CEO'S REPORT

BY GREG WHITE

I was fortunate to attend a recent breakfast meeting hosted by AAPA. The guest speaker was John Statton, General Manager Infrastructure Asset Management, from NSW Roads and Maritime Services.

The presentation was both interesting and informative with gratifying news for the road users of NSW, as well the road construction industry. It was acknowledged that it was extremely important that extra funds be put into the road network, especially because of the rapid deterioration of the pavements due to wet weather over the last few years.

The government has decided to increase capital funding in maintenance in order to increase the amount of road rebuilding that occurs. RMS hopes to rebuild around 1.7% of the road network in 13/14 compared to around 1.1% in 2012/13. With pavement design lives of 30 to 40 years it is essential that this level of funding is required to just maintain the present condition of the network, let alone improve or expand.

A long term plan of spending was presented which allows the road industry to acquire and allocate appropriate resources to cope with the planned work going forward. As more state road authorities publish their forward plan and work cooperatively with industry then it is far more likely the programme is carried out in the most efficient and economical manner.

One statement caught my ear and raised a few eyebrows around the room. When asked for the definition of road rebuilding which contributed to a large portion of the maintenance budget, Mr Statton said it was the reconstruction to reset the pavement's design life. This means that RMS are going to spend $1.8 Billion over the next 12 months, bringing existing failed pavements back to the condition that would ensure a sustainable life. AustStab is delighted in such an approach as surely stabilisation is by far the most attractive rehabilitation method available to achieve this laudable goal. Stabilisation has proven by road authorities time again to achieve a long lasting pavement that is:

- More economical than other structural improvements;
- Faster than standard alternatives;
- Able to reuse usually over 95% of the existing pavement;
- Environmentally friendly with lower energy use and carbon emissions;
- Minimal, if any, need for landfill; and
- Additionally minimal need for scarce good quality road materials.

I can only hope that all Australian road authorities take up this great initiative to invest appropriate funds to maintain our road networks to at least our present standard. I fear too many governments take this great asset which is instrumental in ensuring the optimum productivity of Australia.

We are continuing our series on the latest pavement design methods using stabilised layers. In this issue, the use of lightly bound stabilised bases is outlined. Many main road agencies and local government engineers are taking advantage of this economical method of recycling existing pavement to achieving a long-term solution.

"I can only hope that all Australian road authorities take up this great initiative to invest appropriate funds to maintain our road networks to at least our present standard. "

CEO Greg White

PRESIDENT'S MESSAGE

BY HEATH CURNOW

There have been many changes in the road construction and stabilisation industry over the last five years and the scene is set for that state of flux to continue.

Floods and storm events have followed large scale droughts around the country. This has put pressure on resources as the road network crumbles in the extreme conditions, where in many cases, the state road authorities got used to getting away with reduced road funding with many roads appearing to outperform their design life without the wet to highlight pavement failures.

Many have never experienced the wet, others have forgotten the benefits of lime stabilisation to rapidly dry saturated site material and, in many cases, protect wet sites from moisture ingress. Resultant flood funding over the last few years has resulted in a sharp spike in stabilisation works in flood-funded areas, particularly Queensland, leaving a glut of stabilisation resources.

AustStab faces two step challenges from these times of change; the first ensuring stabilisation works are completed appropriately in order to protect the reputation of the industry with so many new comers to the market.

AustStab has focused on this with the successful establishment of the Stabilisation Accreditation, currently 3rd party audited by ARRB (Australian Road Reserch Board) as well as training courses.

They are targeted at those calling for stabilisation works arming them with some useful tools to understand how to get the benefits out of the process and how to ensure the process applied successfully by those executing the stabilisation works.

The second challenge coming for AustStab is being prepared to assist the stabilisation industry for the effects of a potential market decline looming as flood funding drys up along with the economy if forecasters are correct about China's growth slowing which, in turn, stops propping up Australia's economy along with the mining demand in this country.

This coupled with manufacturing rapidly moving offshore due to Australia's high production and employment costs is likely to have a negative impact on the stabilisation market.

