



CAPSA 2011

Report to RPF 8 – 9 November 2011

Conference detail

- 11 – 14 September Champagne Sports Resort
– Drakensburg
- Attended by a record 392 delegates
- Duration – 3 full days
- Programme
 - 4 plenary sessions (Keynote, 2 technical, Closure)
 - 8 parallel technical sessions (2 at a time)
 - 23 parallel workshop sessions (up to 5 at a time)

Roads of the future – living within the carrying capacity of the planet

- How can we go forward and add value to the provision of roads in an increasingly complex world with finite resources?



Role of CAPSA

- Moulded flexible pavement engineering since 1969
- Provided incentives to industry organisations to give impetus to the developments in intermediate years
- Entering such a period – ***what needs to be done?***

Resolution

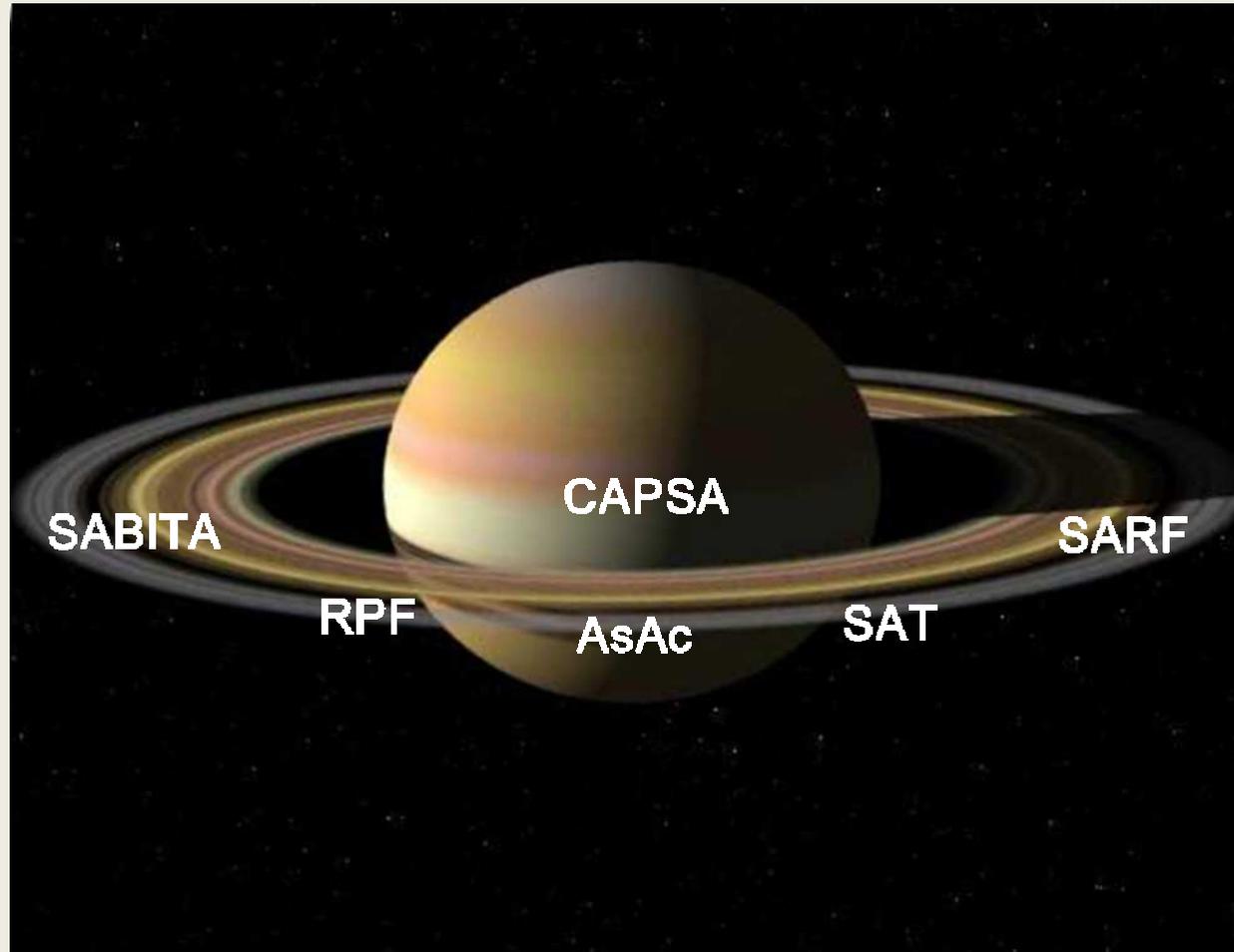
CAPSA 2011 - RESOLUTION

CAPSA 2011 recommends that the next session of the RPF be structured to take cognizance of the outcomes of CAPSA and that structured feedback sessions, on the progress achieved against milestones, be regularly included into future RPF sessions.

