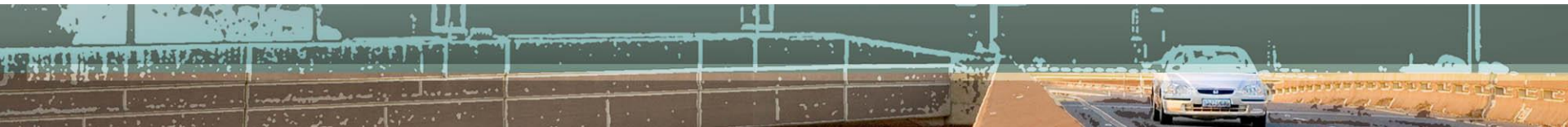
ROAD PAVEMENT FORUM

20 – 21 May 2014

Bitumen Specifications Committee

Dennis Rossmann

THE SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD
Reg. No.1998/009584/06
Creating wealth through infrastructure



BITUMEN SPECIFICATIONS

RPF RESOLUTION TO COMBINE ALL BITUMEN TYPES UNDER A SINGLE STEERING COMMITTEE, WITH APPROPRIATE WORKING GROUPS TO ADDRESS SPECIFIC PRODUCTS

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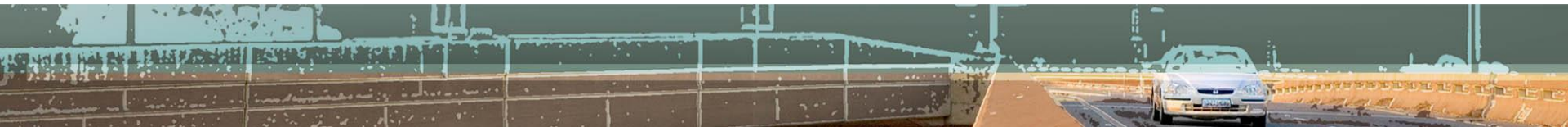


ATTENDANCE

Present

Dennis Rossmann	SANRAL (Chair)
Steph Bredenhann	SANRAL
Saied Solomons	Sabita
Herman Marais	Much Asphalt
Jacques van Heerden	Tosas
Krishna Naidoo	eThekwini Municipality
Kobus Louw	Colas South Africa
Wynand Nortje	National Asphalt
Hennie Loots	SRT
Johan Muller	Tosas
Piet Myburgh	Consultant
Simon Coe	Chevron
Richard Ntombela	Du Pont
Kim Jenkins	University of Stellenbosch
Ronnie Renshaw	Renshaw Consulting cc
Carl Williams	Emergeco
Bob Hornsey	Shell SA
Chumisa Lovilane	SABS
Sibongiseni Shabalala	SASOL
Riaan Burger	SANRAL
Corné Roux	SANRAL

Apologies

Caroline Lawson	Bituguard
Tumelo Ratau	SABS
Leon Alberts	Much Asphalt
Piet Roets	SASOL

