Short Course on

"Pavement Maintenance and Rehabilitation"

Organised by: Centre for Infrastructure Engineering and Management
and School of Engineering
Griffith University Gold Coast campus

Date: 21 July 2005

Speakers: Prof. John Metclaf
Mr. Jothi Ramanujam
Mr. Rob Vos
Dr. Gary Chai

Venue: Building G01 (Business Building) Room 3.55
Griffith University Gold Coast Campus

One Day Course

This course aims to provide up-to-date information on modern techniques of analysis, maintenance and rehabilitation of Pavements.

Who Should Attend?

The course will be beneficial to post-graduate students, engineers and those who are in the design and analysis side of Pavement Engineering and Practice.

Contents of the Short Course

1. Pavement Investigations and selection of appropriate rehabilitation treatments.

This session will cover a number of case studies as taken from several districts in Queensland. It will also highlight the "tools" which are used in the investigation to arrive at the appropriate failure mechanism, and the solutions. The rehabilitation techniques to be elaborated will include pavements on expansive soil subgrade as well.

2. Structural assessment through (deflection testing), pavement investigation and overlay design.

This session includes "hands on" exercises on the traditional widening and overlay. Pavement (material) strength, specification issues, role of the subgrade strength assessment, drainage and cross-sectional requirements are the topics covered in detail.

3. Design, Construction, Performance, and Specification of Insitu-Stabilisation including lime.

This section is on cement, foam and other bitumen stabilization techniques, construction considerations, design considerations, specifications and the testing protocol. Case studies will highlight the usefulness and limitations of these techniques.

4. Recent Developments in Pavement Rehabilitation works:

Capillary rise testing and its importance, Dielectric Testing Ground Penetrating Radar and its use in pavements

5. From bituminous binders to heavy duty pavements

This presentation covers the sources of raw materials, the production facilities for hot mix asphalt, the asphalt mix types (design & properties), their roles in the pavement and the construction methods used.

6. State of the art Accelerated Pavement Testing and the relationship to in-service performance.

There are many Accelerated Pavement Testing (APT) facilities in active use around the world, which have produced findings of direct and immediate significance to pavement design, construction and maintenance with high cost-benefit ratios. Equally there have been many in-service trials of innovative pavements and, of course, there is the wealth of practical experience with the road network. However, there is still the question as to how closely the APT approach can be related to, or predict, ‘in-service’ performance.

This presentation will discuss the state of the art in APT and ‘in-service’ performance research with particular reference to the potential for linking APT results through the Long Term Pavement Performance (LTPP) database.

7. Griffith University- Research & Development Program in Road Management Technology

This session will provide an overview of a collaborative Research and Development Program between Griffith University, SMEC Australia Pty Ltd and six Local Government Authorities (LGAs) in Southeast Queensland. The six LGAs are Gold Coast, Ipswich, Logan, Caloundra City Councils, Caboolture and Redland Shire Councils. The key objective of the research project is to calibrate the road deterioration model currently adopted in SMEC PMS and to recommend a Long Term Pavement Performance (LTPP) study for the City/Shire Councils.

This presentation will elaborate on the design of the LTPP site selection matrix and will also discuss the establishment of the sites and the specification of the field survey works.

8. Mechanistic Approach in Flexible Composite Pavement Design

This session will give the participants an in depth understanding of the fundamental principle of mechanistic approach for a flexible composite pavement design. A case study where FWD was used to predict the in situ stiffness and the compressive strength of a cement stabilised road base will be presented.

About the Speakers – John Metcalf, Jothi Ramanujam, Rob Vos and Gary Chai

(1) Dr. J. B. Metclaf (John) is the Freeport-McMoRan Professor of Engineering at Louisiana State University. He received his B.Sc (Hons) and PhD from Leeds University, England.

John is a Fellow of the Geological Society of London, the Institution of Engineers, Australia, the Institution of Civil Engineers (UK) and a Member of the American Society of Civil Engineers. He served for 12 years as Chairman of the Technical Committee of the Road Engineering Association of Asia and Australasia (REAAA) and represented Australia as Vice President over the same period. He was also Chairman of the Permanent International Association of Road Congresses (PIARC) Roads in Developing Regions Committee from 1970 to 1992. John represented the United States Federal Highway Authority (FHWA) as an expert member from 1992 to 2000.

