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CETANZ
Civil Engineering Testing Association of New Zealand

CETANewZ

The official newsletter of the Civil Engineering Testing association of NZ

Issue 018, May 2013

In this issue...

"As many of you will remember, CETANZ has previously made submissions on the review of the structure of Standards New Zealand."

From the Chair...

Welcome to the May issue of CETANewZ. The dry weather in the north is finally starting to give way to a bit more of the wet as we head towards winter. Hopefully, this will allow for a brief reprieve for those busy with the tail end of the summer earthworks and roading activity. I hear it's getting cooler in the south and for all of us it's been a busy time, not least the working groups and the management committee here at CETANZ. We have been busy behind the scenes working on a number of issues.

As many of you will remember, CETANZ has previously made submissions on the review of the structure of Standards New Zealand. Now the Ministry of Business, Innovation & Employment (MBIE) has released a second document named "Proposals to enhance the delivery of standards by New Zealand's national standards body". In this document MBIE outline a set of proposals that are designed to better utilise the national standards system.

The proposals cover multiple options within the following main areas:

- MBIE absorbing the National Standards Board
- Allowing other organisations to develop standards
- Changing the national standards' institutional set up.

The CETANZ committee has considered all the options and ideas detailed in the proposal. In summary we believe the core issue is not addressed, in that industry shouldn't bear the burden of funding for creation or review of standards. Standards benefit New Zealand and therefore central government should take on more of this responsibility

Contact me if you would like to view our submission.

Other areas of note where we've been busy:

- Getting involved in the joint Australian/New Zealand standards committee CE006 for AS2891 Methods of sampling and testing asphalt. Simeon Hall from Road Science has volunteered to represent CETANZ.
- Organising the next conference: The Careers and Events working group will be announcing details for the 2014 conference very shortly!
-
- Getting ready for our next annual AGM is coming up on the 23rd of August. You will be receiving notification soon, all CETANZ members are invited.

From the Chair Continued...

If you would like to know more, or you want to get involved, feel free to get in touch anytime. Contact us here at info@cetanz.org.nz.

On a personal note I'd like to thank all those that devote their time and effort to the CETANZ cause. Those individuals and their companies that release them and allow the good work to continue deserve a big thanks.
We couldn't do it without you.

I hope you enjoy this issue and take away something new.

