

Issue 012, March 2011

The official newsletter of the Civil Engineering Testing association of NZ

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"Its time to be optimistic, we need to focus on the future and the initiatives that will see our testing industry grow with the economy"

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From the Chair...

Update from the Chair – 18/03/11

Well here we are in the New Year and looking back at last year, it was economically tough for all of us, with work being tight and margins even tighter. Private and public funding of construction work dropped to very low levels and many of our businesses struggled to stay afloat. The government has now brought forward some of the larger infrastructure projects and work seems to be trickling back through the door. Its time to be optimistic, we need to focus on the future and the initiatives that will see our testing industry grow with the economy.

In this issue our working groups will report on their progress regarding the many projects CETANZ has started. All are aimed at returning value to the Membership and helping our industry to perform better.

Our current committee works hard to bring these initiatives to you and I would like to thank those members that work in the background with their contributions and also a special thank you to those companies that provide their employees time for CETANZ work. Their contribution is vital and keeps us well represented and robust.

I must say from personal experience that this work has huge payback. I am often at ground zero of new events and developments as they are happening in the industry and these experiences help grow my personal knowledge and development. So get involved, we can't do it without your support, feedback and effort. Go along to your next regional activity, volunteer to organize one of the next proficiencies or take part in a standard review. Who knows where it will take you.

For those of you like me that have been counting down the days until the new qualification is launched, good news, the writing is completed and it is currently being reviewed by NZQA. InfraTrain and CETANZ are working on the marketing plan for the launch and all going well we will know more very soon.

Before I leave you to catch up on CETANZ, I'd like to take a moment to pass on our deepest sympathies to the people of Christchurch. It is heartening to see that so many have joined the effort to help out in particle ways with showing their support for a city and region in crisis. I'm told that our members in Christchurch are safe and well. CETANZ wishes you and your families well and our thoughts are with you for the days ahead.

Jayden Ellis
CETANZ Chairman



Downer leads bitumen world first

Waste toner from copiers will help make new roads

Graham Skellern—Bay Of Plenty Times

Published with the permission of the Bay Of Plenty Times

Replacing the toner cartridges in the photocopiers of every office is a common occurrence. But what happens to the cartridges?

They are sent to Croxley's toner recycling centre in Auckland. Each cartridge still retains some waste toner, a fine dusty powder, and it is removed, sealed in a cube and dumped in a landfill, at a cost.

Downer's laboratory in Tauranga has, instead, come up with an environmental solution.

Following ground breaking research, Downer has found the waste toner can be added to polymer modified bitumen and used in laying roads - a world first.

It would mean that all the waste residue toner - up to 30 tonnes of it each year - can be recycled instead of ending up in the landfill.

Downer, in conjunction with Croxley and Ricoh New Zealand, has just been granted \$45,800 from the Ministry for the Environment's waste minimisation fund to continue the testing of waste toner in polymer modified bitumen (PMB) and asphalt.

The testing will take place at Downer's newly-upgraded bitumen storage and blending facility in Totara St near the port.

The company, a pioneer in developing the country's roading network, installed Danish-made emulsion and PMB plants two months ago to add a new dimension to road construction in the county.

John Vercoe, Downer's technical manager of bitumen supply, said: "We have done the lab work and we can put all the toner through the plant.

"We can get 3 per cent toner in our polymer without affecting its properties, and we can put 1 per cent into the straight bitumen," he said.

"It doesn't enhance our product but it doesn't detract from it, either.

"We can become a recycling plant for 100 per cent of New Zealand's waste toner, reducing the impact on the environment. It produces a saving for Croxley and Ricoh, and it's not an inconvenience for us. It's a win-win situation for everyone."

Mr Vercoe, a polymer chemist, said the project began following a research paper from United States that talked about adding waste toner to asphalt.

"Our own laboratory work was unable to reproduce the US procedure and we investigated adding waste toner to PMB. It fits well and we are the first to do it. Our research is completed and we are ready to run the waste toner in the plant to verify the results from the lab," he said.

