

South African Pavement Design Method (SAPDM)

Revision Status Report

27th RPF Meeting

21 May 2014

L Kannemeyer

Aka GODZILLA



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**

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
- Nov 2012 = 77 Reports
- May 2013 = 88 Reports
- Nov 2013 = 102 Reports
- **May 2014 = 112 Reports**

Field Trials

- Environmental = 41 Sites - **Completed**
- Experimental Sections
 - R35 Stabilisation = Oct 2012 - **Monitoring Ongoing**
 - R104 Instrumented Typical Pavements = Aug 2013 - **TSD**

Surface Seals – **In progress, work Started April 2011**

Concrete / Block Integration – **Complete ?**

Economic models/guideline – **In Progress (HDM4)**

SAPDM Detail Feedback

Title	Presenter
SARDS Software Portal	L Kannemeyer
SAPDM Seal Ageing and Effect on Pavement Life	G van Zyl
SAPDM Modelling Surfacing Seals and Contribution to TRH3	T Milne
SAPDM R104 Experimental Sections: Latest Benchmark Data	W Steyn



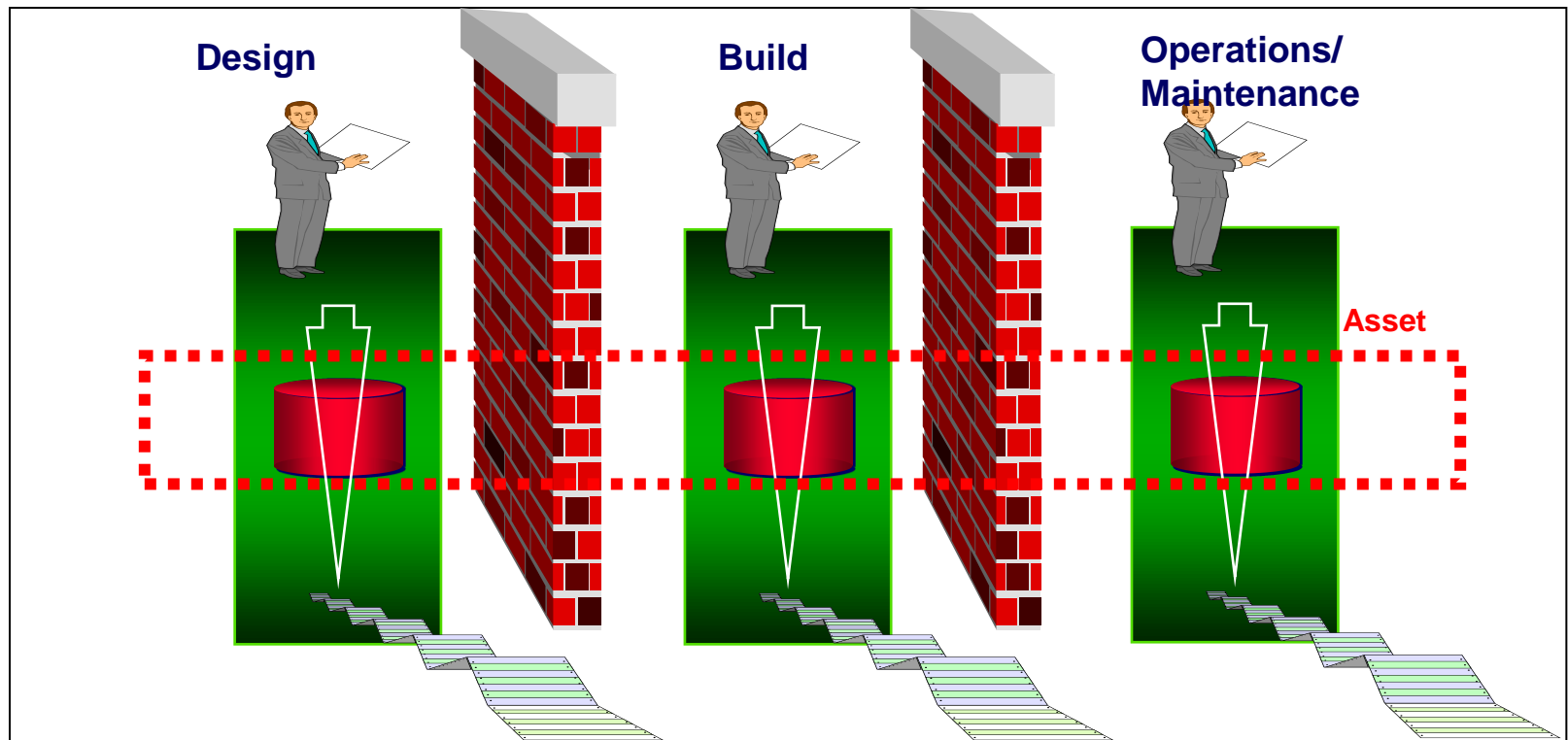
South African Road Design System (SARDS)