SABS Standards Division Committee Induction

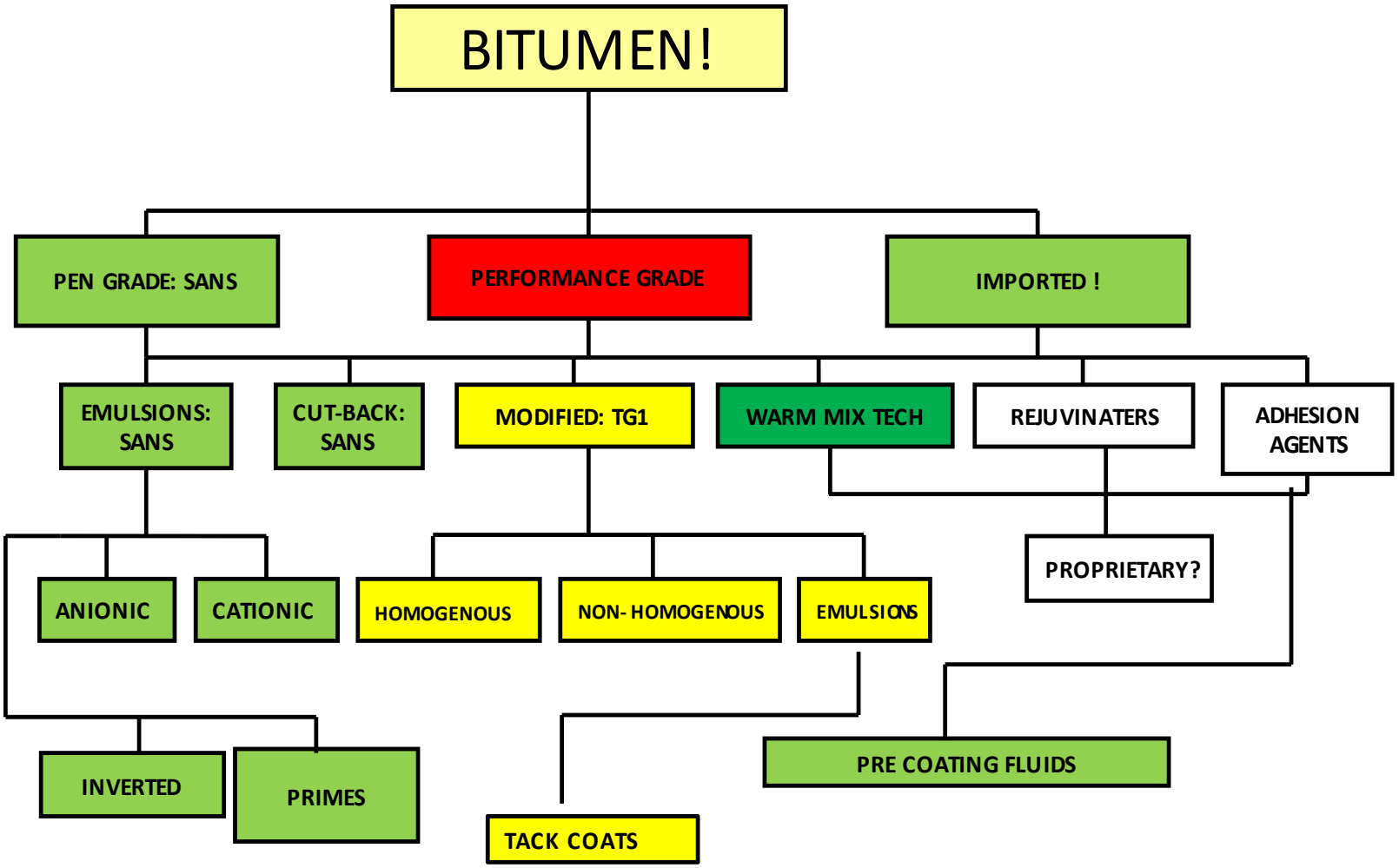
Chumisa Loyilane

23 April 2013

SABS Technical Committees

- Balanced representation of valid national interests:
  - Users (Groups)/Consumers
  - Manufacturers (Groups, various levels)
  - Other interested parties
  - Government
  - Academia
  - Organized labour (if relevant)
  - SMMEs and NGOs

- Membership preferably on the basis of organization, association or industry forum – as opposed to individual membership


BITUMEN!
PEN GRADE: SANS
PERFORMANCE GRADE
IMPORTED !
EMULSIONS: SANS
CUT-BACK: SANS
MODIFIED: TG1
WARM MIX TECH
REJUVINATERS
ADHESION AGENTS
ANIONIC
CATIONIC
HOMOGENOUS
NON- HOMOGENOUS
EMULSIONS
PROPRIETARY?
INVERTED
PRIMES
TACK COATS
PRE COATING FLUIDS

SANS 4001 – BT1 - 2014

SANS 4001-BT1

Table 1 — Grade requirements

1	2	3	4	5	6	7	8
Property	**Penetration grade**						**Test method**
	10/20	15/25	35/50	50/70	70/100	150/200	
	Requirements						
Penetration at 25 °C/100 g/5 s, 1/10 mm	10-20	15-25	35-50	50-70	70-100	150-200	EN 1426
Softening point (ring and ball), °C	58-78	55-71	49-59	46-56	42-51	36-43	ASTM D36[a]
Minimum viscosity at 60 °C, Pa.s	700	550	220	120	75	30	ASTM D4402[b]
Viscosity at 135 °C, mPa.s	≥ 750	≥ 650	270-700	220-500	150-400	120-300	ASTM D4402[b]
Flash point, °C, minimum	245	235	240	230	230	220	ASTM D92
Performance when subjected to the rolling thin film oven test:							ASTM D2872
a) mass change, % (by mass fraction), max.	–	0,5	0,3	0,3	0,3	0,3	ASTM D2872
b) viscosity at 60 °C, % of original, max.	–	–	300	300	300	300	ASTM D4402[b]
c) softening point (ring and ball), °C, min.	–	57	52	48	44	37	ASTM D36[a]
d) increase in softening point, °C, max.	10	8	7	7	7	7	ASTM D36[a]
e) retained penetration, % of original, min.	–	55	60	55	50	50	EN 1426
Spot test, % xylene, max.	–	–	30	30	30	30	AASHTO T102

[a] Using shouldered ring.
[b] Recommended apparatus is the RV viscometer, using SC 4 spindles with thermosel system.
[c] Actual values to be reported in five-unit intervals (see annex A).