The first trial will be conducted within two weeks. Downer would take delivery of 200 litre drums of the waste toner - which is not exactly the cleanest product - and its only hurdle now is to figure out how best to handle the fine powder.

It's dusty and the waste toner needs to be transferred to the mixer and milled with the bitumen and SBS polymer, which is imported from Korea and other parts of the world.



John Vercoe is now looking at safely transferring the dusty waste toner from the

drum to the mixer in the polymer modified bitumen plant behind him. Photo / Mark McKeown

The cartridge waste toner would end up being part of the stronger and longer lasting polymer modified bitumen (PMB) which lengthens the life of a road surface at least five times.

Most of the country's roading network is made from the cheaper chip seal where the bitumen is sprayed first and the chip aggregate is added.

City streets are laid with the less noisy and smoother asphalt where the aggregate and bitumen is mixed and then laid by a paving machine and rolled.

The PMB, more resistant to wear and tear, is now being used on sections of highways that have particularly heavy use.

Downer has applied it on the recent upgrades of Maunganui Rd near the flyover and on the intersection of Fraser St and 15th Avenue in Tauranga, and it is popular for paving at the heavily-used ports, distribution centres and rail and log yards.

"Every time a truck goes past, the road flexes. When it keeps flexing, the road eventually cracks," Mr Vercoe explained. "During a hot summer, the bitumen softens and starts flowing away from the wheels and creates ruts.

"Adding polymer, which has a lot more flexure, to the bitumen makes the road surface stronger and gives it extra life. There's some polymer in the waste toner and that's where the project comes in," Mr Vercoe said.

So, wouldn't it be wiser to construct smoother, longer lasting road (asphalt) surfaces right from the start?

"It's hard to know," said Mr Vercoe. "The roading network is structured on low capital outlay and higher maintenance. The full life costings are very difficult to calculate.

"New Zealand, Australia and South Africa uses chip seal because of the big distances to cover with low population levels, and they are trying to stretch the roading dollar further than anyone else," he said.

As well as recycling waste toner, Downer has found a way to reduce the bitumen heat, making energy savings and improving safety.

The bitumen is mixed with water containing chemicals and churned in the emulsion plant, reducing the heat from 180C to 80C when it is sprayed on the road.

Downer has installed three emulsion plants at three of its sites in Bluff, Lyttelton and Tauranga.

"This is the future," said Mr Vercoe. "When you are spraying bitumen at 170/189C, it can cause major burns. The emulsion technique drops the temperature to a safe level."

Downer, which started in 1870 as the Public Works Department, now employs 5000 people in 50 towns and cities across New Zealand. The group also operates in Australia and through Asia, particularly Singapore, India and China.

Test Focus... Steven Anderson Geotechnics Ltd

The Impact Tester

The first impact tester was developed by Dr Baden Clegg in the 1960s and named after him as the Clegg Impact Tester or Clegg Hammer. These days Impact testers are manufactured by different suppliers, although the original Clegg Hammer is still available.

According to The Clegg¹ website, "Dr Baden Clegg (b.1925-d.1999) originated the concept of the Clegg Impact Test in the late 1960's while a lecturer at the University of Western Australia in Nedlands (Perth) Western Australia. The idea occurred to him that by instrumenting a laboratory compaction hammer it might be possible to obtain a parameter relating to the strength/stiffness of soils and soil-like material."

The most common impact tester in New Zealand is the standard 4.5kg hammer, although other weights are available.

The standard Impact tester is commonly used on granular fill material, such as sands though to gravels, typically pavements, car parks, building pads and trench reinstatement. ASTM suggests that the impact test can be conducted on soils, but this is usually done with the light hammer (0.5kg).

The impact tester has a few advantages:

- It is a quick test tool, which means more coverage of the test area.
- It is relatively cheap to purchase.
- It is easy to use, allowing inexperienced people to check compaction before calling in a laboratory for a final test.

The electronic display shows an impact value that is the peak deceleration in units of tens of gravities as the hammer strikes the test surface.

