

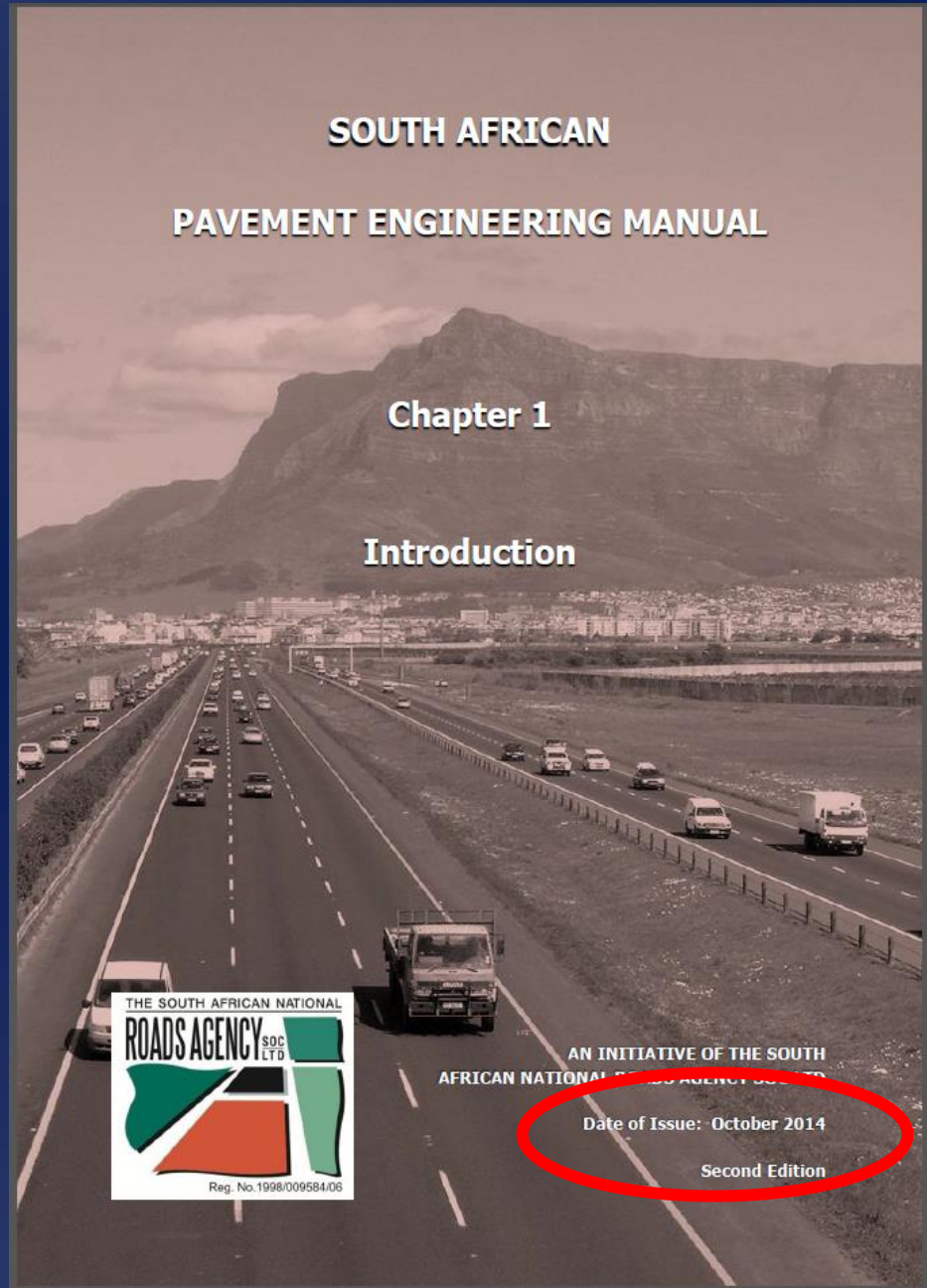
SAPEM Update

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Rubicon Solutions

RPF

Pretoria

November 2014



South African Pavement Engineering Manual

- First Version released January 2013
- Launches in April & May 2013
- Documented comments from launches
- Received comments on sapem@nra.co.za

