Fourteenth International Flexible Pavements Conference

"SUSTAINABLE ROADS"

25th to 28th September 2011

Copies of the presentations made at the Conference are listed below. Click on the title to access the PowerPoint. Where a conference paper was also submitted click on (*Conference Paper)*.

DAY 1 - MONDAY 26th SEPTEMBER 2011

Opening Plenary Session

8:30 AM CHAIR – Mr John Lambert, Chief Executive Officer, Australian Asphalt Pavement Association.*(mp3 sound file)*

OPENING: Mr Sergio Cinerari, AAPA Chairman and Chief Operating Officer, Downer Australia – East. *(mp3 sound file)*

KEYNOTE OPENING PRESENTATION – Mr Michael Bushby, Chief Executive, Roads and Traffic Authority, NSW. *(mp3 sound file)*

KEYNOTE PRESENTATION: SUSTAINABILITY- Dr Helen Murphy, Director Environmental Sustainability, VicRoads.

Plenary Session – Proudly sponsored by Ammann

10:30 AM MATCHING ACCELERATED PAVEMENT TESTING TO PAVEMET DESIGN AND PERFORMANCE – Dr R Buzz Powell, NCAT Assistant Director & Test Track Manager, USA

11:00 AM SUSTAINABILITY BENEFITS TO COMMUNITY BROUGHT BY ASPHALT PAVEMENT TECHNOLOGIES – Mr Dave Newcomb, Vice President Research & Technology National Asphalt Pavement Association, USA

11:30 AM GLOBAL LEADERSHIP IN SUSTAINABLE ROAD CONSTRUCTION – THE CHALLENGE FOR AUSTRALIA – Mr Rolf Jenny, Senior Vice-President, Corporate Development of Ammann Schweiz AG, Switzerland

12:20 PM CATERPILLAR ANNOUNCEMENT

12 NOON PANEL QUESTIONS & ANSWERS

12.15 Lunch - **Proudly sponsored by Caterpillar**

STREAM 1
Sustainability

1:15 PM ASPHALT FOR SUSTAINABLE PAVEMENTS –

- Warm Mix validation Project
- Recycled Asphalt Pavements

Mr John Lambert, Chief Executive Officer, Australian Asphalt Pavement Association.

STREAM 2
Construction Practice

1:15 PM PAVING SMOOTHNESS – THE SUM TOTAL OF BEST PAVING PRINCIPLES PRACTICE

- Paving Professional Wokshops & importance of training
- Buggy & noncontact continuous paving USA policy about self-regulated
- Quality Control
- Thermal Management IR Buggy & Thermal imaging bar
- CIR Profiller process & lead into new SX5 stabilisers &

1:35PM THE DEVELOPMENT OF PROTOCOL FOR THE USE OF WARM MIX ASPHALT PAVEMENTS IN AUSTRALIA

- Summary of work conducted in an Austroads project to develop a protocol for the management of WMA pavements in Australia
- Review of current practice overseas
- Evaluation of emission calculators
- Laboratory testing
- Validation of the relative field performance of WMA and hotmix asphalt pavements being conducted in Melbourne

Mr Kieran Sharp, ARRB Group

2.00 PM GLASS ASPHALT - A CONVENIENT TRUTH *(Conference Paper)*

- Asphalt containing glass as an aggregate, has been widely tried around the world as a means to dispose of surplus waste glass since the 1960's
- -In 2002 Fulton Hogan (then Pioneer Road Services) performed the first trials with glass asphalt for City of Canning, WA
- 100,000 tonnes has since be used by City of Canning, Town of Vincent and Shire of Kalamunda
- Field Trials and testing of various mix designs

Meda Sicoe, Technical Manager WA,SA & NT-QA Manager WA, Fulton Hogan, Australia and Colin Leek , Project manager form City of Canning

2.25 PM SUSTAINABLE DEVELOPMENT : INTRODUCTION TO LOW ENERGY/WARM MIXES PRODUCTION. OPTIMISATION OF ASPHALT PLANT RECYCLING TECHNOLOGY