President
Heath Curnow

"AustStab believes that contractors that are accredited in accordance with the accreditation scheme will provide a consistently higher quality product than other contractors. "

The role for AustStab as this unfolds is to help promote benefits and innovation in stabilisation and educate those calling for stabilisation works to ensure corners aren't cut at the peril of the industry as margins tighten.

AustStab believes that contractors that are accredited in accordance with the accreditation scheme will provide a consistently higher quality product than other contractors. All accredited contractors have a complete verified understanding of stabilisation process and theory as audited by the Australian Road Research Board.

The busy times continue with the AustStab AGM now upon us. This year the AGM returns to the Gold Coast and includes meetings of the working groups, an industry dinner sponsored by Wirtgen, the inaugural stabilisation awards of Excellence 2013 night sponsored by Caterpillar and don't forget the golf.

This is our second year of the stabilisation awards with the quality and quantity really stepping up this year. We've a diverse range of high standard submissions really getting the judging panel to split hairs in order to decide on the best submission for each of the four categories. Details and of the awards and AGM can be found on the AustStab website www.auststab.com.au.

Remember, if your site is wet or clayey, stabilise with quicklime to save time. Need more strength, stabilise with cement and if flexibility is what your pavement requires, foamed bitumen stabilisation is the answer.

DESIGN OF A CEMENT STABILISED BASE LAYER FOR LIGHT TRAFFIC

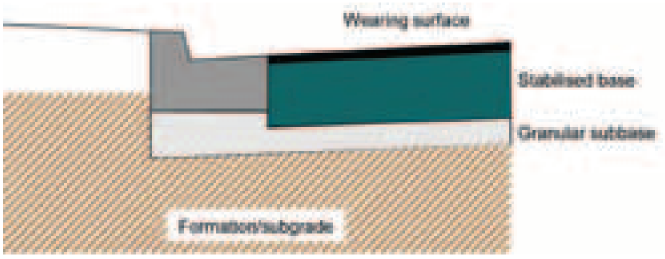
1. INTRODUCTION

The purpose of this article is to provide a brief summary of the procedure for the design thickness of stabilised local roads using an empirical approach. The thickness of the stabilised layer is based on experience from a range of local government practices in Australia

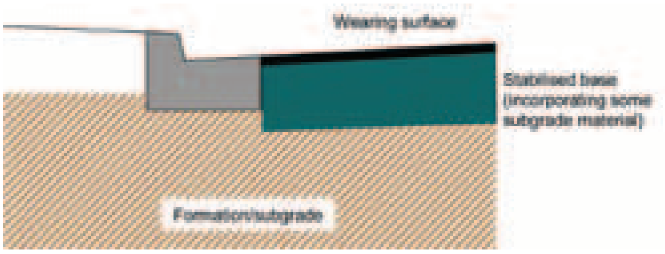
The full guideline is on the AustStab website titled Pavement Design Guide for Cement Stabilised Base Layer for Light Traffic.

Figures 1 and 2 show the typical configurations of insitu stabilised base layers of local roads. When the existing road has less than the required pavement material, up to 30% of the sub-grade material has been used in projects to get sufficient mixing depth and strength.

Figure 1 Typical configurations in urban streets with kerb and gutter.

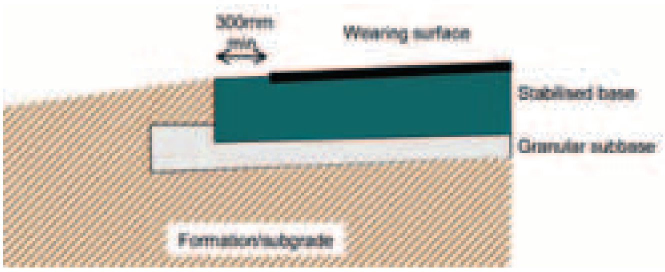


(a) Both base and subbase materials are used to stabilise the road.

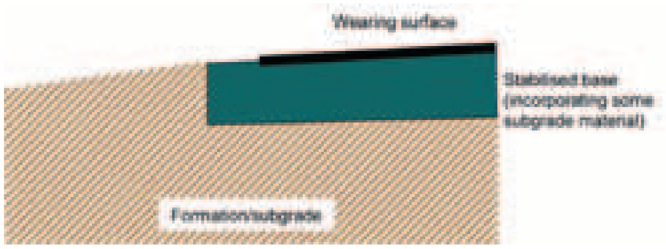


(b) Up to 30% of the subgrade could be used to stabilise a thin existing road.

