

Development of a reference surface for the assessment of pavement skid resistance measurement devices

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SaferRoads2017
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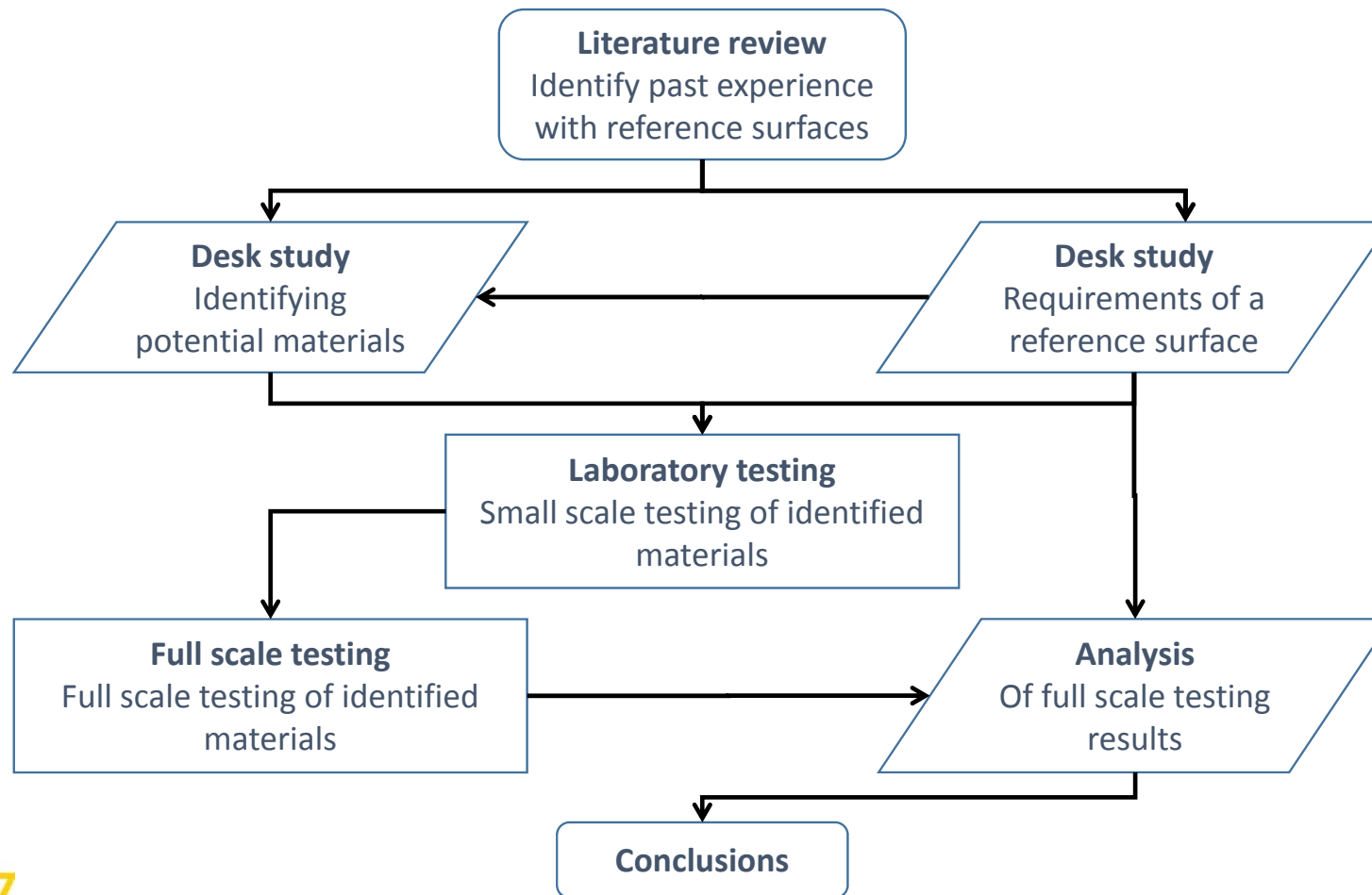
Introduction and background



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Introduction and background – Project overview



Desk study – Literature review

- Eldridge, A., Whitehurst, E.A. and Neuhardt, J.B. (1986) Time-history performance of reference surfaces. Page 61-71. Baltimore: ASTM.
- Huckins, H.C. (1977) FHWA Skid measurement test centers. Washington: FHWA.
- ISO/TC22/SC 9. (1986) Vehicle dynamics and road-holding ability. s.l.: ISO.
- Wambold, J. and Henry, J. (2002) NASA Wallops tyre/runway friction workshops. Langley: NASA.
- FEHRL. (2008) FEHRL Report 2008/04 Harmonization of European routine and research measuring equipment for skid resistance. s.l.: Tyre and Road Surface Optimization for Skid Resistance and Further Effects.