SANS 4001 – BT 2 - 2012

Table 1 — Cutback bitumen: medium-curing grades

1	2	3	4	5	6	7	8
Property	Requirement						Test method
	Type and grade designation[a]						
	MC-10		MC-30		MC-3000		
	Min.	Max.	Min.	Max.	Min.	Max.	
Kinematic viscosity at 60 °C, cSt[b]	10	20	30	60	3 000	6 000	ASTM D2170
Dynamic viscosity at 60 °C, mPa.s [c]	10	25	30	70	3000	7000	ASTM D4402
Flash-point, °C	38		38		38		ASTM D93
Water, % by mass or volume		0,2		0,2		0,2	ASTM D95
Distillation at 101,325 kPa absolute							
Distillate % (by volume) of total distillate to 360 °C							
to 190 °C	0	20	0	15	–[d]	–[d]	ASTM D402
to 225 °C	20	70	15	60	0	25	
to 260 °C	60	90	50	85	0	40	
to 316 °C	80	100	80	100	35	80	
Residue from distillation to 360 °C % (by volume) (by difference)	40	–	50	–	80	–	ASTM D402
Viscosity at 60 °C on residue from distillation, Pa.s	30	–	30	–	30	–	ASTM D4402

[a] For the guidance of the user the range of temperature application is given in annex B.
[b] Primary requirement for certification and reference method in cases of a dispute.
[c] Used as a field test to facilitate wider participation of third party laboratories.
[d] Value to be reported.

EMULSIONS

- SANS 309:2004 – Anionic Road Emulsions
- SANS 548:2003 – Cationic Road Emulsions
- SANS 1260:2004 – Invert Bitumen Emulsion

After revisions having been completed > 1 year ago – STILL awaiting SABS approval and publication!!!!

SANS 4001 – BT3 – 2014 – ANIONIC EMULSIONS

Table 1 —Type and grade requirements

1	2	3	4	5
Property	**Type and grade requirement**			**Test method or subclause**
	Spray type (RS)	**Pre-mix type (MS)**	**Stable-mix type (SS)**	
	Grade			
	60	**60**	**60**	
Coagulation value when mixed with standard dolerite chippings[a], % (mass fraction)	25 min	25 max	–	5.3
Coagulation value when mixed with cement, % (mass fraction)	–	–	2,0 max.	5.4
Viscosity at 50 °C, Saybolt Furol seconds	21 to 50	21 to 50	–	ASTM D244
Binder content[b], % (mass fraction)	60 to 62	60 to 62	60 to 62	
Residue on sieving, g/100 mL				
710 µm	0,10 max.	0,10 max.	0,10 max.	5.5
150 µm	0,25 max.	0,25 max.	0,25 max.	
Sedimentation after 60 complete rotations	Nil	Nil	Nil	5.6
[a] The dolerite chippings were sourced at Rooikraal Crushers in Gauteng, South Africa (see annex B).				
[b] By difference from water content determined in accordance with ASTM D244.				

SANS 4001 – BT4 – 2014 – CATIONIC EMULSIONS

Table 1 — Type and grade requirements

1	2	3	4	5	6	7	8
Property	**Type and grade requirement**						**Test method or subclause**
	Spray type (CRS)			**Pre-mix type (CMS)**		**Stable-mix type (CSS)**	
	Grade						
	60	**65**	**70**	**60**	**65**	**60**	
Viscosity at 50 °C, Saybolt Furol seconds	15 to 50	51 to 200	51 to 400	20 to 50	51 to 200	50 max.	ASTM D244
Binder content[a], % (mass fraction)	60 to 63	65 to 68	70 to 73	60 to 63	65 to 68	60 to 63	
Fluxing agent content[b], % (mass fraction)	5 max.	5 max.	5 max.	5 to 10	5 to 10	Nil	
Residue on sieving, g/100 mL 710 µm 150 µm	 0,10 max 0,25 max.	 0,10 max. 0,25 max.	 0,10 max. 0,25 max.	 0,10 max. 0,25 max.	 0,10 max. 0,25 max.	 0,10 max. 0,25 max.	5.2
Particle charge a) Standard procedure (10 mA) b) Modified procedure (50 mA)	 Positive –	 Positive –	 Positive –	 Positive –	 Positive –	 – Positive	5.4 ASTM D244
Binder deposit on the cathode after 30 min, g, min.	1,0	1,0	1,0	–	–	–	5.4
Sedimentation after 60 complete rotations	Nil	Nil	Nil	Nil	Nil	Nil	5.2
Aggregate coating water resistance test	–	–	–	pass	pass	–	5.5
Coagulation value when mixed with standard silica flour, % (mass fraction)	–	–	–	–	–	2,0 max.	5.6