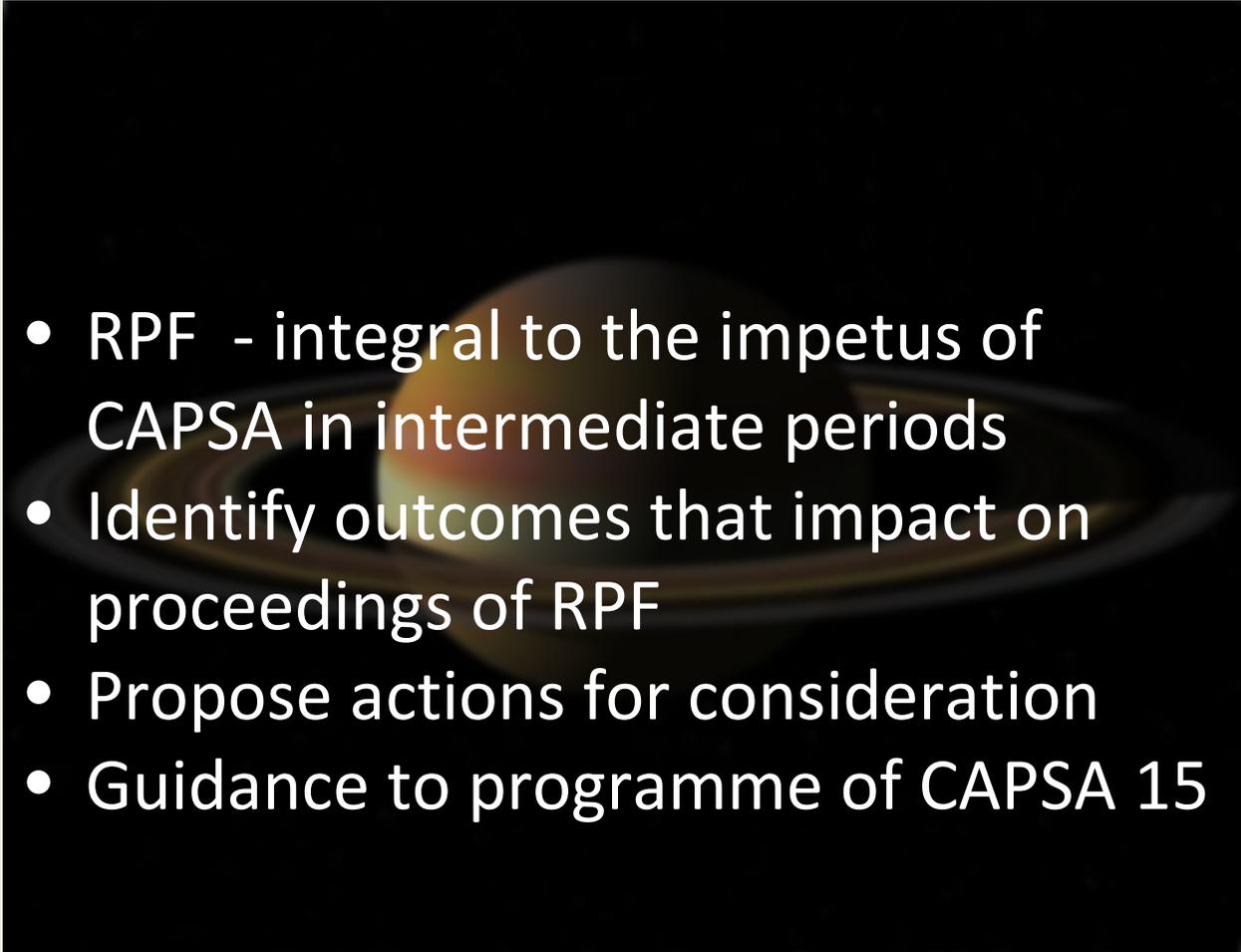


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Relationships



Relationships

- 
- RPF - integral to the impetus of CAPSA in intermediate periods
 - Identify outcomes that impact on proceedings of RPF
 - Propose actions for consideration
 - Guidance to programme of CAPSA 15

Presentation outline

- Overview of framework and outcomes
- Appraisal of workshop sessions (W Steyn)
- Recommendations for consideration

Opening Session

- Introduction – chairman Phil Hendricks
- Keynote address – Jonathan Hanks
- Presentation on Green Roads – Steve Muench

Chairman's remarks

- Terms of reference CAPSA 07
- No of delegates in 20 - 29 and 30 – 39 yr. age groups increased
- Mindful of the need for interaction between young and more seasoned professionals
- Consultants dominant sector
- Consultants & academia prominent author section