- Contractors, Asphalt Mix Producers and Asphalt Plant Manufacturers have 'Sustainable Development as a major concern.
- Low energy mixes and RAP recycling are activities to reach such goal
- RAP recycling, in plant (or in situ), should be adopted
- Combined one's allow for the maximum of flexibility
- Recycling facilities to achieve constant production savings

Andrea Mazzanti, Area Manager, Marini S.p.A, Italy

- Australia as a LCR (less regulated country) (not supporting tier 4)

Mr Jeff Richmond, Roadtec, USA

1:50 PM PLANNING AND PREPARATION FOR COMPACTION OF STIFF MIXES WITH EXTENSIVE TENDER ZONES

- Planning and preparation steps to produce consistently a high density dense graded hot mix asphalt (HMA) during rehabilitation of Interstate Highway 88 (I-88) near Sidney, New York. U.S.A. in 2009
- The contractor, Lancaster Development Corporation, desired to minimize the compaction equipment required for the project without sacrificing production or quality using rolling patters that would permit the use of two, steel-drum, vibratory compactors as the entire compaction train
- Caterpillar consultants worked with the Lancaster managers and quality control personnel to develop compaction plans that would meet the requirements for (1.) matching paving production (250 tonnes per hour); (2.) reaching densities that met specification for full payment; and (3.) working ahead of verified tender zones during the breakdown phase of compaction

Terry Humphrey, Training Consultant, Caterpillar, USA

2.25 PM SUSTAINABLE WAY – PAVING AND COMPACTION *(Conference Paper)*

- Reducing environmental impact and at the same time increasing performance are not conflicting targets
- Utilizing intelligent process control systems roads can be built with superior quality, high cost efficiency AND a lower environmental impact
- Sustainability throughout all the stages of the product lifecycle
- Operator safety and ergonomics
- Reduced construction times by up to 50%
- Economic benefit calculations based on projects in Germany

Roland Egervari, Sales Support Manager - Compactasphalt® - Marketing Department, Dynapac GmbH, Germany

2.45 PM Panel: Questions & Answers

3.00 PM Afternoon Tea

3:30 PM STREAM 1 – MAINTENANCE TREATMENTS

3.30 PM GEOTEXTILE REINFORCED SEALS - THE WESTERN AUSTRALIAN COMING OF AGE *(Conference Paper)*

- Major highways and freeways in Western Australia were showing significant pavement defects and failures associated with cracking and ingress of moisture post cracking
- Resurfacing of these roads by applying Geotextile Reinforced Seals (as a Strain Alleviating Membrane Interlayer under asphalt and as a Strain Alleviating Membrane (SAM) with a double seal as the running course.
- Experience of Main Roads WA of implementing a technology (GRS) commonly used on the east coast but used only sporadically in WA
- Usage of GRS has grown from close to zero to be in excess of 300,000 m^2 per year which will continue for some years to come.
- How WA managed the rapid expansion in use of GRS
- Improvements to the finish of cold planed surfaces, issues with applying GRS in a very hot climate and overlapping of geotextile fabric to provide continuous protection across the width of a carriageway

Garnet J Gregory, Project Officer – Surfacings, Main Roads WA, Materials Engineering Branch

4.00 PM PREVENTION OF CRACK PROPAGATION - SIXTH AVE TRIAL *(Conference Paper)*

- Presents the findings from 30 different pavement rehabilitation scenarios in an effort to prevent reflective cracking
- The trial was 10 years old in July 2011
- Recommendations to prevent crack propagation

Con Rimpas, Principal, Pavement Analysis

4.20 PM A CASE FOR GEOTEXTILE REINFORCED SEALS WITH ASPHALT *(Conference Paper)*

- Australian experience and case studies

Rod Fyfe, Business Development Manager, Geotextiles & Drainage, Geofabrics

3:30 PM STREAM 2 – WORKSHOP – ENHANCED CONSTRUCTABILITY OF UNBOUND GRANULAR PAVEMENTS FOR THIN SURACINGS

- **Workshop Leader: Lance Midgely, AAPA Consultant *(Report)* *(Conference Paper)***
- **Panel Member: Walter Holtrop, National Surfacings Engineer**