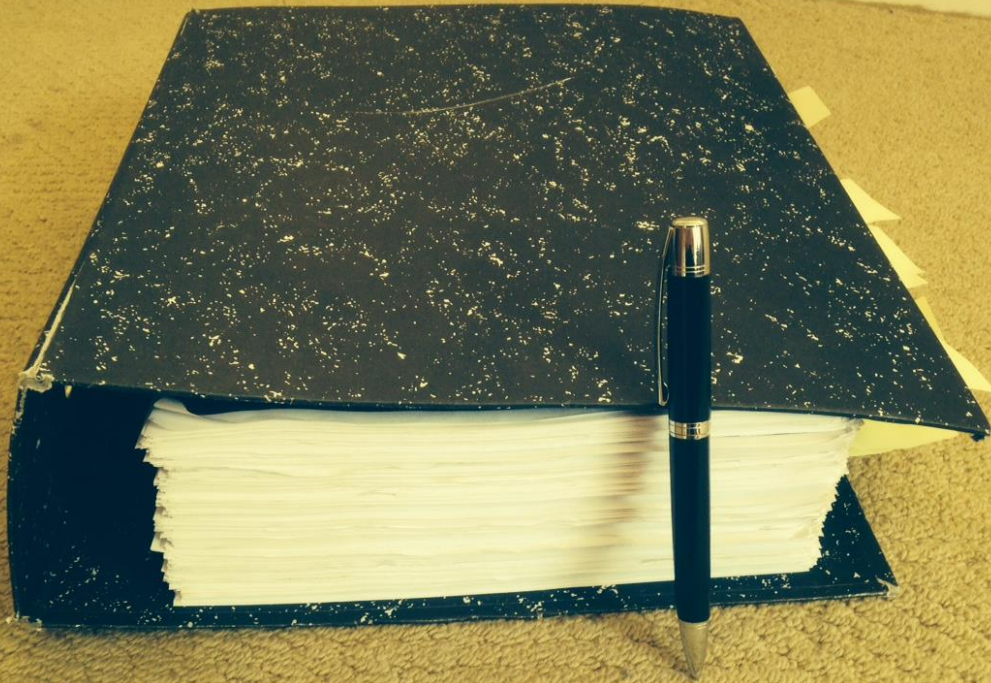
SAPeM

- Dedicated SANRAL Reviews
- Author/reviewer workshops in Dec & Jan 2014
 - *Much discussion!!*
- Corrections & revisions
- Second Edition finished in October
 - www.nra.co.za
 - Search for SAPeM

SAPEM Structure

	Title	Pages	App.
1	Introduction	27	15
2	Pavement Composition and Behaviour	41	
3	Materials Testing	71	26
4	Standards	76	1
5	Laboratory Management	25	3
6	Road Prism and Pavement Investigations	87	12
7	Geotechnical Investigations and Design Considerations	59	17
8	Material Sources	71	
9	Materials Utilisation and Design	121	
10	Pavement Design	129	
11	Documentation and Tendering	24	
12	Construction Equipment and Method Guidelines	155	22
13	Quality Management	104	20
14	Post-Construction	31	

TOTAL ~1 100 pages



SAPEM: Brief

- 1st stop for anything related to pavement engineering
 - Roadmap for young engineers
 - **Mentoring**
 - Technically appropriate
 - Readable
 - Visually appealing
- Does it make sense?*

What's New (in General)?

- New SANS sieve sizes ONLY
- Waterbound Macadam
- Block paving
- Dates taken out of guideline references
 - *TRH, TG, SABITA, etc*
- Standard Specifications
 - *Taken out specific COLTO*
- Drainage (reference to SA *Drainage Manual*)



TRH Revisions

Many of the TRH guideline documents are in the process of being updated. See the SANRAL website, www.nra.co.za for the latest versions.



Drainage

Drainage is an extremely important consideration for pavements! Water is the primary cause of premature failure, accelerated distress and reduced structural capacity.

All aspects of drainage are comprehensively covered in SANRAL's Drainage Manual and not repeated in SAPEM. Download the Drainage Manual from www.nra.co.za.

What's New?

- **Chapter 1: *Introduction***
 - Moved history of roads
 - Political aspects
 - **List of all major references in Appendix**
- **Chapter 2: *Pavement Composition and Behaviour***
 - Table covering all phases of pavement engineering
 - Expanded materials behaviour sections
 - Drainage

A photograph of a Rotavapor laboratory instrument, which is used for solvent evaporation. It features a glass condenser, a rotating flask, and a heating mantle. The background is a plain, light color.

**SOUTH AFRICAN
PAVEMENT ENGINEERING MANUAL**

Chapter 3

Materials Testing



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Date of Issue: October 2014

Second Edition

A photograph of a concrete pump truck. The truck is a large piece of machinery with a long, articulated boom that extends upwards. The background is a clear, bright sky. The text is overlaid on the image.

