South African Pavement Design Method (SAPDM)

Revision Status Report

26th RPF Meeting

6 November 2013

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 = 95 Reports

Field Trials

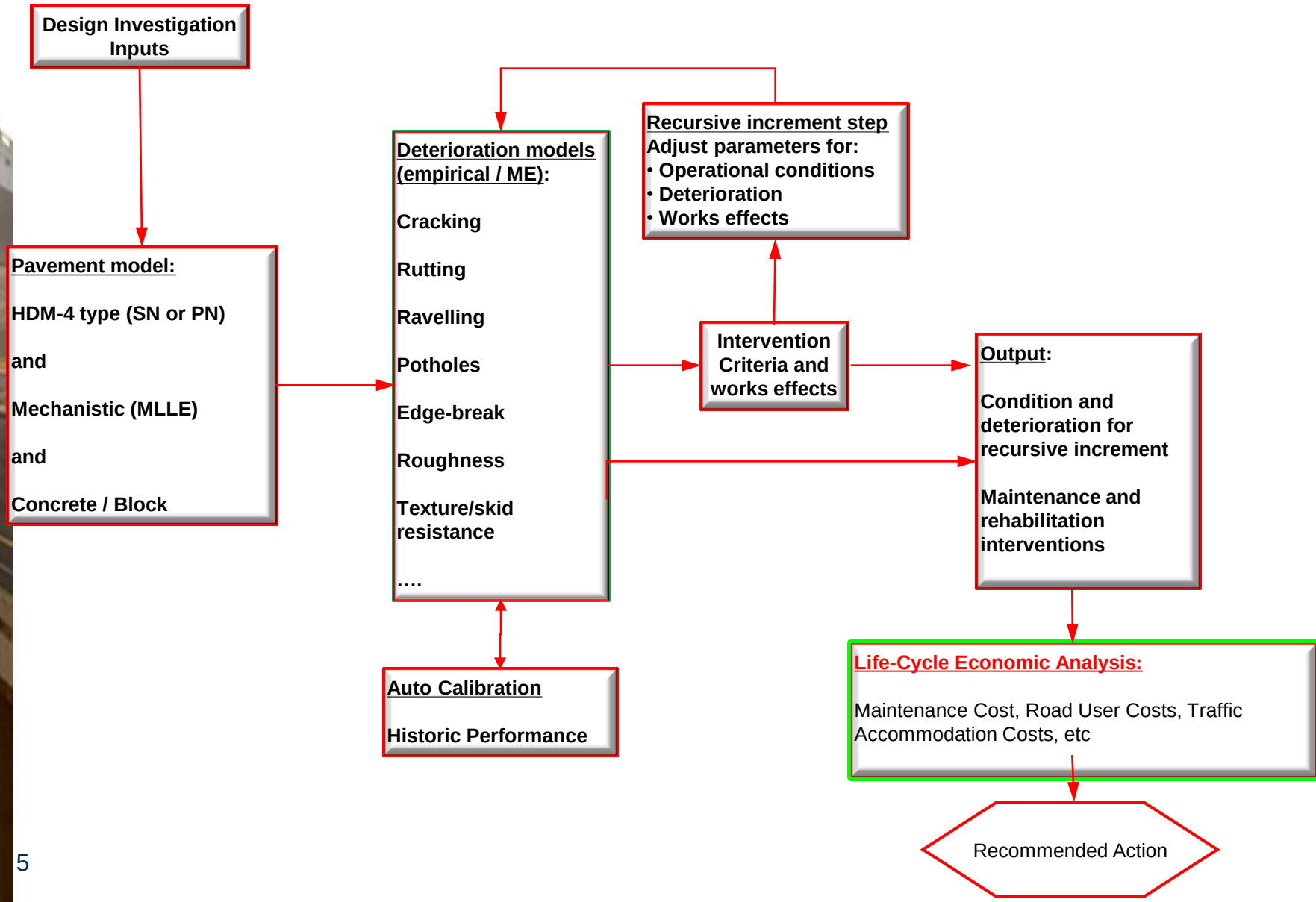
- Environmental = 41 Sites - Completed
- Experimental Sections
  - R35 Stabilisation = Oct 2012 - Monitoring Ongoing
  - R104 Instrumented Typical Pavements = Aug 2013 - TSD

Surface Seals – In progress, work Started April 2011

Concrete / Block Integration – In progress ?

Economic – HDM4 RUC Reprogrammed, Meeting with Leading Transport Economists on models/guideline

SAPDM – Performance Simulation Flow



Road Economic Analysis Tools in RSA

Up to 1994...