Jayden Ellis

Chair - CETANZ

Laboratory & Industrial Technologies

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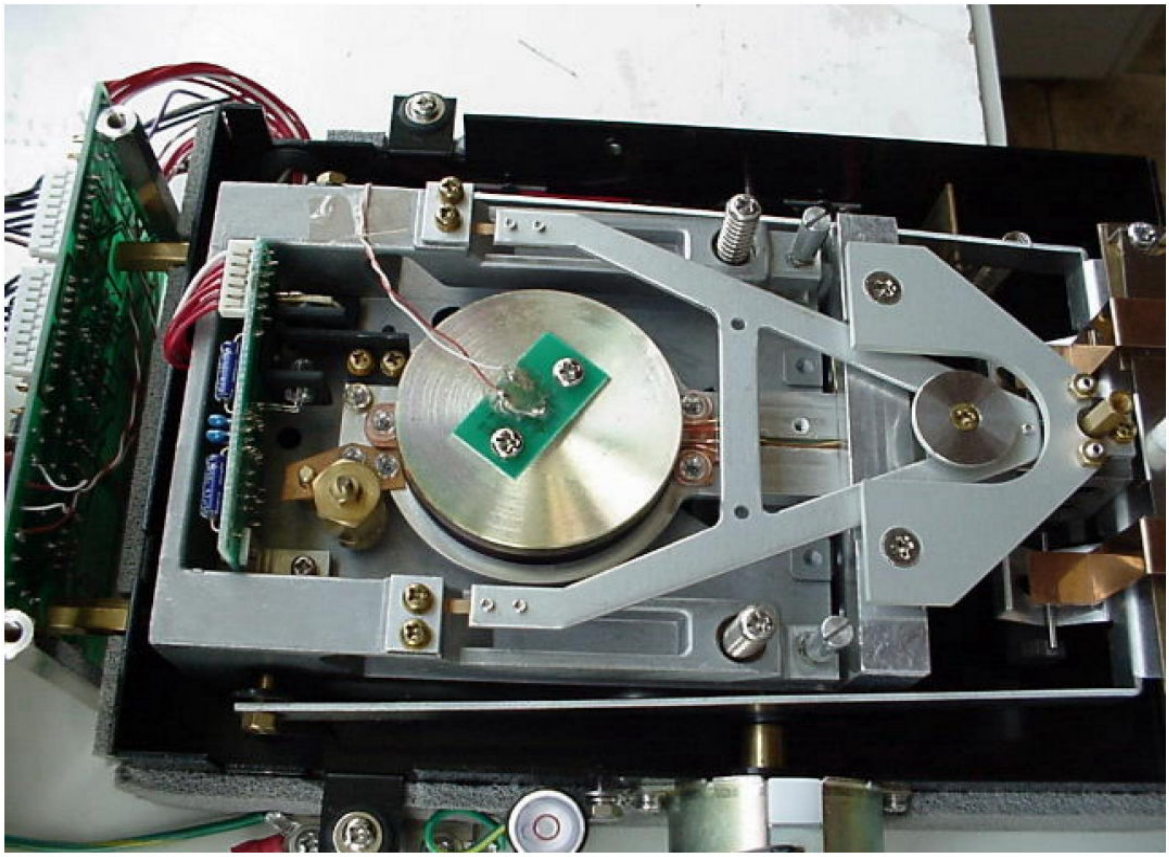

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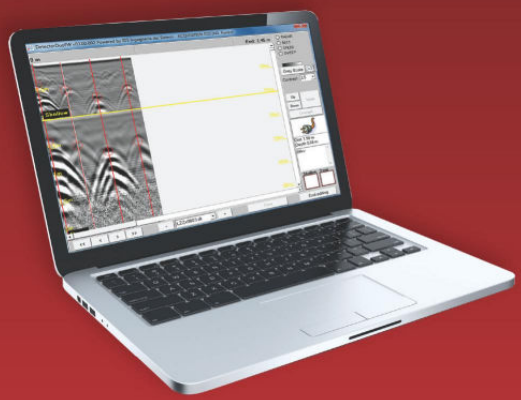

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National Certificates For Civil Engineering Laboratory Technicians

Fulton Hogan Profiles

Chapa Jayalath is the research and development supervisor at Fulton Hogan. She recently completed the national certificate in infrastructure civil engineering (senior laboratory technician) level 5.

I started as a laboratory technician at Fulton Hogan Auckland laboratory 5½ years ago. When I came into this industry I had previous work experience in a chemical/biological laboratory environment but was unfamiliar with civil laboratory testing. It is only when you work in the industry you realise how much research and quality control testing goes into building roads!
I have been learning on the job and been specialising in bitumen and emulsion testing. I have been very lucky to learn from Irina and Glynn Holleran, my managers as they have a vast knowledge in this field. This qualification gave me a chance to put my knowledge to the test so to speak and gain recognition.

The Senior Laboratory Technician qualification covers theory as well as practical areas in the laboratory. You need to have a very good detailed understanding of tests and the underpinning theory behind it. You need to be able to understand the meaning of test results and how they relate to field and explain, evaluate and trouble-shoot laboratory tests. This is very important as sometimes non-standard test conditions need to be used as part of research and development testing.
This qualification also gave me a chance to delve into details of quality managements systems that are in place.

Achieving this qualification requires commitment. I think the hardest thing for me was finding time to sit and study. Eric Paton, our laboratory manager was immensely helpful letting me bounce ideas off him and donating his time on weekends. It was hard work but I'm glad I put in the time and completed it.

