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Faculty of Engineering,  
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Fakulteit Ingenieurswese, Bou-omgewing en  
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# LTPP Results of EME placed on South Coast Road – After 10 years

Prepared for presentation at the 50<sup>th</sup> RPF Meeting

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# Acknowledgements



# Outline of presentation

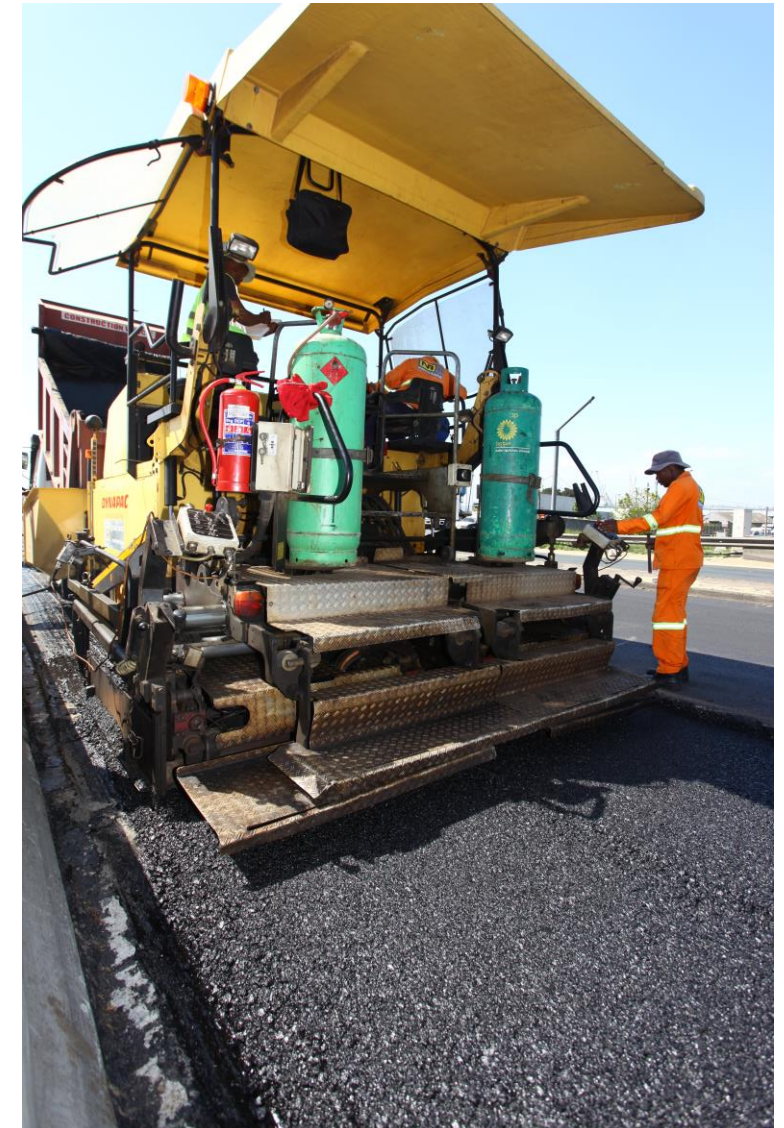


- Background
- LTPP Monitoring programme
- Results
- Conclusions



# Background: What is EME ?

- Hot-mix asphalt base mix manufactured using
  - Hard bitumen (typically 10/20 pen grade)
  - High binder content
  - Good quality aggregates
- Originally developed in France early 90s
- The key performance attributes
  - ✓ High stiffness
  - ✓ High resistance against permanent deformation
  - ✓ High resistance against fatigue cracking
  - ✓ Good durability and workability



# Background: EME Technology Transfer to SA

- Initiated by SABITA in 2006
- Technology transfer study conducted by CSIR in partnership with asphalt industry
- **First EME design guide published in 2013 (Sabita Manual 33)**
  - Revised in 2015, 2019 and 2022



Design procedure for  
*High Modulus Asphalt (EME)*

Manual 33  
Fourth Edition, November 2022



# South Coast Road LTPP Section

- First full-scale implementation of EME in SA
- Approximately 300 m long
- Located on South Coast Road in Durban at the intersection with Bayhead Road
- Major access road to the Durban harbour
- **EME mix design**
  - EME 20 mix with 10/20 pen grade binder
- **Pavement structure (ES10 – 30 to 100 million E80s)**
  - 30 mm SMA wearing course
  - 160 mm EME base layer (2 x 80 mm)
  - Penetration macadam
- **Construction completed in September 2011**