4.40 PM A SUSTAINABLE MAINTENANCE METHOD FOR CRACKED PAVEMENTS USING POLYESTER ASPHALT REINFORCEMENT: INCREASE PAVEMENT LIFE, REDUCE MAINTENANCE AND CREATE SUSTAINABLE PAVEMENTS *(Conference Paper)*

- 40 years experience in various major projects in and outside of Australia
- Latest research in this field on the effectiveness of high modulus polyester asphalt reinforcement
- Comparison of embedded energy for different rehabilitation methods showing the sustainability of polyester asphalt reinforcement

Christoph Hessing, Area Manager, Huesker Synthetic GmbH, Gescher, Germany

5.00 PM Panel: Questions & Answers

DAY 2 – TUESDAY 27 SEPTEMBER 2011

Plenary Session

8.30 AM KEYNOTE PRESENTATION: AN APPRECIATION OF THE PRINCIPLES OF PERPETUAL PAVEMENT DESIGN LEADING TO THE DEVELOPMENT OF THE PERROAD MECHANISTIC PAVEMENT DESIGN TOOL

David H. Timm, Gottlieb Associate Professor of Civil Engineering, Auburn University, USA

9.00 AM KEYNOTE PRESENTATION: TECHNICAL AND ECONOMIC BASE REQUIREMENTS FOR EFFECTIVE ASSET MANAGEMENT *Conference Paper*

Ralph Haas, The Norman W. McLeod Engineering Professor and Distinguished Professor Emeritus, University of Waterloo, Canada

9.30 AM KEYNOTE PRESENTATION: BLACK WITH WHITE – AN ASSESSMENT OF POTENTIAL REHABILITATION TREATMENTS FOR A CONCRETE PAVEMENT

Marshall Thompson, Professor Emeritus Civil Engineering, University of Illinois, USA

10.00 AM Panel: Questions & Answers

STREAM 1
BINDERS AND CONTROL SYSTEMS

10.45 AM ACCELERATED LOADING TEST RESULTS OF TWO NCAT SECTIONS WITH HIGHLY MODIFIED ASPHALT *(Conference Paper)*

- A multi-year accelerated loading program at the renowned National Center for Asphalt Technology (NCAT) in the United States has provided performance data of full depth SBS modified pavements. The study has given new insights to construct sustainable and economical pavements
- Latest results of two sections with highly modified asphalt. Comparisons are made between the predicted rutting using models of Delft University of Technology, lab performance data and actual rutting data on the track

STREAM 2
REASEARCH AND DESIGN

10.45 AM ASPHALT PAVEMENT SOLUTIONS - FOR LIFE: IMPLEMENTATION PROJECT UPDATE *(Conference Paper)*

- Australia lacks the resources to adequately achieve design model verification, and alliance with international researchers is essential
- The Australian asphalt industry has taken the opportunity to enhance the design of long life asphalt pavements by commissioning the 'Asphalt Pavement Solutions – For Life' project
- Reviews the performance history of long life asphalt pavements including information gleaned in the course of the AAPA study Tour in 2010

- The value of the concept of highly modified asphalt is shared in terms of increased performance, thickness reductions and cost reductions.
- Implications for pavement design with design models are discussed

Erik J Scholten, Kraton Polymers Nederland bv Amsterdam, The Netherlands

11.20 AM SBS MODIFIED ASPHALT MIXTURES FOR HEAVY DUTY PAVEMENTS *(Conference Paper)*

- Outline of the superior characteristics that can be given to asphalt mixtures when they are modified with special designed SBS modifications
- Extensive laboratory investigation of a reference and SBS modified base course mixtures
- Results of monotonic compression and tension tests will be presented as well as the results of a fatigue testing program
- Endurance limit for the reference and modified mixtures was developed. Consequences thereof on thickness design will be presented

Andre A.A. Molenaar, Delft University of Technology, Delft, The Netherlands and Erik J. Scholten, Kraton Polymers Nederland bv Amsterdam, The Netherlands