Figure 2 Typical configurations in rural roads without kerb and gutter.



(a) Both base and sub-base materials are used to stabilise the road.



(b) Up to 30% of the sub-grade could be used to stabilise a thin existing road.

This procedure does not apply to roads where the design traffic exceeds 106 DESAs or when the stabilised layer becomes a sub-base.

2. DESIGN PROCEDURE

The design procedure described in this guideline is summarised in the flowchart below (see Figure 3).

Figure 3 Design procedure for stabilised base for local roads.
(Refer to site investigation guideline (AustStab, 1999a))

3. MATERIAL MIX DESIGN

Material mix design procedures are detailed in Part 4d of the Austroads Pavement Technology series (Austroads, 2006). As a starting point, material properties including particle size distribution and Atterberg limits are minimum requirements to understand the pavement material.

The thickness of the stabilised layer is based on a cemented material tested in the laboratory to meet the unconfined compressive strength range (UCS) of 1 to 2 MPa, with a target of 1.5Mpa.To achieve an appropriate mix design it is often necessary to employ a geotechnical consultant.

If there is no experience with using cementitious binders in your region, the following starting application rates (by mass) may be used for the laboratory test program:

Table 1 Indicative traffic levels for different street types (Austroads, 2006b).
Note: Direction Factor (DF) is 0.5, except for Minor Street with single lane traffic where DF= 1.0

Street type	Indicative Design Traffic (DESA)	Design period (years)	AADTtwo-way	Heavy vehicles (%)	Design AADHV	Annual growth rate	Cumulative Growth Factor (Table 7.4)	Axle groups per heavy vehicle	Cumulative HVAG over design period	ESA/ HVAG
Minor with single lane traffic	3 x 103	20	30	3	0.9	0	20	2.0	13,140	0.2
	5 x 103	40				0	40	2.0	26,280	0.2
Minor with two lane traffic	4 x 103	20	90	3	1.35	0	20	2.0	19,710	0.2
	8 x 103	40				0	40	2.0	39,420	0.2
Local access with no buses	4 x 104	20	400	4	8	1	22.0	2.1	128,480	0.3
	9 x 104	40				1	48.9	2.1	285,576	0.3
Local access with buses	8 x 104	20	500	6	15	1	22.0	2.1	240,900	0.3
	1.5 x 105	40				1	48.9	2.1	535,455	0.3
Local access in industrial area	1.5 x 105	20	400	8	16	1	22.0	2.3	256,960	0.4
	3 x 105	40				1	48.9	2.3	571,152	0.4
Collector with no buses	4 x 105	20	1200	6	36	1.5	23.1	2.2	607,068	0.6
	106	40				1.5	54.3	2.2	1,427,004	0.6
Collector with buses	8 x 105	20	2000	7	70	1.5	23.1	2.2	1,180,410	0.6
	2 x 106	40				1.5	54.3	2.2	2,774,730	0.6

- 1 to 3% for reasonably graded crushed rock;
- 2 to 4% for reasonably graded sandy, clayey gravels; and
- 3 to 5% for poorly graded sandy, clayey gravels.

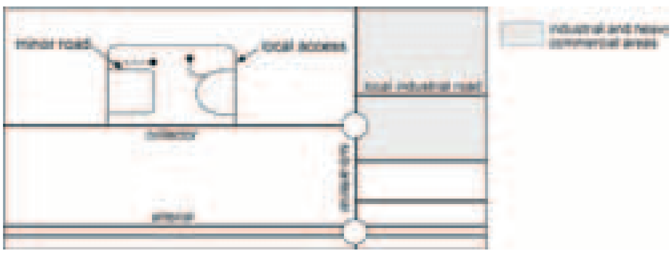
4. DESIGN SUB-GRADE STRENGTH

The design CBR is determined by using either the Dynamic Cone Penetration (DCP) or laboratory test results of a representative sample of the sub-grade. For both approaches, the designer should subdivide the project into sections which are deemed to be homogeneous with respect to sub-grade type, topography and drainage, and a design sub-grade CBR is determined (separately) for each of these sections.