# Performance Monitoring Programme

- Initial monitoring plan at six-month intervals over the first two years
  - Visual condition surveys
  - Deflection measurements
  - Profilometer surveys
    - ❖ Rutting measurements
    - ❖ Macro-texture measurements
    - ❖ Roughness measurements
  - Traffic loading assessment
- Follow up assessments carried out
  - 4 years
  - 5 years
  - 7 years, and
  - 10 years after construction
- **Detailed results to be presented at CAPSA 2023**



# Visual Condition Survey

- Overall condition is good

Before rehabilitation



10 years after rehabilitation





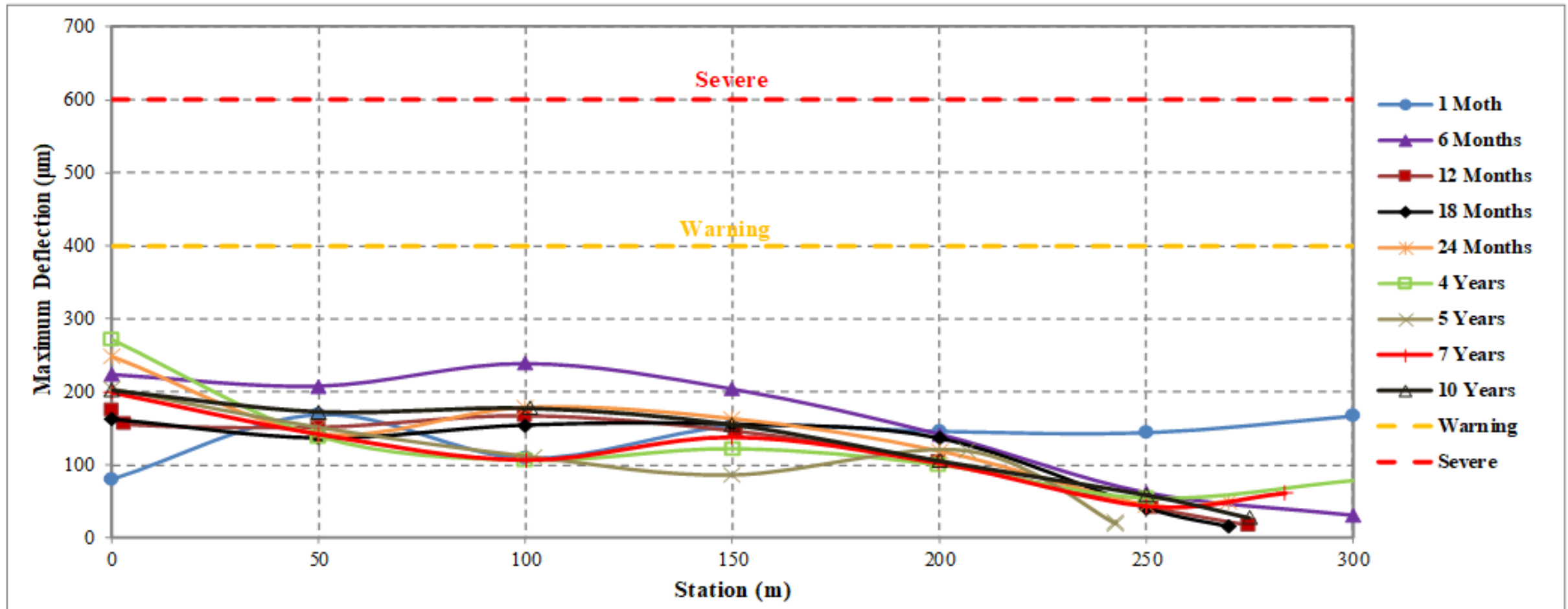
# Visual Condition Survey

- SMA aggregate polishing
- SMA surface failures
- Joint cracks observed during the previous surveys are not deteriorating further
- Water ponding and gravel accumulation at beginning of the section



