



South African Pavement Design Method (SAPDM)

Revision Status Report

22nd RPF Meeting

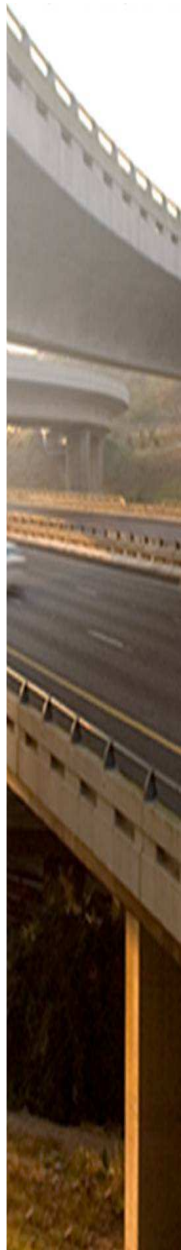
9 November 2011

L Kannemeyer

Aka GODZILLA


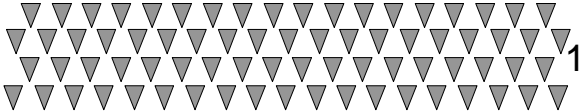

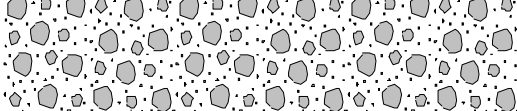
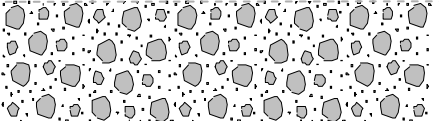
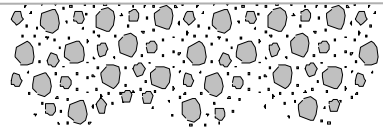


Typical SA Pavement and SAMDM



SA Pavement Structure

Current ME Damage Model

	35mm Wearing course	Asphalt Fatigue – Freeme 1970s
	150 mm Crushed stone base	Permanent Deformation FOS Maree 1970s to 1980s
	150 mm Cemented subbase	Effective Fatigue and Crushing Failure De Beer 1980s
	150 mm Granular upper selected subgrade	Vertical Strain Criteria Dorman and Metcalf 1965
	150 mm Granular lower selected subgrade	Vertical Strain Criteria Dorman and Metcalf 1965
	In situ subgrade	Vertical Strain Criteria Dorman and Metcalf 1965

Current SAMDM has number of limitations, i.e. no damage models for plastic deformation in Asphalt layers, number of models outdated, etc, etc

Why is Revision of SAMDM Required ?

- **Summary**

- Classical ME design method - single estimate of bearing capacity
- Critical layer approach – distress mechanisms disconnected
- Separated resilient response and damage models
- Material resilient response
 - Recommended M_r and Poisson's Ratio values
 - Conflict between slow and dynamic test results

- **Users are disillusioned with the method**

- Counter-intuitive and inadmissible results
- Extreme sensitivity of the method to input data
- Inconsistent input
 - Resilient response (FWD, MDD, Laboratory)
 - Strength parameters

- **Statements made that ME-design is not possible due to:**

- Too many unexplained effects (chaos)
- Getting the right answers for the wrong reasons (i.e. correctly predicted expected life, but wrong layer failing !)