5. DESIGN TRAFFIC

The design traffic has been based on the Austroads classification of local roads as shown in Figure 4 and Table 1 (above).

Figure 4 Lightly-trafficked street categories to be used with Tables 3 and 4 (Austroads, 2006b).



6. PAVEMENT THICKNESS

Table 2 may be used to determine the thickness of the stabilised base layer for different street types with a separate wearing course consisting of a sprayed seal and/or thin asphalt layer up to 40 mm in thickness. The design thickness in Table 4 includes an allowance for a construction tolerance of -10 mm to +20 mm. No further thickness increase for construction tolerances should be applied.

For roads within car park areas where delivery vehicles are likely to travel, use thicknesses for street types F to H.

Table 2 Cemented base layer thickness (mm) for different sub-grade strengths and traffic levels with a thin bituminous or asphalt surfacing.

Street Type1	IDT2 (DESAs)	Cemented base layer thickness (mm)5				
		Design subgrade strength (CBR)				
		< 3%	3% – 5%	6% – 10%	11% – 15%	> 15%
A. Minor with single lane traffic	3 x 103	200	175	150	150	150
B. Minor with two lane traffic	4 x 10^3	200	175	150	150	150
C. Car park with no delivery vehicles	8 x 10^3	225	200	175	150	150
D. Local access with no buses	4 x 10^4	225	200	175	150	150
E. Local access with buses	8 x 10^4	250	225	200	175	175
F. Local access in industrial area	1.5 x 10^5	275[3]	2504	225	200	175
G. Collector with no buses	4 x 10^5	300[3]	2754	250	225	200
H. Collector with buses	8 x 10^5	325[3]	3004	275	250	225

Notes:
1. Street type as defined in Austroads pavement design guide and shown in Figure 4.
2. Indicative design traffic in DESAs based on work by Austroads and shown in Table 3.
3. In the dark shaded region it is recommended to stabilise the subgrade. Refer section 7.
4. In the light shaded region it is suggested to stabilise the subgrade. Refer section 7.
5. In some regions of Australia the minimum thickness is 200 mm (values in italics).

7. LIME STABILISED SUB-GRADES

The possible applications of lime stabilisation of sub-grades are to:

- increase sub-grade stiffness;
- reduce the PI of insitu pavement material;
- enhance volumetric stability; and
- modify sub-base layers to improve stiffness of the pavement.

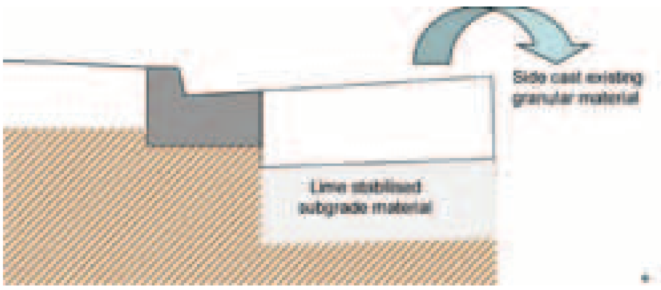
An increase in sub-grade stiffness will reduce the thickness of base layers and require less material from quarries. Also, when road usage changes (ie an increase in heavy traffic) a pavement material may subsequently show signs of distress leading to the need to rehabilitate the road.

Rather than reducing the design life of the treatment through thin granular pavements it is recommended that lime stabilisation will allow the full use of the existing granular pavement without the need to place an overlay material and hence, change the inlets to drainage structures.

The design of pavements with lime stabilisation of the sub-grade is covered in the lime stabilisation technical note (AustStab, 2006b).

Figure 5 shows a diagrammatic solution for sub-grade stabilisation of existing roads with existing kerb and gutter. A similar approach can be used when no kerb and gutter exists. Sub-surface drainage is not shown in these figures and should be considered in pavements subject to wet conditions.

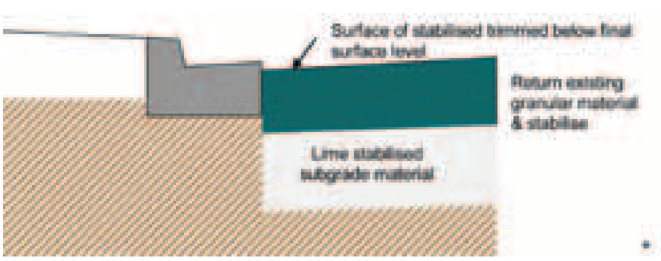
Figure 5 Sub-grade stabilisation with existing kerb and gutter.