Portal

Why Name Change?

We are not only doing pavement design, but capacity & safety etc as well !

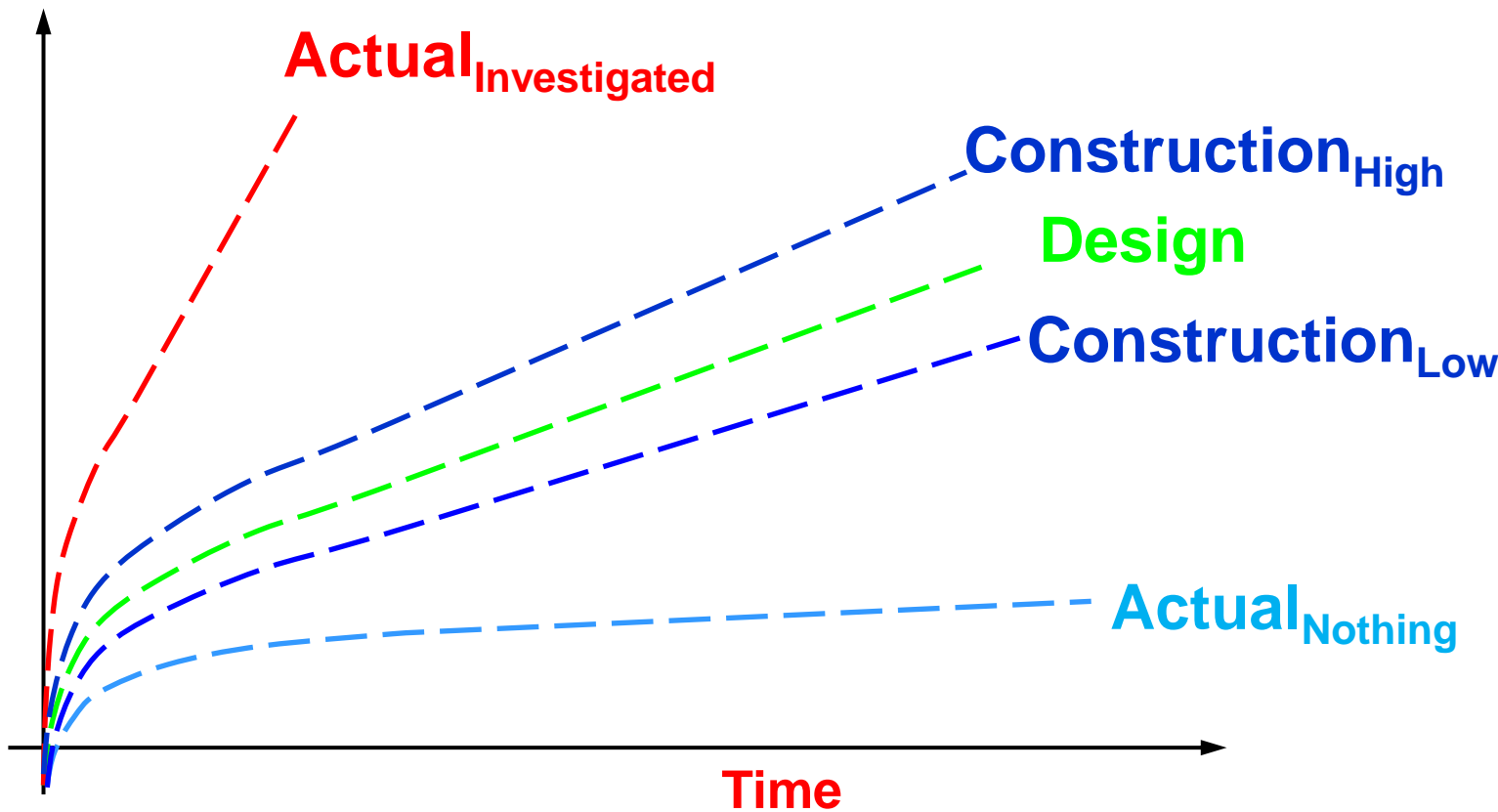
SARDS Software Portal – Why ?



