



VCMLA Newsletter

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New Soil Testing Brochure Complete

The VCMLA has recently sent out copies of a new brochure developed to promote our industry. It provides basic information about a career in geotechnical testing and the diverse range of industry sectors a technician may develop their career. If you or your organization did not receive any of the complimentary brochures, please contact a member of the association or send me an email (ernie@groundscience.com.au) and I will be happy to send some your way. The idea is that you are able to promote your business to local schools and attract local staff by leaving some of the brochures with career teachers. There is a position on the back page to place your company details. If your company holds a promotional stand at a conference, feel free to include them on your stand. We would be please to provide more copies on request.

*Promote your company –
promote your association
VCMLA*



Message from the president

If you would like to drop me a line or a topic you would like discussed send it to email: president@vcmla.asn.au
Regards

Ernie Gnabling

Not happy with a test method - contact your representative or one of the members on the CE009 committee.

CBR testing – A controversial test.

TEST IN DISCUSSION

(If you would like to raise an issue on a test why not drop us a line)

The CBR test is one of the most common performed tests in soils laboratories. It has an MU that makes the test seem dangerous to say the least. Dangerous in that it could be a lawyer's paradise, if it came to two labs with very different answers in a dispute. Who is correct? Or rather whose answer is more accurate in simulating what is occurring in the field. This is a topic that would be great to discuss in a conference, which I am sure would be hotly debated. In this article I would like to raise one aspect of the test.

Soaking of the specimen

The Australian Standard test method stipulates that the base plate and swell plate have a set number of holes and the hole diameters are to be 3mm diameter. During my many NATA assessments I have seen equipment that has differing numbers of holes and hole diameter less than 3mm. I have also seen many with the holes blocked with soil.

1. How much influence does this have on the test?
2. Why do we soak the specimens under water?
3. How do we know four days has replicated what is occurring in the field.

My opinion on soaking is based on 25 years of performing the test and establishing a mental database of how soils behave in the re-moulding process and the eventual CBR value. Everyone working in a lab performing these tests should be doing the same. A good technician should be able to look at and feel a soil and estimate the CBR value with relatively good accuracy. What is the point of this, well as we all know CBR proficiency testing has shown us that a wide range of tests results can be achieved on the same sample but which is correct? As a NATA signatory you have to look at the result, the material, its MDD, its OMC and make an assessment is this answer correct. This mental data base on how materials should behave comes into play at this stage.

What I have notice over the years is that the test method AS1289 6.1.1 does not reflect a true result when testing soil types of high plasticity and more precisely Basaltic Clays soils. It is common knowledge that these soils are very low load bearing materials when fully saturated, yet it is common to obtain CBR values higher than what the signatory expects the soil will behave and is questioned by the designing engineer. CBR values of 5 and above are often questioned, yet values of 8, 9 or even 10 occur. Where is the error, if we understand these sorts of numbers should not occur? It must be the soaking process if all other specifications have been met. We appreciate that the test method has been followed but it is the method itself that has failed the true value. We appreciate basaltic soil have high plasticity characteristic and are great for building dams to retain water, so it goes to show that the four days of soaking is only going to allow minimal water ingress. Permeability testing supports this fact with values in excess of 1x 10⁻¹¹m/sec. If a basaltic soil is kept dry it has very high load bearing characteristic, but if it is allowed to soak for an extended period the soils will become extremely soft and weak. It stands to reason that soaked CBR testing of soils of high plasticity need to be soaked for periods longer than 4 days to provide the designer a true load bearing value of these soil types. Soaking periods of at least 7 days should be adopted for soils that fall into this category. At the opposite end of the scale materials such as sands or free draining gravels do not need to be soaked for four days. The saturation rate on these soils most probably occurs within hours but it is blends and materials variations that could cause further disputes if very short soaking period s are adopted. I would like to see these sorts of materials only soaked for two days instead of the standard four days, providing a particle size distribution test has been performed and the percentage passing the 75um sieve is less than 10%. What are your thoughts?