11.55 PM LATEST ASPHALT PLANT MANAGEMENT & CONTROL SYSTEMS

- Latest European control system technologies
- Energy usage and performance optimization, using real time energy consumption display and trending tools
- Extended functionality like order management, docketing system, traffic guidance equipment, self-loading.
- Extended functionality like integrated maintenance scheduling and fleet management systems
- Data exchange using Web services
- Retrofit – implement latest control systems on older plants

Michael Halada, Product Manager, Ammann Schweiz AG, Switzerland

- Program of work to characterise the performance of production samples of asphalt used on major projects around Australia using the Asphalt Materials Performance Tester (AMPT)
- Procedures for new pavement thickness design software, utilising the entire design temperature and load frequency spectrum, have been proposed

Ian Rickards, AAPA Consultant

11.15 AM LABORATORY VERSUS FIELD ASSESSMENT OF FULL DEPTH ASPHALT MIXES IN NEW ZEALAND *(Conference Paper)*

- Mixes for use in full depth pavements and with RAP especially require special design considerations
- Design parameters and field performance relies on compaction
- Laboratory compaction of specimens produces samples that have different air void distributions to field samples
- Measurement of production samples properties will be different to field results when void distributions are different
- Field cores provide a more reliable indication of mix performance and compliance because of the control of compaction level and compaction type. Field cores display a better consistency in terms of mechanical; properties because the orientation and void distribution is real life
- Wheel compaction :a better correlation between laboratory and field

Glynn Holleran, Technical Divisional Manager, Fulton Hogan Ltd, New Zealand and Irina Holleran,TS Manager Fulton Hogan Ltd, New Zealand

11.50 AM PROJECT LEVEL AUSTRALIAN METHODOLOGY FOR FLEXIBLE PAVEMENT DESIGN *(Conference Paper)*

- Principal aspects of the Australian Methodology for Flexible Pavement Design and Evaluation using principles from The Austroads *"Guide To Pavement Technology".* This guide was developed for Australia and New Zealand in order to standardize a procedure for pavement design and evaluation, considering national and international pavement experience
- New Austroads methodology for flexible pavement design and provide a comparison against the previous guide

12:10 PM Panel: Questions & Answers

STREAM 1
TAILORED PAVEMENT SURFACINGS

1.30 PM THE STRIPPING POTENTIAL OF AGGREGATES IN WARM MIX ASPHALT *(Conference Paper)*

- Laboratory evaluation undertaken by RTA NSW, building on their earlier work from 2007
- Assessment of the stripping potential of various aggregates and binder combinations using Plate Stripping test at various temperatures
- Determination of the temperature at which a maximum of 10% stripping for each system occurs
- Development of a master curve and shift factor
- Impact of adhesion agents and applicability to polymer modified and multigrade binders

Warren Carter, Chairman AAPA National Technology Committee

1.45 PM PERFORMANCE-BASED CONTRACTS FOR ASPHALT SURFACINGS *(Conference Paper)*

- Qld Metropolitan Region investigating innovative asphalt surfacing
- Performance based specification and project documents developed
- Three projects for thin asphalt overlays undertaken – one project detailed
- Boral thin asphalt surfacing project using SMA-type mix on Stafford Road, Brisbane
- Learnings on risks, treatment selection, proprietary products and performance assessment

Trevor Distin – National Technology Manager, Boral Asphalt; Rob McGuire – A/General Manager, Boral Asphalt Queensland; Robert Vos – Queensland Executive, AAPA

- Additional material characteristic and design considerations based on research overseas aimed at improving the design process further

Ernesto Urbaez, Senior Engineer, Fugro PMS and James Erskine, Senior Engineer, Fugro PMS