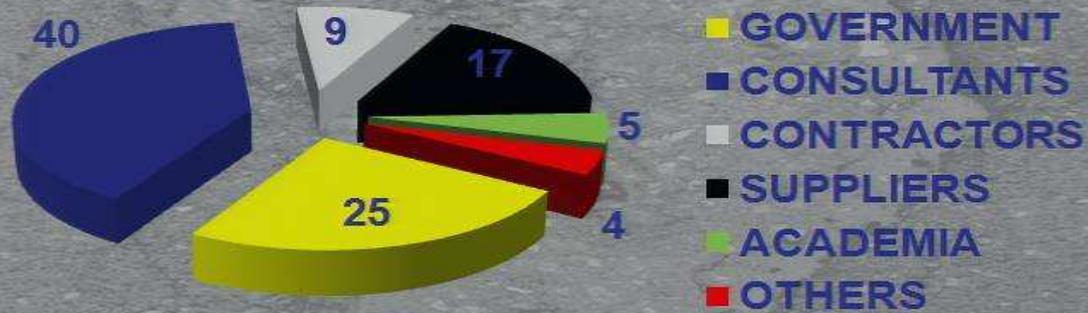
Delegate composition

Delegates 2011



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DELEGATE COMPOSITION



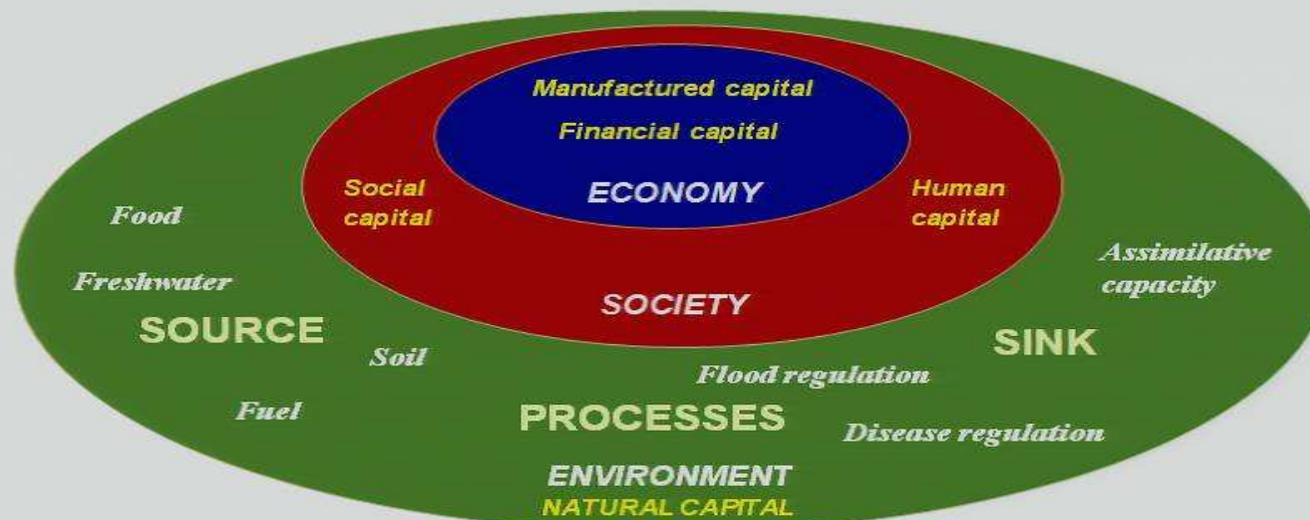
Keynote address

Hanks - Sustainability

Understanding the commercial rationale



Sustainability: an approach to **creating value** that sustains or enhances the **systems and resources** (capital stocks) upon which that value **depends**