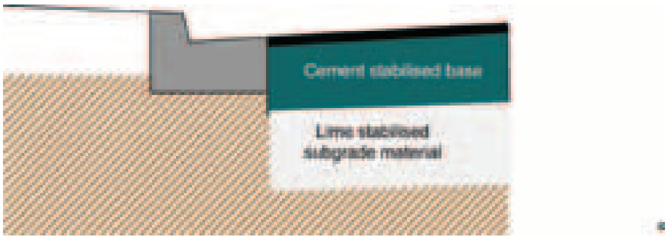
A. Existing pavement material is side cast to expose top of sub-grade. Depth of side cast material to include design depth of base-course stabilisation, an allowance for bulking due to volumetric change and an allowance for final wearing course thickness. Total bulking & wearing course thickness to be disposed.

Lime is spread at specified rate and mixed to specified depth. After compaction the side cast granular material is returned and lightly compacted.

Note: All services should be identified before construction work commences, and any service that needs to be lowered should be carried out before side casting.



B. Cementitious binder is spread at specified rate and mixed to specified depth. Surface is trimmed below the lip of the gutter to allow surface treatment to be constructed after initial curing of pavement material.



C. Construction of final wearing surface. Where a thin asphalt layer is to be the wearing course, it is recommended that a SAMI seal is used prior to placing the asphalt.

8. DESIGN EXAMPLE

A local access road with bus traffic in a large rural regional centre is to be rehabilitated using insitu stabilisation. The typical wearing surface for this road type is 30 mm of dense graded asphalt between kerb and gutters, with a strain alleviating membrane interlayer (SAMI) applied to the surface of the stabilised layer.

The existing road has been investigated and after laboratory testing the design CBR is 8% and the existing granular base and sub-base material is 250 mm.

The traffic consultant for the council has established that the design traffic is about 500 AADT and a 20-year life is sought for this treatment. The other traffic assumptions in Table 3 are consistent with this access road. Therefore, the design traffic is 8 x 104 DESAs.

In summary the design inputs are:

Subgrade strength: 8%

Design traffic: 8 x 104 DESAs

Using Table 4, the stabilised layer thickness is 200 mm. Figure 6 summarises the pavement cross-section.

Pavement material sampled from the project site indicated the following material properties:

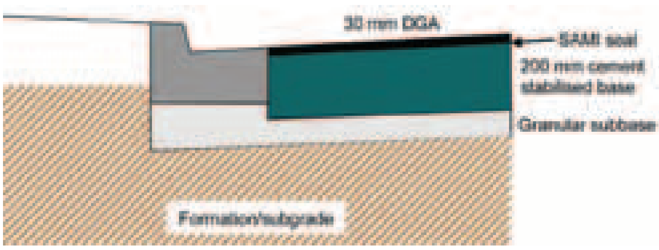
Plasticity Index: 10%

% Passing 0.425mm Sieve 32%

Maximum dry density: 1.8 t/m3

The pavement engineer has therefore chosen a General Blended cement for the trial UCS testing. Laboratory testing with a GB cement has indicated that the UCS strength testing after 7-day standard curing temperatures is 1.5 and 3.2 MPa for binder application rates of 3 and 4% respectively. Therefore, the pavement engineer has chosen an application rate of 3.5% which is specified as a spread rate of 12.6 kg/m2.

Figure 6 Summary of the design example.



FOOTNOTES

[1] *It is common to use the dry mass of the pavement material. Do not specify application rates by volume of material.*

[2] *Each street type has an indicative design traffic (IDT) for either a 20 or 40 year design period.*

[3] *For stabilised base layers with cementitious binders, the use of bituminous seals has been highly successful. However, in certain circumstances the use of PMB seals or geotextile seals may provide greater flexibility in the wearing course.*

AUSTSTAB SECOND AWARDS OF EXCELLENCE - 2013 WINNERS ANNOUNCED

This year's award nominations showcased some excellent developments and innovative projects.