- **New Technology**

Cross-Ply Architecture

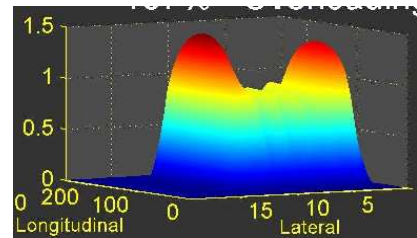


New Tire Technology

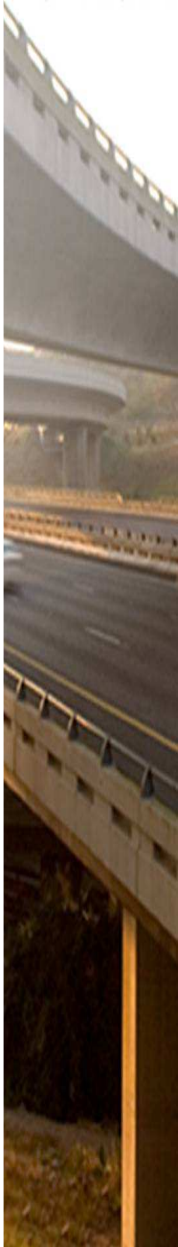


Increased Tire Pressure

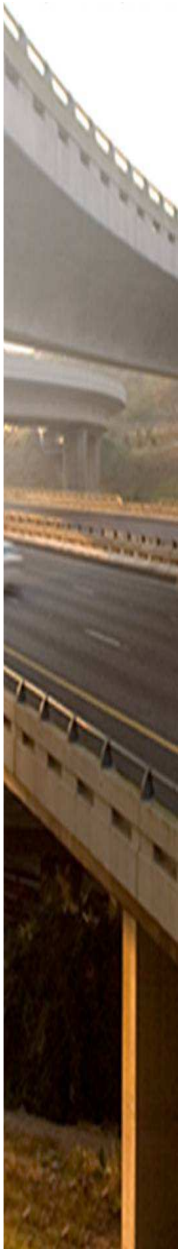
Radial architecture
Invented by
Michelin



SAMDM – Lipstick on a PIG ?



SAPDM Revision - Overall Objectives



Theory

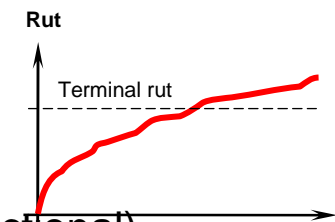


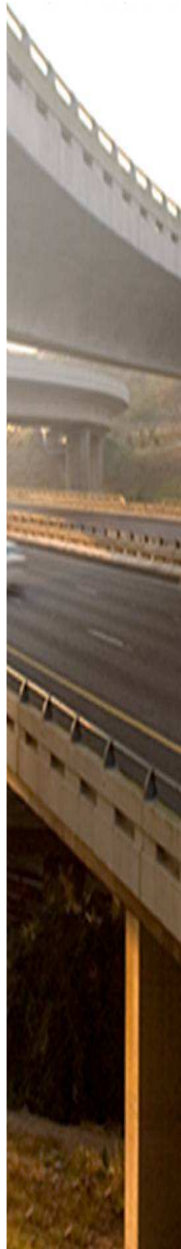
=

Reality



- To develop a design method that is:
 - Accurate (theory must agree with reality)
 - Enable input of basic material properties (i.e. grading, moisture content, etc) that is readily available to the user
 - Rely on results of test equipment generally available in practice
 - Must take full cognisance of the in-service operating conditions of the pavement and the impact thereof on the design inputs
 - Impartial in terms of pavement type selection
 - Unbound (Crushed stone, natural gravel)
 - Stabilised (Cement, Foamed-bitumen, Emulsified-bitumen)
 - HMA
 - Concrete / Block Paving
 - Incremental life cycle performance simulation (structural/functional)
 - Comprehensive cost-benefit analysis procedure assessing different life-cycle strategies and including cost and benefits for road users as well as road authorities
 - Be easy to use and allow for different levels of analysis





User

Young professional

Seasoned professional

Design Specialist

Design application

Design scenario:

- Routine and preliminary design
- Low risk
- Low design experience
- Known materials – default input
- Conventional material classification
- Pavement Number Concept