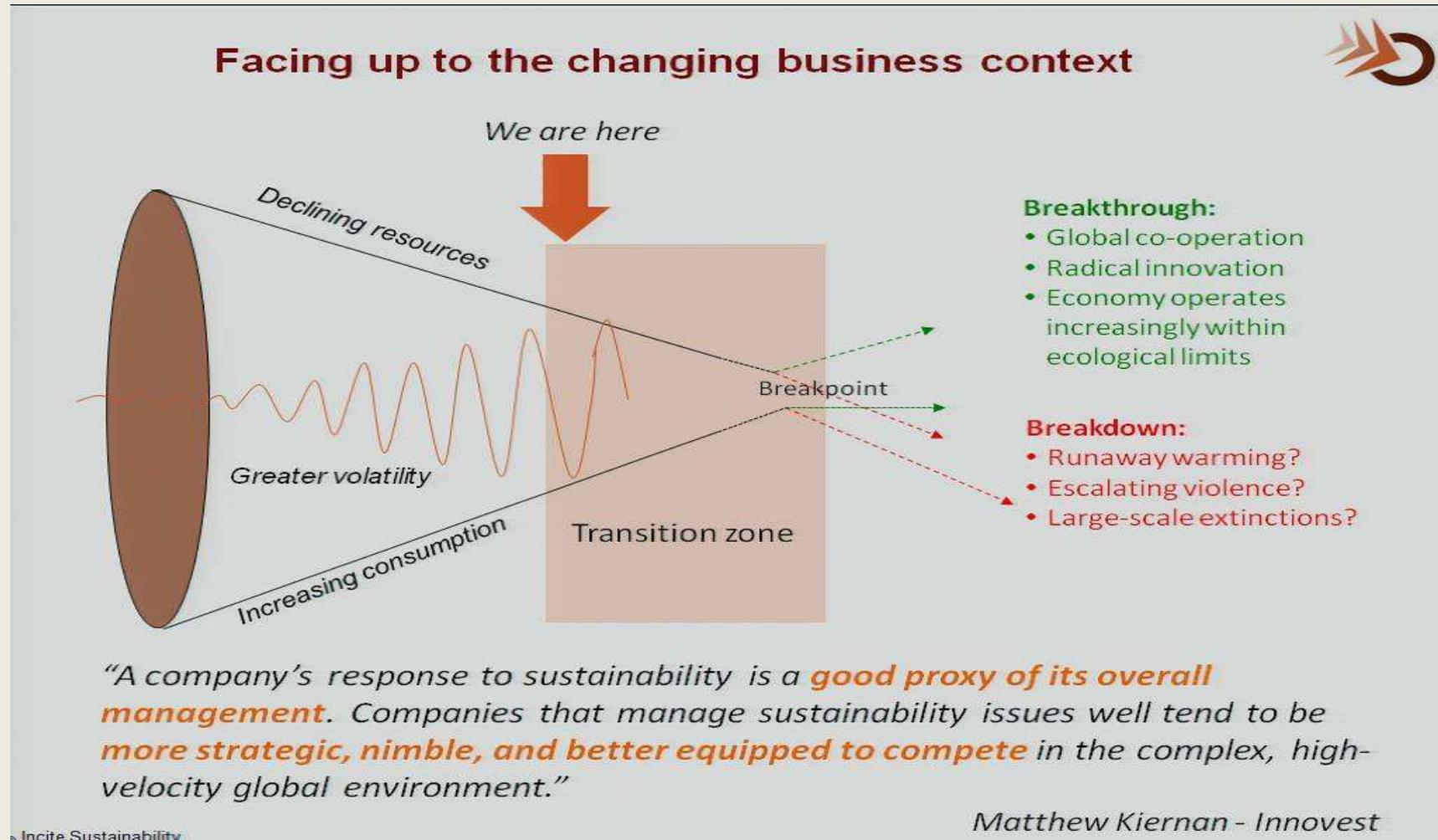
Hanks

- This leads to challenges over and above those generated by macro-economic indicators:
 - Availability and costs of commodities like energy, water and transportation
 - Availability of skilled labour
 - Exposure to volatility in weather

Key issues raised

- Boardrooms are in denial – not supporting innovation
- We need to do more than complying with standardised checklists (e.g. EIA)
- Global situation:
 - Economy being 5 times what it was a half century ago
 - World population grown to 7 billion
 - Increasing wealth inequality - volatility
- We are in a critical position:
 - Decreasing resources
 - Increased consumption
 - Increased social turbulence (due to wealth inequalities)

Critical position

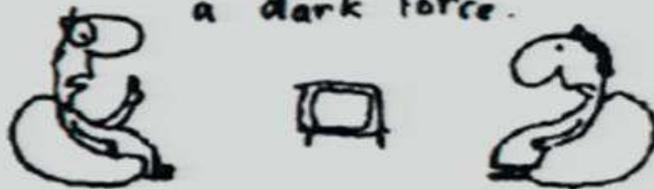


Conclusion

The commercial imperative for environmental practice



our way of life is
being threatened by
a dark force.



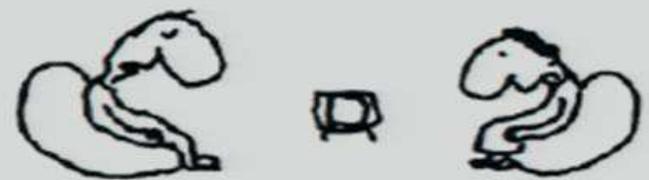
we must defend our
way of life.



WHAT IS THIS
DARK FORCE WHICH
THREATENS OUR WAY
OF LIFE?



it's our way
of life...



Lennig

Our bit

- Gloomy, disconcerting picture
- Obvious incentives to strive to:
 - Reduce dependence on non-renewable resources
 - Care for the environment and safety of people
 - Sharpen our technology to promote durability and long life
 - Entrench sustainable practice

Formed the basis of the programme of CAPSA 11

Steve Muench



Greenroads

- Greenroads supports *opportunities that roads offer* to support natural laws and human values
- Independent 3rd party sustainability rating for:
 - Road *design* and *construction*
 - All types and sizes of projects
- 11 minimum project requirements
- Voluntary credits

Attributes

- Closely aligned to CAPSA focus areas & topics
- Materials and resources
 - Re-use,
 - Recycling
 - Energy efficiency
- Pavement technology
 - Long life
 - Warm mix asphalt
 - Cool pavements
 - Quiet pavements

Reasons for adopting

- Significant savings (ROI)
- Make money (single bottom line)
- Quantify contributions to sustainability

“Intention to produce Greenroads South Africa by end of next year” – Steve Muench

CAPSA 07 – terms of reference for CAPSA 11

- CAPSA 07 retrospective
- Identified technical issues to be addressed
- **Now** within the context of sustainable practice
- Translate knowledge and awareness into practice



Assessment framework

- Accounting for *variability and risk*
- Cognisance of *Health, Safety and Environment (HSE)*;
- Improved methods for *HMA design*;
- Better modelling of traffic and proper assessment of *material strength* in structural pavement design procedures; and
- Some issues related to *surface seals*
 - Uniformity of design methods
 - Traffic limits.