The information contained in this article is the opinion of the author and not those of the VCMLA. - Regards **Ernie Gmehling**

Did You Know

The **Atterberg limits** are a basic measure of the nature of a fine-grained soil. Depending on the water content of the soil, it may appear in four states: solid, semi-solid, plastic and liquid. In each state the consistency and behavior of a soil is different and thus so are its engineering properties. Thus, the boundary between each state can be defined based on a change in the soil's behavior. The Atterberg limits can be used to distinguish between silt and clay, and it can distinguish between different types of silts and clays. These limits were created by Albert Atterberg, a Swedish chemist.^[1] They were later refined by Arthur Casagrande. **Albert Mauritz Atterberg** (March 19, 1846–April 4, 1916) was a Swedish chemist and agricultural scientist who created the Atterberg limits that are commonly referred to by geotechnical engineers and engineering geologists today.

Atterberg received his PhD in chemistry from Uppsala University in 1872 and stayed there as a lecturer in analytical chemistry until 1877, during which time he toured Sweden and abroad to study the latest developments in organic chemistry. He then went on to become the principal of the Chemical Station and Seed Control Institute at Kalmar, publishing numerous papers on agricultural research dealing with the classification of varieties of oats and corn between 1891 and 1900.

It was towards the age of fifty-four that Atterberg, while continuing his work on chemistry, began to focus his efforts on the classification and plasticity of soils, of which he is most remembered for. Atterberg was apparently the first to suggest the limit <0.002mm as a classification for clay particles. He found that plasticity to be a particular characteristic of clay and as a result of his investigations arrived at the consistency limits which bear his name today. He also conducted studies aiming to identify the specific minerals that give a clayey soil its plastic nature.

Atterberg's work on soil classification gained formal recognition from the International Society of Soil Science in a Berlin Conference in 1913. Two years later a U.S. Bureau of Standards report stated that Atterberg's method was as "as simple a one as could be devised, and...it is well that we should become familiar with it." The U.S. Bureau of Chemistry and Soils adopted it in 1937.

The importance of Atterberg's work has never been fully realized in his own field of agricultural science, nor in other subjects concerned with clays, such as ceramics. Its introduction to the field of geotechnical engineering was due to Karl von Terzaghi, who came to realise its importance at a relatively early stage of his research. Terzaghi's assistant, Arthur Casagrande, standardized the tests in his paper in 1932 and the procedures have been followed worldwide ever since.

Liquidity index

The liquidity index (LI) is used for scaling the natural water content of a soil sample to the limits. It can be calculated as a ratio of difference between natural water content, plastic limit, and plasticity index: $LI = (W - PL) / (LL - PL)$ where W is the natural water content.

Activity

The activity (A) of a soil is the PI divided by the percent of clay-sized particles present. Different types of clays have different specific surface areas which controls how much wetting is required to move a soil from one phase to another such as across the liquid limit or the plastic limit. From the activity one can predict the dominant clay type present in a soil sample. High activity signifies large volume change when wetted and large shrinkage when dried. Soil with high activity are very reactive chemically.

Normally, activity of clay is between 0.75 and 1.25. It is assumed that the plasticity index is approximately equal to the clay fraction ($A = 1$). When A is less than 0.75, it is considered inactive. When it is greater than 1.25, it is considered active.

VCMLA Committee drawing board.

Your committee

Ernie Gmehling – chairman
 Dom Meadley – Secretary
 Malcom Talbot – Treasurer
 Geoff Hughes – committee member
 Tom Seymour – committee member

We are trying to piece together the history of Soil mechanics in Victoria. Who were the technicians in the early days, what contributions were made by our predecessors, how can we recognize their efforts. If you have any information from your company's history we would be please to hear from you.

Calibration of test sieves – only five members have made use of them – book your turn

As most of you are aware the VCMLA purchased a set of fine sieves (0.075 – 2.36mm) for use as a master set to perform calibrations. These sieves are available for hire for the cost of \$30 per use. If you wish to borrow them you need to contact Ernie Gmehling at Ground Science on 9464 4617 and make a booking. The hire is for one week only and the sieves must be collected from Thomastown and returned. The hire includes a jar of glass beads ranging in size from 0.075 – 0.85mm, a container of pea gravel, a copy of the sieves certificates and the sieve check forms which need to be completed on collection and return.

