



Australasian Chapter

Newsletter

IECA (Australasia) Presidents Report.

Michael Frankcombe



I recently attended the IECA EC08 conference and trade expo in Orlando in the USA. The primary purpose of the trip was to undertake a review of the Certified Professional in Erosion and Sediment Control (CPESC)

program in our region (region 10) with Envirocert International (previously CPESC Inc).

In the months before the conference Rick Morse and I developed a proposal for submission to Envirocert International to allow modification of the CPESC program to make it more relevant for our region. Fortunately all of our recommendations were accepted and they will be adopted from 1 April 2008. Key aspects of the changes include:

- Review of all applications in Australia including referee checks;
- A single application fee in Australian dollars;
- A fee structure that reflects the true cost of program administration;

- The adoption of a “take home” exam instead of the multiple choice Part II exam. The take home exam will involve the preparation of an Erosion and Sediment Control Plan that reflects relevant state and industry standards; and
- Changing the “In Training” status to “Associate”.

The revised applications forms can be obtained from the Chapter Office. Contact details can be found on the back of the Newsletter. They will be available on our web site in due course.

We are also considering bringing the Certified Erosion, Sediment and Storm Water Inspector (CESSWI) program to our region. The CESSWI program is aimed at persons involved in the inspection of on ground erosion, sediment and storm water works at the site level. I'm keen to hear your feedback if you think this program is relevant to our region. Personally I consider it very relevant as currently there are a number of local governments trying to implement their own inspector programs.

Michael Frankcombe
IECA (Australasia) President.

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Emerald Members



IECA Names International Associate Editor for *Environmental Connection* Magazine

Steamboat Springs, CO—In an effort to facilitate the dissemination of erosion control information from around the world, the International Erosion Control Association has selected Rick Morse, CPESC from Picton, New South Wales, Australia to serve as International Associate Editor for the association's members-only publication, *Environmental Connection*.

In his new role, Morse is responsible for obtaining manuscripts discussing a topic or application implemented outside North America. Morse will then send the manuscript through the peer-review process and work with the author to make any necessary revisions.

“I see the project as a very important step in broadening IECA's erosion and sediment control technology base from one that serves North American members very well, to one that helps all our members and, through this, fosters further development of the technologies promoted in North America,” said Morse. “It is a win-win situation—the entire membership will benefit.”

For this section of *Environmental Connection* Morse is seeking articles that are practical and clearly demonstrate how soil erosion or sediment pollution is controlled. Morse will require that articles be explicit so that others can fully understand the processes used. This is so others, if nec-

essary, can replicate the project under different conditions.

“While many of the basic parameters that underpin our technology are the same, their outworking can be very different, depending on local soils, climate, facilities, services and socioeconomic structures. We can all learn by listening and sharing with each other, providing we can think laterally,” said Morse.

Once reviewed by Morse, the articles will then undergo a double-blind, peer-review process that ensures all technical material printed in *Environmental Connection* meets IECA's standards of accuracy, quality and that the article is non-commercial.

“My experience is that practitioners from countries outside North America have so much to contribute to the industry, but they need a forum for sharing their ideas to see these thoughts bud and, eventually bear fruit. *Environmental Connection* can play a very important role in this,” Morse said.

Anyone interested in submitting an article to *Environmental Connection* should visit IECA's Web site at <http://www.ieca.org/membership/getinvolved/newstouse/authorinstructions.asp> for information and guidelines.

International Erosion Control Conference, New Plymouth, NZ, 2007, Key Note Paper

THE SOIL SCIENTIST - A THREATENED SPECIES

Bill Gardyne, Oxbow Consulting

ABSTRACT

Historically, the soil scientist was valued as a key resource by the agricultural industry. However with the broad-scale mapping of soils completed, there seemed to be a government perception that their services were no longer required. In New Zealand funding for soils research was simply stopped, whilst in Australia, as our soil scientists reach retirement age, their positions are not renewed. Unfortunately, the fine-scale of human activity makes much of their earlier mapping unhelpful as a management tool, even at the farm scale.

The earthworks component of construction projects are generally led by engineers with an emphasis on the geotechnical qualities of soils, and the landscaping by landscape architects who are focused on what grows natively in that area. Often there is little communication between each, and key information is missed by both professions.

The preparation and execution of a well-managed erosion and sediment control programme is a multi-disciplined affair, with the soil scientist potentially having critical input to the engineering design, construction methodology, and landscape treatment.