Outcomes and actions

- Distilled in a QA session during closure
- FACs & delegates responding to key questions/issues emerged during conference
- Present to RPF and identify those issues that can be incorporated into the plans of RPF

Implementation of Greenroads concept

- For such a system (of LCA) to operate equitably:
 - Road authorities must adopt and drive
 - Must be measurable
 - Supported by bodies e.g. Sabita to assist authorities to:
 - Measure
 - manage
 - innovate to advance such a system

Bituminous products – conducive to energy savings

- Warm mix asphalt
 - Gaining foothold globally
 - Initiatives of eThekweni has yielded a WMA guide for SA
 - Australia (Brisbane municipality)
 - Scope expanded to modified binders in Europe
 - Pushing the envelope on temperature reductions required ($>30^{\circ}\text{C}$)
 - Other road authorities encouraged to adopt technology (COCT – trial sections)

Classification of RA

- No resolution
- “Yes” in workshops
- Otherwise:
 - Selected milling and stockpiling
 - Aggregate should not be crushed
 - TRH 21 gives guidance (ownership required)

Initiatives to update asphalt design

- Scope:
 - HMA, WMA, HiMA, thin layer conventional asphalt
 - Linked to analytical structural design methods
 - Inform national specifications
- Sabita
 - Extensive project with CSIR to review procedures
 - Another project on TT of EME to HiMA
- End product
 - New SA design *method*
 - Workshop with practice in February

Revision of national specifications on asphalt

- Current design procedures not conducive to production of optimal mixes
- Revised method should inform revisions of specifications
- Establish a formal communication structure for doing so

Seal design

- Web-based discussion forum – Southern Hemisphere Spray Seal Alliance being established
- Opportunities for interaction between researchers and practitioners
- Participants envisaged:
 - Sabita, SAT, CSIR, Academia
 - ARRB, AAPA, Academia

Variability and randomness in Pavement Design systems

- Being introduced to the fullest extent within the bounds of reasonableness
- SAPDM founded on and driven by statistics
- Data inputs based on probability-density functions
- Make predictions on likely performance attributes
- Variability translates into risk – “*SAPDM is risk management system*” – HT
- Remains underpinned by sound engineering modelling
- PN method incorporated for
 - Lower risk applications
 - Preliminary investigations of pavement type options

Preservation of pavement assets

- Pressure to spend budgets – undue pressure on consultants to deliver designs within short period (e.g. 2 months)
- More time is required to pre-empt premature failure:
 - Gain intimate knowledge of road conditions and external inputs
 - Optimise designs
 - Avoid changes in the scope of current contracts
- Term contracts should be considered