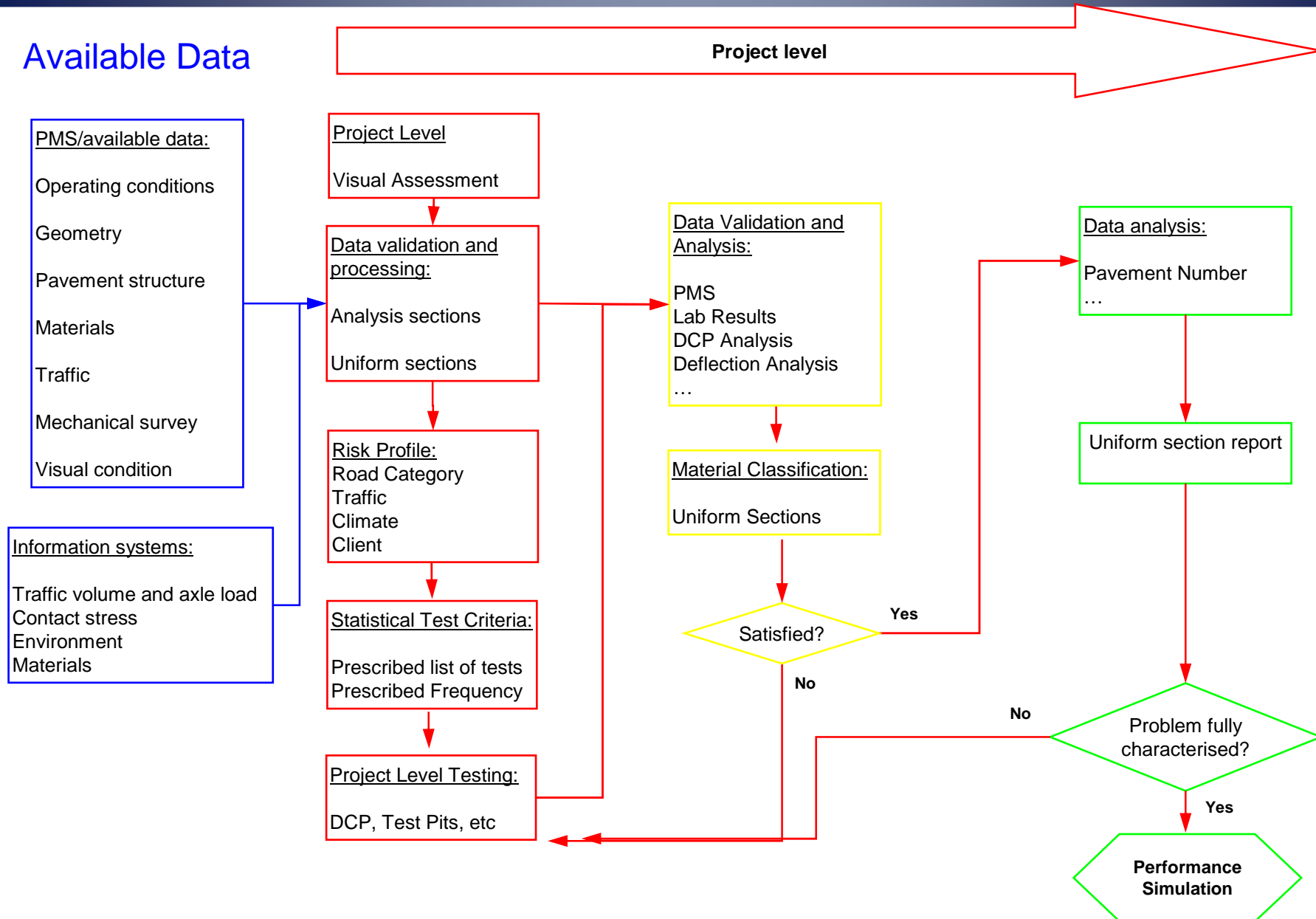
Design scenario:

- Important design
- Medium risk
- Seasoned professional designer
- Project specific input