Four consecutive drops are performed at one location and the maximum value is reported.

To ensure a good test

1. Sand often shears resulting in a low strength, especially if the sand is unconfined. In applications where the sand is confined at the edges and surface, such as with a floor slab or pavement, the use of a surcharge significantly increases the value and is more representative of the end use. The same occurs in the CBR test where a surcharge is used to allow for confining by overlaying pavement. An easy way of manufacturing a heavy guide tube with surcharge weight is to cut a steel pipe (53mm to 54mm internal diameter) to the same length as a guide tube. Bore out an old scale weight to allow the pipe to be inserted, then weld the pipe to the top of the weight. You will need to make sure the surcharge mass is the correct weight for your pavement or floor slab loading. Lastly drill a hole in the guide tube, near the base, to allow air to exit when the hammer falls.
2. It is important that the test is an impact test and not absorbed into the test material, therefore at the completion of the test, check the depth of the indentation. Some old papers suggested a maximum impression in the surface of less than 5mm after the test, though this is material dependent.
3. Care needs to be taken when testing materials with impact values less than 15. This is nearing the lower limit of the impact testers operating range.² Often at this range the impression in the surface exceeds 5mm.
4. The impact tester is a shallow test tool therefore each layer of fill material (maximum of 150mm thick layers) should be tested as it is compacted. A surface reading will not represent the strength at depth.
5. The materials being tested must have a maximum particle size less than 37.5mm.

The impact test is a strength test which has correlations to CBR and Modulus, though care should be taken with correlations to ensure they are relevant to your site materials and conditions. These correlations are for the 4.5kg hammer.

The standard correlation is: $\text{Unsoaked CBR} = (\text{IV})^2 \times 0.07$ where IV is the impact value.

A more recent correlation is: $\text{Unsoaked CBR} = (0.24 (\text{IV}) + 1)^2$.

The Clegg¹ website and various papers provide a correlation to Modulus for the 4.5 kg hammer (with a 450 mm drop height and 50mm diameter hammer face) as:

$\text{Clegg Hammer Modulus (4.5kg hammer) (MPa)} = 0.088 (\text{IV})^2$

The most common test method is ASTM D 5874 - Standard Test Method for Determination of the Impact Value (IV) of a Soil. There is also an Australian test method AS 1289.6.9.1: Methods for testing soils for engineering purposes-

Method 6.9.1: Soil Strength and Consolidation test - Determination of stiffness of soil - Clegg Impact Value (CIV).



Figure 1 Clegg Impact tester



Figure 2 Dr Baden Clegg (from Clegg Website)

Test Focus Continued.....

Operation Tips:

1. Do not drop it directly onto concrete or other hard surfaces, this destroys the accelerometer – which is the most expensive part of an impact hammer. If in doubt drop the hammer from a low height. Do not exceed an impact value of 100.
2. The equipment is not intended to be used in the rain. If it gets wet, open the electronic readout box to check moisture has not got into the electronics. Dry overnight in a warm place. Make sure the transport box is also dry.
3. Keep the hammer face clean, this ensures good contact with the test surface
4. Avoid testing on large particles.
5. The impact tester is not intended for cohesive soils.
6. Carry a spare cable

References

1. Clegg Website www.clegg.com.au
2. Author's opinion



Figure 3 Geotechnics Impact Tester



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CETANZ Travel Grant Award—Conference Postponed

“The winning author will be required to present at the AGTA conference in Brisbane, September 2011”

Due to the Queensland flooding earlier this year, AGTA have decided to postpone their conference until September

The CETANZ management committee are pleased to still offer the opportunity for 1 fully paid current CETANZ member to attend the AGTA conference in Australia.

General:

To apply you must submit a paper which covers any topic associated with civil engineering materials testing. The winning author will be required to present at the AGTA conference in Brisbane, March 2011. Papers submitted need to meet the criteria as per conditions set out in earlier email. Please contact us if you require more information.