12:15 PM Panel: Questions & Answers

STREAM 2
OPTIMISING PERFORMANCE

1.30 PM METHODOLOGY FOR PREDICTING SMOOTHNESS RESULTS FOR THE INTERNATIONAL ROUGHNESS INDEX (IRI)

- The International Roughness Index (IRI) is arguably the best indicator of ride quality among the various smoothness measurement systems currently in use
- Case study of a project where the contractor laid down two 64 mm lifts of HMA on reclaimed bituminous and granular material.
- IRI scores for the granular surface, the first lift and the second lift with percentages of improvement for each lift.
- The effects of various issues and paving techniques are correlated to the IRI scores in sections
- Analysis of IRI scores on a two-lift project that had a high degree of initial roughness. How to predict how much improvement can be made on each successive lift. How certain "mistakes" affect IRI scores in a negative manner
- Averaging devices that are used to avoid replication of surface deviations.
- Summary of the paving techniques that are proven to lower IRI scores, improve ride quality, and increase the contractor's ability to predict IRI scores

Terry Humphrey, Training Consultant, Caterpillar, USA

2.05 PM AN INVESTIGATION INTO THE SPRAY PATTERNS OF BITUMEN PRODUCTS *(Conference Paper)*

- Results of a test program that investigated the spraying behaviour of various binders and emulsions. A laboratory spraying simulator was used to determine the transverse spray pattern of products through a single nozzle
- The non-Newtonian flow properties of polymer modified binders (PMB) and emulsions required that must have their performance validated by new means
- Results will be used to update the national bitumen sprayer calibration test methods, with greater and updated understanding of the performance and repeatability of the nozzles, and the properties of sprays with alternative materials

Steve Patrick, Research Engineer – ARRB Group and Walter Holtrop
National Surfacings Engineer – AAPA

2.25PM TYPICAL CAUSES AND SOLUTIONS TO BLEEDING SEAL COATS *(Conference Paper)*

- Sustainability of the sealed road network is a challenge
- Traffic is increasing rapidly, in particular the heavy vehicles
- Up to 10% of the network may have inadequate surface texture
- The success of sprayed seals depends on:
  - selection of suitable treatments
  - careful design of the rates of application
  - construction by trained, experienced crews
  - early intervention if things do go "wrong"

Walter Holtrop, National Surfacings Engineer, AAPA

2.05 PM DEVELOPING A PROPRIETARY PRODUCT UNDER A QUASI-PERFORMANCE BASED SPECIFICATION

- Review of a "performance based" specification
- Product development from laboratory work through to field trials
- Full scale production and supply of the product
- Replication of the product/concepts – pitfalls and successes

Warren Carter, National Technical Manager, Downer Australia

2.25 PM IMPROVING THE RELIABILITY OF PERFORMANCE MODELLING AND HARMONISING SPECIFICATIONS WITH THE HELP OF COMPUTATIONAL STATISTICS *(Conference Paper)*

- Asphalt properties and performance is commonly estimated by using averages of measured or empirical values
- Seemingly consistent specification requirements may be near impossible to meet at acceptable costs.
- The use of simulation techniques assist in highlighting the hidden risks to both the contractor and the road agency and allow developing realistic specifications.
- Simulations are also useful to estimate the probability of meeting specified targets. .
- Performance forecasting is at the core of managing pavement assets
- Examples will be used to illustrate the key points and the application of computational statistics

Peter Kadar (Dr), Principal Engineer, Sustainable Infrastructure Management, ARRB Group

2.45 PM Panel: Questions & Answers

DAY 3 – WEDNESDAY 28 SEPTEMBER 2011

Plenary Session
Ashalt Manufacture Proudly Sponsored by Astec Australia

8.35 AM KEYNOTE PRESENTATION: THE EVOLUTION OF HMA PLANTS AND PAVEMENTS FOR A SUSTAINABLE FUTURE

- Evolution of HMA Plants in the USA (1900's to today) and a Peek into the Future
- How and Why the USA evolved from Batch to Continuous HMA Mixing Plants
- Overview of the Evolution of HMA Pavements for Sustainability: 2007 to Today
- State of sustainability in HMA pavements in the USA

Ben Brock, President Astec Inc, USA

9.15 AM KEYNOTE PRESENTATION: HEALTH AND SAFETY ASPECTS OF WORKING WITH BITUMEN - PAST AND PRESENT

- Historical overview of the key studies and events that address health aspects of working with bitumen
- The impact of REACH implementation in Europe (recent dossier update, hazard review, oxidised grades, DNEL and new phrases recommended in the MSDS)
- IARC review process: what will happen in October
- Health, safety and environmental initiatives in Europe including safe loading, delivery, fume exposure method