John began his career at the Transport and Road Research Laboratories, UK. He was also a Post Doctorate Fellow, National Research Council of Canada before joining the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) in 1960. He was Materials Engineer, Queens land Main Roads Department from 1964-1969. He spent a period at TRRL-UK between 1967-1969 conducting a research project on construction quality control. John joined the Australian Road Research Board (ARRB) in 1969 and was appointed Deputy Director in 1975.

In 1992, he moved to Baton Rouge to take up the newly created Freeport-McMoRan Endowed Chair. He is the author of some 120 technical papers and one text. He has been Keynote Speaker at several National and International Conferences.

He has acted as consultant/adviser to the United Nations Department of Technical Co-operation for Development, the World Bank, and the Kingdom of Saudi Arabia. In

Australia he has acted for the Snowy Mountains Engineering Corporation, the Department of Housing and Construction, the Development Assistance Bureau, State Road Authorities and various branches of Industry. In the USA he has advised FHWA on PIARC. He is an appointed member of the TRB National Committee of Superpave and has recently also been appointed as co-chair of the national committee on Accelerated Pavement Testing. In 2003 he was appointed to the US Army ERDC JRAC committee as an advisor.

In May 1998 he was, Researcher of the Year in the Department of Civil and Environmental Engineering, LSU and in May 2002 was given the Achiever of the Year award. He was elected an Emeritus Member of the Transportation Research Board technical committee on Low Volume Roads in January 2003. He is currently a member of three TRB Committees.

(2) Jothi Mohan Ramanujam (Rama) is the Principal Engineer Pavement Rehabilitation at the Queensland Department of Main Roads (QDMR). Rama as we call him has 32 years of experience with Pavement Engineering of which 16 years were at QDMR. He graduated from University of Sri Lanka and obtained his Post-graduate Degree with distinction at the University of Leeds. He is a Chartered Engineer and a Member of Engineers, Australia, ICE London.

In addition to his excellent experience on Road works in Sri Lanka, Rama also worked on major Road and Highway Projects in Nigeria, Abu-Dhabi, UAE and the Kingdom of Brunei before joining QDMR. This and other major activities have exposed Rama to tropical, sub-tropical and Middle East Practice of Pavement Design and Engineering. At QDMR, as a Principal Engineer (attached to the Pavement Rehabilitation Unit, Pavements Materials and Geotechnical Division of the Roads System and Engineering), Rama has been active in the

- Development of technical capability in districts and regions
- Development and/or improvements to standards, specifications and code of practice
- Management of risk through development of pavement risk profiles and
- Transfer of technology

Rama has planned, organised and carried out pavement investigation works on more than 500 projects, including performance studies of rehabilitation treatments such as fabric seals, pre-mix edge strips, crack control products, granular recycling and asphalt recycling. Also, through his research and development work, he has contributed to the Pavement Rehabilitation Manual, which won him the Main Roads Excellence Award.

Other departmental documents to which he has made a significant contribution are:

- Technical Note 8 on the use of fabric for sealing works
- Technical Note 39 on lime treatment of clay subgrades
- Technical Note 44 on in -situ foamed bitumen stabilization of pavement materials
- Technical Notes 11 and 12 on hot in-place asphalt recycling
- Supplementary Specifications for in-situ recycling of granular pavements
- Guidelines for the application of geo-fabric seals on clay subgrade (work in progress).
- Nomograph for interpretation of Benkelman Beam deflection parameters
- SMOOTH BOWL software for eliminating noise problems in the data acquisition system during deflection testing
- Construction and performance report on dust suppressants.
- Workshop on the latest technique of lime injection for expansive soil subgrades
- Software for granular and asphalt overlay design.

Rama has also participated and presented papers in the International Conferences in many countries and also in most States within Australia.

(3) Rob Vos is the Regional Executive for Queensland of the Australian Asphalt Pavement Association (AAPA) where he has been for the last 5 years. Prior to that Rob was Technical Director for the Southern African Bitumen Association (SABITA) and prior to that he spent thirteen years in various roles in a State Road Authority in South Africa. Rob has a BSc Engineering from the University of Cape Town.

His experience ranges from running a large state road construction unit, being contracts engineer, running the state's PMS and being seconded through the Foreign Affairs Department to deliver a significant externally funded roads development program.

His experience in the private sector included the development of the South African pavement and bituminous materials research program in conjunction with the CSIR Transportek and Universities.