The winner will attend the Conference, present their paper and provide a written report of the conference, detailing their experience/learning's. Award winners are also required to present their paper at a local regional CETANZ meeting in the year of the award. CETANZ will be given rights to publish the paper on their website and in other suitable publications.

Selection:

A judging committee consisting of 2 members of the CETANZ management committee and 2 senior civil engineering testing professionals (as selected by the CETANZ Management Committee) will review all papers and vote on the winning paper. The winning paper will be voted on according to Content, originality (i.e. a paper that has not been submitted before is preferable), Best match to the AGTA theme. If on the occasion only one paper is received, the submission will still undergo the selection process listed above. CETANZ reserves the right to defer the prize and re-advertise for entries to a later alternative conference should the Judging panel consider the entries to be unsuitable.

“The award is to the value of up to \$2,000.

Presentation:

The winner of the award will be announced by email and in the CETANewZ

Presentation of a certificate will be made at a convenient location by the CETANZ Chair or his representative.

Value of Award:

The award is to the value of up to \$2,000. It is to be used only for the reimbursement of expenses in attending the AGTA Brisbane 2011. Acceptable expenses included in the reimbursement are: registration, airfares and associated taxes and accommodation for the duration of the conference. Reimbursement will take place upon acceptance of receipts by the CETANZ Management Committee.

“The winner of the award will be announced by email and in the CETANewZ”

Submission:

Papers must be submitted to info@cetanz.org.nz by 21st April 2011.

Any queries please email to info@cetanz.org.nz

Best of Luck!!!!

The CETANZ committee

From the working groups | Social Activities, Careers and Training

Last Meeting 12th February 2011

Next Meeting 20th May 2011

Social Activities, Careers and Training Group Members

Jennie Dingley— Envirolab Geotest—Group Leader
 Jayden Ellis – Stevenson Laboratory
 Brigitte Sargent – Geotechnics
 Sarah Amore—Opus Hamilton
 Michael McGlynn—Geotechnics
 Murray Cleveland—Testlab

The Society Activities and Training and Careers Group have had a busy couple of months with several events for CETANZ members in the pipeline.

Michael McGlynn arranged for Stephen Wormald from Dynatest (UK) talk about and demonstrate the Lightweight Deflectometer (LWD). The venue for this activity was to be at the Downer Testing Laboratory in Christchurch on 24 February. As you all know, the earthquake of February 22 has caused significant damage and disruption in the Canterbury region. Consequently, this event has been postponed until a later date.

April sees a combined training and social event for the Waikato/Bay of Plenty area. A get together is planned for Auckland members in May. Details regarding the nature of these events and venues will be released shortly.

Regional activities in the areas of Whangarei, Christchurch, Wellington and Nelson are also planned in the coming months. If you are interested in assisting us organise a get together in one of these areas please email us on info@cetanz.org.nz

The Laboratory Technician qualification is getting very close to being launched. Infratrain are putting on the last final touches and we aim to have the qualification in action around the middle half of this year. We will keep you updated as the time gets closer

Work has started on the 2012 conference with venues and other details to be advised in the near future.

Don't forget to submit your paper by the end of April to be in to win the travel grant to attend the AGTA conference in Brisbane this September!

Jennie Dingley

Sudoku & Quiz

Sudoku

					2		1	4
			4	8			9	5
			9		1	3		
		6		4				9
8								3
2				7		8		
		8	5		4			
5	2			9	8			
6	1		7					

General Quiz

- 1) What is the Capitol of Libya?
- 2) When was the first Footrot Flats published & in what newspaper was it?
- 3) How many legs do a butterflies have?
- 4) After which famous person was the teddy bear named?
- 5) What is the main gas found in the air we breath?
- 6) What was Myanmar formally called?
- 7) Who played in the number 7 jersey for the all blacks in the 1987 rugby world cup semi final (hint: it wasn't Michael Jones because it was a Sunday) ?
- 8) What is the speed of sound at sea level called?
- 9) What are the young of eel called?
- 10) Name the five all blacks who have played first grade for the warriors?