Dr Carl Robertus, Global Technology Manager, BP Bitumen, Germany

9.50 AM DESIGN OF RECYCLED ASPHALT MIXTURES USING DOUBLE DRUM MIXER *(Conference Paper)*

- Recycling of asphalt mixtures is an important issue in the asphalt industry
- In the Netherlands recycled asphalt base course mixtures contain up to 50 % of RAP and there is a strong tendency to increase this amount. Also recycling of Porous Asphalt Concrete (PAC) becomes more and more important in the Netherlands especially since most of the surface layers of the highway network are made of PAC
- The double drum mixer, which has been introduced a few years ago in the Netherlands, seems to be perfectly suited to produce asphalt mixtures containing high mounts of RAP
- Design of asphalt mixtures in the laboratory is currently done in a way which is completely different from what occurs in practice
- Is the quality of the mixtures produced according to the traditional method comparable to the quality of the mixtures produced in real life?

Andre Molenaar, Delft University of Technology, the Netherlands

10.25 AM Panel: Questions & Answers

STREAM 1
REMEDIAL WORKS

11.15 AM EMERGENCY REMEDIAL INTERVENTION ON THE SECONDARY RUNWAY AT THE EAST LONDON AIRPORT *(Conference Paper)*

- Background to the project,
- Design rationale undertaken to ensure that the remedial measures could form part of the future rehabilitation
- Construction process: not high tech, but was certainly high risk

Simon Tetley - Senior Associate, Roads and Highways Div. Arcus GIBB, South Africa

11.45 AM BITUMEN TREATED BASECOURSE – RAPID AND RESILIENT NETWORK OPTION *(Conference Paper)*

- Major floors have damaged over 9000 km of Queensland roads
- Road repair options sought for rapid repair, under traffic and in remote areas
- Bitumen Treated Bases rediscovered and AAPA draft specification developed in Qld
- Demonstration project using >200 000 tonnes BTB with sealed surface

STREAM 2
OPTIMISING PERFORMANCE

11.15 AM TURNING RAP INTO A VALUE ADDED PAVEMENT ASSET *(Conference Paper)*

- The journey under taken by Boral Asphalt to manufacture asphalt with up to 50% RAP without compromising the performance of the final product
- Extensive laboratory tests were undertaken to measure fatigue, rut resistance and resilient modulus of the plant produced mixes with increasing % of RAP for different mixes
- Reporting on trials
- RAP is an appreciating asset of the state through the value it brings as a hedge against rising bitumen prices and as a valuable engineering material if it is reused in the manufacture of asphalt

Trevor Distin - Boral Asphalt National Technology Manager and Russell Crabb, Boral Asphalt Technical Manager NSW

- Feedback on learning's from the project and specification application

Robert Vos – Queensland Executive, AAPA, Trevor Distin – National Technology Manager, Boral Asphalt; Peter Pezet – Technical Manager, Queensland Metro, Fulton Hogan, Warren Carter – National Technical Manager, Downer

12.15 PM IMPROVED PAVEMENT SUSTAINABILITY WITH SPECIALTY EMULSIONS *(Conference Paper)*

- Effective low cost treatment for aged pavements
- Combined enrichment and rejuvenation features provide the potential to extend the service life of oxidised pavements beyond that achieved by conventional enrichment treatments
- Pavement sustainability is improved by conserving scarce high quality aggregate resources.
- Observations from both low traffic pavements such as airports as well as low volume rural roads are discussed
- Field trial observations indicate good recovery of skid resistance soon after application and rapid rejuvenation effect on old binder

John Lysenko, Technical Development Manager, Binders, Fulton Hogan

11.45 AM OPTIMISING PERFORMANCE - THE KNOWLEDGE CHALLENGE *(Conference Paper)*

- Future improved performance is threatened by the continuing loss of experienced road and pavement engineers
- Roads and pavement engineers need to be more skilled and knowledgeable
- Technology transfer, education and the optimisation of design, construction and maintenance strategies are inextricability linked and success in enhancing each will play a big part in the sustainability of the asphalt road

