LISBOA 2010
MAY 25/28

16th World Meeting

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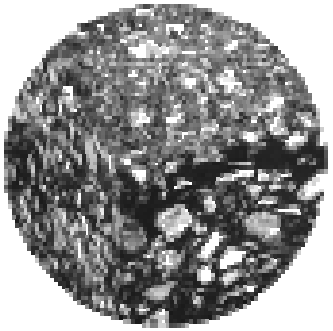
Sustainable Roads with Asphalt Rubber

- Dr. Jorge Sousa
- George Way



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Crumb rubber

Minus No. 10 mesh is used; free of wire and other contaminants; up to 0.5% fiber

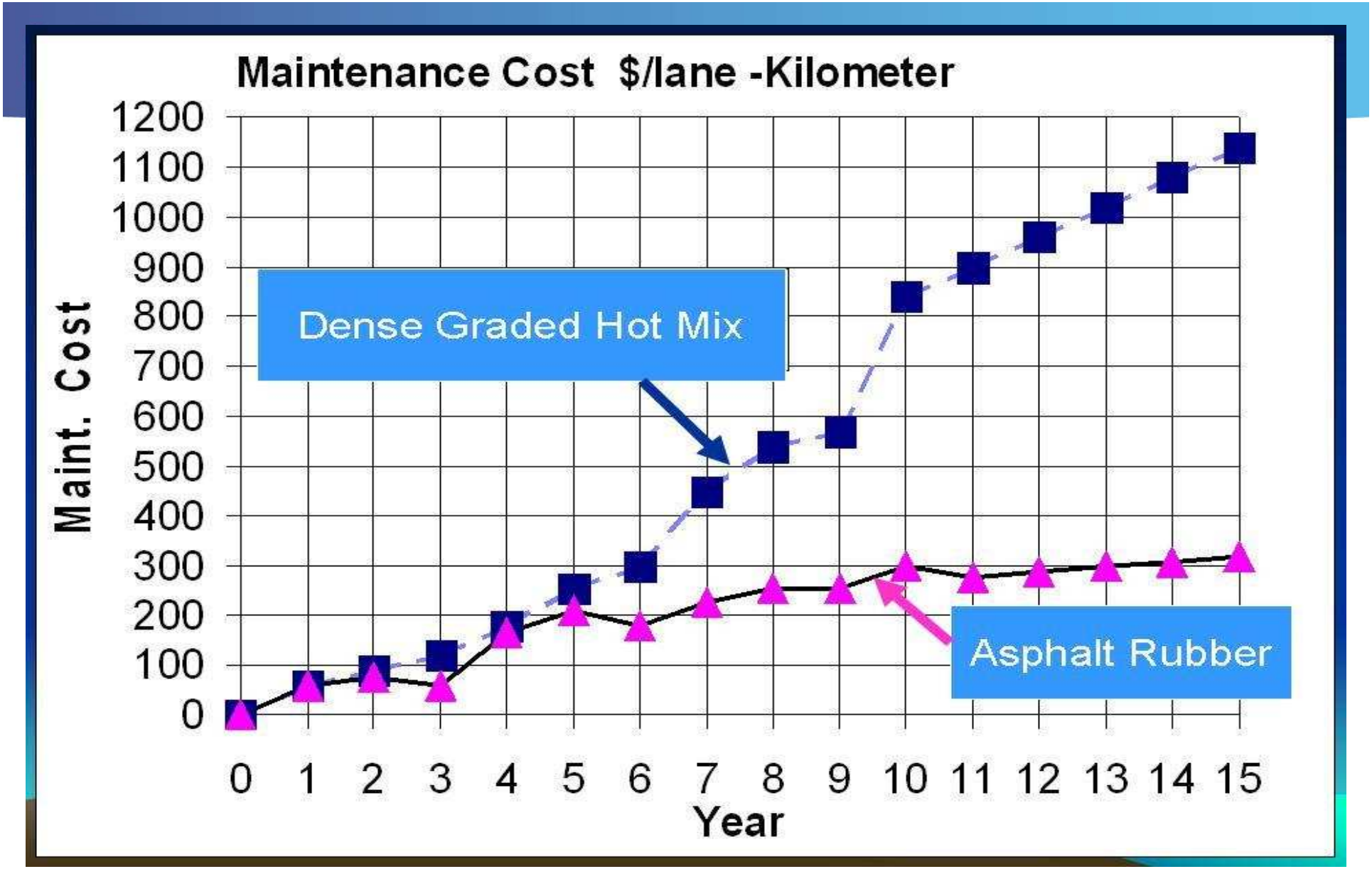
Definition of Asphalt Rubber

- It uses **20 +/- 2 %** crumb rubber
- Crumb rubber gradation passes #10
- Reaction time minimum **45 min.** at (**180 a 200 ℃**)
- Modifies asphalt properties
- **ASTM D8-88** has defined properties

Additional Asphalt-Rubber ASTM Standards

ASTM 6114 Asphalt-Rubber Specification
ASTM 6932 Open-Graded Friction Course Design & Construction
ASTM 7064 Open-Graded Friction Course Mix Design
ASTM 7584 Asphalt-Rubber Cape Seal


