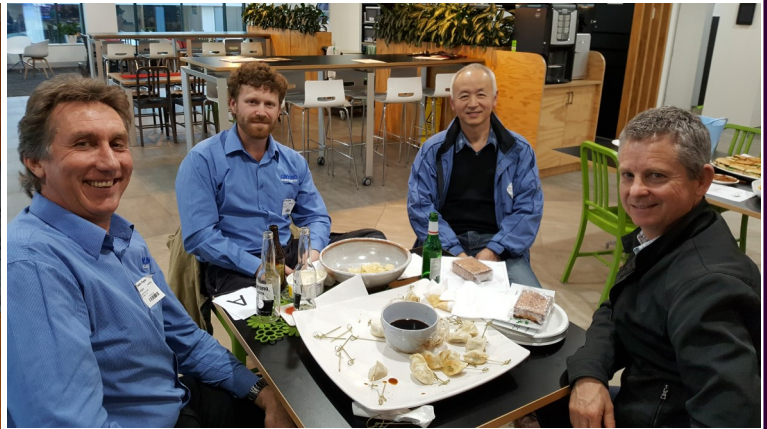
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10 Years of CETANZI!



Skid-resistant roads reduce crashes by 40%

3:39 pm on 15 September 2017



Phil Pennington, Reporter
phil.pennington@radionz.co.nz

Advances in what we drive, such as driverless cars, are expected to slash the number of road deaths and serious injuries in years to come.

But improvements in the surfaces we drive on will also be crucial, the Transport Agency said.



Darren Newland and the SCRIM truck. Photo: RNZ / Phil Pennington

The holy grail of road designs is the skid-less highway, as the injury crash rate is between 4.5 and 9 times higher on slippery roads than skid-resistant ones.

Continued from page 5

"New Zealand are world leaders, they're right at the cutting edge of skid resistance, at least up there with Europe and probably even beyond," Darren Newland, who oversees the skid-test trucks for British company WDM, said.

"Head and shoulders [ahead] of the Americans in terms of continuous skid resistance monitoring."

WDM said skid-related fatalities have fallen nearly 40 percent since it began surveys of New Zealand highways for the Transport Agency in the mid 1990s.

Its latest high-tech trucks, which work only in this country, shoot 20 lasers at the road, detecting ruts and slumps, and measuring roughness and skid-resistance, all at a speed of up to 80km/h.

The Transport Agency crunches the data from the onboard computer dubbed 'The Tardus' and spots the blackspots.



Mark Owens of the NZ Transport Agency. Photo: RNZ / Phil Pennington

"A really good one would be at State Highway 2, just at the Petone underbridge, so we had regular crashes there with people sliding off," Mark Owen from the Transport Agency said.

"You've got a long straight and then a sharp bend. And by using this information we could say, yes, we've got a skid problem."

It helped pinpoint the best roadseal mix, in this case the priciest of them all, calcined bauxite, which is almost as hard as diamonds.

Continued from page 6

"I truly believe that the work that we do ... actually saves lives out on the road," Mr Newland said.

WDM aims to expand the number of lasers under the truck from 20 to 3200, enough to scan each millimetre of the 3.2m-wide lane to detect every crack, and so help keep water out.

Meanwhile, the strength of the highways is being measured by another machine, the Traffic Speed Deflectometer, which is about halfway through a survey of all the highways that is due to wrap up late next year.

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Reminder For NDM Users ...

The change from Principal Licensee to Source License has taken effect as of 1 October 2017. If you are due to renew your license you should be looking to update your Radiation Safety Plan and switch to the source license.

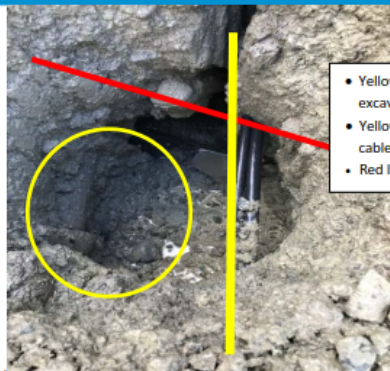
For further information please either contact the Office of Radiation Safety or drop me a line or email bsargent@geotechnics.co.nz or 0508 223 444. Further detailed information will be distributed in the near future.

Safety Alert



Ground conditions resulted in 33kV PowerCo Cables not identified using GPR

THE EVENT



Prior to the excavation for the new foundations of the Bunnythorpe Grid Skills Training Facility the project team undertook a Ground Penetration Radar (GPR) survey of the work area.

The GPR did not highlight anything, leading the supervisor to believe the area was free of buried hazards.

The proposed digging was stopped only by a query made by a person with site knowledge. Further investigation revealed in-service cables were in the proximity of the proposed excavation (see attached photo).

Once the cables were identified using the Hydrovac method a second survey was conducted highlighting the impact of the ground conditions on the results. Note these cables were not identified during first survey and the second visit was not conclusive.

ACTIONS TO BE CONSIDERED WHEN IDENTIFYING BURIED SERVICES

- GPR is an acceptable method to help with the identification of services but is not 100% conclusive and should only be part of the risk mitigation. A cable locator should also be used in conjunction with the GPR.
- Ensure a comprehensive review of buried services drawings are collated, as not all information is available on a single overall drawing.
- Use physical references (fence lines, boundaries, and existing equipment) to mark out approximate locations of buried services.
- Pothole using hand tools or Hydrovac method, ensuring you have investigated the total area you propose to excavate using mechanical plant or other means prior to the excavations commencing.
- The use of Hydrovac or potholing must always be the final step before excavation is to commence.



For more information
Please contact:

Name
Designation:
Ph.: Mob:

Brian Carwell-Cooke
Project Manager
021 228 5132

Transpower New Zealand Ltd The National Grid



Last Editions Competition Winner



Thanks for the entries for the last captions competition. Congratulations to the winner Denys Searls from Opus in Dunedin. Your vouchers are on the way!!

"In case of flooding, lie on back and use paddles affixed inside"

Photo thanks to Alex Beijen from Landtest

This Editions Competition

This edition see's the start of our "concrete spoon" award. The lucky recipient will win their own bespoke concrete spoon (and maybe a voucher).