Fred Perese: At the age of 16, straight after high school I went through a company called Caetmax for a couple of weeks and from there they introduced me to Fulton Hogan which was where I was offered a job to be a lab technician.

Being young and having no knowledge of civil engineering lab work, I learnt as I worked from all the other technicians through the years but I have always been keen to be qualified in what I do so I gladly took the opportunity when I was offered this qualification. So I have been a lab technician for the past 4 and a half years and in that time I've tested in the areas of aggregates, asphalt, bitumen, concrete and soils but for the past 2 years I've been based in working on asphalt mix designs. Even though I have done bitumen testing numerous times throughout the years I would have to say that the qualification helped me a lot in terms of looking at the binder tests in depth which gave me a better understanding of the purpose for each test and showed me how critical each step is from the calibration of equipment to the reporting of the result).

I found it challenging to strap myself down to complete this qualification as the last time I did any form of study was in high school years ago but with help and motivation from my lab manager and colleagues I was able to complete it. I am considering on doing the asphalt strand in this qualification in the near future.

Technical Group
Update from CETANZ

UPDATE May 2013

Proficiency Program

Schemes underway

Category	Test	Volunteer Laboratories
Aggregate	Clay Index	Winstone & Stevenson - **DONE**
Aggregate	ASTM Density and Absorption	Fulton Hogan Nelson - **DONE**
Soil	Standard Compaction & Triaxial Perm Solid Density	Stevenson & OPUS
Concrete	Compression & Density Tests	Holcim & Stevenson – Jayden
Field	NDM	Stevenson (North Island) - Jayden
Asphalt	Binder Content Grading	City Care / Bitumen and P – Toni & Steve M
Asphalt	ServoPac	Downer – Frank - **STARTED**

Proficiency Program Update

•Weathering Quality Index Report is completed and will be placed on website.
•Sand Equivalent Proficiency Report is completed. Will be placed on the website.
•PSV proficiency report – Almost completed.
•Clay Index data collection completed. Results Distributed to participants.
• Standard compaction proficiency to be extended to Triaxial Perm as material preparation is the same.

TNZ T/1 Review

The final CETANZ draft of TNZ T/1 has been handed to National Technical Pavement Group (NPTG) for last comments.

The 1st draft of the Guideline for Benkelman Beam Measurement of Deflection has also been handed to the NPTG for comment.

Roading Testing Standards Steering Group (RTSSG)

•NZS 4407 draft is completed
•SNZ have reviewed and provided a price to tidy up and publish. ~$50K
•We are now waiting to hear from NZTA if they will help fund. NZTA is currently including in budget discussions.
•Jayden is waiting to hear back from CCANZ and AQA regarding NZS 3111, 3121, 3112 proposal. CETANZ has committed to funding $10K in total towards the review.

IANZ /PPAC Report

•Working on IANZ investigation into changing the way signatory status is awarded in NZ. IANZ is looking at the Australian model where the Laboratory awards Signatory and supplies evidence at audit time. IANZ's Report is due out by end of the year.

Accreditation and Reporting of Derived Assumed and Subsequent Data.

•Technical Group has discussed the endorsement of results calculated and/or derived from test results (e.g. inferred CBR, % Air Voids from assumed Solid Density etc.).

We are working with IANZ to form a list of which values should or shouldn't be accredited.

NZTA T/19.

•IANZ to report back to NPTG regarding areas of concern with wording etc.

NDM Guideline

•Technical Group is looking at feasibility and need for NDM guideline/best practise note.

NZTA – PSV request

•Technical Group to discussed request from NZTA in regards to placement of stone on PSV shoe during test. They believe that aggregate particles do not orientate the same way in the road as the PSV method is asking us too do. Especially for Slag and Rounded River Aggregate….i.e. getting lower PSV results than expected. 40 v's what they think they should get …60.