Without such consideration, the project cost and outcomes are likely to be significantly compromised. This paper discusses some of the author's experiences where input from a soil scientists could have significantly alleviated costs and/or environmental impacts.



Testing is required to most cost-effectively grow crops, even if it is only grass.

1. AGRICULTURE

Historically, good farmers, *i.e.* those wanting to optimise their crop returns by minimising inputs and reducing waste and pollutants, would engage a soil scientist, often in conjunction with an agronomist, to advise on crop choice and soil amelioration (mostly fertilisers) to optimise crop production.

Earthworks projects generally have a 'crop' component through short-term erosion control by grasses, or long-term through the final landscaping design. Both of these can certainly be optimised by expert knowledge, particularly if supplemented with appropriate site-specific soils testing. Whilst New Zealand may have a reputation for 'bottomless' soils of great productivity, a consequence of its geological youth, Australia has some of the oldest soils on the planet exhibiting problems from both lack (nutrients), and excess (salts), and decades of mismanagement. Whilst one might respond differently – one being Mother Earth and the other Great-Grandmother Earth – in either instance, when one is wanting to grow things optimally, it would be rare to find a situation when \$100/test plus professional interpretation is not cost-effective.

2. ACID SULFATE SOILS

More than 60% of coastal floodplain wetlands in NSW have been drained for agricultural and urban development over the last 120 years to convert wet swampy lands into productive agricultural land, and to mitigate the adverse effects of major floods on property. Floodplain drainage has increased the rate that both surface waters and ground waters enter coastal estuaries, and consequently the aeration of sulfidic marine sediments that underlie large areas of these coastal floodplains. These increased oxidation and mobility of stored acidity is having adverse impacts on estuarine ecology, infrastructure and agriculture.



Treating acid sulfate soils with lime prior to use as a construction material.

The impacts of drainage from floodplain backswamps with acid sulfate soils were recognised by the community soon after drainage was introduced. Reports of alum affected land were made in newspaper and government reports in the 1920s. Soil scientist Pat Walker recognised the presence of 'catclays' in northern NSW at Grafton and Kempsey in the early 1960s. He warned that excessive drainage could lead to "undue soil aeration" which would aggravate the acidic conditions in the swamps. However this warning was not recognised by the broader community for nearly 25 years.

Whilst the presence ASS has been recognised by individual farmers and soil scientists for decades, major community concern about the impact of ASS drainage only developed in Australia after a large fish kill on the Tweed River in 1987. This event initiated a process of community capacity building which has resulted in significant changes in how ASS are managed.

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FOUNDATION MEMBERS:



Whilst procedures have now been formalised in NSW and Qld, advanced knowledge of potential liming rates (sometimes more than 300kg/m³) may alter the design to avoid rather than treat such soils. As more research is performed, we are becoming aware of the complexity of the chemistry associated with these soils, and our current simplistic approach to them. (Freeman Cook, CSIRO *pers. comm.*)

3. MINING

The addition of one chemical will lead to changes in chemical ratios, and when viewing in an holistic environment, one benefit can have another dis-benefits. For example, adding lime to neutralise mine rock waste will reduce the availability of aluminium and its consequent toxicity, but will then have a reduced floccing effect in water from that aluminium with a consequent increase in suspended solids leaving the site. Perhaps it would be better to treat the water prior to leaving the site.

4. EARTHWORKS PROJECTS

The biggest bang-for-bucks is definitely associated with major earthworks projects where there is significant cut-to-fill. The attitude on such projects is that 'all soil is good soil but some is better than others', this being based on geotechnical characteristics. Unfortunately, as the knowledge of soils enters a wider professional arena, other considerations are coming to the fore. Acid rock is now being exposed as we cut through, rather than go over, landscapes. This is creating problems for the landscapers as they find that neither seed nor plants inserted into this environment flourish, if indeed they grow at all.

4.1 Acid soils and acid rock

Recently a 'signature' road project cut through a hill of what was thought to be rock. It was designed and constructed on this premise and has steep sides as this reduces the cost (less spoil). However, once completed, the observation was made that it was not hard rock, but material in various stages of weathering, and was both dispersive and acidic. Leaving it exposed is not an option because of aesthetics and its lack of stability in the long-term. Given the steepness and depth of the cut ameliorating this area is expensive, and a final treatment is still to be determined. Had the right questions been asked during the design phase, this situation could have been avoided. Other projects have been plagued by poor landscaping results, some where the same contractor has been successively involved.