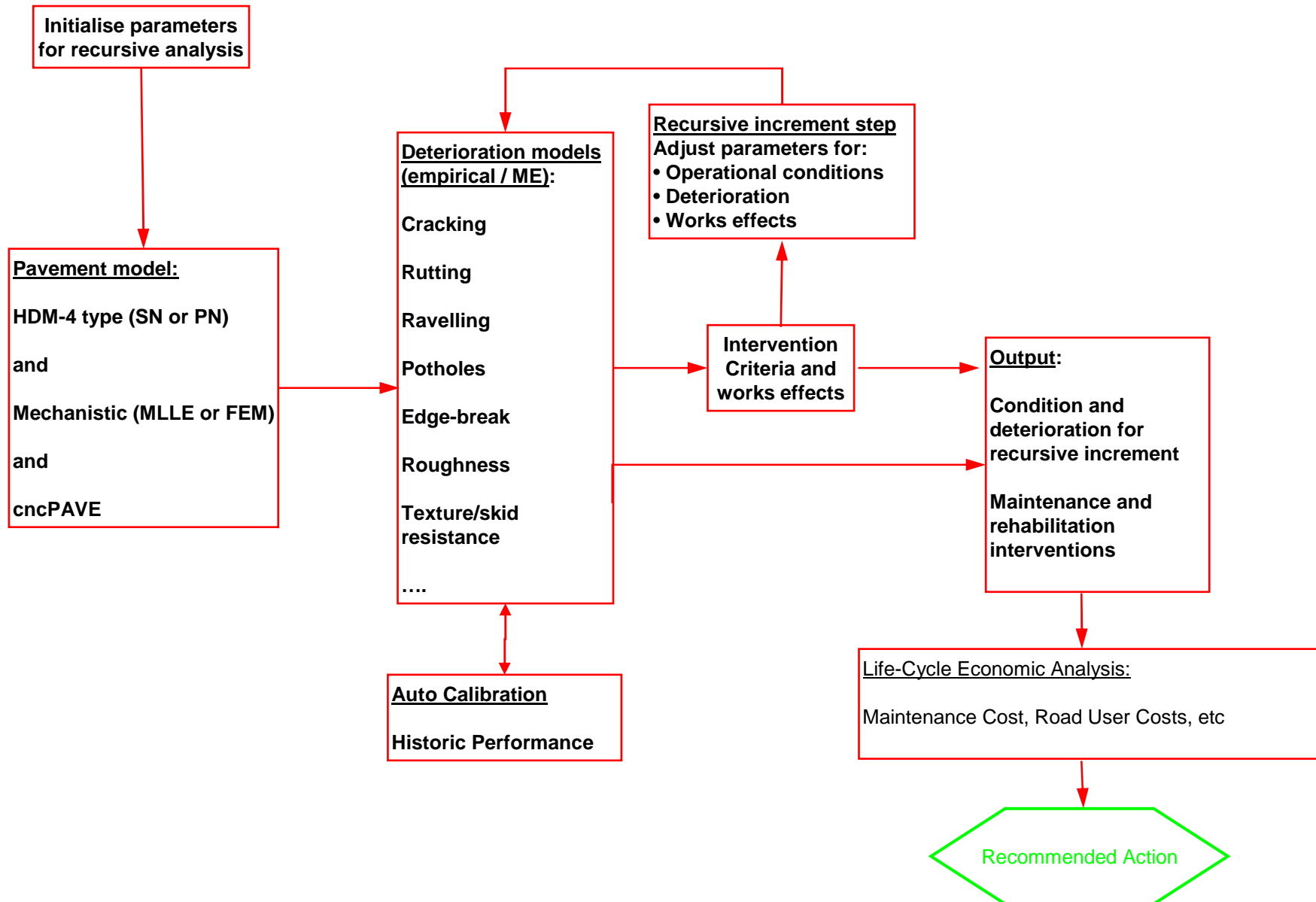
Design scenario:

- Very important design, high risk
- Special investigations
- Specialist designer
- Unusual materials
- Project specific input

