

Australasian Chapter

Newsletter

IECA (Australasia) Presidents Report.

Michael Frankcombe



IECA is about to undergo arguably it's most significant change since its inception back in 1971. IECA has always had its leadership and governance based in North America with various chapters primarily in the USA and to a lesser extent internationally.

tional Board and with a lot of hard work and unfailing determination has been successful in getting regionalisation to the table and ultimately to the membership for approval.

The regionalisation of IECA will be formally rolled out at the North American conference in February 2012. What this means is that IECA will split into two regions: Region One will consist of North America, Canada and Europe. Region 2 will consist of Australasia, South Africa, India and Malaysia. Additional countries will be added to the regions as new

(Continued on page 2)

Australasia was the first chapter established outside the USA. It was established by Rick Morse and Doug Wimble. Over time more international chapters have been established resulting in a more diverse membership but also leaving many of us questioning the relevance of our North American governance.

Doug, Rick and I have held director and leadership roles on the International Board and have raised the need for regionalisation for many years with limited success until now. Rick is currently a director on the Interna-

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2011 Mining Rehabilitation Conference
Cypress Lakes Resort, Hunter Valley, NSW, Australia



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www.gemsevents.com.au/ieca2011/

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chapters are established.

Each region will have a board of directors with board members sourced from each of the chapters. The role of the regions will be to support the development of existing chapters and the establishment of new chapters as well as ensuring an appropriate level of corporate governance.

In the past chapters have been required to submit part of their membership fees as 'dues' to North America to support the running of IECA and IECA events with primarily a North American focus. With regionalisation these fees will remain in the region and will be used to support the chapters and the running of region specific events.

The impact on our Chapter will be minimal as we are used to doing our own thing without assistance from North America. One advantage is that once every three years an Australasian conference will be a regional conference potentially giving us a greater diversity of speakers and topics.

In the short term the Australasian Board will be working hard with Rick Morse to set up Region Two. We will keep you informed of our progress as things develop. If you have any questions pertaining to regionalisation please get in touch with us.

Michael Frankcombe
President.
IECA (Australasia)



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Mining Rehabilitation Conference 2011



Unlike past IECA Australasia Conferences where we have been hampered by major external events such as September 11 and the demise of Ansett in 2001 and the GFC in 2009, the 2011 Conference went off without a major global hitch and was a great success.

The setting was just perfect for a Mining Rehabilitation Conference with an emphasis on erosion control. Cyprus Lakes Conference Centre is set in the picturesque Hunter Valley and all the accommodation is set on the side of a steep hill covered in native vegetation in order to keep the soil and buildings from moving down hill.

The conference started with 2 concurrent workshops, presented by John McCullah from Salix Applied Earth Care in the US and Michael Frankcombe, IECA Aust President. John covered Environmentally Sensitive Streambank and Channel Design and Michael covered the Fundamentals of Erosion and Sediment Control. Both courses were very well attended.

The evening was the first of the official networking occasions with the Welcome Cocktail Reception. Thanks must go to RRM for sponsoring this event. There was definitely a buzz in the room with colleagues catching up and also meeting new people with similar interests.

Tuesday morning saw the official opening of the Confer-

ence, Nigel Charnock from Xstrata the major sponsor to the Conference gave the opening address. Nigel was then followed by our 2 Keynote speakers for the day, Michael Frankcombe and Mike Cole. Mike Coles challenged the industry to build ecological corridors and believes the mining industry should be a significant partner in this. Michael Frankcombe asked the industry to stand up and be a leader and to challenge current thinking no matter the obstacles you make encounter.

After morning tea the subject of Sustainable Mine Land Form design was tackled by Rob Loch and Helen Squires. They agreed that it is a costly process and needs to be tailored to the site, though ultimately early planning and good rehabilitation saves money.

Did you know there could be 22 different specialist disciplines involved in the development of a sustainable erosion and sediment control plan for a project? Bill Gardyne detailed the need



to involve different knowledge based disciplines to ensure all the right questions can be asked and answered appropriately.