At this stage we would need to see further evidence of this via research or current trials that are taking place, before we would commit to providing any support or technical guidance.

Proficiency Analysis Training for CETANZ members?

•The Technical Group is looking at approaching several suppliers of statistical analysis services to run training here in NZ.

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Asphalt Mix Design in New Zealand

Steve McCone

Introduction: World wide there are many options for asphalt mix design. This will cover what is being used in this country. The major asphalt designs fall into two groups.

Marshall Asphalt Mix Design. Up until the late 1990's this was the key mix design method. These are generally specification based mixes covered by the NZTA specifications. Mix types such as Mix10 Mix15, Mix20, Mix40, Stone Mastic Asphalt, and Open Graded Mixes. Part 1 will be a very brief summary of the basics of Marshall design from a technicians prospective.
APRG18 Selection and design of asphalt. An Australian/NZ design methodology. This is based on the USA superpave/sharp model, and is based on using performance tests to model the asphalt behavior on the road. It is used in conjunction with the National Asphalt Specification (NAS). Gyratory compaction, (with some Marshall) this will be covered in part 2.

Marshall Asphalt mix Design.
History. Developed in Mississippi Highway Dept. in 1939, and refined by the US Army Core of engineers during WW2. The US Corp of Army Engineers needed a system that was rapid, used compact equipment and required a minimal effort. It is still the most commonly used design method world wide.
New Zealand Use: Marshall mix designs are still common in NZ, with APRG18 designs now being used for structural asphalt and for roads designated as "heavy" or "very heavy" by NAS. Marshall is used for mixes under specs TNZM10, P11, P23 etc. It can be used for structural asphalt, airports, ports etc. The majority of asphalt is designed to "Asphalt Institute MS-2 Mix Design Methods" This method has over 70 year of history in this country..
Overview. Asphalt design utilizes many individual test methods. Historically since the origins are US we use ASTM methods. It follows logical steps.

1.Aggregate selection. The minimum physical properties are covered by the NZTA specs. Generally all course aggregate must meet TNZ M6. This involves; testing Crushing Resistance, Weathering Index, Polished Stone Value, Cleanness, Sand Equivalent, Clay Index, Density/Water Absorption, Broken Faces, and Grading. Test methods are NZS4407 with Density/water Absorption to ASTM.

2. Binder selection. Traditionally binder (bitumen) in New Zealand until the 1990's was supplied from Marsden Point, covered under the M1 spec. Bitumen is separated into different categories, based on the penetration (ASTM D5, measured in 10^{th}'s of a mm) The main categories for asphalt are, 40/50, 60/70 and 80/100. With 80/100 used for normal traffic conditions and 60/70 and 40/40 selected to heavy traffic/stress conditions.

3.Aggregate blend. The aggregate blend depends on use. The general rule is the larger the aggregate the stronger the mix eg. Mix20 and Mix40 are generally structural mixes. This is balanced against the cost since depth tends to be 2.5 times the greatest stone size. Individual aggregates are dry blended to be within the control limits in M10 (or to a contract specification).

4 Sample preparation. With the aggregate pre-blended. Five different binder content points are selected. These are normally 0.5% apart, e.g. 5.0, 5.5, 6.0, 6.5, 7.0%. These are compacted with a Marshall Hammer Fig 1, with a standardized force eg 75 blows per side. Briquettes are made at each point, in replicates of three. Total of 15. Also at each point a sample is tested for Maximum Theoretical Specific Gravity, (the zero air voids value). As well as accurate blending, temperature is critical. The Asphalt Institute guide lines are based on bitumen viscosity, with 170 ±20 centistokes mixing and 280 ±20 centistokes for compaction. These are tested be the kinematic viscosity test.