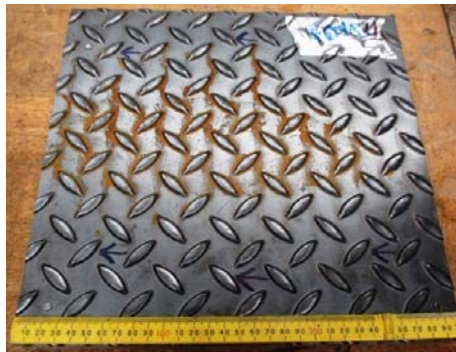
Desk study – Reference surface requirements

Parameter	Long term system	Disposable system	Research question
Polishing resistance & wear from usage	One hundred, or greater, sets of measurements can be made.	A single set of measurements (enough to assess one device) can be made.	Does the material polish or wear with use?
Consistency of production	Performance of surface is consistent over the length of a single surface.	Performance of surface is consistent over the length of a single surface, and surface can be made by multiple manufacturers.	Is the material produced consistently?
Aprox. SC(50)	0.1 – 1.0 This is the typical working range of SCRIM. This wide range of values so several surfaces may be required to provide a reference covering this range.	0.1 – 1.0	Is the friction level acceptable? Does the material provide multiple friction levels?

Desk study – Identification of materials



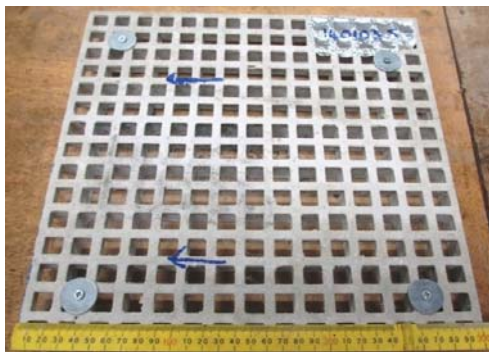
Abrasive sheets



Metals



Ceramics



Composites



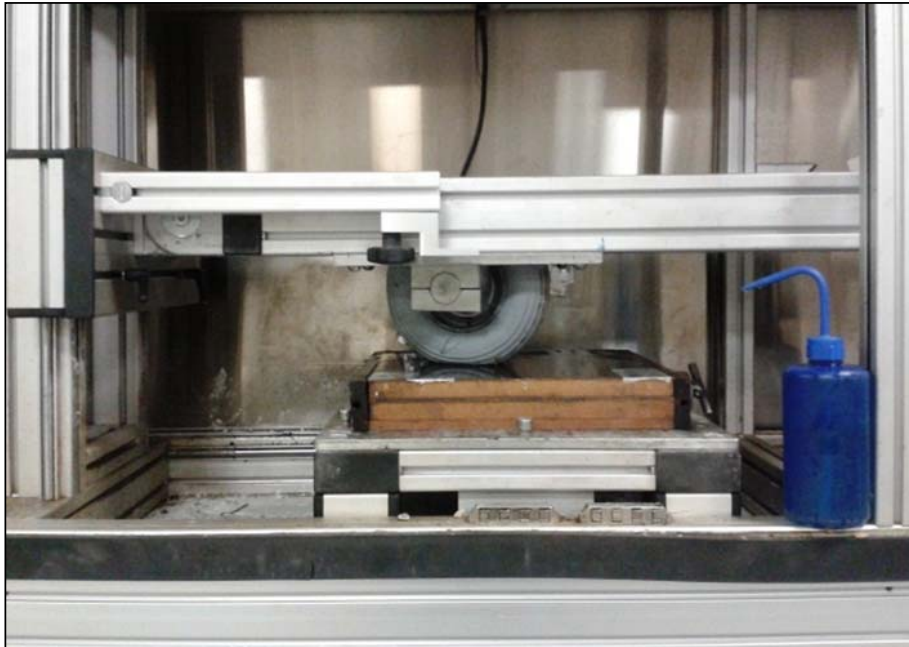
Plastics



Calcined bauxite



Laboratory assessments - Methodology



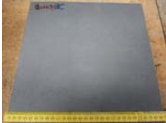



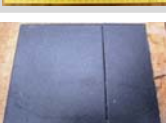
The Wheel Tracking Machine



The Portable Skid Resistance Tester



Laboratory assessments - Results

Material		Mean PTV	Long term	Disposable
Anthracite tile		22.0	Yes	Yes
Deck Safe Mini-mesh		83.3	Yes	Yes
Lego		35.1	Yes	Yes
Non slip tile		30.9	No	Yes
SiC abrasive paper		87.5	No	Yes