Recycled organics, TRM's, Mine Closure Planning and Soil analysis were the topics addressed after lunch. The common theme during the afternoon session was to know what you are working with in the beginning and decide what end result you want and work towards this.

The conference dinner was planned as a Great Aussie BBQ to be held around the lovely pool unfortunately the wind had been blowing all day so it was decided to move things inside to the warmth. The food was fantastic and plentiful. Our guest speaker Dr Antonio Passini was most entertaining taking us through his families wine making experiences in Italy. Dr Passini was in fact the Corporate Impostor - Homer Popantio..

Day 2 of the conference kicked off 9am there were noticeably a few weary people hiding at the back of the room after "networking" until the small hours the previous night.

John McCullah kicked off the day talking about Natural Channel Design and Stabilisation, he presented to the audience videos he has produced of work he has done, these can be found on watchyourdirt.com .

NSW Coal Mine Rehabilitation Regulation and Performance was the second topic of the day presented by Greg Summerhayes from Industry and Investment NSW. Greg talked about the development of new guidelines dealing with environmental rehabilitation. He asked the question – "Why rehabilitate?" His answer was because our long term future depends on doing so and it also increases the communities acceptance of mining.

Another sumptuous morning tea led us into the pre lunch papers. Both Rod Masters and Rob Loch had similar messages saying how important it is to understand your soil and preparing it correctly before any revegetation can take place.

The post lunch concurrent session tackled slope drainage, grassland reconstruction, compost standards and remediation of a stream rock bar.

The method used in rehabilitation depends greatly on the unique situation being addressed. This is the message our last speaker of the conference gave the audience, and this was a common message through out the whole conference.

IECA Australasia would like to thank all the sponsors for the conference.

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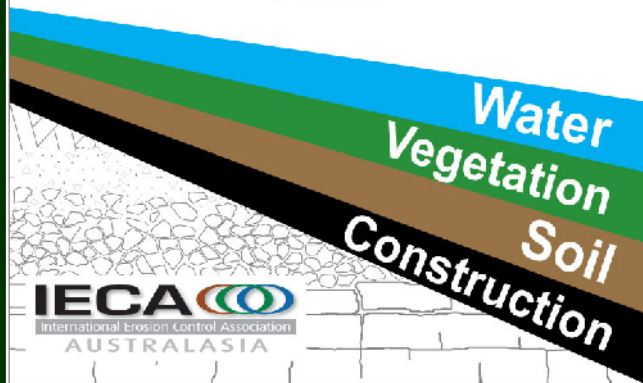
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Best Practice Erosion & Sediment Control

Book 1 – Chapters

November 2008



If you wish to order a copy of the *Best Practice Erosion and Sediment Control* document please go to www.austieca.com.au and download the order form or contact the office on:
admin@austieca.com.au,
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BPESC Roadshow

Grant Witheridge recently wore his voice out presenting to over 250 people at 10 different locations throughout SE Queensland and NSW.



The BPESC Roadshow was a joint event between IECA Australasia and the Environment Institute of Australia and New Zealand (EIANZ). The purpose of the Roadshow was to introduce to the industry the Best Practice Erosion and Sediment Control (BPESC) document. The BPESC documents have been developed with a national perspective and have the flexibility to deal with the wide ranging climatic conditions found across Australia.

The BPESC documents are not intended to replace existing State documents, rather they act as a supporting design tool in a manner similar to how Engineers Australia's *'Australian Rainfall and Runoff'* and *'Australian Runoff Quality'* documents support a State's drainage and floodplain management policies and guidelines.



The training courses were presented by Grant Witheridge, the author of the BPESC document. They provided an opportunity for people working in the building, construction, and erosion & sediment control industries to familiarise themselves with the design and application tools provided within this recently finalised suite of documents.