[a] By difference from water content determined in accordance with method ASTM D244.

[b] In ASTM D244 "fluxing agent" is referred to as "oil distillate". ASTM D244 gives an approximate estimate of light fractions added to bitumen, thus enabling the emulsion binder to be characterised giving an indication of the permanent characteristics of the residual binder. If the CRS emulsion contains no fluxing agent, the type of emulsion should be succeeded by the letter "t" in brackets, for example, CRS 65(t).

SANS 4001 – BT5 – 2014 – INVERTED EMULSION

Table 1 — Grade requirements

1	2	3
Property	**Grade requirement**	**Test method or subclause**
Viscosity at 50 ℃, Saybolt Furol seconds	25 to 40	ASTM D244
Water content, % (volume fraction)	10 to 20	ASTM D402
Distillation (corrected to a pressure of 101,33 kPa)		ASTM D402
Distillate (including water content), % (volume fraction) of total distillate to 360 ℃		
to 190 ℃	25 to 55	
to 225 ℃	45 to 75	
to 260 ℃	60 to 90	
to 316 ℃	80 to 100	
Viscosity at 60 ℃ on residue from distillation, Pa.s, min.	30	ASTM D4402

SANS 4001 SUMMARY

- BT 1: PENETRATION GRADES: 2014
- BT 2: CUTBACK GRADES: 2012
- BT 3: ANIONIC EMULSIONS: 2014
- BT 4: CATIONIC EMULSIONS: 2014
- BT 5: INVERTED EMULSIONS: 2014

Technical Guideline:
The use of Modified Bituminous Binders in Road Construction

TG 1
Second edition
August 2007

ISBN 0-7988-5535-5

Published by the
c/o CSIR Built Environment
0001
First published in 2001

TG 1 REVISION

Chapter 1: Introduction:
Chapter 2: OHS
Chapter 3: Composition and Characteristics;
Hot:
Emulsions:
Warm Mix: - included in HMA Design protocols
Rejuvenators: - Included in HMA Design protocols

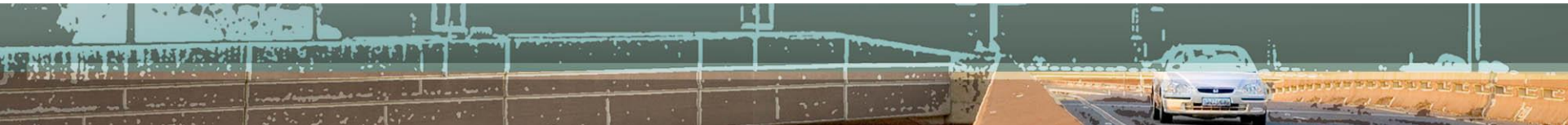
Chapter 4: Manufacture
Chapter 5: Classification
Chapter 6: Product Requirements
Chapter 7: Selection
Chapter 8: *Construction*
Chapter 9: *Storage and Handling*
Chapter 10: *Sampling / Testing*
"What if" section?