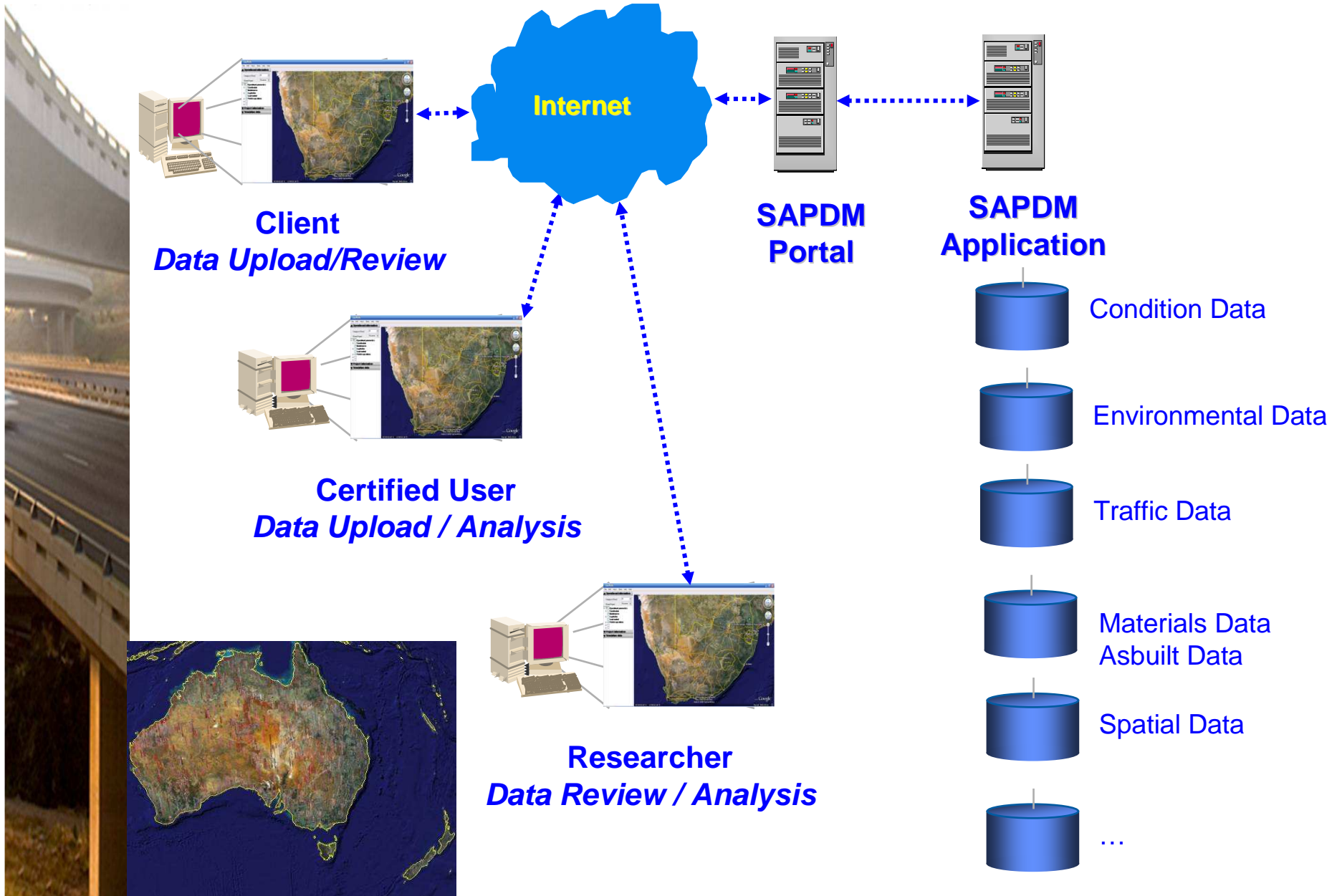
SAPDM – Investigation Process Flow



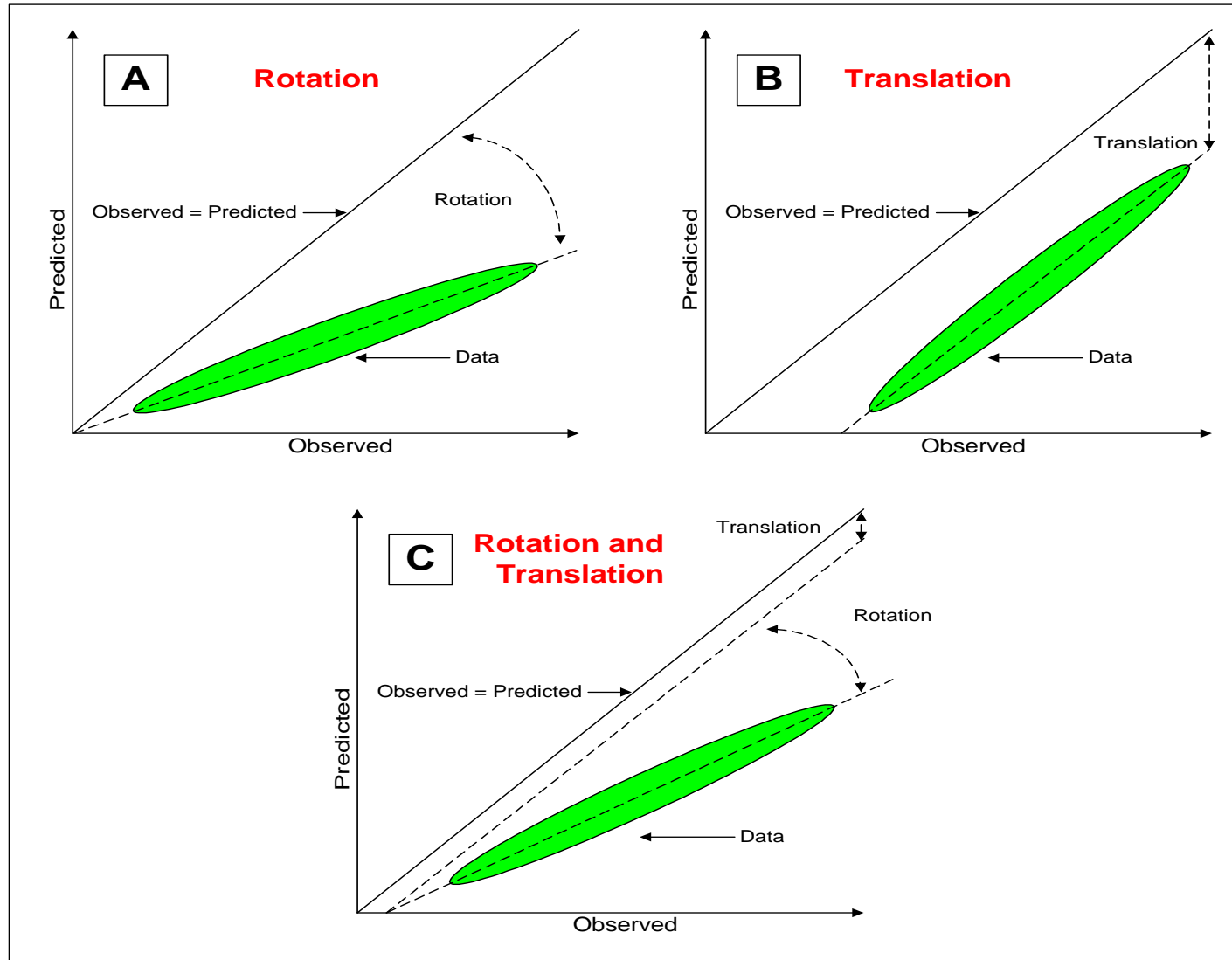
SAPDM – Performance Simulation Process Flow



SAPDM – Information Flow



SAPDM – Information Flow



SAPDM Revision - Historical Overview

- Process initiated at RPF - **May 2005**
- R&R framework - **November 2005**
- Pavement Performance Information System (LTPP)
 - Material Classification Concept
 - Pavement Number Concept (PN)
 - 50 Projects Completed – **February 2008**
 - 11 Stabilized Projects Added – **February 2008**
- Mechanistic-Empirical Analysis System (MEAS)
 - Phase 1 – Develop Detailed Project Briefs – **November 2006**
 - Phase 2 - Inception Phase (22 Projects) – **July 2007**
 - Peer Review – Phase 2 Reports – **November 2007**
 - Additional SANRAL Requirements – **December 2007**
 - Appointment of Main Service Providers – **September 2008 (5 year)**
 - CSIR Built Environment
 - Pavement Modelling Corporation
 - SC Van As Traffic Engineering
- SAPDM Website (www.sapdm.co.za) – **May 2009**



CONTENTS

- Home
- Technical
- Project Management
- Public Documentation
- Project Team Documentation
- Frequently Asked Questions
- Disclaimer

Search: >>

Username:

Password: >>

Not registered, [click here](#) | Forgot your Password, [click here](#) | Change password, [click here](#)

welcome to the South African Pavement Design Method Website...