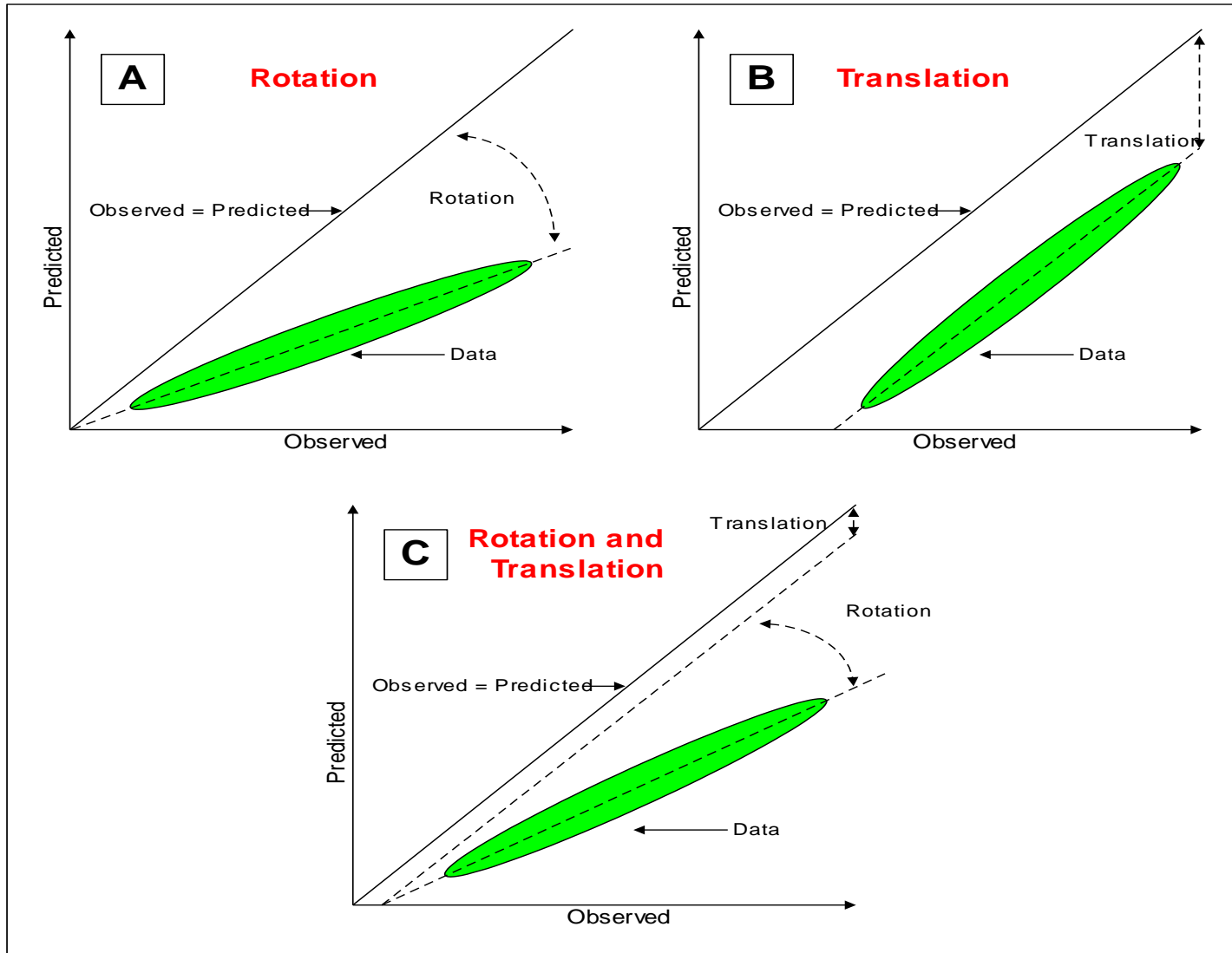
- Traditionally Road Authorities are organised according to vertical silos for administrative convenience, this results in vertical walls between silos resulting in authorities losing sight of the complete asset life cycle and focusing on delivery efficiency within each silo (doing the same thing quicker, cheaper).
- We need to ensure electronic flow of data through the life cycle