The criteria for this award is funny, embarrassing, stupid—or all three. Subjects of the story can remain anonymous (but obviously the story will be published and the nominator named)

So start dobbing in your workmates and lets all have a good laugh: info@cetanz.org.nz. Discretion guaranteed.

PS any volunteers to mould the spoons???

Changes to NDM Calibration Standards

As the NZ standard 4407 for NDM calibration is now obsolete, the Calibration suppliers have been discussing in depth options at hand. They have investigated re-creating a NZ Standard and possible adoption of either an AS or ASTM alternative.

The investigation was initiated by The Measurement & Calibration Centre who involved Groundtest in the process. Their findings/recommendations have been presented to the CETANZ Technical Group.

After solid investigation the Technical Group are in agreement and believe the best option available to the industry is for the NZ Calibrators of NDM's to adopt ASTM D7759/D7759M - 14 Standard Guide for Nuclear Surface Moisture and Density Gauge Calibration due to the following:

- In-line with best metrology practise, if a local specification is not available the Standard of the Country of manufacture is used, which in this case is the USA and ASTM Standard Methods
- The NDM gauges are manufactured to meet ASTM D7759/D7759M – 14 and factory calibrated to this by the manufacturers
- ASTM D7759/D7759M – 14 is a comprehensive Standard Guide that is updated every 7 years at no cost to our local industry
- ASTM D7759/D7759M – 14 calls for annual verification which can be carried out by the user. This provides certainty around accuracy and reliability and possible savings for the user
- Re-calibration is required every third year unless interim verification exceeds given limits at which stage re-calibration is then required.

Previous calibration standards required the gauges to be calibrated every second year. As users of these gauges we feel this is not industry best practice as all our other equipment is calibrated/verified annually. We believe the annual verification gives certainty to the end client around the reliability of the gauges.

Whilst the current calibration facilities can carry verification out as a service, users who wish to can come up with a process whereby they can validate their own gauges. Other than these small changes we do not believe the end users/stakeholders will notice any difference by a change of standard.

Therefore, we recommend and support transitioning from the current obsolete NZ 4407 standard to the ASTM D7759/D7759M – 14 Standard Guide by the end of 2018.

Any queries can be directed to Jayden Ellis or Brigitte Sargent via email info@cetanz.org.nz



From the working groups

Technical Group

Members who took part in the recent NZS 3111 Density and Absorption, NZS 4407 Cleanness Value and AS Wet and Dry Strength Variation proficiencies, should have now received the finalised data. If you haven't please contact Jayden. Stevenson Construction Materials Laboratory is working on an NDM proficiency and a Concrete Cylinder Strength. The group is also considering Bitumen and Asphalt schemes for early in the new year.

| Category | Test | Volunteer Laboratories |
|-----------|-----------------------------------|--|
| Aggregate | D&A NZS 3111 | OPUS – 2017 DONE |
| Aggregate | Wet/Dry AS | Fulton Hogan Auk – 2017 DONE |
| Aggregate | Cleanness Value 4407 | Road Science Auckland – 2017 DONE |
| Asphalt | Binder Content & Grading | Fulton Hogan - 2017 |
| Aggregate | Sampling / Grading (North Island) | Stevenson - 2017 |
| Field | NDM (North Island) | Stevenson - 2017 |
| Concrete | Compression & Density Tests | Stevenson – 2017 |
| Bitumen | ???? | 2017? |
| Asphalt | ???? | 2017? |

If you are wanting to get involved there is funding available for those that want to volunteer their Laboratory as a potential organiser. Please contact CETANZ info@cetanz.org.nz. We desperately need a volunteer to organise a Soil test type proficiency for this year.

The proposed 1st stage of the research/study for NZ vibrating hammer is now almost ready to go. NZTA is waiting for the business plan to be finalised so that they can carry on with the project. The initial final scoping report should be available shortly.

The M/6 Working Group met in June to discuss the M/6 Specification, PSV Control Stone replacement, RAMM (aggregate naming), Sealing Chip Abrasion research and use of RAP in membrane seals. The draft M/6 specification and notes documents are now finalised and have been submitted internally in NZTA for vetting and checking. Expect release before the end of the year, however this could be delayed with the recent restructure and new business plans waiting for approval.

Changes have been made to testing protocols, Broken Faces and PSV shoe preparation.

NZTA is organising final arrangements to provide Laboratories access to the new verified NZ Control Stone. There is likely to be some type of transition period to allow those with UK Control Stones to use up current stock.

Working Group Update Cont.....

Technical Group Cont.....

Some issues persist with those entering source names incorrectly into RAMM. A penalty system is being considered. Laboratories are reminded to ensure that they have been supplied with the correct source name.

The correct naming can be viewed at the NZTA portal as per this link: <https://nzta.maps.arcgis.com/apps/webappviewer/index.html?id=c81a4699b12c43328cb6f505d9c5bc3b>

Some discussion around detailing what RAP could be used in membrane seals. Some more work is to be done on this.

AQA & NZTA are still conducting checks on M/4 results to see if basecourse producers are likely to meet the statistical acceptance options proposed by NZTA. This is almost complete. No decision on whether NZTA will go for Q method or Operating Characteristics (OC).

Ethylene glycol testing has been seen in contracts recently and there has been confusion as to whether the test is for aggregate acceptance or is a reported value only. It is still a report only test. The test method is still in draft version and is currently going through NZTA internal vetting and checking processes. Expect a final version to be released soon.

The Technical Group has contacted NZTA and requested that all NZTA future specifications and contracts, favour the new AS/NZS joint bitumen and asphalt test standards.

Calibration providers have approached CETANZ and suggested that the ASTM Guide should be adopted in New Zealand for Calibration of NDMs. The group has discussed and agreed.

The Technical Group is working on a short summary of the ASTM guide to send to members and should be completed soon.

Other Projects continuing in the background are NZS 4402 review/replacement – work continues to assess possibility of adopting AS standards. UoM Guide and Accreditation and Reporting of Derived, Assumed and Subsequent data Guide

Careers & Events (C&E)

The 10 year celebrations and networking functions were held in Auckland, Hamilton, Tauranga and Christchurch. It was a great event to meet new potential members a catch up with existing members. We plan to hold more events like this over the next year to give everyone the chance to keep in touch with each other and discuss current and up and coming issues and opportunities.