SOUTH AFRICAN ROADS BOARD

DEPARTMENT OF TRANSPORT

CHIEF DIRECTORATE NATIONAL ROADS

COST-BENEFIT ANALYSIS OF
RURAL ROAD PROJECTS

PROGRAM CB-ROADS

USER'S MANUAL

ISSUED BY:

THE DIRECTOR-GENERAL
DEPARTMENT OF TRANSPORT
P.O. BOX 415
PRETORIA
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PREPARED BY:

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Since 2000

H D M - 4

HIGHWAY DEVELOPMENT & MANAGEMENT

volume **one**

Overview of HDM-4

Henry G. R. Kerali
J. B. Odoki
Eric E. Stannard

Association mondiale de la Route
AIPCR PIARC
World Road Association

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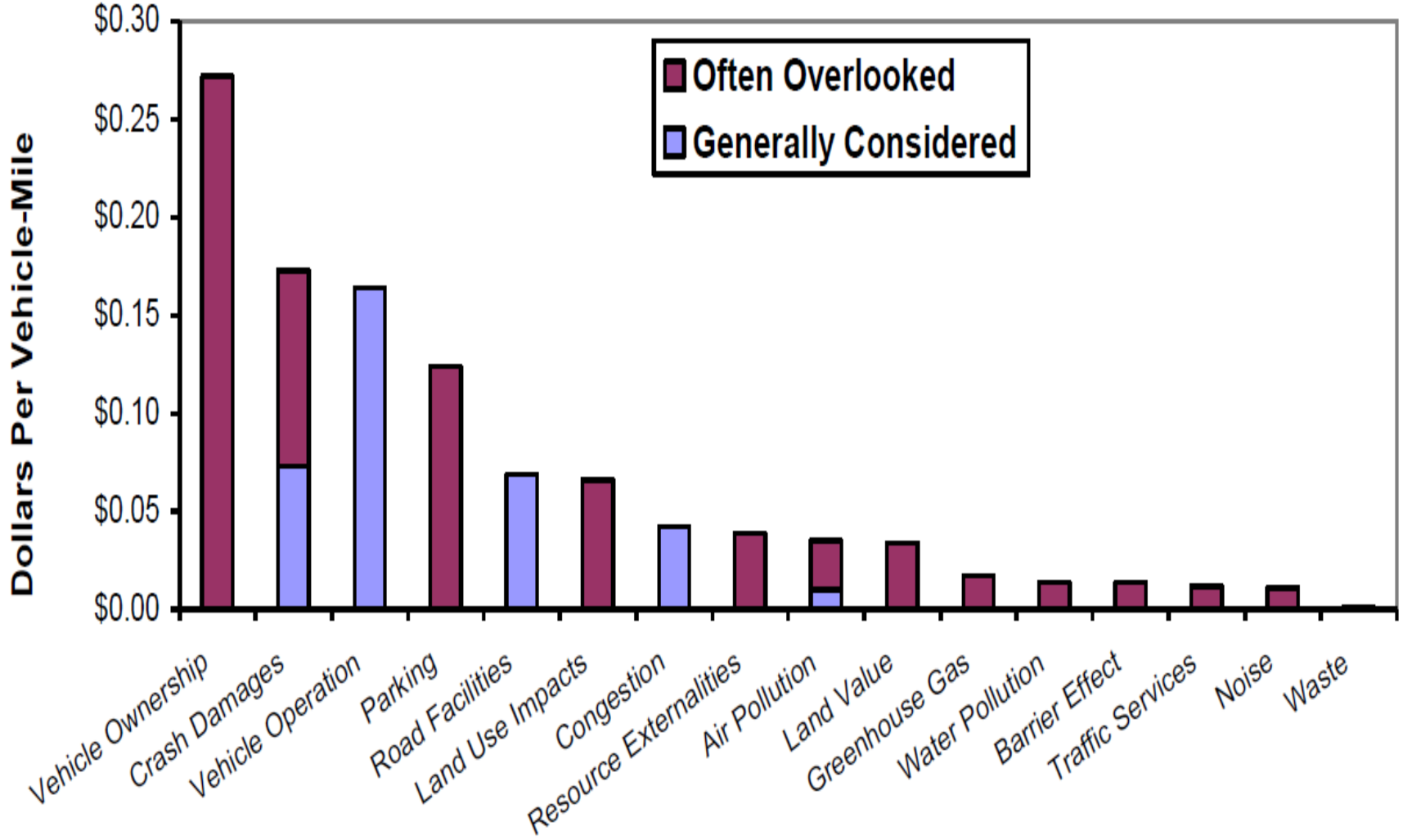
THE HIGHWAY DEVELOPMENT AND MANAGEMENT SERIES

Economic Costs To be Considered ???