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Chapter 4

Standards



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What's New?

- Chapter 3: *Materials Testing*
- Chapter 4: *Standards*
 - Only using new SANS sieve sizes
 - Updated TMH1 to SANS lists

2.3.2 Grading Modulus

The Grading Modulus provides a simple but useful method for assessing the properties of soils and gravels. It is calculated using either Equation (2), which uses the percentage retained on the sieves, or Equation (3), which uses the percentage passing the sieves.

$$GM = \frac{R_{2.00\text{mm}} + R_{0.425\text{mm}} + R_{0.075\text{mm}}}{100} \quad (2)$$

$$GM = \frac{300 - (P_{2.00\text{mm}} + P_{0.425\text{mm}} + P_{0.075\text{mm}})}{100} \quad (3)$$

where R_{2.00 mm} etc. = percentage *retained* on the indicated sieve size

where P_{2.00 mm} etc. = percentage *passing* the indicated sieve size

Material with a high Grading Modulus (> 2.0) indicates that it is coarsely graded and of relatively good quality, while material with a low Grading Modulus is indicative of material with finer grain sizes, and poorer road building quality.

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Chapter 5

Laboratory Management



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What's New?

- **Chapter 5: *Laboratory Management***
 - Incorporation of more of M2 Manual, no longer in Appendix

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Chapter 6

Road Prism and Pavement Investigations



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**SOUTH AFRICAN
PAVEMENT ENGINEERING MANUAL**

Chapter 7

**Geotechnical Investigations and Design
Considerations**



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What's New?

- Chapter 6: *Road Prism and Pavement Investigations*
- Chapter 7: *Geotechnical Investigations and Design Considerations*
- Chapter 6: *Road Prism and Pavement Investigations* **In the roadbed**
- Chapter 7: *Geotechnical Investigations and Design Considerations* **Out the roadbed**

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PAVEMENT ENGINEERING MANUAL**

**Chapter 8
Material Sources**



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Version 1.0

What's New?

- **Chapter 8: *Material Sources***
 - *More info on environmental approval processes*

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PAVEMENT ENGINEERING MANUAL**

Chapter 9

Materials Utilisation and Design



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PAVEMENT ENGINEERING MANUAL**

Chapter 10

Pavement Design



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What's New?

- **Chapter 9: *Materials Utilisation and Design***
 - *Reference to New SA HMA Guideline*
 - *Waterbound Macadam*
- **Chapter 10: *Pavement Design***
 - *Bits of clarification and improved explanations*

What's New?

- Chapter 11:
Documentation and Tendering
 - More interesting
 - More on types of contracts
 - Follows the documentation process through to close-out of the Works

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Chapter 11

Documentation and Tendering



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Chapter 12 Construction Equipment and Method Guidelines



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Chapter 13 Quality Management



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What's New?

- Chapter 12: *Construction Equipment and Method Guidelines*
- Chapter 13: *Quality Management*

Table 21. Typical Production Rates

Construction Process	Typical Production Unit (per day)
Single seal	10 000 – 20 000 m ² (full width)
Double seal	10 000 – 12 000 m ² (½ width)
Asphalt surfacing	350 – 400 tons
Asphalt Base	400 – 600 ton
G1 base	2 500 – 3 000 m ²
BSM base	3 000 – 4 000 m ²
Cemented subbase	3 000 – 4 500 m ²
Natural gravel layers	4 000 – 5 000 m ²
Waterbound macadam (hand placed)	400 m ²
Prime/tack	15 000 – 50 000 m ²
Concrete	
– JRCP (220 mm hand placed)	420 m ²
– CRCP (180 mm hand placed)	480 m ²
UTFC	6000 - 8000 m ² (400 tons)



– V
– E

What's New?

- **Chapter 12: *Construction Equipment and Method Guidelines***
- **Chapter 13: *Quality Management***
 - *Waterbound Macadam*
 - *Block paving*
 - *Testing and frequency of tests tables summarized in Appendix*
- **Checklists will be available in Excel format**

SOUTH AFRICAN PAVEMENT ENGINEERING MANUAL

Chapter 14

Post-Construction



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What's New?

- **Chapter 14: *Post-Construction***
 - *Asset Management*
 - *Maintenance*

What Now?

- At a glance SAPEM looks the same
 - *Many little changes, too many to create a list*
- Download the new versions
- Print
 - *Chapters 1, 2, 6, 7, 8, 11*
- Send in your comments/corrections
 - sapem@nra.co.za
- Update again in a few years