Education options – Certificate iii in Laboratory Operations

Ground Science has taken the step along with other organizations to provide their staff with the opportunity to obtain recognition of prior learn towards a certificate iii and or iv in laboratory operations. Several new starters have also enrolled in the trainee /apprenticeship training program which provides financial support to the employer and a qualification to the staff. The course is run by many RTO's with Swinburne elected as our nominated Registered Training Organization. The start up process and paperwork is a bit of a mine field but once you get through the process it's onto the training. It's not your typical training process of going to a school class but a mix of on the job training, text book modules and some class work. If you're interested in furthering your education talk to your laboratory manager or contact the VCMLA for further details.



Go No Go Gauges – calibration of plate test

The VCMLA has acquired a set of coarse plate sieve calibration gauges (4.75 – 60mm) commonly referred to as Go No Go gauges. You select the sieve size you wish to check and you direct the appropriate metal gauge into the required sieve slots. When you place the gauge into the slot it must fall within the limits. (each gauge is tapered from say 18.0mm to 19.0mm) This allows you to perform the operation relatively quickly instead of having to measure the slot with a vernier. All you need to do is set up a check sheet and mark off that the appropriate number of slots was found to comply.

There are a range of sizes on a holder which you separate out for use as required.

These are available for hire from the VCMLA for \$20.00 Ideally you can hire the reference sieves and the Go No Go gauges together for \$50.00. Please make cheques payable to VCMLA and bring your payment at the time of collection.

Contact Ernie Gmehling 0401 924 205

News from NATA

1. NATA Staff - Our Melbourne office now has seven staff members involved in the Construction Materials Testing field. Bettina Poxleitner is the Field Manager, Karen Moore and Mark Schembri are Regional Coordinators with Karen looking after Victoria. Dom Meadley is Technical Consultant/Senior Scientific Officer, Sarah Rodgers is Senior Scientific Officer and Jason Vaughan is our newest staff member as Scientific Officer. Sophie Droutsas is administrative support.

2. New Australian Standard AS 5101 for stabilized soils.

AS 5101 2.2 replaces AS 1141 3.3

AS 5101 3.3 replaces AS 1141 72

Laboratories accredited for the above AS 1141 test methods will need to have their scopes of accreditation changed by a desk-top variation before test results for the new methods can be included on endorsed reports.

Any affected laboratory will need to submit a copy of the front sheet of the method and a copy of the proposed test report in order for accreditation of the AS 5101 methods to be considered.

3. Surveillance Visits

Some laboratories will have been involved in a new surveillance visit in the last few months.

NATA intends to visit each laboratory every 18 months to assess their compliance with its requirements. A reassessment visit will be conducted every three years with a surveillance visit conducted in between.

At the surveillance visit, a full review of the quality system and its implementation will be carried out but there will be no technical assessment of the performance of tests. Many technical aspects will still be assessed at the surveillance visit such as records for training, environment, proficiency testing, equipment calibrations and reporting.

At the reassessment, the NATA team (lead assessor and technical assessor) will concentrate on the technical requirements but will also look at how the quality system is implemented, e.g. internal audits, management reviews and document control.

It is important to note that the purpose of a reassessment visit is to assess the laboratory's current scope of accreditation. Requests for additional tests and/or additional signatories may be considered if they do not interfere with the reassessment process. Otherwise a separate chargeable variation visit can be arranged.

At a surveillance visit, requests for additional tests and/or signatories will not be considered. However, where these are necessary, every attempt will be made to include these as a separate **chargeable** variation visit on the day of the surveillance or the day after.

4. Assuring the Quality of Testing

You will have noticed the new NATA Technical Circular #8 which covers Proficiency Testing and Assuring the Quality of Testing in Construction Materials Testing.

This circular should assist you in preparing your plan for proficiency testing and other programs for assuring the quality of testing.

NATA no longer provides proficiency testing services, although its subsidiary PTA will continue to provide these services in competition with other proficiency testing providers.

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