Careers & Events Cont...

Conference planning is well underway with the Heritage Hotel in Auckland City being the venue from the 8th to 10th of August 2018. A call for papers and sponsorship is about to go out, we would love your support on both of these!

CPT Group

All known CPT contractors in NZ have now joined the CPT Group, making 22 contractors in total with at least one CETANZ member per contractor company. The auditing documents have been finalised and agreed upon and the auditors have been appointed. The auditors are Graeme Duske and Allan McConnell.

The initial round of field observations are expected to begin in January next year, this will be a fact-finding exercise to gauge the state of the industry and form the basis for a best practice guideline that will set the standard for future audits.

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CPT TESTING - THE NOTION THAT IT'S ROCKET SCIENCE MUDDIES THE PROCESS

An opinion piece by Allan McConnell of IGS

1 A Little Bit Of History (my apology for errors I am certain to make)

The CPT - Cone Penetration Test - evolved from the idea that if a person pokes a stick or rod into the ground then that will give an indication of soil strength. This type of testing is still done today, unofficially, and un-hampered by any national or international standards and procedures. I took the adjacent photo a few years ago, and the result was persuasive - that little soil bank was "pretty damned soft".

The early evolution was more-or-less as follows:

- In the 1920s (I think) the Scandinavians started the process of evolution; first the Swedish invented the "Swedish Weight Sounding Method" in which known weights were placed onto a standardised "stick" (ie a rod with point).
- A little later, the 1940s, the Dutch came up with the first Dutch Cone Penetrometer - a 10cm² steel point pushed into the ground via rods protected from friction inside a steel casing. Fig 3.64 below.
- Shortly after that things started to get more complicated, and by the 1950s an independently pushed "adhesion jacket" was added to the mix. Fig 3.65(b) below.

All of these were mechanically operated one way or another, and the Dutch Cones had one sort or another of mechanical load measurement system. Typically a small hydraulic load cell with a couple of Bourdon Gauges pushed inner rods from the top - where the load was measured.

I note that when I started life as a geotechnical engineer in 1969, my first employer still used a mechanical CPT with inner rods operation and hydraulic load cell and gauges as described here. This system is still used in some developing countries and a more sophisticated variant is used by many or all contractors in Belgium. IGS owns a mechanical cone system, like figure 3.65(a) below, for using in horrible places where we could not possibly push an electric cone; these are still made by at least one Dutch manufacturer (Geomil), probably also by others.

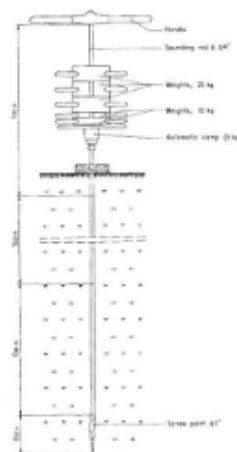


Fig. 1.21. Swedish Weight Sounding Method. (The photograph was taken about 1920 and is from the files of the Swedish State Railways).

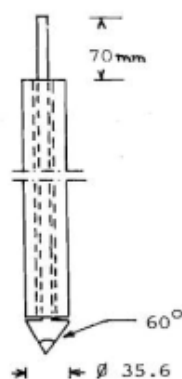


Fig. 3.64. Original Dutch cone (Vermeiden, 1948).

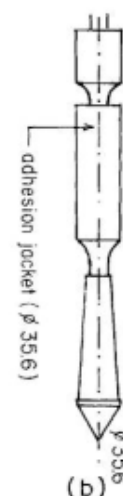
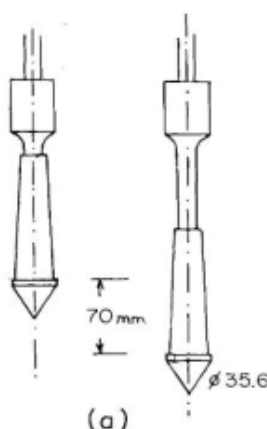


Fig. 3.65. Present form of Dutch cone: (a) mantle cone, (b) adhesion jacket cone (Begemann, 1953).

Then in 1974 a smart Aussie geotechnical engineer, (Dr) Jim Holden, designed and built an electric cone with strain gauge load cells for the tip and sleeve measurements. I'm not sure if that was a world first or not; I suspect not.

Anyway, this cone design was taken up commercially by a nice, smart and eccentric Melbourne man called John McGregor and became known as the Macsil Penetrometer. It was not a piezocone.

I bought my first electric cone, a Macsil, in 1980 and pushed it from the back-end of drilling rigs for a while. That was very unsatisfactory but was better than nothing.

Then in 1981 the CPT rig shown in the adjacent photo was built for me to use on the "New Brisbane Airport" job. It was very successful. There was however no automatic data acquisition system and we used to chalk the rods and write down on paper the cone and sleeve readings every 100mm, read off from two little digital meters.



At first we hand-drew the plots using a light table and graph paper then later we use a very early Lotus spreadsheet and a Tandy Radio Shack computer, with pen plotter, to draw the plots. The plotter's nib was a clamped-in ball-point pen.

We have in recent years done many tests on sites close to some of these early ones, and I can tell you that these old crude(ish) plots were in fact not too bad. The Brisbane Airport domestic terminal, apron, runways and taxiways were designed based on these tests.

All the dimensions/details of a usual CPT were decided by this time. The tip was 10cm²; the sleeve was 150 cm². The push speed was the same as we use now (though the Australian Standard tried to mess with this); we plotted q_c and f_s and f_t .

In fact apart from the addition of a piezo-element to measure pore pressure, the only things that have changed are the robustness, convenience and accuracy of the system. But, take it from me, while not very robust, the old Macsil cones were surprisingly accurate and repeatable.