SARDS Portal – Why ?

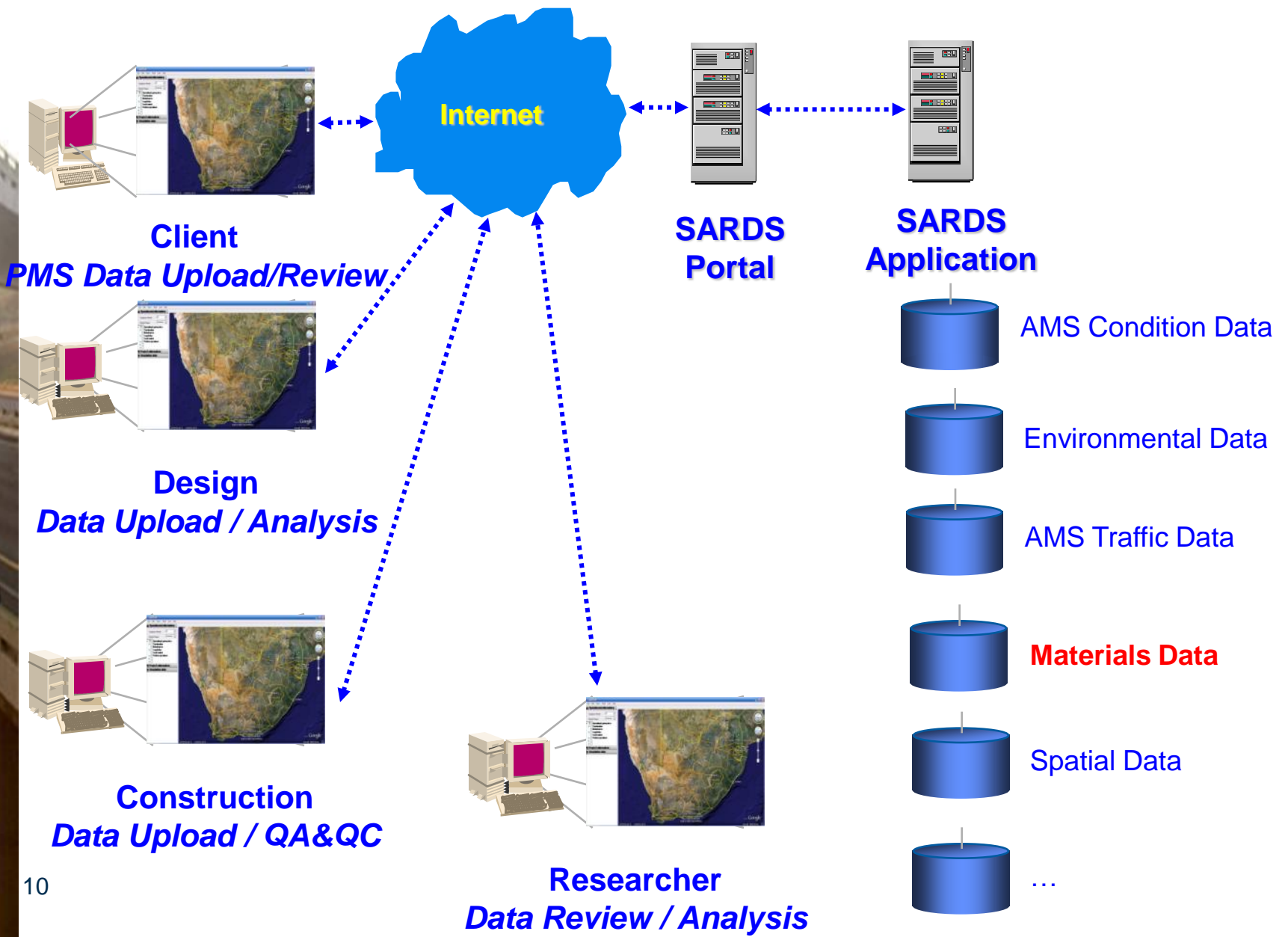
Damage



SARDS – Updating of Models



SARDS – Information Flow



WELCOME TO THE SOUTH AFRICAN ROAD DESIGN SYSTEM

ABOUT THE SYSTEM

The South African Road Design System provides a comprehensive framework to facilitate the process of pavement design. The process is initiated with the registration of projects at the road authority for tender purpose. Projects listed for tender are open to view by accredited users and these projects are populated with available network level data. The SARDS portal provides convenient viewing capability for design engineers to gain insight into the design requirements of the project.

Once appointed for the design of a specific project, the design engineer is supported with an array of tools through the SARDS portal that incorporates the latest pavement engineering technology.

1. DESIGN INVESTIGATION

A data management system that allows for capturing, viewing and processing of vast volumes of data associated with the design investigation process. Data views are presented in a linear viewer format that is easy to navigate

State-of-the-art data analysis procedures including:

- Classification of visual condition data using the deduct point system
- Comprehensive deflection bowl analysis
- Dynamic homogenous section demarcation using automated change-point detection
- Point-by-point back-calculation of effective layer stiffness moduli using the latest multi-layer and numerical optimisation routines

A materials information system that:

- Allows for capturing materials test results from existing pavement layers as well as potential external material sources including borrow-pits and commercial sources
- Prepares the necessary materials related input for the performance simulation component of the SARDS

2. PERFORMANCE SIMULATION

Combined simulation of structural and functional pavement deterioration using rational empirical and mechanistic-empirical techniques

The first pavement performance simulation package intended for routine pavement design that utilises material cross-anisotropy in the primary pavement response model