Those attending the course had a choice of a 1 day or 2 day training. Undoubtedly the 2 day training was the most popular. Those that missed out on the 2 day training in Brisbane booked early and travelled to Sydney. Following lists the topics that

were covered over the 2 days.

- Overview of Best Practice Erosion & Sediment Control Documents
- Drainage and Erosion Control Techniques
- Sediment Control Techniques
- De-Watering Sediment Control
- In-stream Work Practices
- Sizing Temporary Drainage Control Measures
- Sizing Type 1 & 2 Sediment Control Measures
- Preparing Erosion and Sediment Control Plans
- Workshop in the Preparation of Erosion and Sediment Control Plans

We are currently working with EIANZ in Victoria and the Northern Territory to develop a similar event. If you are interested in attending please let the IECA Aust office know, admin@austieca.com.au or keep an eye on the website, www.austieca.com.au ..

Contributions to the Chapter Newsletter.

If you have or know of a case study you feel others in the industry would be interested in, and feel it would be an appropriate item for the Chapter Newsletter. Please forward it to admin@austieca.com.au.

2011 Mine Rehabilitation Conference Technical Tour.



The 2011 Mine Rehabilitation Conference Technical Tour involved the inspection of Hunter CMA rehabilitation sites where recycled organics and other soil ameliorants have been used to reduce soil erosion and improve revegetation performance.

The following Fact Sheet provided by the Hunter Central Rivers CMA summarises the findings of this work.



Making Degraded Soils Productive with Compost - Fact Sheet Hunter Central Rivers Catchment Management Authority.

The following fact sheet has been provided by the Hunter Central Rivers CMA in conjunction with the Office of Environment & Heritage.

Soil erosion is a significant environmental issue throughout the Hunter Valley. Low soil fertility, salinity, sodicity (high levels of sodium) and poor soil structure mean that these soils are inherently prone to degradation, leading to loss of topsoil and the formation of erosion gullies.

These same soil characteristics make revegetation of gully erosion difficult. The establishment of ground cover on rehabilitated erosion gullies can take years and in many cases the bare, exposed subsoil will never achieve good groundcover.

Correction of soil deficiencies usually involves the application of chemical ameliorants such as lime to treat soil acidity, gypsum to treat sodicity (high levels of sodium) and improve soil structure, and nitrogen and phosphorous fertiliser to boost growth. However organic matter is also usually deficient. Research has shown that recycled organic matter (compost) has a greater influence on repairing soil structure than lime or gypsum and it is now considered to be a key ameliorant for long term successful revegetation of major erosion gullies.

As part of its program of market development research for recycled organics, the NSW Office of Environment and Heritage (OEH) has invested significant funds over the past five years into trialling recycled organics applications in the Hunter and other regions.

Using OEH Best Management Practice Guidelines, the Hunter-Central Rivers Catchment Management Authority (CMA) has used recycled organic matter to revegetate large erosion gullies in a variety of landscapes in the Hunter Valley and has contributed to improvements in the efficient application of organic products.

Sites were treated with one application prior to sowing with ground covers using the following criteria:

- Optimum depth for batters (approx 3:1) 25mm - 30mm
- Material (60/40 blended composted soil conditioner and coarse mulch)
- Optimum depth for flat areas having water diverted away from site 25mm
- Soil conditioner material used on flat areas.

On past projects a 60/40 blend was used, however on the Liddell site a 50/50 blend of soil conditioner/coarse mulch on the batters, and soil conditioner on the floor of the shaped gully area was trialled.