Fig 1. Marshall Compaction Equipment

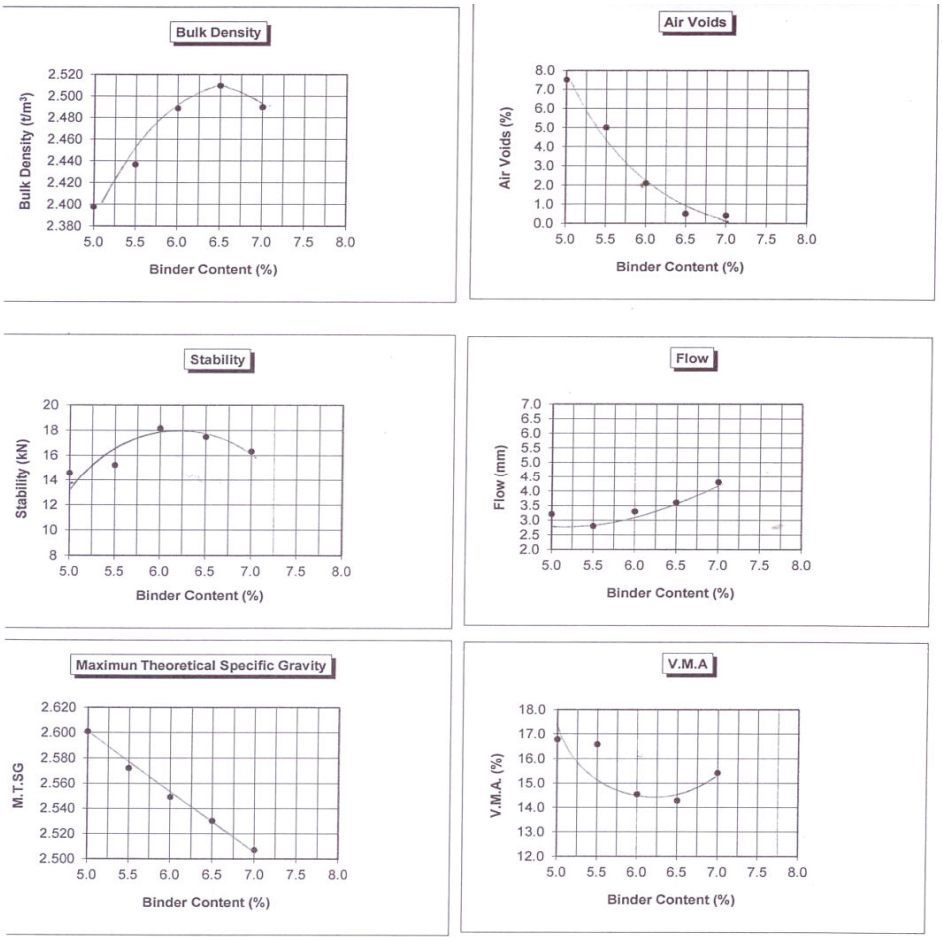
5. Marshall Testing. The five points are tested for; bulk specific gravity, theoretical maximum specific gravity, Marshall stability and flow.

Fig 2. Marshall Breaking Equipment

6.Volumetric Properties of Asphalt. From the tests in step 5, there are several calculations. All based on the asphalt volumes. These are; air voids (%), Voids in mineral aggregate(%), voids filled with binder (%). These are plotted with stability, flow and maximum specific gravity against the percentage binder addition.

7. Selection of optimum binder. The optimum binder depends on the specification and its function. As a general rule there is a minimum stability, a range for flow (e.g. 3-4mm), a range for air voids (e.g. 3-5%). There needs to be enough binder to coat the stones, to give the mix durability and resistance to water stripping.

Fig 3. Typical plots for Marshall Mix Design



Suggested Reading: Asphalt Institute "Mix design methods"
Shell Bitumen "The bitumen handbook"

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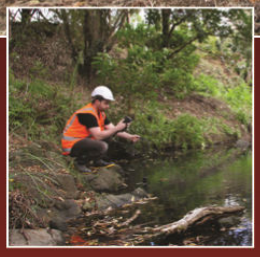

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