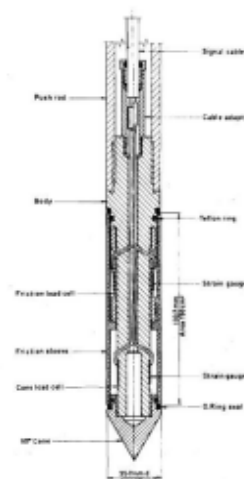


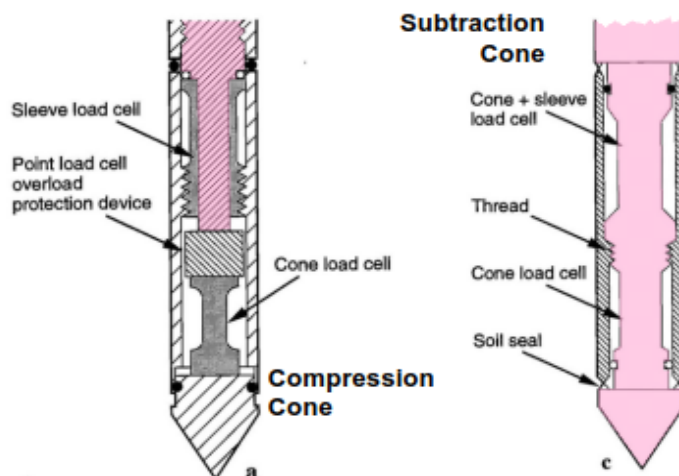
Fig. 3.66. Electric penetrometer of the Australian Country Roads Board (Holden, 1974a).

2 So, What's Worth Talking About?

2.1 Compression Cones vs Subtraction Cones

Most CPT testing is done these days using one of two electric CPT types. And there is quite a lot of chatter about "what's best" and "what's not". These are "compression" and "subtraction" cones (I'll call them C-Type and S-Type for simplicity). The difference can be seen in the adjacent figures.

- The C-Type cone has independent load cells (ie strain gauges) to measure cone resistance and sleeve friction.
- The S-Type cone has one load cell behind the tip that measures cone resistance and another above the connection to the sleeve that measures total resistance. To obtain sleeve friction the software subtracts one value from the other.



There is no doubt that of the two types:

- In principle a C-Type cone might be (potentially) more accurate at measuring sleeve friction than an S-Type cone; after all the two load cells of the S-Type cone will each measure very similar relatively large load readings and the software subtracts one large number from another large number to get a small number; ie the friction sleeve load.
- In principle though, and in fact, there is absolutely no reason why the cone tip resistance measured by either type should have different accuracy to the other - think about it.
- The S-Type cone is much simpler and much more robust than the C-Type cone. You can see from the figures on the previous page that each part of the C-Type is smaller and thus more fragile, and necessarily this means there is more maintenance needed for the C-Type.

Much of the negative chatter about S-Type cones has arisen from the following:

- In times past, strain gauges were not as good as they are now - hence the S-Type cone system potentially lead to very significant errors.
- A poorly calibrate S-Type cone is certain to lead to sleeve friction errors.

But let me say clearly here that if both types are well calibrated, its hard to tell the difference between the two types these days. And also let me say that, due to its greater robustness, a well-calibrated S-Type cone will drift less than a C-Type cone during use. It stays in calibration longer. There's much less to go wrong inside.

IGS routinely does both CPT types of tests - and nowadays clients' usage is about 50/50. Before we did our own calibrations under our own rigorous regime, this was 5% S-Type and 95% C-Type. In Holland it is around 95% S-Type testing - the birth-place of CPT.

I will discuss calibration later in a bit more detail, but it must be obvious to everyone that any discussion about comparison of cone types, resolutions, accuracies, etc etc is simply a big joke if you do not know if the cones you are debating or chattering about are "in calibration" or not. See Section 2.4 about this important matter.

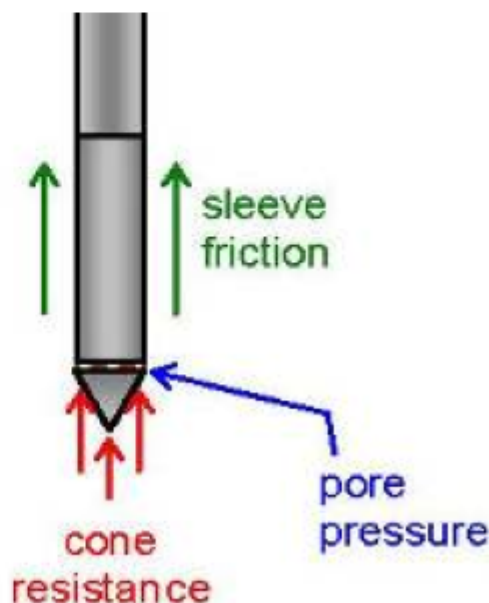
2.2 Piezo-cones vs Non-piezo-cones (I never know whether to hyphenate this ??)

Another matter of difference between CPTs is piezo-cones vs non-piezo-cones. From here on I will mostly use my normal terminology; CPT to mean non-piezo-cone; CPTu to mean piezo-cone.