A world-leading unique formulation of damage models that is based on the Markov principle and eliminates the need for the iterative, strain-hardening approach to damage modelling that is normally employed in recursive performance simulation
Economic assessment of different pavement design alternatives with consideration of road authority and road user cost

3. CONSTRUCTION QUALITY ASSURANCE

- Quality assurance material test units based on TMH1 and the latest SANS 3001 test methods
- Quality assurance adjudication schemes based on COLTO 8200 and 8300
- Automated quality assurance and as-built reporting

SARDS – User Registration

Register - User Details

e-Mail address
e-Mail address

Confirmation e-mail address
Confirmation e-mail address

Password
Password

Confirm password
Confirm password

Security Question
Please select

Security answer
Security answer

Name
Name

Surname
Surname

I have a valid RSA ID number

User Details Previous Next Close

USER LOGIN

User name
Username / e-mail address

Password
Password

Remember me

Forgotten your password? [Request a new password](#)
[Change your password.](#)
[Register if you don't have an account.](#)

Log in

myACCOUNT ITIS SARDS COTO REGISTER LOGIN

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

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SARDS – Product Licence Details

ITIS DESKTOP - PRODUCT LICENSE DETAILS

AVAILABLE ITIS LICENSES AVAILABLE SARDS LICENSES REGISTERED LICENSES

SUB LICENSES	ORGANISATION NAME	LICENSE START	LICENSE END	LICENSE	
None	SANRAL	2013/03/09	2056/09/07	B7AFF110C6DE40A9911D5552B218F483	Copy

ITIS Desktop - Download

BEFORE DOWNLOADING THE DESKTOP INSTALLATION, YOU MUST FIRST CHECK THE SUPPORTED PLATFORMS, SOFTWARE REQUIREMENTS AND PREREQUISITES. THESE PREREQUISITES WILL AUTOMATICALLY BE DOWNLOADED BY THE INSTALLER.

WINDOWS XP

WARNING: Support for Windows XP has been discontinued as Microsoft no longer offers support.

WINDOWS 7

The following is needed when installing on Windows 7.