Ken Mavin, Executive Manager: Academic and Ray Farrelly, Executive Manager: Development, Centre for Pavement Engineering Education

12.15 PM BULK DENSITY INVESTIGATIONS IN SOUTH AUSTRALIA *(Conference Paper)*

- Samples of DG, SMA and OG have each been tested for bulk density using presaturation, vacuum sealing and mensuration tests
- Presaturation test limitations are highlighted and Absorption check recommended
- Recommend that for SMA presaturation test be replaced with vacuum sealing test
- Recommend vacuum sealing test may be used as an arbitration test, but step change in bulk density between tests needs to be contractually predetermined

Johnny Tran, Asphalt Engineer, DTEI, SA

12.45 PM Panel: Questions & Answers

STREAM 2

PAVEMENT INVESTIGATIONS AND DESIGN

2.05 PM MANAGING SURFACE FRICTION IN QUEENSLAND – AN INDUSTRY RESPONSE *(Conference Paper)*

- Skid resistance management and provision subjected to public and media scrutiny
- Industry embarked on projects with national team including ARRB, SRA's
- Three key areas:
- Surface friction measurement device & testing protocol suitable for use in court
- Evaluation of Qld TMR skid resistance data to identify management and budget implications
- Site specific assessments of materials and surface friction performance over time
- Feedback on the achievements and outcomes for products and management

Robert Vos – Queensland Executive, AAPA; Justin Weligamage – Manager (Road Asset Strategy), Queensland Department of Transport and Main Roads

2.35 PM A ROAD PAVEMENT FOR VERY RAPID CONSTRUCTION – 25 TO 33 YEARS OF SUCCESS *(Conference Paper)*

- In the mid 1970's, Boral Asphalt and Blacktown City Council (in western Sydney) co-operated to construct the first full depth asphaltic concrete (FDAC) pavement in at least New South Wales
- Over the following nine years, at least six road sections were constructed using this method all have been heavily trafficked and/ were in shopping areas
- The simple construction method included laying the asphalt layers by grader, directly on the subgrade. The pavements were 225 to 300mm thick with no intermediate layer. The cost effectiveness taking all aspects into consideration was excellent
- Analysis of the current pavement condition including subgrade condition, asphalt materials used and remaining life
- Compares the design and construction method used, to the current methods in terms of the estimated cost and construction time

Paul Ritchie, Director of Ritchie Civil Engineering

3.05 PM ESTIMATION OF THE "C" VALUE CONSIDERED IN THE AASHTO-93 GUIDE FOR BACK ANALYSIS OF THE ELASTIC MODULUS OF THE SUBGRADE *(Conference Paper)*

- Estimation of the "C" value included in the methodology for back analysis of the subgrade elastic modulus of the AASHTO-93 Guide for Pavement Design developed in the United States of America in 1993
- The AASHTO-93 Guide has been used and is still used by many road agencies within USA and around the world. This guide includes a methodology for back analysis of the superficial defections using the Falling Weight Deflectometer in order to estimate the elastic modulus of the subgrade
- This paper shows, based on the material that have been surveyed that an average "C" value of 0.79 should instead be used; this is more than double the recommended value of 0.33
- Finding impacts the final result of the eastic modulus of the subgrade incrementing its value and the expected structural behavior

Ernesto Urbaez, Senior Engineer, Fugro PMS

3.25 PM THE USE OF FWD TESTING AS A QUALITY CONTROL TOOL DURING CONSTRUCTION *(Conference Paper)*

- Potential benefits of FWD testing during construction, practical considerations and limitations based on the experiences gained during the duplication of a section of the Centenary Highway near Brisbane
- Recommendations regarding potential acceptance / evaluation criteria for FWD testing as a quality control measure during construction
- Testing procedures

Joe Grobler, Senior Pavement Engineer, GHD and Cameron Taylor, Principle Engineer, GHD

3.45 PM Panel: Questions & Answers

Conference Close - Mr John Lambert, Chief Executive Officer, Australian Asphalt Pavement Association.*(mp3 sound file)*