Figure 1 **Automobile Costs** (Litman 2009)



SAPDM Detail Feedback

Title	Presenter
SAPDM Mechanistic Seal Design	**T Milne**
R104 Construction	**H Theyse**
R104 Instrumentation	**W Steyn**

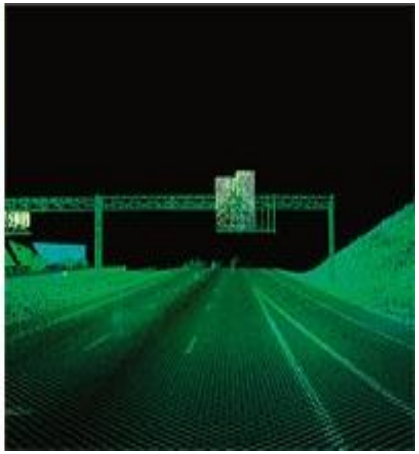
SANRAL Traffic Speed Deflectometer (TSD)

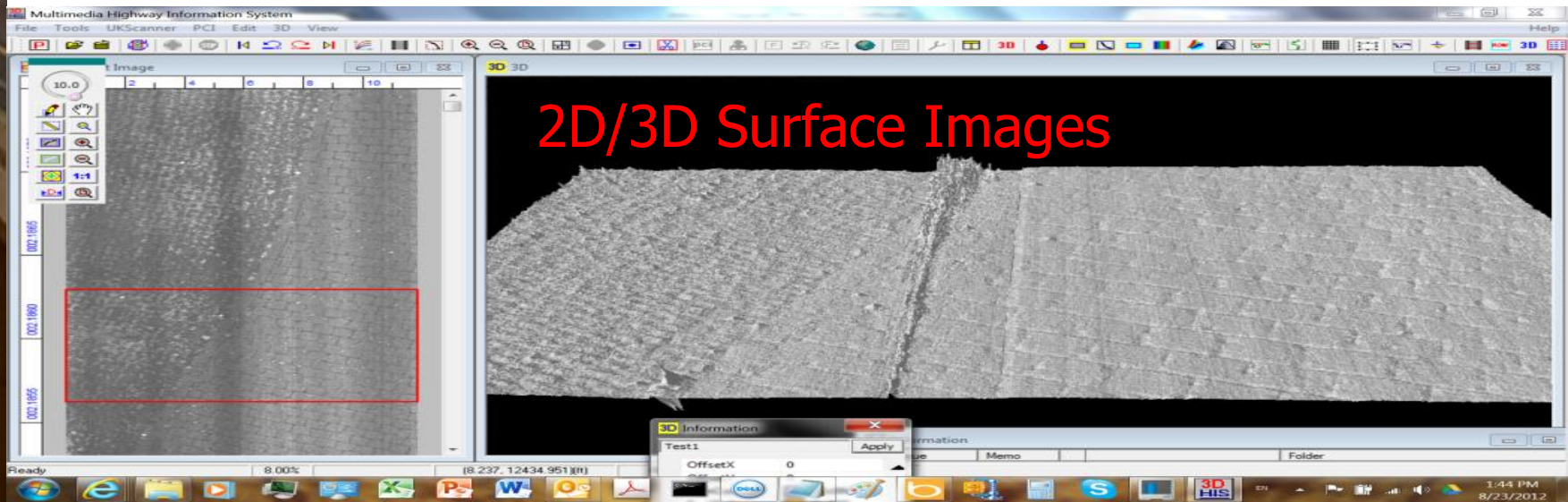
Pavement Deflection Data

Deflection Bowl every 25mm @ 80 km/h

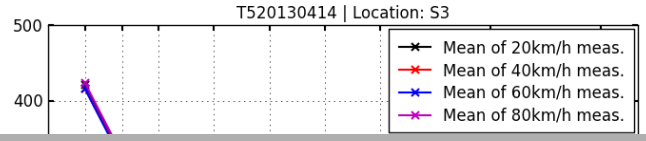