4.2 Landscaping

The other significant aspect on earthworks projects is the expectation that plants will grow in subsoil, either as cut, or as highly compacted fill. This is in complete contrast to how one prepares soil in a vegetable patch, or occurs naturally in a forest. There is a need to consider the characteristics of the soil during the design phase and either be selective of soil type and/or placement, ameliorate, or change the species palate, to achieve the desired outcome. Treating and placing a suitable growing medium on the outer 1–2m of a fill batter is likely to be cost-effective, however the earthworks supervisor may take some convincing.

Hydro-seeding has become a common method of progressively treating large areas of completed earthworks. Often there is a generic specification which is expected to be effective in all situations. For example the NSW RTA has one specification for all of NSW. On one recent project, the results being achieved by such a specification were quite poor. The hydro-seed contractor obtained a soil test at his own cost and then requested a change to the specification, with no net change in his rate per square metre. The results were extraordinarily different as shown below.



LH photo shows hydro-seeding with specified mix. RH photo shows hydro-seeding with modified mix as a result of a soil test to reflect actual soil requirements.

sively, but often incompletely, as it requires observations after sitting over-night, and it is rarely supplemented with any other testing. The qualities of the water used in this test (if diverging from distilled water) can also significantly alter the outcome (*pers. obs.*).

Unfortunately, some specific soil characteristics makes this test invalid and on one recent major road project the dispersive nature of the soil was not recognised until a large rain event close to the completion of construction. This one event resulted in undercutting of the pavement, and piping from the verge to points 8m down the fill batter. The resultant turbidity in local watercourses prompted action by the environmental regulator, and a headache for the contractor. The soil was both sodic and saline. The sodicity caused it to have poor strength in the presence of water, and the salinity nullified the dispersion which would otherwise have been observed in the Emerson Crumb test. Also, the input of energy – remoulding in the case of the test, or working and compaction on a farm or earthworks site – can change the behaviour of the soil from one which appeared stable to one which is dispersive.

5.3 Dispersion

The Emerson Crumb was developed in Australia by Bill Emerson in the 1960s as a field test to indicate dispersivity of a soil. It is used extensively,

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International Erosion Control Association

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5. SOIL TESTS

Soils data is needed for design and construction. The minimum testing required for interpretation by a suitably qualified soil scientist are as follows:

- pH
- Electrical conductivity and Chloride
- Organic carbon, nitrogen / nitrate nitrogen, sulphur (C, N, S)
- Exchangeable acidic cations (H, Al)
- Exchangeable basic cations (Ca, Mg, K, Na)
- Cation exchange capacity (CEC)
- Plant available phosphorus and potassium (P, K)
- Micronutrients (Fe, Mn, Cu, Zn, B)
- Particle size analysis / field texture description

These should form part of the specification for any significant earthworks project. Testing should include samples of matched topsoil and subsoil samples.



Undermining of road as a consequence of an untreated sodic and saline soil.



Dispersive nature of a parent material which also has a pH of 3.5 making landscaping options limited.

6. CONCLUSIONS

Our soil scientists are disappearing rapidly from our smorgasbord of professionals and we need to recognise their past contributions, and both our current and future needs. New graduates are required to enter into this profession. This will only happen when we start asking the right questions and realise that we require them to answer those questions. If not . . .

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1 Peter Slavich, Christina Clay and John Williams. 2004. SuperSoil 2004: 3rd Australian New Zealand, Soils Conference, 5 – 9 December 2004, University of Sydney, Australia.

Published on CDROM. Website www.regional.org.au/au/asssi/1

President's Technical Tips.

Over the last 6 years Michael Frankcombe has written a Technical Tip for each Newsletter. These are a great reference source. The accompanying table lists the topics covered and the Newsletter in which they were printed. Past Newsletters can be found on the Chapter website.

Vol	Issue	Topic
8	#2 - Dec 2002	Bonded Fibre Matrix
9	#1 - April 2003	Update on Bonded Fibre Matrix
9	#2 - July 2003	Sediment Fences
9	#3 - December 2003	Erosion Control Blankets & Mats
10	#1 - April 2004	Sediment Basin
10	#2 - August 2004	Turf & Reinforced Turf
10	#3 - Dec 2004	Rock Filled Wire Baskets
11	#1 - April 2005	Hydro Mulch Tackifiers
11	#2 - Aug 2005	Composted Mulches
12	#1 - April 2006	Dispersive Soils.
12	#2 - Aug 2006	Compost filled filter tubes
12	#3 - Dec 2006	Erosion Mats
13	#1 - April 2007	Check Dams
13	#2 - August 2007	Concrete Lined Channels