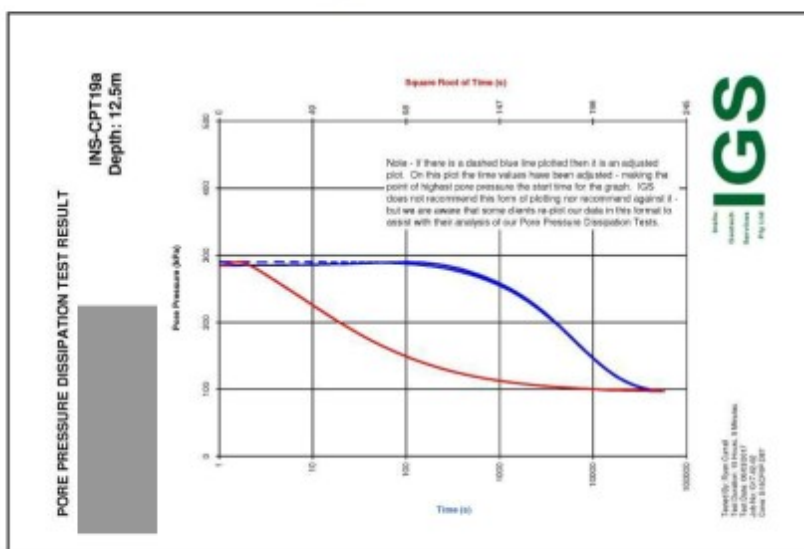
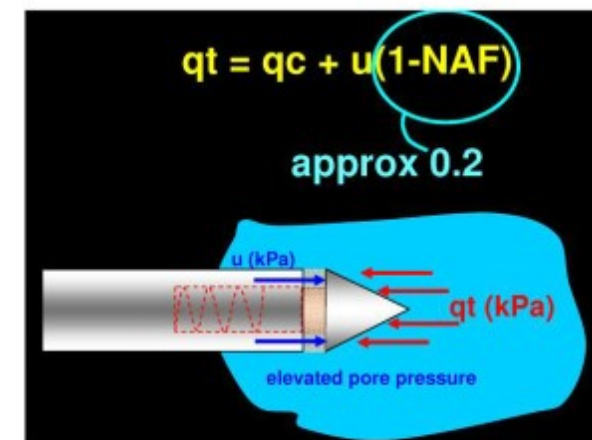
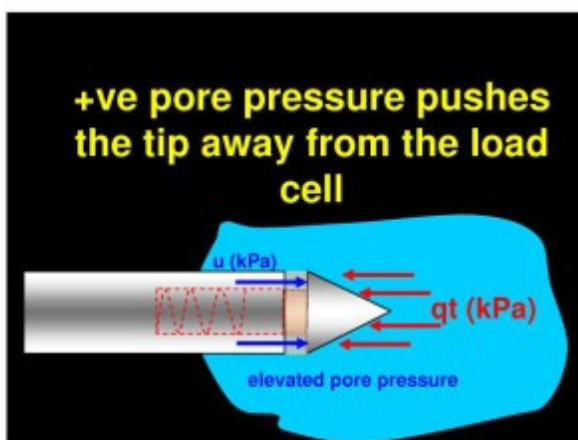
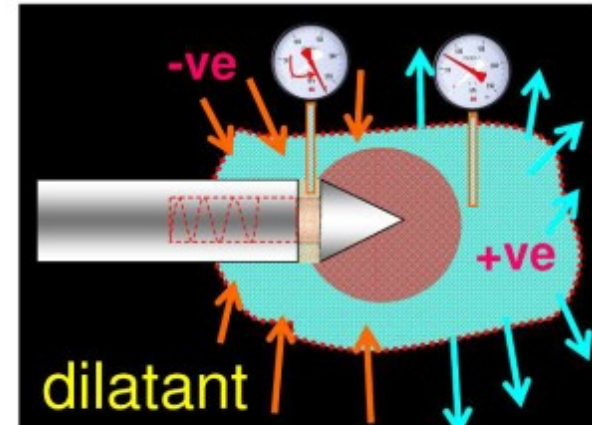
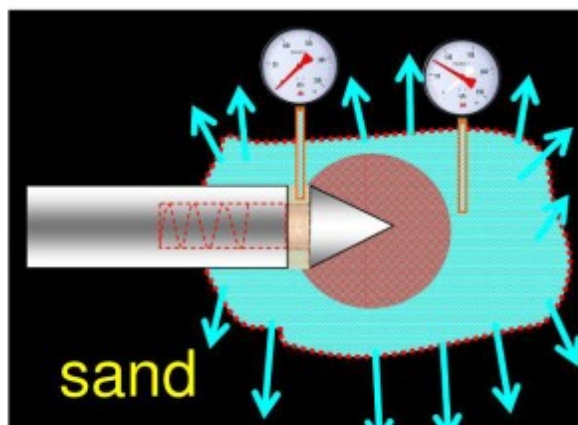
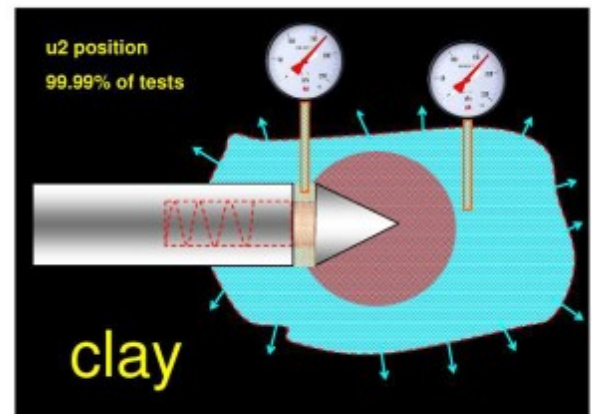
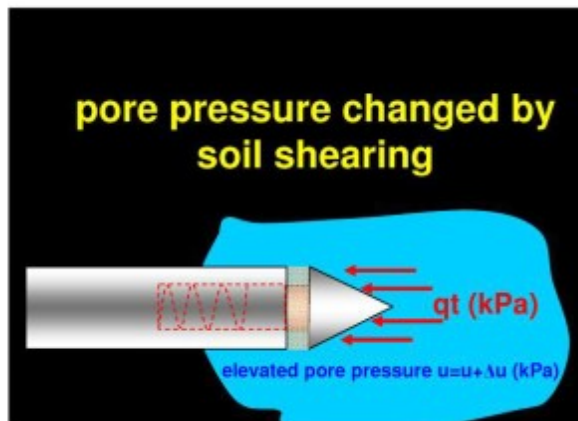
Both S-Type and C-Type cones can be piezo-cones, and either type measures pore pressure as well as the other - there is no difference at all.

Pore pressure is measured for a number of reasons - the most common are:

- Enhanced soil identification - pore pressure response is related to soil type; related to soil permeability.
- For making in situ measurements of permeability in fine-grained soils - ie by Pore Pressure Dissipation Testing.
- For establishing the phreatic surface or static pore pressure - you let the pore pressure dissipate and you are left with the pre-existing pressure (that may be related to water table level; or flow through an embankment or etc).
- For making corrections to the measure cone resistance q_c , to compensate for the effect of pore pressure in the small space behind the cone tip (this pressure pushes the tip away from the load cell). After such correction the corrected cone resistance is termed q_t (ie q total).