Soil test results for Liddell site:

Sample	Depth	Dispersion %	EAT	VE %	USCS	EC	PH	CEC & Exchangeable cations (me/100g)					P (mg/kg)
								CEC	Na	K	Ca	Mg	
Topssoil	0cm	90	1	<1	Clay Loam	0.22	6.3	15.4	3.5	0.2	2.1	7.1	1
Subsoil	15cm	74	2(3)	5	Clay Loam	0.76	7.6	18.8	5.0	0.3	2.1	8.3	2

FOUNDATION MEMBERS:





****Note the presence of large amounts of carbonate and heavy mottling in the floor of the gully at Liddell – indicating groundwater movement in this zone. Soil Ece values in the deep subsoil of the gully varied from 4ds/m to 30ds/m.**

Head cut at top end of Liddell gully system, approximately 6 metres deep, highly active



Gully system at Liddell prior to soil conservation earthworks



Plashett gully was 14 metres deep in places prior to soil conservation earthworks

Plashett following soil conservation earthworks (diversion, shaping and filling)



Plashett following soil conservation earthworks and application of recycled organics



Doughboy hollow prior to soil conservation earthworks



Doughboy hollow following soil conservation earthworks (diversion, shaping and filling)



Doughboy hollow during spreading of recycled organics – note steep batters



Doughboy hollow following spreading of recycled organics Dec '09



****Note the establishment of large amounts of digit grass and natural regeneration occurring on the Doughboy Hollow site. Galenia control will be an issue in the future. Initially kangaroo grazing was also an issue with emergent grasses. It is interesting to note that the seed bed remained dormant despite small falls**

It can be seen from the EAT (Emerson Aggregate Test) and Dispersion % that the topsoil is highly dispersive, having high tunnelling susceptibility and structural stability problems. The subsoil is also unstable and shows high dispersion. The quantity of exchangeable Na is very high as a percentage of Cation Exchangeable Capacity (CEC).

Also the Ca:Mg ratio is well outside normal parameters (should be 5:1 – 1:1), as is the K:Mg ratio (should be <0.4) making vegetative growth conditions less than ideal.

The principle of using recycled organics is to not only provide organic matter and nutrients within a growing medium to promote grass cover, but also to protect this poorly structured soil from tunneling and rilling due to uncontrolled movement of water across bare soil.

Key Messages

The most important factor in the revegetation of any degraded site is exclusion of stock access.

Preparation

Soils must be harrowed prior to spreading of organics to provide a good seed bed. Organics are spread with seed and another harrowing carried out post spreading to incorporate organics and seed into the soil.

Succession of vegetative cover on recycled organics

Example of seed mix used on recycled organics site:

Species	Rate
Tall Fescue	6 kg/ha
Couch Grass Hulled and Unhulled	8kg/ha
White clover	3kg/ha
Woolly Pod Vetch	3kg/ha
Kikuyu	3kg/ha
Paspalum	3kg/ha
Perennial Ryegrass	6kg/ha
Ryecorn	10kg/ha
Starter 15 / Granulock	2 bags

Non-invasive cover crop will initially stabilise organics and begin growth cycle providing cover to emergent grasses. Introduced annuals will then emerge followed by introduced perennials. Provided there is a good source of native seed in areas surrounding site, native grasses will gradually encroach into these areas.

Incorporation of seed into the organics by harrowing helps to prevent seed removal by ants, etc. Seed may remain dormant for some time until conditions are favourable and germination occurs.

Machinery must be matched to site conditions

Doughboy Hollow – steep batters meant organics could not be spread with conventional trailing spreading equipment. Four wheel drive type spreader was needed to spread organics on steeper parts of the site.

Impact of grazing native animals

The impact of grazing native animals (Kangaroos) needs to be assessed on a site by site basis.

Cost

Soil Conservation Earthworks (shaping, diversion, gully control structure construction, harrowing, spreading seed, etc.) cost is variable depending on length of banks, shaping and fill material. Cost to supply and spread recycled organics (composted garden materials) – as supplied by ANL, on site is approximately \$10,000 - \$12,000 per hectare.

For further information regarding Soil Conservation Earthworks and the application of Recycled Organics contact the Hunter Central Rivers Catchment Management Authority:

Adam Bush
02 65 424437
adam.bush@cma.nsw.gov.au

Steve Eccles
02 65424421
steve.eccles@cma.nsw.gov.au

Presidents Technical Tip - When to use sediment basins. *Michael Frankcombe CPESC.*

One of the most common questions I am asked by my clients is ‘when do I need to use a sediment basin?’ It is not an easy question to answer because each site has its own set of unique variables that dictate what approach we may take.