Low volume sealed roads

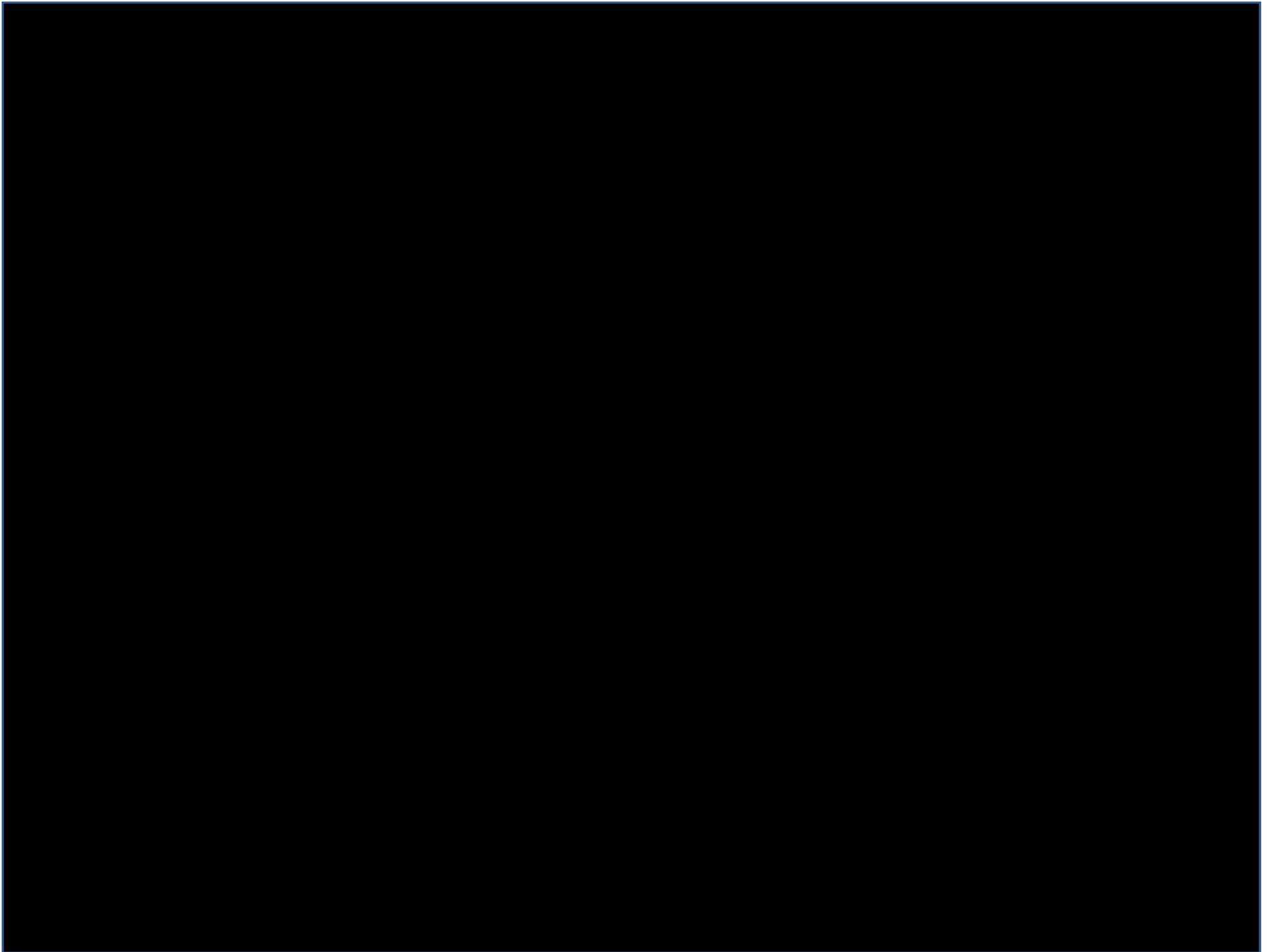
- More efficient exploitation of materials:
 - Laterites, calcretes, sand (in general use in southern Africa region)
- Adopt appropriate (non-conventional) standards
- Translate experience into standards and design methods (SAPEM)
- Consider a full session on topic at next CAPSA

Prizes

1. SAT Prize for the best paper by a young professional
Erik Denneman (CSIR BE)
Transfer of High Modulus Asphalt Technology to South Africa
2. CAPSA prize of the best paper by a new entrant
Thothela Tumelo (Aurecon)
Surfacing seal aggregate durability specifications

Recommendations on next CAPSA

- Choose venue wisely ready ***access to airports***
- 2011 venue offered multitude of venue options
 - Architecture conducive to ***flexibility and concurrent sessions*** (crucially important for a compressed conference programme)
- Three day is the limit – ***consider 3 ½ days***
- Consider including ***low volume sealed roads*** as important topic area
- Increased scope for ***interaction between young and seasoned professionals***



CAPSA 2011 Workshop feedback



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Process

- Summarized version of workshop feedback
- 4 Workshops with 5 topics and 3 main questions each
 - 60 Main issues debated over 40 hours by an average of 45 delegates
 - 1 800 hours of professional time
 - Between R 1 million and R 2 million invested in the future of the industry
- A few overall issues identified
- Major issue per workshop
- Details added to CAPSA2011 website



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List of topics

Workshop 1

- a. Recyclable materials
- b. Reconstituting bitumen rubber
- c. Warm mix asphalt
- d. Airport / safety and friction
- e. Performance characteristics

Workshop 2

- a. Cold mix asphalt
- b. Delivery
- c. Appropriate standards for LV sealed roads
- d. Energy savings measures
- e. Pavement Design approaches

Workshop 3

- a. Hot mix asphalt design
- b. Sabita 28 launch
- c. Road pavement designs
- d. Laboratory practice
- e. Performance grading / DSR

Workshop 4

- a. Hi modulus asphalt
- b. Quality issues
- c. Bitumen supply / imports
- d. Seal design options
- e. Materials characterization



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Overall issues

- Cross-pollination, mentoring and training during workshops
- Excellent opportunity for novices to engage in discussions with seasoned professionals
- In some cases no new discussions – however, standard practice affirmed
- General requirement for better marketing around various concepts in the industry



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Focused issues

Workshop 1a: Recyclable materials

- RA should be graded and classified as a specific material
- Stop using roads as dumping ground for rubbish – use appropriate waste only
- **Ownership to be taken of materials from road – do not just dump it**



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Focused issues

Workshop 1e: Performance characteristics

- Unanimously - we don't know what we are designing when working with bitumen-rubber mixes
- Gaps include material and construction uncertainties, lack of experience
- Requirements for structural and functional properties are mutually exclusive and generally one cannot use one layer to satisfy all requirements
- **Revision of current design methods should include bitumen rubber**