The first four cartoons on the following page explain how pore pressure can be used to enhance soil identification. The two below that explain the concept of pore pressure correction (ie q_c to q_t correction). The final figure is a typical Pore Pressure Dissipation Test plot taken to about t_{90} ; note that this test ran for more than 15 hours - it would have been run overnight.



this plot is rotated for clarity

Note that this test ran for 15 hrs and 8 minutes (overnight)

2.3 About Pore Pressure Response

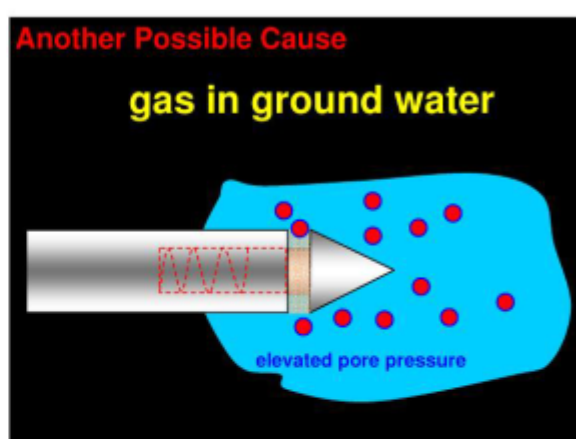
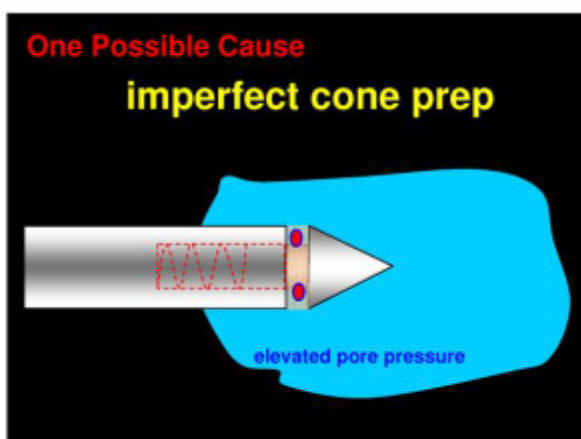
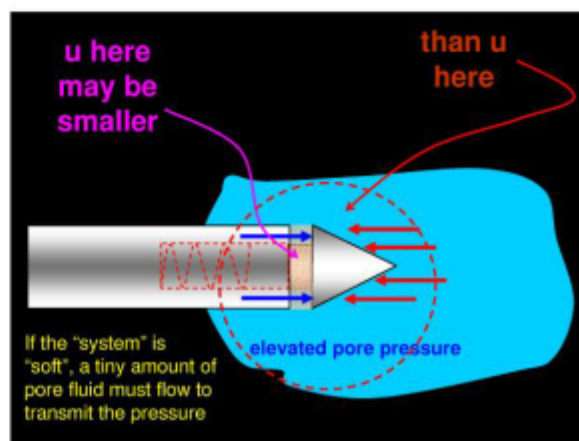
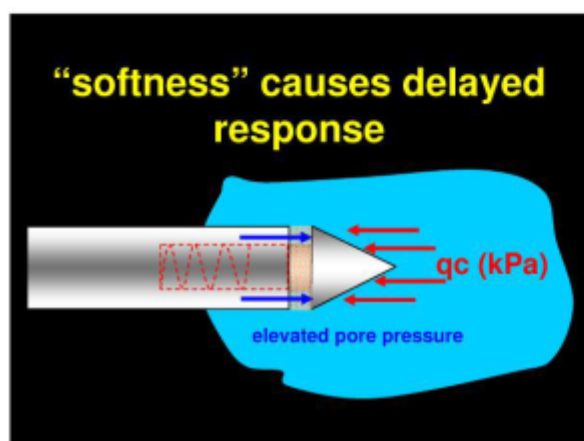
To open this "conversation":

- Measure q_c is easy.
- Measuring f_s is easy.
- Measuring a "proper" pore pressure (u) response is much more difficult/complicated and may not be possible.

By "proper response" in the above, I actually mean a positive pore pressure response that clients and theorists expect. Let me say here that not all soils will give such a response: "soils ain't soils" - and I'm sure that any contractors who have worked in Christchurch will cheer hooray when they see me write this.

Some materials - coarse sands, shells, fissured clays, unsaturated soils, residual soils, may simply respond with a disappointing or even negative pore pressure; and, if the negative value is too negative, the cone's filter element may not "recover" during a test, at least not without implementing special measures that may well take time and if so will cost someone money.

The conversation below is not about these soils but is about "getting it right" in soils that should and would produce a proper pore pressure response. See the cartoons below.



While in some situations the tester has no control over pore pressure response, it is an important part of their understanding, training and procedures that he/she does everything reasonably possible to prepare a piezo-cone properly in regard to saturation of the pore pressure measurement system.

In IGS we make a "big deal" of this - filters are submerged in heated glycerol under a near-vacuum and vibrated randomly for 72 hours - and the process on the rig of assembling the cone has similar careful processes.

If the ground will not cooperate readily, the tester can implement testing procedures that take time, sometimes a lot of time, and that time consequently costs the client, or someone, money. At IGS we believe that is a client decision. After all the client may not even care about this. We have in fact "invented" a Test Category system that the client must choose from test-by-test, or for a project overall, based on their expectations and needs.

2.4 Equipment Calibration

To open this "conversation":

- Measure q_c is easy.
- Measuring f_s is easy.
- Measuring a decent pore pressure response is harder but can usually be achieved.
- But it's all a waste of time (a joke in fact) if you don't know today, as you're doing all this careful testing, that the equipment you are using is "in calibration".

It's rather interesting to note that way back in 1980 when I bought my first electric cone equipment from Macsil, the kit provided included an on-the-job calibration apparatus; a calibrated proving ring with jack, all mounted in a frame inside a nice plywood box.

It came with a stern recommendation from the manufacturer to "check the (bloody) calibration daily" - or "more often if in (bloody) doubt".

I dug around in the back of my big shed that's full of stuff and found one of those calibration frames. See the adjacent photo.