From the working groups | Technical Group

Last Meeting 23rd February 2011

Next Meeting 11th May 2011

Current Technical Group Members
Jayden Ellis – Stevenson Laboratory
Stevens Anderson – Geotechnics Laboratory Ltd
Frank Hu - Downer EDI
Sarah Amooore - OPUS Hamilton.
Wayne Campton- Babbage
Keith Towl – IANZ (Observer)
New Technical Group Members
David Morgan from Winstone Aggregates
Grant Bosma from Fulton Hogan
Steve McCone from Bitumen and Pavement.

Our 2nd meeting was hosted by Jayden at Stevenson Drury Quarry.

The group worked on the following items:

Proficiency Program for 2011

- Completing Sand Equivalent Proficiency
- Completing Plasticity & Linear Index Proficiency
- Sourcing a Professional Proficiency Analyser for future schemes.
- Technical Guide for Scala Tip Calibration
- Draft Budget for Technical Group Spend 2011
- Newsletter article – “Test Focus”

Items completed since last newsletter:

- Uncertainty of Measurement Tool posted on Website
- WQI Proficiency Data distributed to Participants.
- Sand Equivalent Proficiency data returned.
- Full Proficiency subsidisation (including Professional Analyser) investigated.
- Standards notified of Scala Specification issue.
- PSV Proficiency samples have been distributed

From the working groups | Technical Group continued

The Technical Group has been quite busy since the last newsletter. Many of the projects started before Christmas are nearing completion or have been completed. The UoM tool is up and running and we are in the middle of sourcing a professional analyser for our proficiency schemes so that the technical group can return well-structured and analysed reports to the proficiency participants. We have identified the potential costs to run fully subsidised proficiencies for the CETANZ membership and have put forward budget options to the committee for voting. The 2011 Proficiency program is drafted and we are now looking at sourcing and confirming volunteer Laboratories to organise the schemes. Please contact the Technical Group if you would like to help.

Category	Test
Aggregate	Clay Index
Soil	Standard Compaction
Concrete	Compression & Density Tests
Field	(Regional) NDM
Bitumen	TBA

Also in the background, the Road Testing Standards Steering Group's 1st working group, has meet with the Steering Team and Standards NZ, to create the process by which the Working Group will complete its review of the NZS 4407 tests PSD, Size and Shape, Cleanness Value and Broken Faces test methods. Once this first group has the review underway more groups will be formed to start review of more NZS 4407 test methods. Soon the group will be seeking feedback from CETANZ and Laboratories on the tests listed above.

Later this year I expect the RTSSG to ask for more volunteers to help form further Working Groups, please lend a hand if you can, have your say.

Jayden Ellis
CETANZ Technical Group Leader
jse@stevensons.co.nz
info@cetanz.org.nz



SITUATIONS VACANT

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Enquiries regarding this role can be made to Sarah Amore on: (07) 858 - 2872.

For further information and to apply, please visit our website, www.opus.co.nz.

Applications close 3 April 2011.

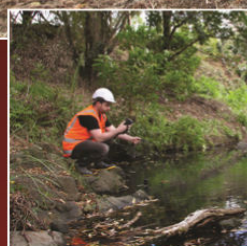
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An ode to Careering Ahead 2010
By Bruce Hopkins from his chair CETANZ 2010

The day was September 23rd, the year two thousand and ten,
 CETANZ careering Ahead began right there and then,

Michael McGlynn stood, he welcomed, the journey was underway,
 If Benji Marshall he feared, this he did not say,

First up was Terry, son of the Kayes,
 When Terry speaks it would be wise to hear the words he says,
 Terry spoke leadership, he spoke courage, be open to risk taking,
 Pavarotti he may not be, but singing in the Opera, it was of the universe and his own making,

Steve of the english Fisher strand,
 Sang uncertainty praises of those who live in NZQAland,
 Asphalt was lonely, field testing to,
 As for concrete, it almost ended up taboo,