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Focused issues

Workshop 2b: Delivery

- Actions to be taken to reduce risks related to the design and implementation of reseals thereby increasing their performance and cost-effectiveness?
- Know the road and moisture conditions - Engineer must visit the road regularly during design period and enough time must be allowed for design. (At least through seasonal variations – 18 months minimum)
- **Accept situation and adapt through appropriate design, construction and maintenance efforts**
- **Know the road and conditions and base designs on knowledge**



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Focused issues

Workshop 2c: Appropriate Standards for Low Volume Sealed Roads

- Proposed table (range of binder types for use in LVRs with "recommendation" on applicability) - Accepted as good start
- Stick to existing alignment as much as possible when surfacing gravel roads - take adequate precautions to mitigate against safety problems
- **Good economic reasons exist for surfacing low volume roads**
- **This needs major attention**



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Focused issues

Workshop 2d: Measurement of energy savings and reduced emission

- Process should be incentivised by government using a standard calculator (i.e. IRF or Sabita version)
- Appropriate specifications should be applied to the improvement of the environment
- **Sabita calculator being introduced**



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Focused issues

Workshop 2e: Pavement design approaches

- Cautious support depending on a number of logistical issues around implementation
- Simplex/complex (design approach) depends on design situation, knowledge of client, traffic, road category, expertise
- Use simple rules for initial design, complex rules to optimize design
- Building better pavements not necessarily achievable with current procurement system

- **Marketing of current developments through SAT / RPF important**
- **Education and training – who is doing what – how do we train the next (current?) generation?**



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Focused issues

Workshop 3a: Design of Hot Mix asphalt

- Marshall – 2 opinions
 - Use Marshall – it works (with experience)
 - Time to move away from Marshall design, it does not provide performance parameters

- **Ensure that new asphalt specification is linked with new asphalt design method**
- **Methods should inform and support each other**
 - Packing, Bailey, grading guidelines etc important



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Focused issues

Workshop 3d: Laboratory practice

- If the SANAS accredited lab's quality assurance management system is applied on site laboratories it would make a difference in pavement condition
- **SANAS requires active / working proficiency system to work**
- **RPF has a role to entrench a laboratory proficiency system**



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Focused issues

Workshop 3e: Performance Grading of Bitumen

- PG will be manufactured if refineries did not have to buy new equipment
- Need at least 2 DSRs per refinery in South Africa.
- Further DSRs in several reference laboratories
- DSR is quicker - 6 DSR tests in same time as one empirical test
- Better reflects in service performance and loading conditions

- **Report various DSR values for all designs**
- **Allows design based on performance related criteria**



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Focused issues

Workshop 4b: Seal design method options

- Sealing in adverse weather - High volume of traffic, accept less risk - Low volume traffic – accept more risk
- Spread sealing seasons reduces peak binder demand from suppliers
- Actions can be taken to improve the performance of surfacing seals in South Africa
 - General - Understand why poor performance – Investigate
 - Design - Selection of appropriate seal type
 - Construction - Lack of experience on QA including contractor & consultant
 - Incentives - Longer term maintenance contracts
- **Current efforts through SAPDM process**
- **TRH3 revision status?**



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Focused issues

Workshop 4c: Quality systems

- Is it not time to embrace modern technology into QA?
- Make use of mixing plant printouts (per batch) as well as intelligent compaction data instead of only traditional coring
- **Visual screening of quality even before detailed testing?**
- **Test to confirm not to determine**



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Focused issues

Workshop 4d: Bitumen supply

- Workshop resolution
 - **Bitumen** is a “strategic” (commercially critical) commodity.
 - **Government** needs to ensure that the blockages are taken out of the way. Clear the red tape. Put high priority into National Planning needs / benefits. Commit to 3+ year works programs
 - **Suppliers** need to the right price to incentivize production and investment.
 - **Contractors** become masters of their own destiny / become entrepreneurs in binder supplies
 - **Binder manufacturers** will through price parity stay in the bitumen market. Increase in binder manufacturers/new importers. Import and supplement local supply
- **Accept the facts and make a plan**
- **Maybe the solution is an alternative material????**