- Windows Installer 4.5
- Microsoft .NET Framework 4
- SQL Server Compact 4

ITIS DESKTOP SHELL

Choose ITIS Desktop Shell installer for a smaller download should you meet all the prerequisite software installations, after registering the software in the admin section you synchronize your software, this will then install the required modules for which you are registered.



ITIS Desktop Shell

Size 3.53 MB

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WINDOWS VISTA

The following is needed when installing on Windows Vista.

- Windows Installer 4.5
- Microsoft .NET Framework 4
- SQL Server Compact 4

WINDOWS 8

The following is needed when installing on Windows 8.

- Windows Installer 4.5
- Microsoft .NET Framework 4
- SQL Server Compact 4

ITIS DESKTOP FULL

Choose ITIS Desktop Full to have the prerequisites and modules installed all during installation. This installer is larger and is the best choice for first time installation.



ITIS Desktop Full

Size: 15.3 MB

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PLEASE NOTE

YOU MAY REQUIRE YOUR IT ADMINISTRATOR TO PERFORM THIS INSTALLATION AS YOU WILL REQUIRE ADMINISTRATOR RIGHTS ON YOUR WINDOWS INSTALLATION.



SARDS QA Module – Test Locations

South African Pavement Design Method (DEBUG)

Hide Viewer ▲

1.2 km
1 1

20

30

40

50

Lots **Test Locations** Bulk Laboratory Compaction Field Density Stabiliser Uniformity

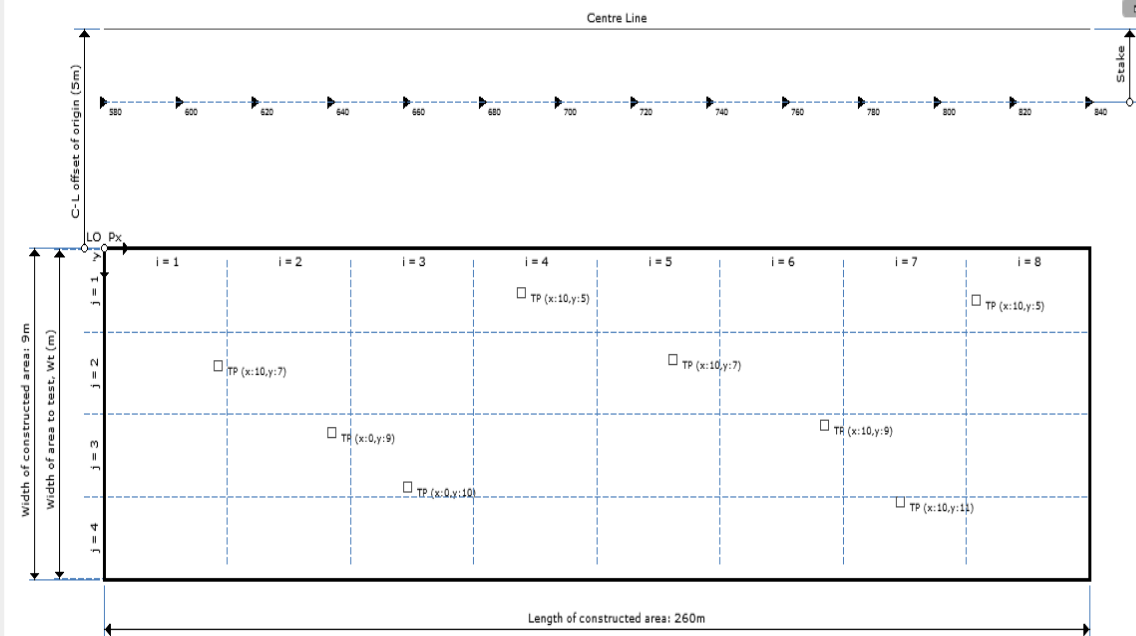
Selected Lot Number: R10401E-L1-580m-840m Stabilised Cement C1 TMH1 COLTO8200

Save Generate Test Locations Refresh Test Locations Layout

Stake offset X(m)	Stake offset Y(m)	Depth in layer(mm)	Bulk Sample	Field Density	Stabiliser content	Uniformity
10	7.2	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	9	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	10.5	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	5.2	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	7	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	8.8	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	10.9	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	5.4	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Click to Add a Test Location