The products of this research included guides and manuals on:

- Appropriate standards for bituminous surfacings
- Labour enhanced construction of bituminous surfacings
- LAMBS – design and use of large aggregate mixes for bases
- GEMS – design and use of granular emulsion mixes
- Guidelines for seals using homogeneous modified binders
- The design and use of porous asphalt mixes
- Economic analysis of short term rehabilitation options
- Appropriate standards for the use of sand asphalt
- Technical guidelines for the specification and design of bitumen rubber asphalt wearing courses
- Sealing of active cracks in road pavements
- The design and use of emulsion treated bases –phase 1

Rob has also authored and presented numerous local and international papers on a wide range of topics on bituminous materials, surfacings, product warrantee systems, HS&E topics and research & development strategies.

(4) Dr Gary W. Chai is a Research Fellow in the School of Engineering, Griffith University Gold Coast Campus. Gary has about 20 years of working experience in both Pavements and Geotechnical Engineering. He received his B.Sc (Hons) and M.Sc in Civil Engineering from the University of Louisiana and Kansas State University in the USA respectively. He is a Member of Engineers, Australia, Road Engineering Association of Asia & Australasia (REAAA) and an Affiliate Member of the Australia Stabilisation Industry Association (AustStab). Gary was a member of the technical sub-committee of the Permanent International Association of Road Congress (PIARC)'s Concrete Road Grouping from 1997 to 1999.

Upon graduating from Kansas State University, he served the Kansas Department of Transportation (KDOT) as a Pavement Design Engineer at the Geotechnical Unit of the Bureau of Materials. At KDOT, Gary has designed many pavement structures for road rehabilitation works in several Counties in the state of Kansas. He conducted falling weight deflectometer (FWD) deflection tests, dynamic cone penetrometer (DCP) tests and pavement condition surveys for determining the cause of pavement failures and to evaluate pavement and subgrade performance. He was also involved with the FWD test on pavement foundation along the a major inter-state highway in Kansas for the US Strategic Highway Research Project (SHRP).

In addition to his pavement design experience in the USA, Gary also worked on major Build-Operate-Transfer (BOT) Road and Highway Projects in Malaysia, the Philippines, Vietnam and China. For the BOT projects, Gary performed pavement residual capacity evaluation using mechanistic approach for highway pavement widening and rehabilitation works. Gary also performed technical audit and design review on highway piled embankment on adverse ground conditions, innovative and specialised ground treatment works for highway embankment construction on soft clay and peat soil. He has also collaborated with a number of pavement and geotechnical experts from the United Kingdom and Australia on several occasions for conducting embankment and pavement failure investigations.

Gary has accumulated substantial international experience in highway management and pavement engineering. To disseminate and transfer road management and pavement technology, he frequently gives research seminars at national and international conferences in the Asia Pacific Region as well as in the Australasia.

TENTATIVE PROGRAMME

21 July 2005 (Thursday)

09:30	–	11:00 am	Session 1	
11:00	–	11:15 am		Coffee break
11:15	–	12:45 pm	Session 2	
12:45	–	01:30 pm		Lunch
01:30	–	03:00 pm	Session 3	
03:00	–	03:15 pm		Coffee break
03:15	–	04:45 pm	Session 4	

Venue: Building G01 (Business Building) Room 3.55, Griffith University Gold Coast Campus

Registration Fee (a minimum nominal charge is adopted to cover only the expenses).
For normal participants, $150 AUD (includes 10% GST)
For students, $75 AUD (includes 10% GST)

You can obtain additional information regarding the course by contacting

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Registration Form

Short Course on "Pavement Maintenance and Rehabilitation"

Given Name:			
Last Name:			
Position:		Title:	
Organisation:			
Department:			
Address:			
State:		Postcode:	
Telephone:		Facsimile:	
Mobile:			
Email:			

Please inform us of any special dietary requirements.
The registration fee includes light refreshment, light lunch and handouts during the program.

Enclosed is my registration fee of:

□ For normal participants, **AUD$150.** (*GST included*).

□ For students, **AUD$75.** (*GST included*).

Cheque Payments:

Cheques or money order to be made payable in Australian Dollars to "**Griffith University**". In Australia, the ABN, required to be used for GST purposes, is **78106094461**.

Credit Card Payments:

☐ Bankcard ☐ Visa ☐ MasterCard

Card Number: _____

Expiry Date: _____

Name of Card holder: _____

Card Holder's signature: _____

Amount to be charged: _____

Please fax or mail the completed form (by 20 July 2005) to
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