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Focused issues

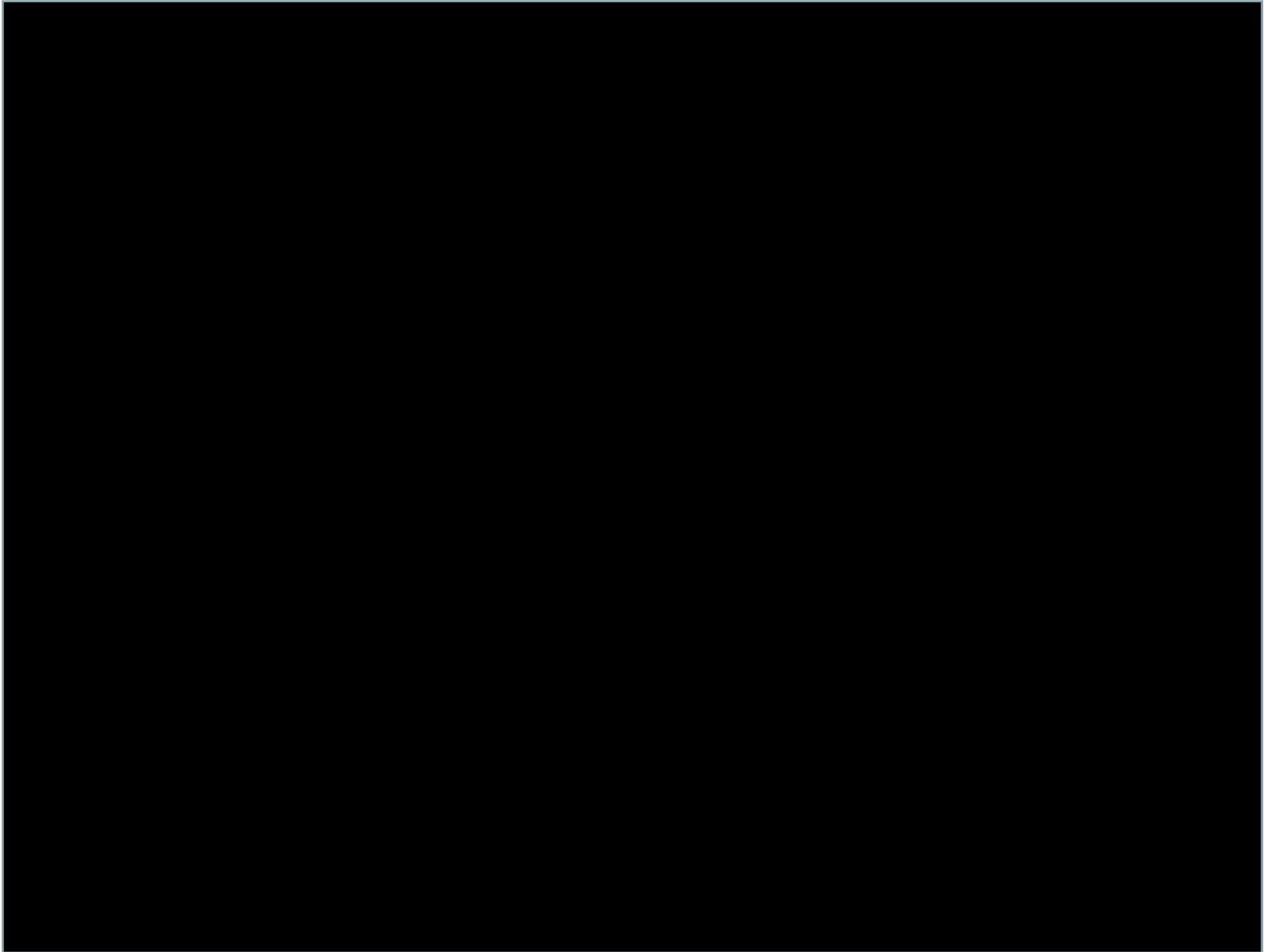
Workshop 4e: Materials characterization

- Important to incorporate appropriate methods and laboratory tests into the system to ensure best in situ data for designs
- Make appropriate use of available technologies
- Concern about level of skills for both standard and advanced laboratory testing in South Africa

- **Capacity building – by whom / where**
- **Who takes responsibility?**



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Recommendations to RPF

1. Provide for ongoing ***structured feedback sessions*** on progress against milestones identified by CAPSA
2. RPF consider a section on ***sustainable practice*** in future programmes
3. Support independent ***3rd party rating systems of sustainability*** in road design and construction

Recommendations to RPF/cont ...

4. Assign ***ownership of TRH21*** to keep abreast of new developments in RA technology
5. RPF to interact regularly of progress in development of the ***Asphalt Design Method***
6. RPF to assist in establishing a contact forum for communication between parties involved in the ***revision asphalt design and the national specification***

Recommendations to RPF/cont

7. RPF should assist in the establishment and function of the envisaged ***Southern Hemisphere Spray Seal Alliance***
8. RPF programmes should cater for innovative practice for ***LVSR's***
9. RPF should support initiatives to declare bitumen a ***strategic product for development***
10. RPF should support procedures that will lead to ***improved designs***, considering prevailing conditions and design periods

Recommendations to RPF/cont

11. RPF should reconvene the ***bitumen specification task group*** to consider the introduction of the DSR as a measure of bitumen properties
12. RPF has a role to entrench a ***laboratory proficiency system***
13. RPF should encourage and offer opportunities for ***mentorship*** via its programmes & delegate profile



Key drivers in construction industry

- ***Increased demand*** for new infrastructure
- Shift in demand for building materials
- Project delays due to extreme weather conditions
- Increased costs associated with ***carbon-intensive raw materials***
- ***Shift in investments*** depending on project exposure and more/less carbon intensive products/processes