Layout Grid



Show Test Results ▼



SARDS QA Module – Detail Data / Calculations

South African Pavement Design Method (DEBUG)

Show Viewer ▾

Lots
Test Locations
Bulk
Laboratory Compaction
Field Density
Stabiliser
Uniformity

Selected Lot Number: R10401E-L1-140m-380m Stabilised Cement C1 TMH1 COLTO8200 Test location: 01 ▾

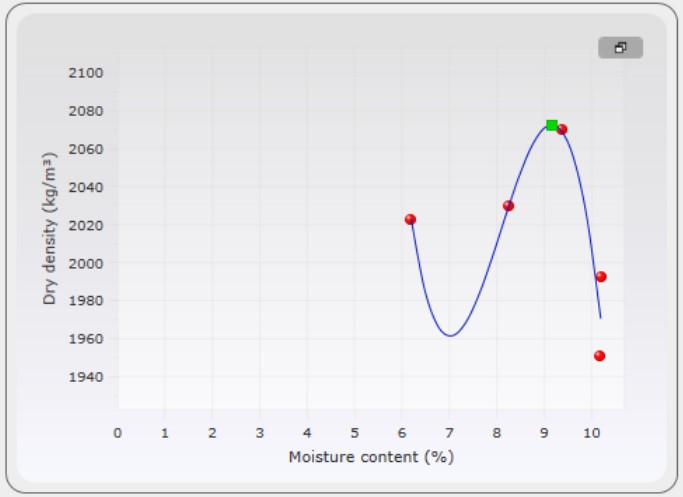
Save

Optimum compaction moisture content and maximum dry density - TMH1 A7

Moisture content method: Oven Moisture ▾

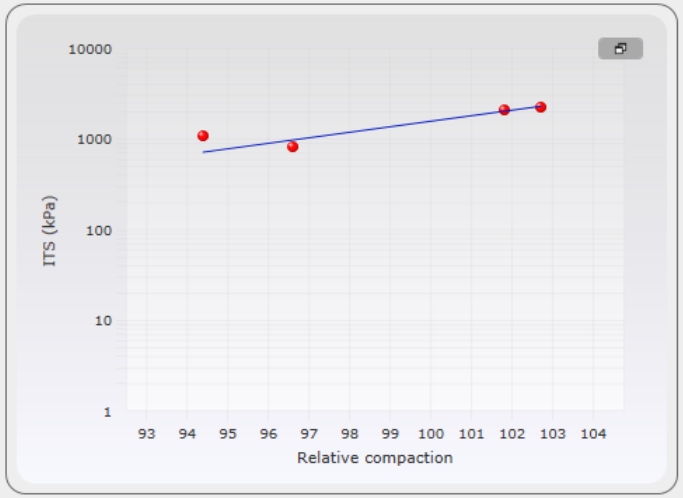
Mass of container and wet material, a(g)	Mass of container and dry material, b(g)	Mass of container, c(g)	Mass of mould with compacted material, Wc(g)	Mass of mould Wm(g)	Volume of mould, V(ml)
909.0000	846.0000	227.0000	9871.0000	4953.0000	2288.0000
980.0000	910.5000	228.5000	9968.0000	4936.0000	2292.0000
910.5000	858.5000	228.5000	9972.0000	4936.0000	2292.0000
910.0000	870.0000	224.0000	9868.0000	4953.0000	2288.0000
932	871.5	225	10133	4953	2288

Click to Add a Test



Unconfined Compressive Strength and Indirect Tensile Strength - TMH1 A14 and A16T

Compaction effort	Dry density (kg/m3)	Moulding moisture content (%)	Height of specimen (mm)	Diameter of specimen(mm)	ITS load (kN)
Modified AASHTO	2129.0000	6.9000		152.4000	41.2700
NRBs.Value	2110.0000	6.9000		152.4000	38.5600
Standard Proctor	2002.0000	6.9000		152.4000	15.1900
User 1	1956.0000	6.9000		152.4000	20.1700
User 2					



Show Menu ▾

ITS

Show Test Results ▾

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