The BPESC Document nominates three criteria that provide guidance to the need for a sediment basin:

- A disturbed area greater than 2500m².
- Estimated soil loss of greater than 150m³ per year.
- TSS levels in discharge water of 50mg/L or less.

Let's examine a theoretical construction site located west of Newcastle in the Hunter Valley in NSW that triggers all three of these criteria. The site is flat and has 5ha of disturbance draining to a single point.

If we assume that the whole site is disturbed (C factor = 1), using the Revised Universal Soil Loss Equation (RUSLE), the estimated soil loss from that site from sheet and rill erosion is 1079 tons per year. This is an awful lot of soil and it would take a lot of temporary sediment control measures to contain that amount of soil. It is virtually impossible to contain given that a sand bag check may hold 0.25m³ of soil in the very best circumstance. A well constructed sediment fence may hold 2m³ of soil.



Turbid water seeping through a woven sediment fence

There are two ways that we can deal with this situation – employ really good erosion control to minimise the generation of sediment or use a sediment basin to trap the eroded sediment. Sediment is only generated when erosion occurs therefore control of erosion is the most effective way of controlling sediment.

Let's look at our theoretical construction site again but instead of having a totally disturbed site we bring a hydro-mulcher along and establish a really good grass cover (70% soil surface cover). Our C factor reduces from 1 to 0.015 which results in an estimated soil loss of 15 tons per annum. This is a volume of soil that is much easier to manage and deal with.

Temporary sediment controls are only effective at trapping small quantities of coarse sediment. They are completely ineffective at controlling turbidity. This is because they cannot contain sufficient volume of turbid water at zero flow velocity to allow suspended solids to settle out. This problem is further compounded if high clay, dispersive or sodic soils are present where the clay particles remain in suspension due to poor ionic bonding. The only way that turbidity with these soils can be controlled is through effective erosion control, sediment basins and chemical treatment of turbid water.

Unfortunately I often see sites relying on temporary sediment control measures with these soil types without any degree of the success.

Another common problem I see on construction sites is sediment basins constructed in or from dispersive soils. Because of the extreme erosion risk associated with dispersive soils, the sediment basins become their own source of sediment and turbidity. Tunnel failure through the sediment basin wall is common. In these environments non-dispersive soil should be imported to construct the sediment basin wall and to cap the excavation. If it is not possible or practical to import non-dispersive material then it can be treated with superfine agricultural gypsum at rates

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determined by soil testing.

So you if you have a high clay soil, or dispersive or sodic soils and you need to control turbidity you must use effective erosion control to minimise the generation of sediment and a sediment basin and chemical flocculants to treat the turbidity. If you cannot fit basins on your site then erosion control must be at the highest possible level.



Tunnel erosion through a sediment basin wall constructed from dispersive soil

President's Technical Tips.

Over the last 9 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.

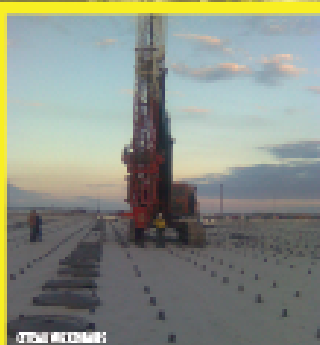
Past Newsletters can be found on the Chapter website.

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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
14	#2 - July 2008	Construction Exits
14	#3 - December 2008	Clean Water Diversion Drains
15	#1 - May 2009	Amelioration of problem soils
15	#2 - August 2009	Gully Pit and Curb Inlet Traps
15	#3 - December 2009	Soil testing for re-vegetation
16	#1 - May 2010	Cellular Confinement Systems
17	#1 - February 2011	Humus and Organic Carbon

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