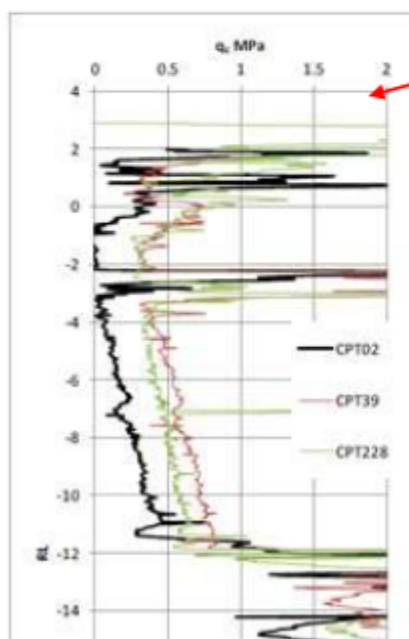
I don't believe that John McGregor thought that his load cells were unreliable, in fact they weren't. He just believed in being sure.

I believe that he understood reality - if you frequently push something into the ground that works via sensitive electronic jiggery-pokery, then it might be wise to check regularly that it is still working properly.



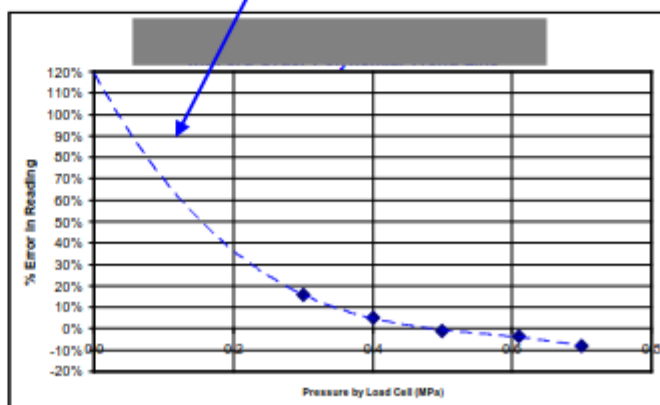
The bottom line to this is that as a CPT testing contractor you are not selling the client time and equipment hire, you are selling him/her data - and (my opinion) is that the client has the right to know that this data that he has bought is correct. And you as the contractor have the right to be able to "stand tall" and tell the client "yes" and be able to defensibly support that statement.

There is a bit of ego protection in this also - Who wants a client or someone else to demonstrate that your data is not correct at all? It happens - see below.



Case History 1: The black plot was a test result from one contractor. The red and green plots were by IGS using calibrated equipment. The black plot almost stopped a project proceeding.

Case History 2: During a project some test plots were "challenged". The contractor defended them. The plots below shows a very large error in the low q_c values. The test data was all in this low range.



In both of these cases the contractor who provided the dodgy data truly believed that their equipment was "in calibration". In both cases they lost enormous dignity (and commercial prestige) from what happened.

In my opinion neither the cone manufacturers nor the standards understand the need for proper calibration. As an example, ISO 22476-1:2012, which is the more-or-less international benchmark standard at present, in Table A1 specifies calibration every 6 months.

Table A1 re calibration interval (6 months or even longer) is ridiculous in my opinion and I have always wondered how that got into this otherwise very rigorous standard. How can any tester or user of the data state that they know their data quality, or state that they satisfy an Application Class when they really have no idea if the equipment is actually in calibration - "well it was ok 6 months ago" is all that can be said. "Oh yes, I have been pushing it in and out of the ground every day since then"

Let me share with you what IGS does about this matter. The following is our stated procedure.

CPTu TESTING

IGS undertakes all CPTu testing using "industry best practice". Part of this is to follow the calibration processes in the de facto "world benchmark standard" ISO 22476-1:2012.

IGS will normally establish several CPTu cones to your site that have all sensors calibrated to exceed that ISO standard's highest-level requirement, designated "Application Class 1".

Our calibration regime will in fact exceed the standard's. As our experience shows that CPTu sensors all drift slightly with use, we will commit to (a) provide fresh calibrations for every cone used at the start of your job and (b) re-calibrate every deployed cone to the ISO standard at the end of the job. Re-calibrations will be compared to pre-job calibrations to confirm CPT accuracy during the whole project. Note that this is IGS "business as usual". We calibrate, q_c , f_s , u and NAF (Net Area Factor).

I refer you to the attached sheet with every quotation that explains IGS's system of "Test Categories". Normal run-of-the-mill CPTu testing (done by everyone) is covered by Category IGS-1S or IGS-1C. Note that this is a trade-off between pore pressure response and productivity, with a bias to productivity (to suit many clients' wishes). A more rigorous approach to management of pore pressure response is covered under the IGS Categories IGS-3S and IGS-3C (or even IGS-4C). We will seek your direction on the test category to adopt before each test - or overall for the project. Note that as some materials are dilatant, rigorous management of pore pressure response can slow test rates somewhat, especially if using the normal u_2 piezometer filter position. We will carry u_1 filters and tips to your job, in case you decide that you want us to use them.

INTERNATIONAL
STANDARD

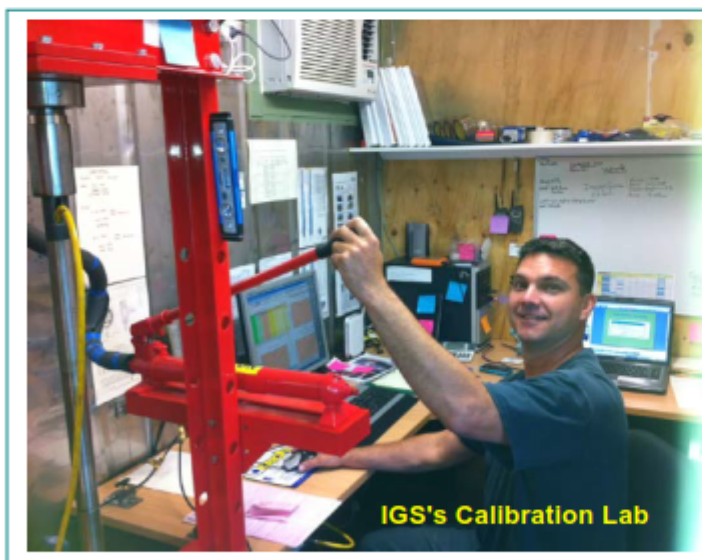
ISO
22476-1

First edition
2012-06-15

Geotechnical investigation and testing —
Field testing —

Part 1:
Electrical cone and piezocone
penetration test

Reconnaissance et essais géotechniques — Essais en place —
Partie 1: Essais de pénétration au cône électrique et au piézocône



A CPT or CPTu is basically a set of high sensitivity strain gauges - they cannot be expected to stay in calibration after being pushed and pulled in and out of the ground over and over again. They do not stay in calibration - "trust me".