SANRAL TSD 0THER OUTPUTS

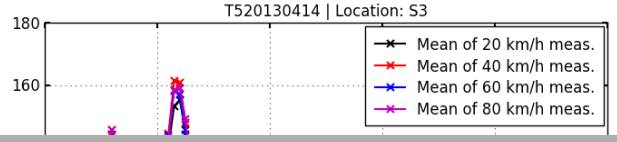
- 3D Laser Point Clouds





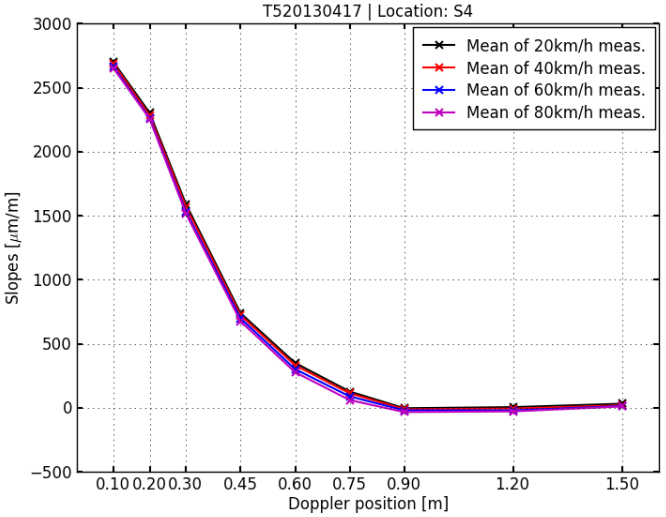
SAT – TSD Results

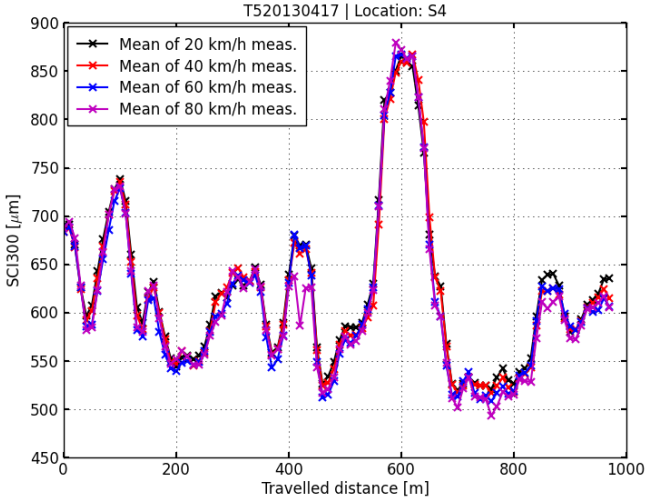




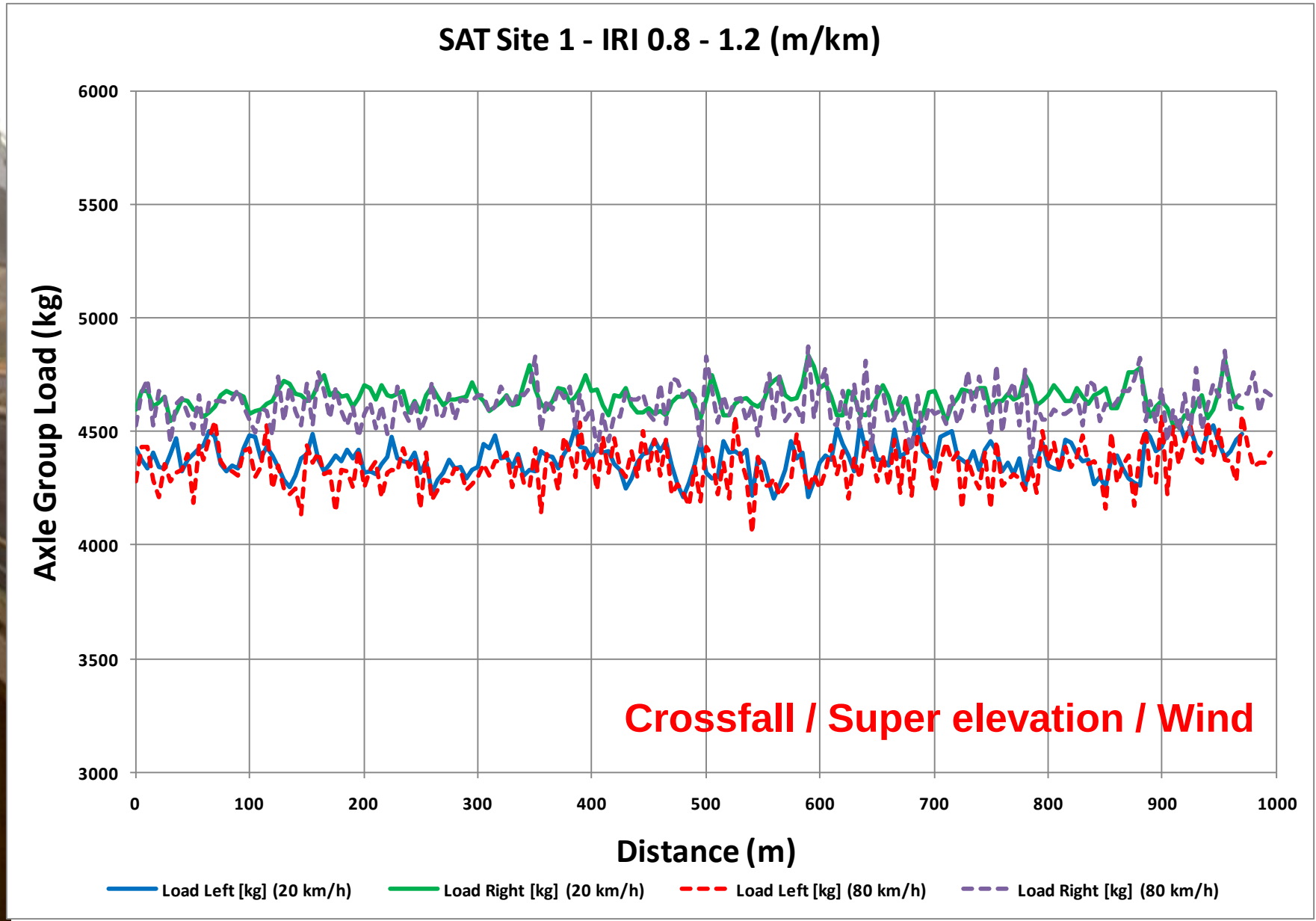
High Repeatability of results that are independent in terms of :

- Speed – 20 km/h to 80 km/h
- Roughness – IRI 0.8 to 6.0 m/km
- Deflection – D0 0.1 to 1.5 mm
- Macro Texture – MPD 0.7 to 3.0 mm