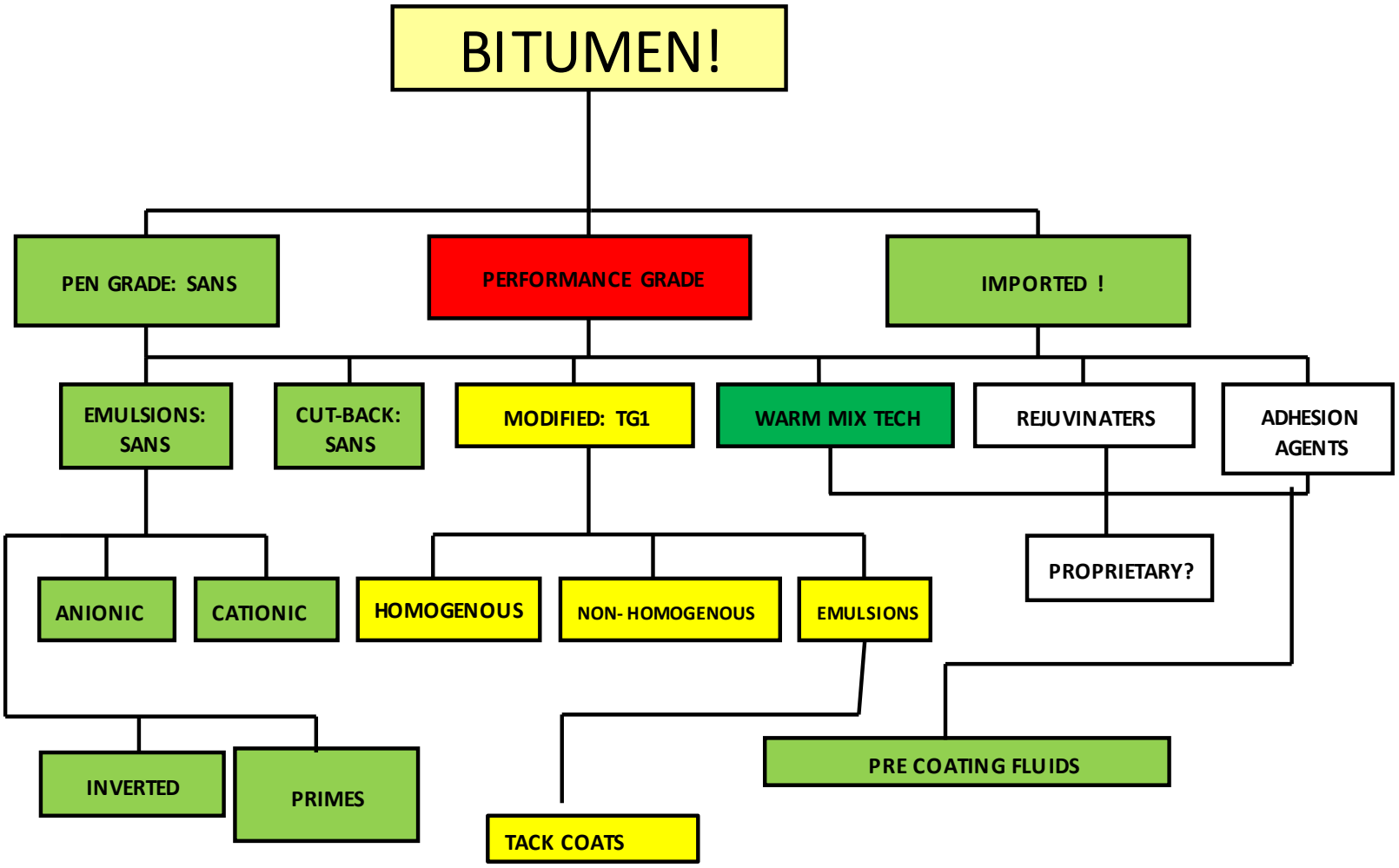
Proposal

That all modified binder suppliers be obliged to make available, to the industry, detailed blending information as well as construction guidelines/constraints of how their products should be handled/used!

CONCLUSIONS

- SANS 4001 BT Series – Great progress
- TG1 – Good progress (End June 2014?)

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BUT WHAT DOES ALL THIS PROGRESS MEAN?

- Sanral and COLTO Road Materials Committee have agreed that: where there is an appropriate SANS National Specification for ANY road construction product – it SHALL carry the SANS mark!!!!

- A “Grace Period” to allow suppliers/manufacturers to obtain SABS Certification??

- TG 1 Guidelines to form the basis of the COLTO Std. Spec. Revision for these products.

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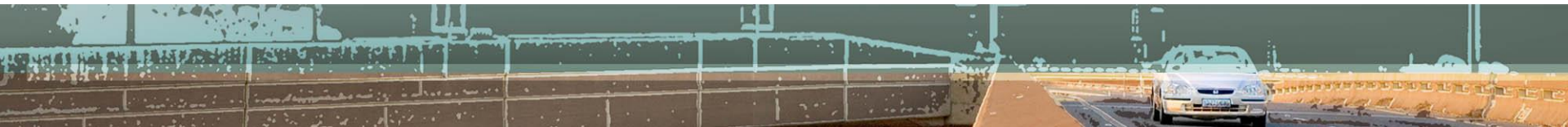

THANK YOU

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