

AFCAP



Report on 2nd Sprayed Sealing Conference 2010

11th–12th October 2010
Melbourne - Australia

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Conference was organized by the ARRB Group with support from VicRoads

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- Conference theme – *Sustaining sprayed sealing practice.*
- Attendance was over 500 delegates.
- Conference was to provide an opportunity for practitioners and policy makers to keep abreast of new developments in sprayed seal design, material selection and construction techniques



Conference Technical Tour: 10th October.

- ARRB's research facilities in Vermont South,
 - ARRB's bitumen laboratories.
 - ARRB's full scale pavement testing research laboratory, currently testing a two coat emulsion seal on a granular base, and
 - demonstration of a spray run using the French synchronized spraying / spreading method



Accelerated Loading Facility (ALF)



Wheel assembly



French synchronized spraying / spreading equipment



Opening ceremony by Mr Don Larkin, Chairman ARRB Board

- **Keynote address by Mr Dennis Rossmann**, South African National Roads Agency (SANRAL); topic: *Imperatives in sustaining sprayed sealing practice*
- **Mr Andrew Bethune**, of VicRoads Australia presented a video on *‘an oral history of Sprayed sealing in Victoria’*
- **Thompson, Hugh** gave an account on *‘Pushing the limits of surface seals (N3 Toll Road in South Africa)’*
- **Esnouf, John**; *Sprayed seal on Australia freeway and*;
- **Harrow, Laurence** gave an account on *the performance of slag aggregate in chipseals in New Zealand*



Day two of the conference featured special sessions

- case studies and the biggest issues facing sprayed seals into the future as seen by Australia, New Zealand and South Africa.
- Practitioners from Australia, New Zealand and South Africa presented their solutions to the hypothetical problem



PAVING FABRIC SEAL DESIGN AND PERFORMANCE ON AUSTRALIAN ROADS

Rod Fyfe, Geofabrics Australasia, South Australia

- focus of this paper was the assessment of performance based on design considerations, selection criteria, installation history and overall performance

benefits:

- Prevent the ingress of water
- Bridging shrinkage cracks
- Reinforces and prolongs fatigue life
- Prolongs surfacing life span



Installation of fabrics



MODELLING THE FLUSHING MECHANISM OF THIN FLEXIBLE SURFACED PAVEMENTS IN NEW ZEALAND

*Sachi Kodippily, The University of Auckland, New Zealand; Theunis F.P. Henning, The University of Auckland, New Zealand
Jason M. Ingham, The University of Auckland, New Zealand; Peter Cenek, Opus International Consultants, New Zealand*

- Flushing is a major cause of maintenance on chipsealed pavements in New Zealand
- Flushing: upward migration of binder results in full or partial covering of surface aggregate.
- smooth surface with low skid resistance affects;
 - safety and structural performance of the pavement surface
- understanding of flushing can have a significant impact in terms of predicting future maintenance needs, expenditure, and performance of pavements.
- The study noted that approximately 30% of chipsealed pavements on the state highway network have failed due to flushing before reaching half the expected life



TRENDS AND CHANGES IN CHIPSEALING IN NEW ZEALAND

Joanna Towler, NZ Transport Agency, New Zealand

John Patrick, Opus International Consultants Ltd, New Zealand

Peter Howe, NZ Transport Agency, New Zealand

- Study finding

Analysis of the age of chipseals when they are resealed on New Zealand state highways shows that, despite increasing traffic stress, there has been no significant reduction in chipseal life



SYNTHESIS ON CAPE SEAL VARIATIONS IN SOUTHERN AFRICA

GD van Zyl, Mycube Asset Management Systems, Cape Town, S Africa

JD van Niekerk, PD Naidoo & Associates, Cape Town, South Africa

- Cape Seals originated in the Western Cape Province of South Africa
- initial Cape Seal consisted of 19 mm aggregate and two layers of fine slurry,
- several variations to the original composition include different aggregate sizes, binder types and slurry gradings. These alternatives are still referred to as Cape Seals and could perform well, provided appropriate adjustments are made to the binder application, slurry binder content and construction method.