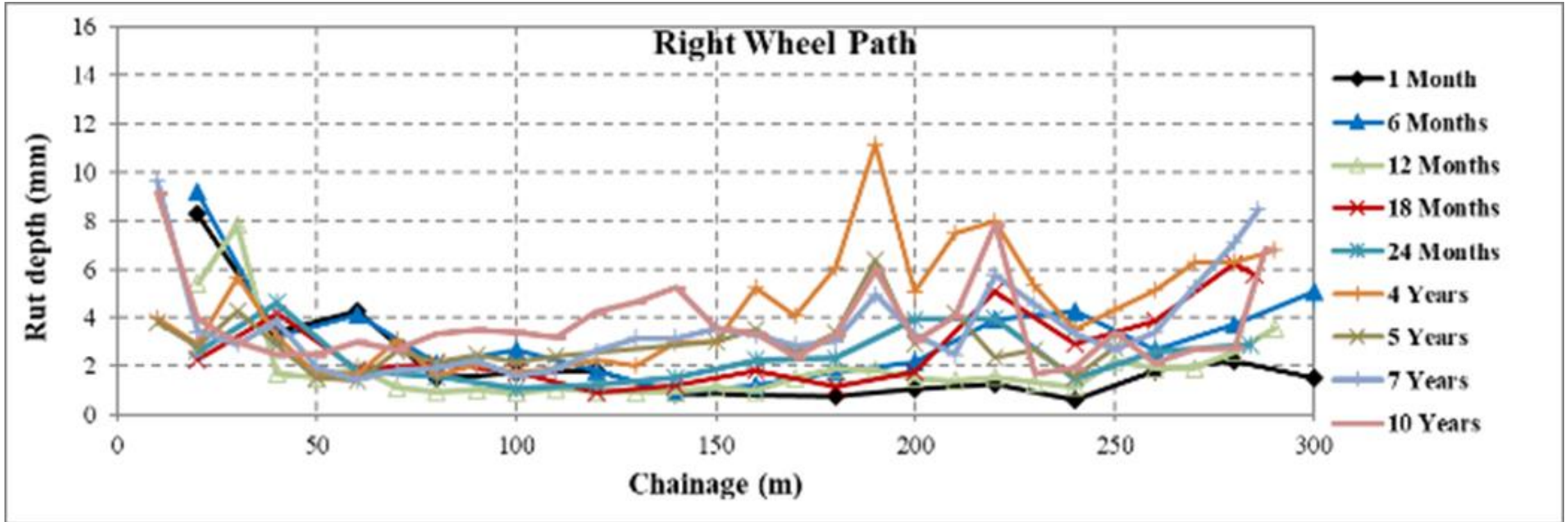
# FWD Deflection Measurements

- Very low maximum deflection values



# Profilometer Survey

- Increasing rut trend on isolated locations

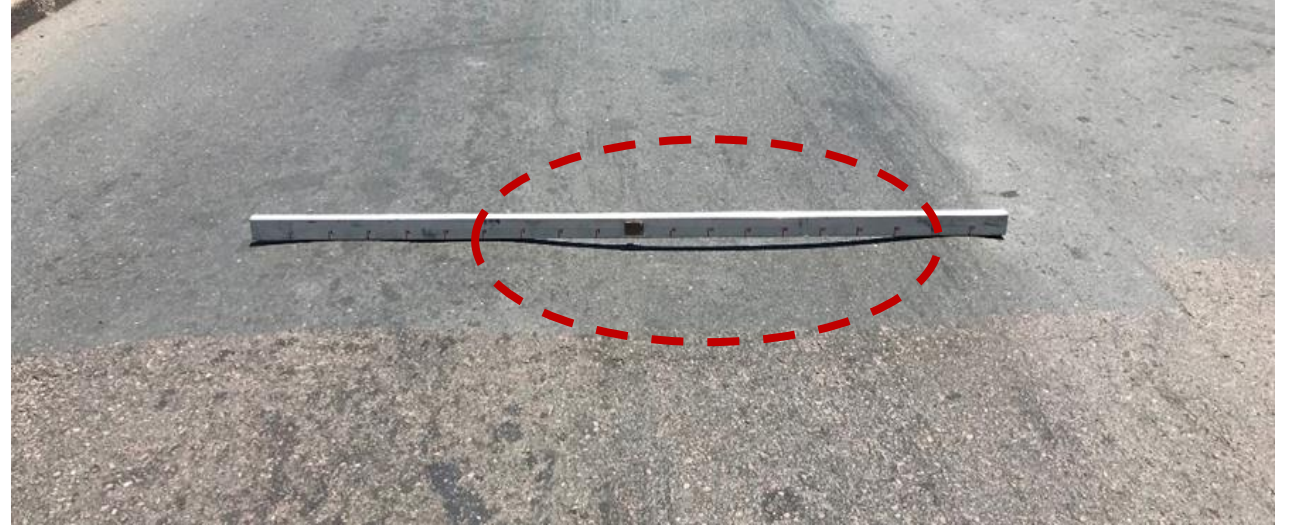


# Rut Measurements

EME – Insignificant rutting



Conventional asphalt – significant rutting



# Traffic Loading

- Estimated up to 44 million ESAL over 10 years (September 2011 to November 2022)



# Conclusions

- The overall performance is satisfactory, taking into considerations the high traffic loading
- The condition of the SMA surfacing layer is deteriorating
- Maintenance intervention to improve drainage at the start and end of the section is required





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# Thank you