National entries demonstrated excellence in work health and safety, excellence in education, sustainability and local government on specific projects, long-term use of stabilisation and continued delivery of education for nearly 15 years.

Awards were presented in all four categories, with two highly commended awards being bestowed.

The judging panel felt the award nominations were of a very high standard and demonstrated continued excellence being confirmed in the field.

The panel was delighted with the variety of projects provided within a number of non-traditional sectors. The high calibre of the nominations made the judging difficult; in a number of categories determining the winner was challenging with some healthy debate between judges.

The Awards of Excellence were presented at a Gala Dinner at the AustStab AGM ***Stabilising the Future*** on 13 August 2013 at the QT Hotel on the Gold Coast in Queensland.

Caterpillar Australia was the sponsor for the Awards. All guests of the dinner received a leatherbound notebook from CAT to commemorate the night.

In 2013 the award finalists and winners were:

Category One: Work Health and Safety

Winner: Downer Infrastructure: Key Learnings from Near Miss Reporting

Downer, as part of the Zero Harm improvement path, implemented a Near Miss Reporting program in May 2012. They attribute the introduction of the program to reducing the TRIFR from nine down to below five, promoting a greater awareness of hazards and potential hazards as well as improving employee engagement.

Downer VMS - Displayed in Rosehill Works depot as part of Near Miss Reporting strategy

Category Two: Excellence in Research or Education

Winner: Centre for Pavement Engineering Education (CPEE): Enhanced Knowledge and Education

Since 1999, CPEE has been delivering a specialist unit of study, "Insitu Stabilisation" as part of the tertiary recognised pavement courses on "Infrastructure Asset Managment" and "Road Engineering and Construction". Since it's commencement, over 100 students/engineers have completed the course.

CPEE, in conjuction with AustStab, have also delivered over two day training seminars in more than twenty locations since 2011, with over 700 candidates improving their awareness, knowledge and skills as part of the face-to-face learning, discussions and tutorials.

Category Three: Innovation or Excellence in Sustainability in pavement stabilisation

Winner: South Australian Jockey Club: Morphetteville Racecourse - Sandtrack Rehabilitation Works

Successfully achieving the objectives of eliminating material contamination from the base of the sandtrack in both the sandtrack and the material of the "Proride", and waterproofing the sandtrack to allow year-round operation without soft clay contamination of the subgrade, the South Australian Jockey Club is this year's category three winner.

The entrant demonstrated innovation, economic, social and environmental benefits in a non-traditional pavement environment.

South Australian Jockey Club - Morphetteville Racecourse Lime and Cement stabilisation of existing base material

Highly Commended: NSW Roads and Maritime Services (RMS) - Plant mixed foam bitumen Farlow's Flat Pacific Highway

In conjunction with Queensland TMR pavement, RMS pavements branch designed a foamed bitumen design. This was implemented on a section of the Pacific Highway subject to high traffic volumes, including heavy vehicle movements (10000-14000 vehicles per day 15% heavy vehicles) and prone to flooding.

The site was subject to tight environmental restrictions due to working within Sepp14 wetlands and immediately adjacent to the Clarence River. The RMS crew was able to achieve a product rate of up to 1600 tonnes per day, compacted and final trim using material batched from RPQ's batch plant.

RMS noted that in the two major flood events subsequent to the project being opened not one potholed developed. This formed a positive public perception and saved RMS significantly in maintenance costs.

NSW RMS - Farlow's Flat - Plant mixed Foamed Bitumen stabilisation works completed under traffic

Finalist - FK Garner and Sons Pty Limited - Fluor K132 Contract - Dawson's Bend Project

This project made the best of poor quality gravel materials that were close to the site on a project on the road system in and around the Fairview Gas Fields near Injune in the Bowen Basin.