Hand-spreading of slurry



Typical spread of aggregate for a Cape Seal



SPRAY SEALS:

QUALITY + APPLICATION RATE = PERFORMANCE

Willem Vonk and Robin van Veldhuysen, Kraton Polymers Research B.V. Amsterdam, The Netherlands

- intrinsic quality of spray seal binders is sometimes not reflected in the performance of the spray seal!
- Binders are expected to provide the following features:
 - seal the pavement, provide skid resistance, not to lose aggregate and not to bleed or fat up.
- question is whether one can transform the quality of the binder into the performance of the seal?
- Premium products (e.g. polymer based) are by no means proof and often require more attention than standard operation with unmodified bitumen.



SPRAYED SEALS FOR AIRPORTS

Greg White, Fulton Hogan Pty Ltd, Australia

- Where the establishment of mobile asphalt plant in a remote location and importation of asphalt quality aggregate is not cost-effective, sprayed sealing is often the only viable airport pavement surface.
- The threat of loose aggregate being ingested into an aircraft engine drives the design and construction of **sprayed** seals for airports.
- successful adaptation of road sealing techniques to airport pavement application requires modifications
 - The design requires high application rates of premium binders to resist the high tyre pressures and wheel loads and to hold the aggregate particles tightly bound
 - Light aggregate spread rates required to prevent aggregate particles from being partially held and then coming loose



Bitumen filled seal



METHODOLOGY USED FOR IDENTIFYING RESEAL PROJECTS IN THE WESTERN CAPE

André van der Gryp, Dept of Transport & Public Works, Western Cape Provincial Administration, South Africa

Mervyn G Henderson, Department of Transport and Main Roads, Queensland, Australia

Gerrie D van Zyl, MyCube Asset Management Systems, Cape Town, South Africa

- Western Cape Provincial Administration, South Africa, uses a Pavement Management System (PMS) to assist in managing their paved road network
- The need for reseal and priority thereof are based on a calculated Reseal Condition Index (RCI),
- apart from the highly trafficked roads in the metropolitan areas, which have asphalt surfacing, and those roads connecting Cape Town and nearby rural towns, surface seals are used on the majority of the WC 6349 km roads to provide an all weather surface



CHALLENGES FACING THE LABOUR-BASED CONSTRUCTION OF BITUMINOUS SURFACINGS IN AFRICA

David A Mfinanga, University of Dar es Salaam, Tanzania

- African countries have many low-volume roads whose management would be more cost effective if surfaced using surface treatments.
- In most low-income African countries there is scarcity of mechanical equipment for sprayed sealing or surface dressing
- use of labour based bituminous surfacing of roads is therefore an appropriate, resource conserving and sustainable solution
- problems include;
 - low availability of appropriate bitumen, preparation of a uniform surface, and availability of angular and single sized chippings. design of the surface dressing and quality control which is a challenge to rural practitioners.



Continuous operation of spraying binder and spreading chippings



THE IMPACT OF COLD WEATHER AND HIGH NIGHTTIME TRAFFIC ON AGGREGATE STRIPPING OF A SINGLE SEAL: A CASE STUDY AT BEAUFORT WEST, SOUTH AFRICA

Alan Moffett, Irafaan Sambo and Derrick FJ Pretorius, ARCUS GIBB Consulting Engineers, Cape Town, South Africa

DEVELOPMENT OF A TEST METHOD FOR DETERMINING EMULSION BOND STRENGTH USING THE BITUMEN BOND STRENGTH (BBS) TEST – A SOUTH AFRICAN PERSPECTIVE