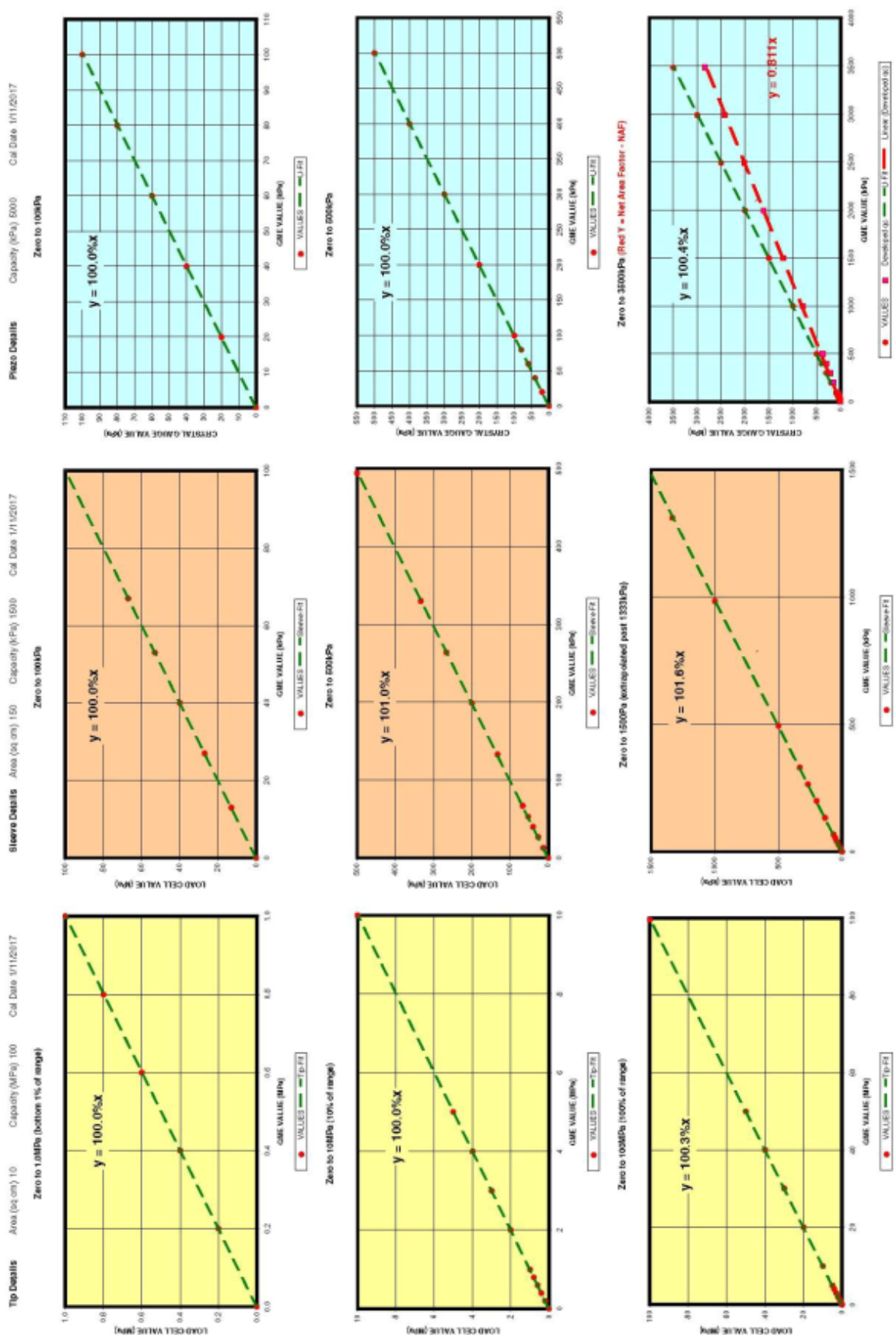
A Typical IGS Calibration

Note: (a) deliberate bias in precision to low ranges and (b) NAF calibration (sometimes call NAR and other things)

No: GC10CFIP.C14010

This cone has been re-calibrated. Use appropriately-sized calibration file.

100MPa Compression Piezocone Calibration Report



Printed: 1/11/2017

In Situ Geotech Services Pty Ltd

3 Closure

CPT and CPTu are in principle pretty simple tests:

- Use good quality equipment that is properly calibrated.
- Push the cone into the ground at the correct speed using straight rods.
- Log the data properly.
- Report the results in the format that you choose or that your client wants.

I hope that my rambling in the foregoing is useful to you. I am impressed at what you New Zealanders are working towards via CETANZ.

As I see it you are working to (a) decide what is right, then (b) all work together to get it right. That's truly great stuff.

Regards, I'll finish with a few IGS photos below.



Allan McConnell



A Word From The Editor

Once again I would like to do a big shout out to all of you who have contributed to this issue of CETANewZ. Just so you know, scores are being kept, and it could be worth your while in the long run....

For many of you the newsletter is your main contact with CETANZ and what keeps you up to date with the good work that continues to be done in our industry. We put a lot of effort into getting the newsletter out and welcome your feedback and input .

Given the number of “unique personalities” in our industry, there has to be a lot of material for a CETANZ “Chinese whispers” column. Of course all identities will be protected and contributors kept anonymous BUT we would love to hear and publish your gossip (Jayden you will rock at this one) Send me your stories for the next issue of the CETANewZ!

The previous issue caption competition was won by Denys Searl of Opus. Thanks to all those who submitted entries and thanks to our judges. Unlike the general election, our voting actually gave a result and no-one had to schmooze Winston Peters!

Labour weekend been and gone and now is the fast dash to Christmas. Keep safe and I look forward to catching up with you at our Conference/AGM if not before

Until next time

Brigitte

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