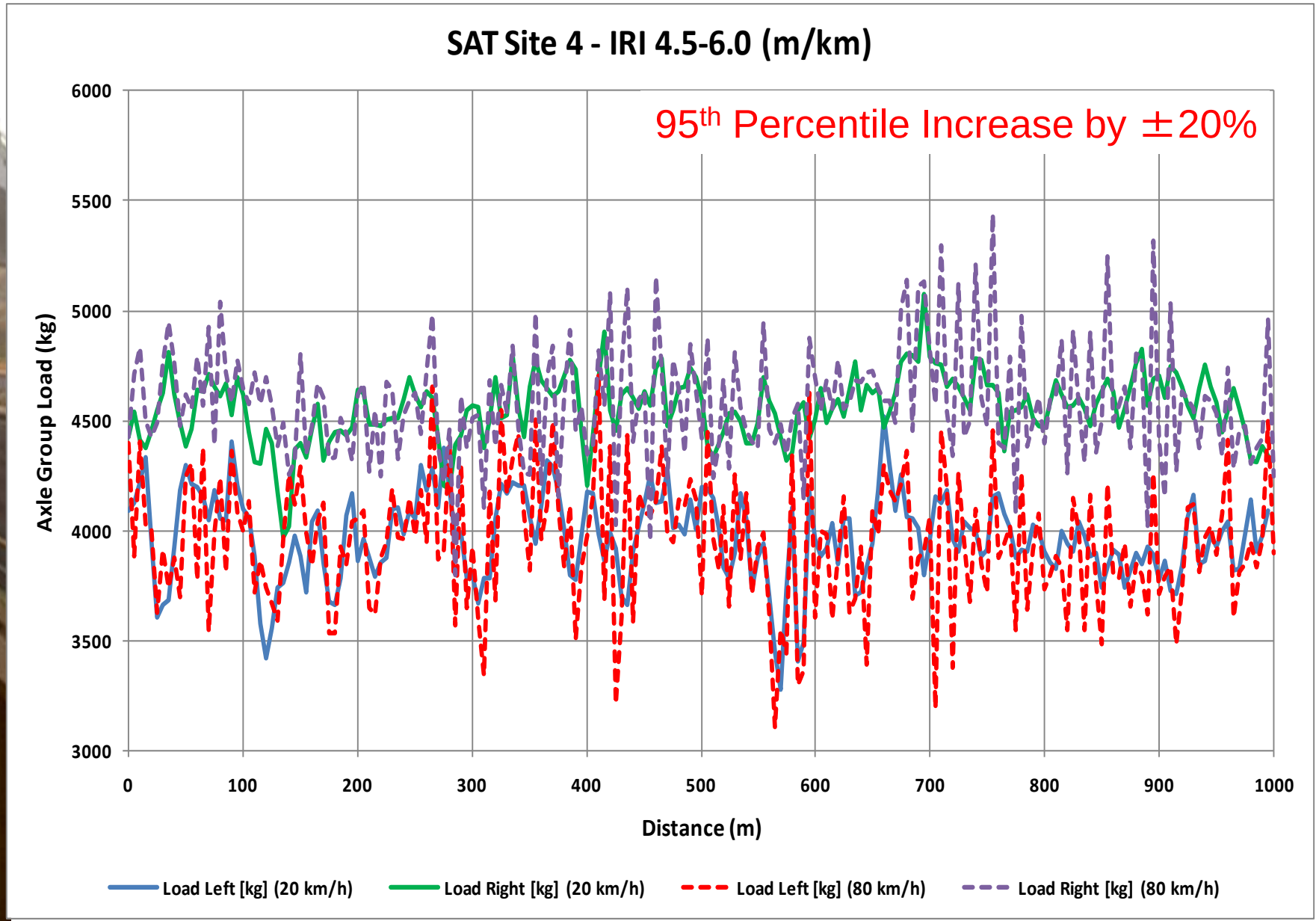




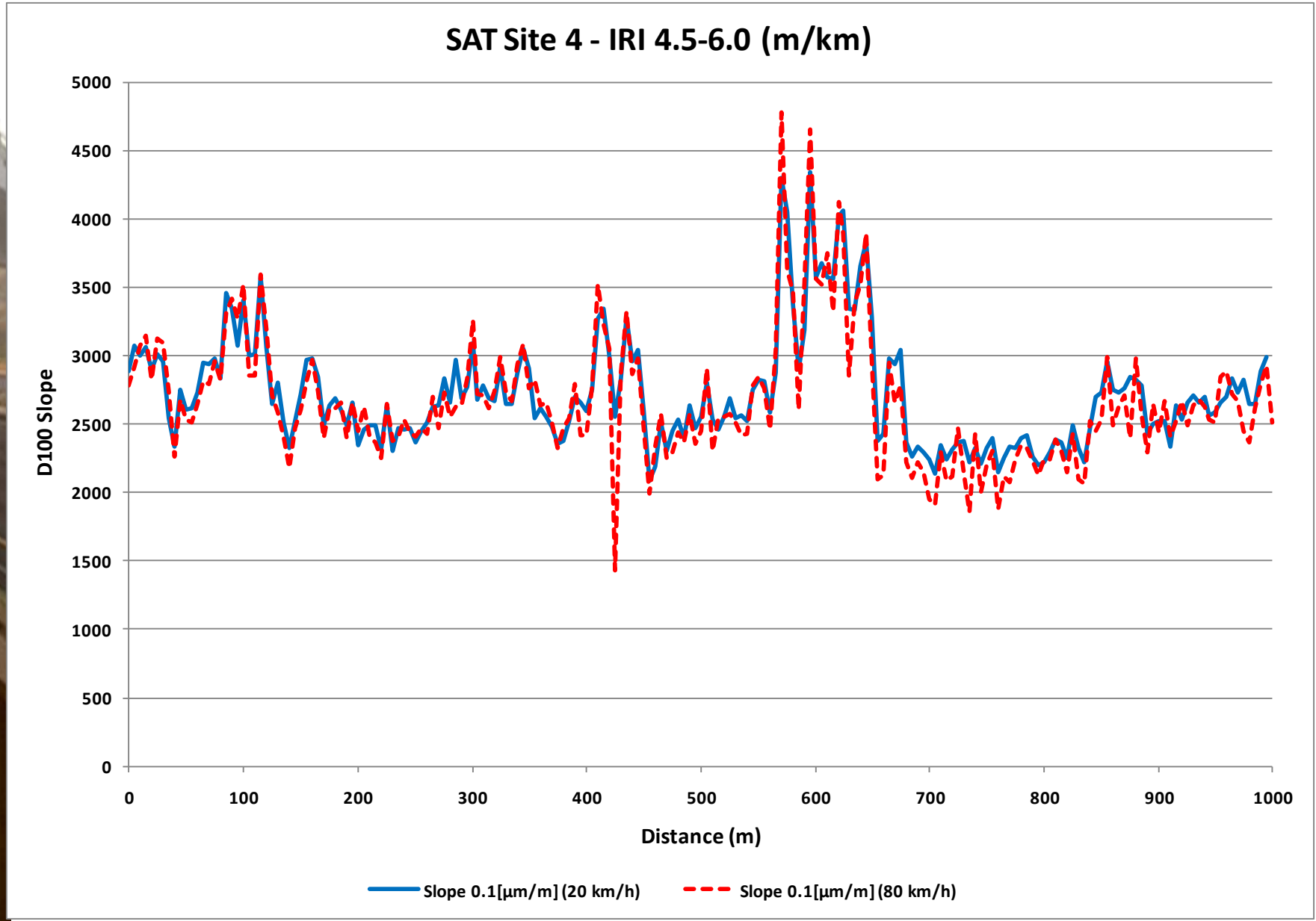
TSD DYNAMIC LOADING



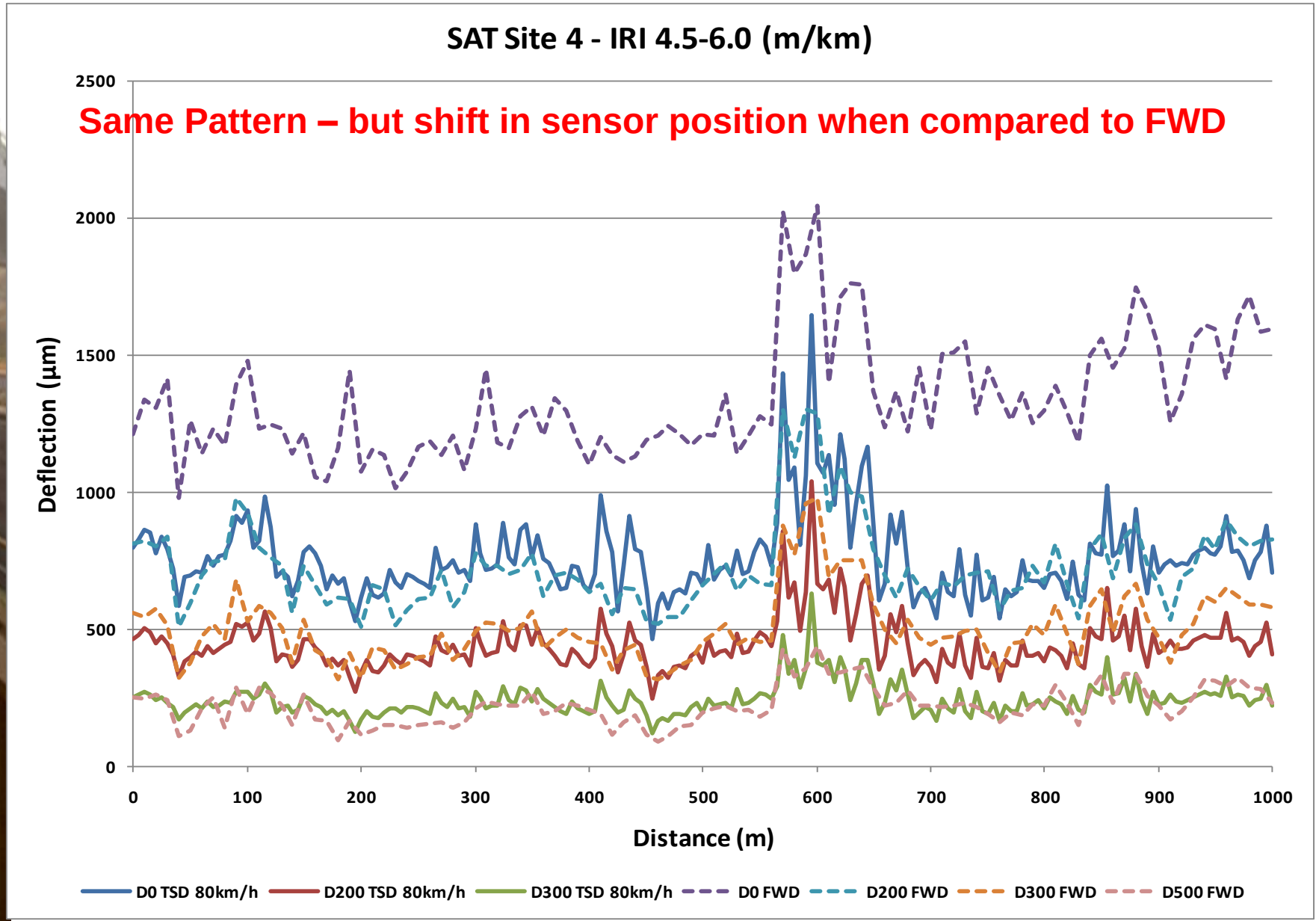
TSD DYNAMIC LOADING



TSD Slope

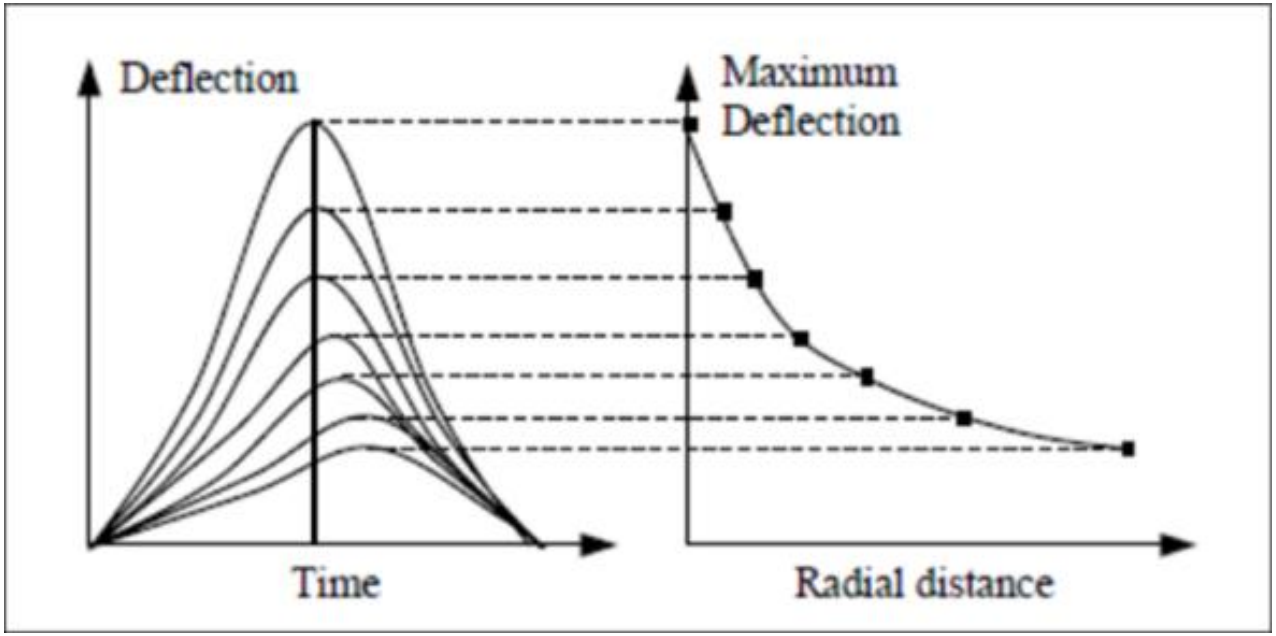

SAT Site 4 - IRI 4.5-6.0 (m/km)
D100 Slope
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
100
200
300
400
500
600
700
800
900
1000
Distance (m)
Slope 0.1[µm/m] (20 km/h)
Slope 0.1[µm/m] (80 km/h)

TSD vs FWD


SAT Site 4 - IRI 4.5-6.0 (m/km)
Same Pattern – but shift in sensor position when compared to FWD
Deflection (µm)
2500
2000
1500
1000
500
0
0
100
200
300
400
500
600
700
800
900
1000
Distance (m)
D0 TSD 80km/h
D200 TSD 80km/h
D300 TSD 80km/h
D0 FWD
D200 FWD
D300 FWD
D500 FWD

Investigating Differences

- Although FWD has been around for some time, cannot be used as the true reference for accepting TSD measurements ?
- Maximum Deflection versus Time History



- **R104 Instrumented Sections**


South African Pavement Design Method - Windows Internet Explorer
http://www.sapdm.co.za
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South African Pavement Design Method
SOUTH AFRICAN
Pavement Design Method
IMPROVING THE STRUCTURAL DESIGN MODEL
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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.
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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
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