Timothy Miller, University Wisconsin – Madison, United States of America

André Greyling, University of Stellenbosch, South Africa

Prof. Hussain Bahia, University of Wisconsin – Madison, United States of America

Prof. Kim Jenkins, University of Stellenbosch, South Africa

USE OF DYNAMIC SHEAR RHEOMETER FOR THE BITUMEN DURABILITY TEST – FEASIBILITY STUDY

Steve Halligan, Main Roads Western Australia, Australia

Sebastien Chatard, SAMI Bitumen Technologies, Australia

Garnet Gregory, Main Roads Western Australia, Australia

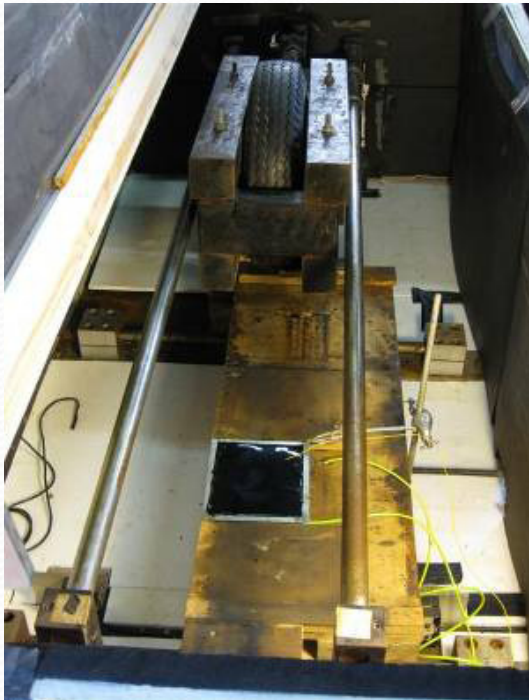
BITUMEN – TYRE ADHESION IN RELATION TO FLUSHED SEALS

Philip Herrington, Opus International Consultants Ltd, New Zealand

Gary Bentley, Opus International Consultants Ltd, New Zealand

John Patrick, Opus International Consultants Ltd, New Zealand

Martin Gribble, Capacity Infrastructure Services Ltd, New Zealand



Bitumen adhesion apparatus



Tyre with bitumen adhered



SELECTION OF A SUITABLE PRIME COAT

Simon Kotze, Vela VKE, Pretoria, South Africa

Lucas van der Schyf, TOSAS, Potchefstroom, South Africa

Gerrie D van Zyl, MyCube Asset Management Systems, Cape Town, South Africa

- paper concludes that problems are still experienced during the construction of sprayed seals, mainly related to poor adhesion, prime penetration and too slow drying. Observations made during the study indicated that certain products could be appropriate for conditions where it is currently not recommended



RESEALING WITH BITUMINIOUS EMULSIONS IN THE A.C.T.

Peter Thompson, ACT Government, Roads ACT, Australia

Dante Cremasco, Downer EDI Works Pty Ltd, Australia

- Advantages of resealing with high bituminous content emulsions (HBCE)
- have as much as 75% solids and are able to be sprayed to produce a single reseal which are more cost effective
 - cheaper resealing rates
 - extended resealing seasons
 - improved safety.

This has been matched by some disadvantages such as:

- greater loose stone issues
- problems with rain events
- problems with high humidity.



THE USE AND PERFORMANCE OF BITUMEN RUBBER IN SPRAY SEALS FOR HOLDING ACTIONS IN RSA

Klasie Jooste, KBK Consulting Engineers, South Africa

Gerrie van Zyl, Mycube Asset Management Systems, South Africa

- Bitumen rubber has been used with success on roads exhibiting serious cracking and also on roads carrying very high traffic volumes and loads. However the availability and lower costs of synthetic polymer modified binders since 1986, has resulted in more and more roads being resealed with these binders instead of with bitumen rubber.
- Typical bitumen rubber composition
- Bitumen – 78%
- Granulated rubber crumb – 20%
- Extender oil – 2%



24th ARRB Conference : 12–15 October 2010

- Conference theme - *Building on 50 years of road and transport research*
- 24th ARRB Conference held as part of ARRB celebrations of 50 years of service was to challenge participants to apply knowledge from a range of disciplines towards achieving more efficient, safe and sustainable road transport systems.