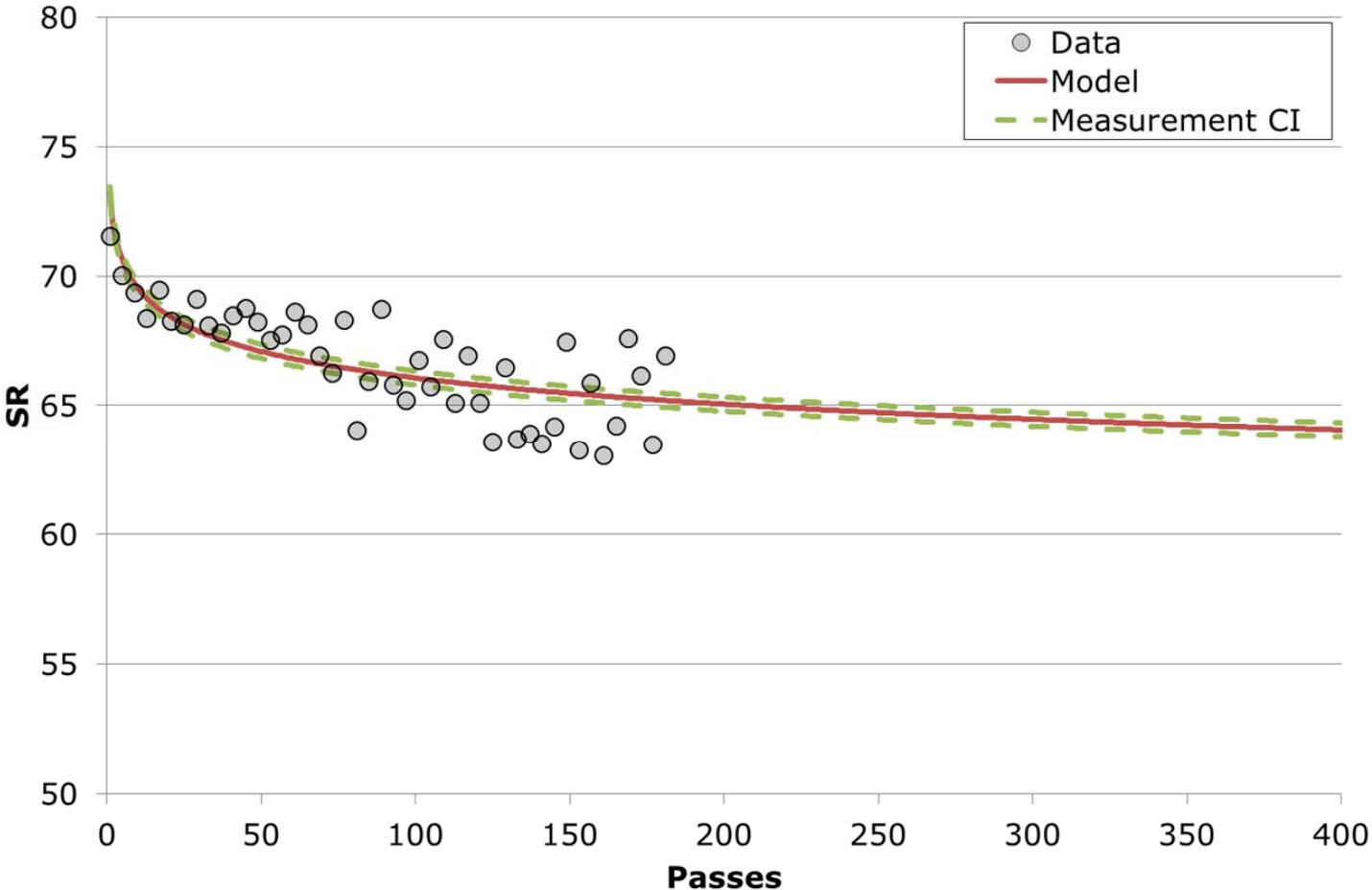
Full scale assessments - Methodology



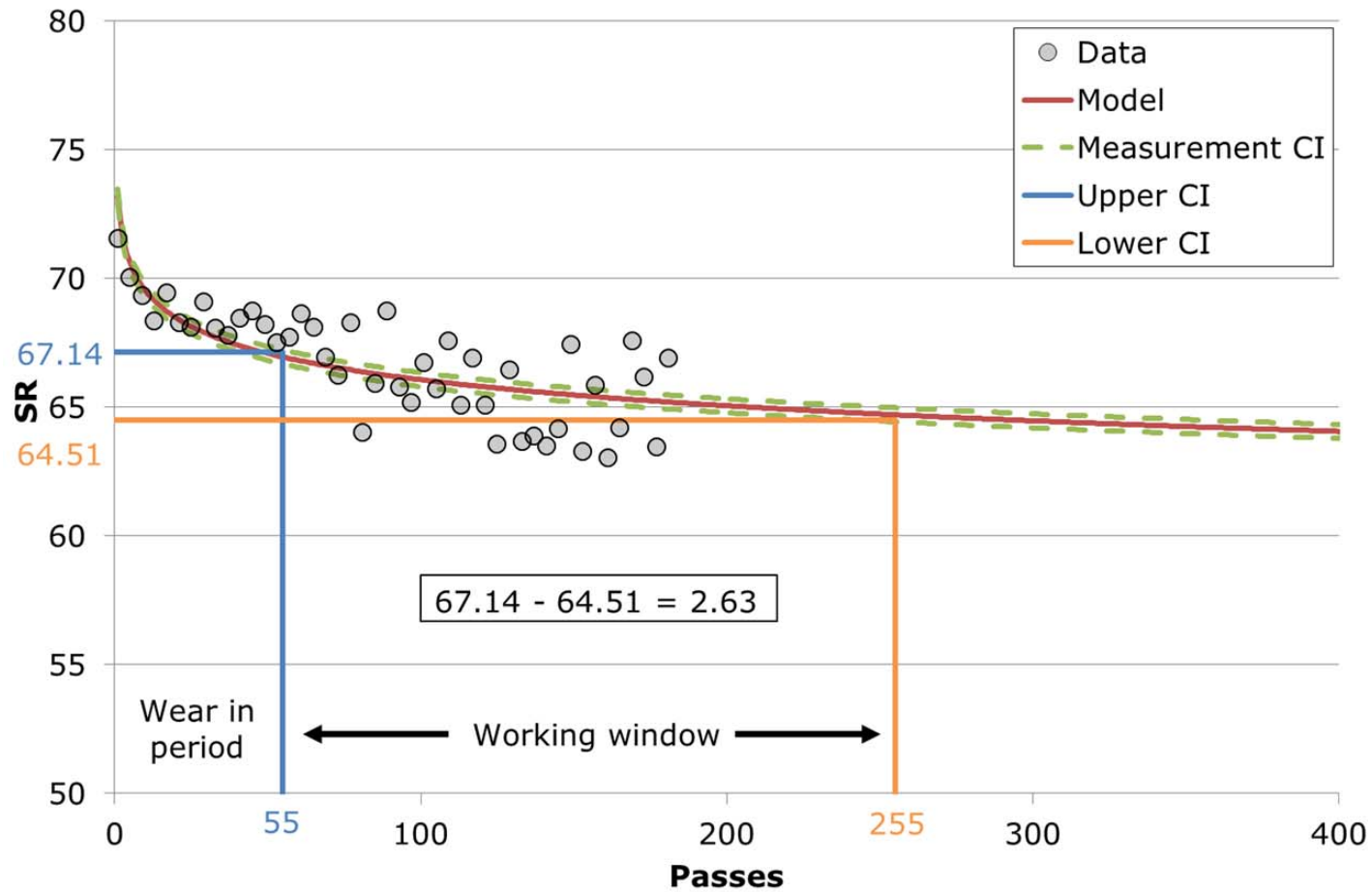
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Full scale assessments - Results



Full scale assessments - Results



Full scale assessments - Results

Surface	Wear In Period (Passes)	Average Skid resistance (SR)	Confidence interval range (SR)	Line of best fit ($y=ax^b$)	
				a	b
Control	144	75.85	0.71	89.88	-0.03
Lego	45	44.29	0.79	38.87	0.03
Mini-mesh	55	65.52	0.54	73.20	-0.02
Anthracite Tile	0	6.11	0.15	5.99	0.01



Conclusions

- All research objectives were met:
 - Identify potential reference surface materials.
 - Develop laboratory and full scale testing methodologies for reference surface materials.
 - Develop an assessment methodology and criteria to ascertain the applicability of materials.
- The materials tested in the full scale trial may be used as reference surfaces for SCRIM devices.
- The use of man made materials offer better performance as reference surfaces than traditional asphalt materials.
- Further research required to answer “Is the material produced consistently?” at full scale.



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