The Scotts daughter Phillipa spoke language that was plain when she took the stand,
 Peeking over the lecturn, pen glued to hand,
 Photos were chosen because they were liked,
 Maps she showed, where her colleague had once biked,

Graeme informed of qualifications, in googling he found the technicians history,
 Gold mining was a kick start to the craft of ore extraction, the back story no longer a mystery,
 Then came the panel,
 Stuart minus the lollipop finally got his slide,
 With laser pointing, he launched us on the qualification ride,

Infratrain from the Bombays north,
 Jim Kelly was he who stepped forth,
 We're here to help Jim did say,
 And now here are the fees you'll have to pay,

Q & A was had without the NZ,
 This Graeme, once again led,
 One question came, two parts to learn,
 Jim stood to answer, 3 parts, his return,
 We learned as minutes passed on the clock,
 That even in Australia, a rock is a rock,
 In a comment from the floor retirement was mooted,
 The industry to the young was becoming more suited,

Bellies full of fodder, into the Annual General Meeting the hard core went,
 Paul Burton thanked the old and the new, and compliments to beautiful secretaries he also sent,

Working reports from Jenny, Jayden and Stuart,
 STOP PRESS; Bridget is bi-functional and Wayne never knew it!,

The Bearsleys boy Sean was up before the break,
 Sense of interlaboratory precision trials, he did make,
 Cool visuals he used as a tool,
 I liked the arrows on the target, they were cool,
 He lost me with the hectpascals & the ISO 5725 part 4
 It was a about this point my brain began to feel sore,

Then about measuring air voids in a compacted asphalt sample from Gary Bently we heard,
 The air voids of said brain meant I only understood approximately every 3rd word,

Matata even with a council consent was not where you wanted to build your abode,
Of this Annette made us aware,
Essentially her MSc thesis she did share,

The LWD with its dual loadings, Bluetooth & real nice set of wheels, Dynatest has got,
Lean concrete stiffness evolutionary theory, Darwinism, it was not,

Stephen Wormald reckoned it's not empirical, it's analytical,
Not knowing what he was talking about I certainly couldn't be critical,

Dr Jan Lindsey reckons we could do some modeling, not of the fashion style though,
We're left hoping it'll be a while, before the next big blow,
Should it happen however we'll probably be sweet,
The Icelanders showed us, with hoses the flow of magma could be beat,

Max Cope gave us a warning, not of volcanoes, but of over simplification,
He did this by showing us a bloody long scientific mathematical equation,
You just take your Dynamics add your dead weight and subtract frictional force,
Then with Rd22 you end up with 3/5ths of bugger all, of course,

Benkelman and his beam test were put under review,
CETANZ politburo member Stuart Anderson presented a fact or two,
Wave theory it turns out is a major player & only kiwis do a correction of the bowl,
However correcting the bowl may actually be correcting the creep when looking at the whole,

Up stepped Graeme Duske, not for the first time,
Darcian behaviours, particle arrangement affecting pore sizes...it was a struggle to find a rhyme,

Whiney fussy Aucklanders & Hobsonvilites to Nasser Almesfer were a bit of a bain,
Compacted cow shit in abundance & crushed glass were his only source of small complain,

Keith Towl said for tools of uncertainty google MSL,
And he happened to use spreadsheets as well,

Saddest news of the day, relayed by Chris Ardouin after he rose from his seat,
There will no longer be massages available in Christchurch's Victoria Street,

Last but not least,
From the strongest man beast,
Taking the salt out of water,
Mike di Meglio wasn't able to say more than he oughta,

Finally... "Where to From Here?"
It was unanimous, the bar for a well deserved beer!

Quiz Answers:

- | | |
|----------------------------|---|
| 1) Tripoli | 6) Burma |
| 2) 1976 & The Evening Post | 7) Mark Brooke Cowden |
| 3) 6 | 8) Mach 1 |
| 4) Theodore Roosevelt | 9) Elver |
| 5) Nitrogen | 10) Mark Carter, Matthew Ridge, Marc Ellis, John Kirwan, Frano Botica |

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