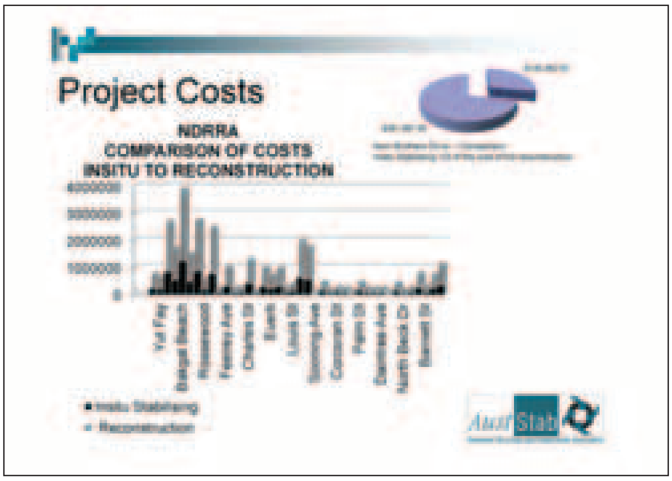
The Dawson's Bend project is located on a critical road within the road network that supplies access to compressor stations, hubs and living quarters. The project provided the client with economic and environmental benefits, and well as meeting the client's demanding engineering specifications.

Category Four: Excellence in Recycling in stabilised pavements in local government

Winner - City of Townsville: Stabilising a partnership

For 15 years, Townsville City Council and Stabilised Pavement of Australia (SPA) have developed a strategic partnership. Many projects have been completed during that time including the Kern Brothers Drive Project, where economic savings in the order of $140/m2 and program savings of six weeks resulting in a two week total project duration were achieved.

Council has worked together with SPA to develop a suitable lime sub-grade stabilisation specification and design manual for all future subdivision works to hopefully generate higher strength more affordable infrastructure.



Townsville City Council - Cost savings obtained on various projects over 15 year relationship with SPA

Highly commended - Nambucca Shire Council: Valla Road

Mid Coast Road Services worked with Nambucca Shire Council to rehabilitate sections of Valla Road. Initial designs allowed for pavement stabilisation of the existing sub-grade material, but site investigations revealed the sub-grade material was too poor for the new road design and continued to a depth of 1.5m in isolated areas.

Hackett Laboratories and NSC designed an alternate pavement, stockpiling the top 200mm of material, removing the next 200mm to waste and replacing the recycled material. This also allowed the saturated material to dry out. The recycled material was stabilised with 70/30 slag lime blend. Economic, environmental, social, time and safety benefits were recognised.

Nambucca Shire Council - Savings and new design methodologies.

The AustStab judging panel thank all award nominees for the time, care and effort in planning and submitting this year's award nominations. Congratulations on showcasing some wonderful projects that are happening throughout Australian in 2013.

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CINEVEX AUSTSTAB STAND
PROMOTES STABILISATION BENEFITS

By Nick Ryan, Manager Strategy and Development, Stabilised Pavements of Australia

Andrew Middleton and I (both of Stabilised Pavements of Australia) and Pat Capaan (Downer EDI Works) were pleased to, on behalf of Auststab, present the benefits of stabilisation to attendees of the Civenex 2013 trade show on the 15th and 16th of May 2013.

Lured by the promise of lower cost, environmentally friendly road rehabilitation solutions, or the free coffee and muffins, engineers, asset managers, supervisors and other key decision makers ventured in to our display area.

Although stabilisation is now a common practice for most road rehabilitations, we were surprised to talk with some attendees who were still not aware of the advantages of utilising conventional (cement/lime/other) stabilisation as a low cost way to increase existing pavement strength and avoid the costly importing and laying of deep gravel overlays.

There was also interest in the application of Foamed Bitumen stabilisation for higher trafficked roads with the increased effective depth and inherent flexibility of a Foamed Bitumen (FB) stabilised layer.

Given the recent two-to-three year's higher rainfall patterns and softened sub-grades, there was an interest in the application of sub-grade stabilisation as part of the whole-of- pavement rehabilitation process.

A primary purpose of the Civenex AUSTAB tent was to reinforce that through AUSTSTAB and expert industry practitioners, there is a wealth of experience and often free of charge design and testing advice available to all engineers, asset managers and supervisors considering a stabilisation solution to their road rehabilitation challenge.

With the ever decreasing maintenance dollar and clear cost benefits of stabilisation activities, there is clearly still more work to do in the wider promotion of new and existing stabilisation practices for the benefit of local government and broader community.

An enjoyable and, we trust, informative day for one and all.