About the project

Mechanistic-empirical pavement design has been one of the primary pavement design tools in South Africa since the early 1970s. Although some improvements were made to the original method over the years, the main components of the current method are still based on research done during the 1970s and 1980s. The problems associated with the current method were highlighted at the Conference for Asphalt Pavements in Southern Africa held in 2004. These problems were again raised at the subsequent Roads Pavement Forum meeting held in May 2005 and a workgroup appointed to initiate the revision of the South African Mechanistic-Empirical Design Method.

Project sponsors

Currently two sponsors have approved funding for the revision of the flexible pavement design method, the South African National Roads Agency Ltd (SANRAL) and the CSIR. CSIR funding covers mostly research activities to establish the foundation from which the development and implementation activities will be launched. SANRAL is the main sponsor and largest client body to implement the revised design method.

NEWS

Sorry, no new news posted
[Click here for all news items](#)

CALENDAR

[Click to view full Calendar](#)

September - 2011

Mo	Tu	We	Th	Fr	Sa	Su
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

PROJECT SPONSORS:

South African National Roads Agency Ltd. (SANRAL) | Council for Scientific and Industrial Research

CONTACT INFORMATION:

For any queries regarding the project please contact the project team at info@sapdm.co.za

www.sapdm.co.za

SAPDM Revision - Progress To Date

Reports

- Nov 2009 = 8 Reports
- May 2010 = 21 Reports
- Nov 2010 = 30 Reports
- May 2011 = 43 Reports
- **Nov 2011 = 56 Reports**

Field Trials – Ongoing

- Environmental Nov 2010 = 41 Sites
- **Environmental Nov 2011 = 39 Sites**
- Material Bulk Samples Nov 2010 = 3
- **Experimental Sections**
 - **Stabilisation (CTB,FTB,ETB/G1) R35 – Feb 2012**
 - **Typical Pavements (R104) – Jun 2012**

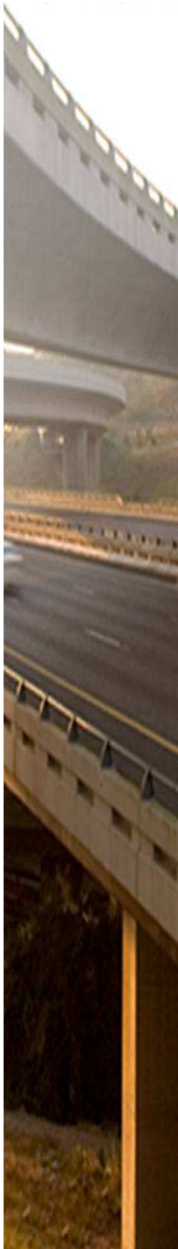
Lab Testing – Ongoing

- Dec 2010 = 6 Asphalt Mixes - Complete
- **May 2011 = 1 of 3 Mixes**

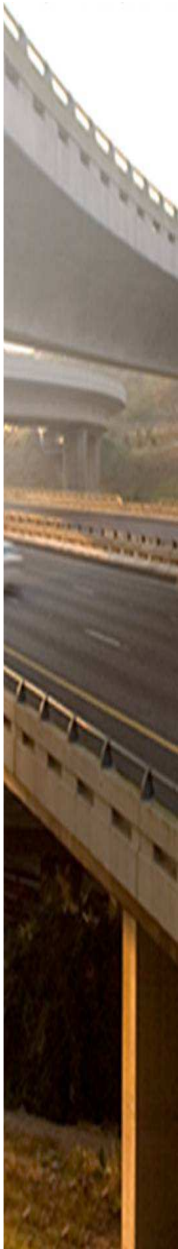
Surface Seals – **Work Started April 2011**

Concrete / Block Integration – **Work Started January 2011**





Title	Presenter
Inception Report: Concrete and Block Paving	P Strauss
Performance of Stabilised Materials	H Theyse





Thank You

www.sapdm.co.za