Adrian Mendoza/The Bee

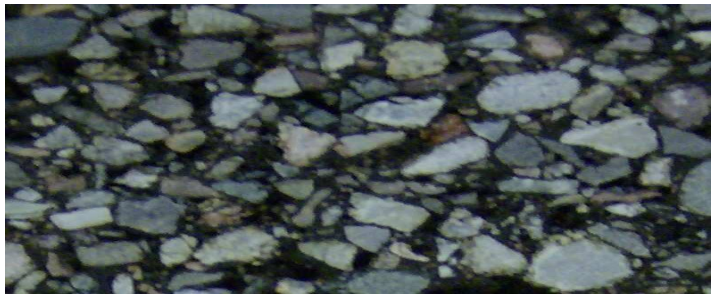


Dense Graded HMA
29000 Observations

Asphalt Rubber
23000 Observations

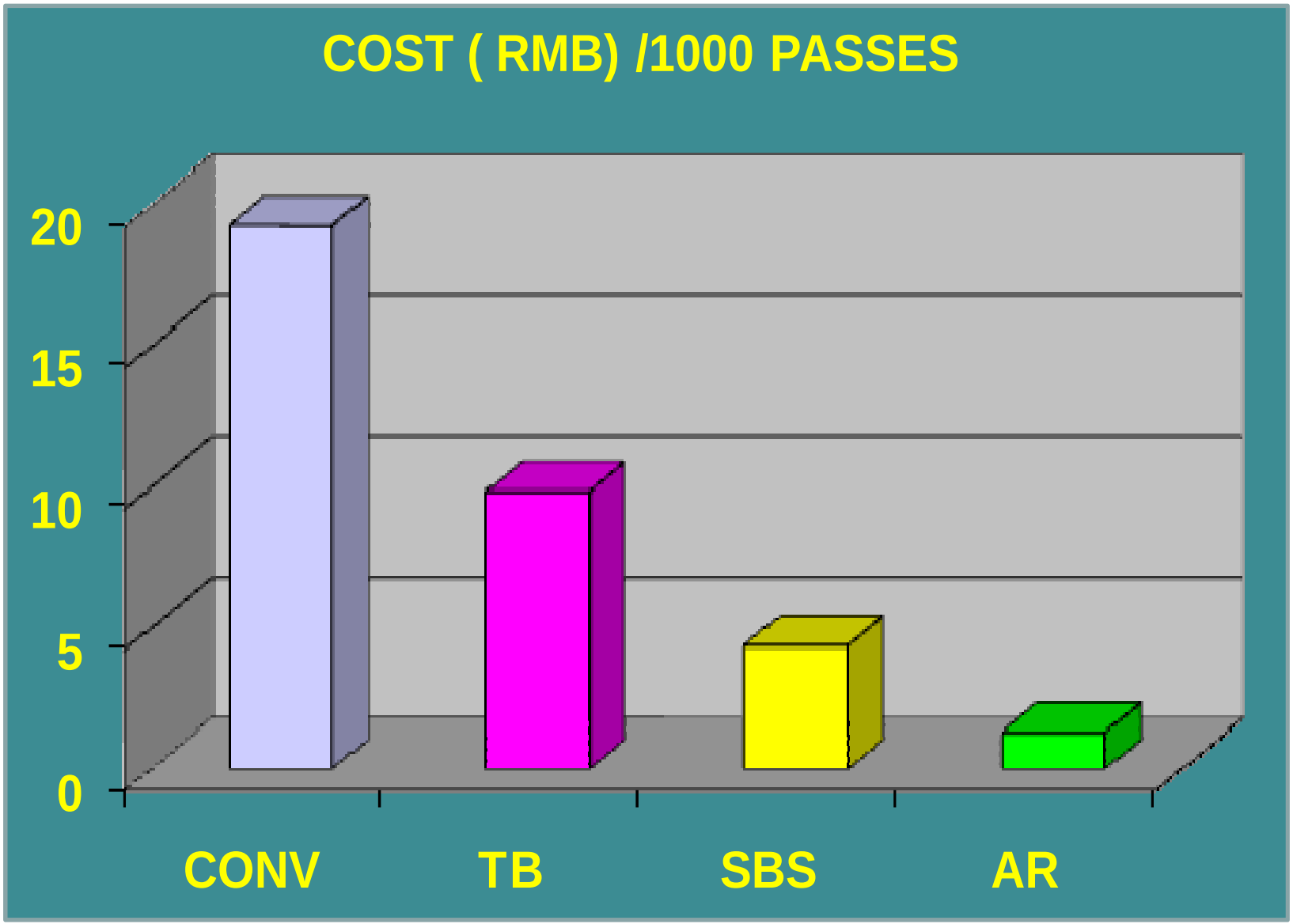
HMA Dense Graded Average
Overlay Thickness
140 mm

Asphalt Rubber
Average Thickness
45 mm



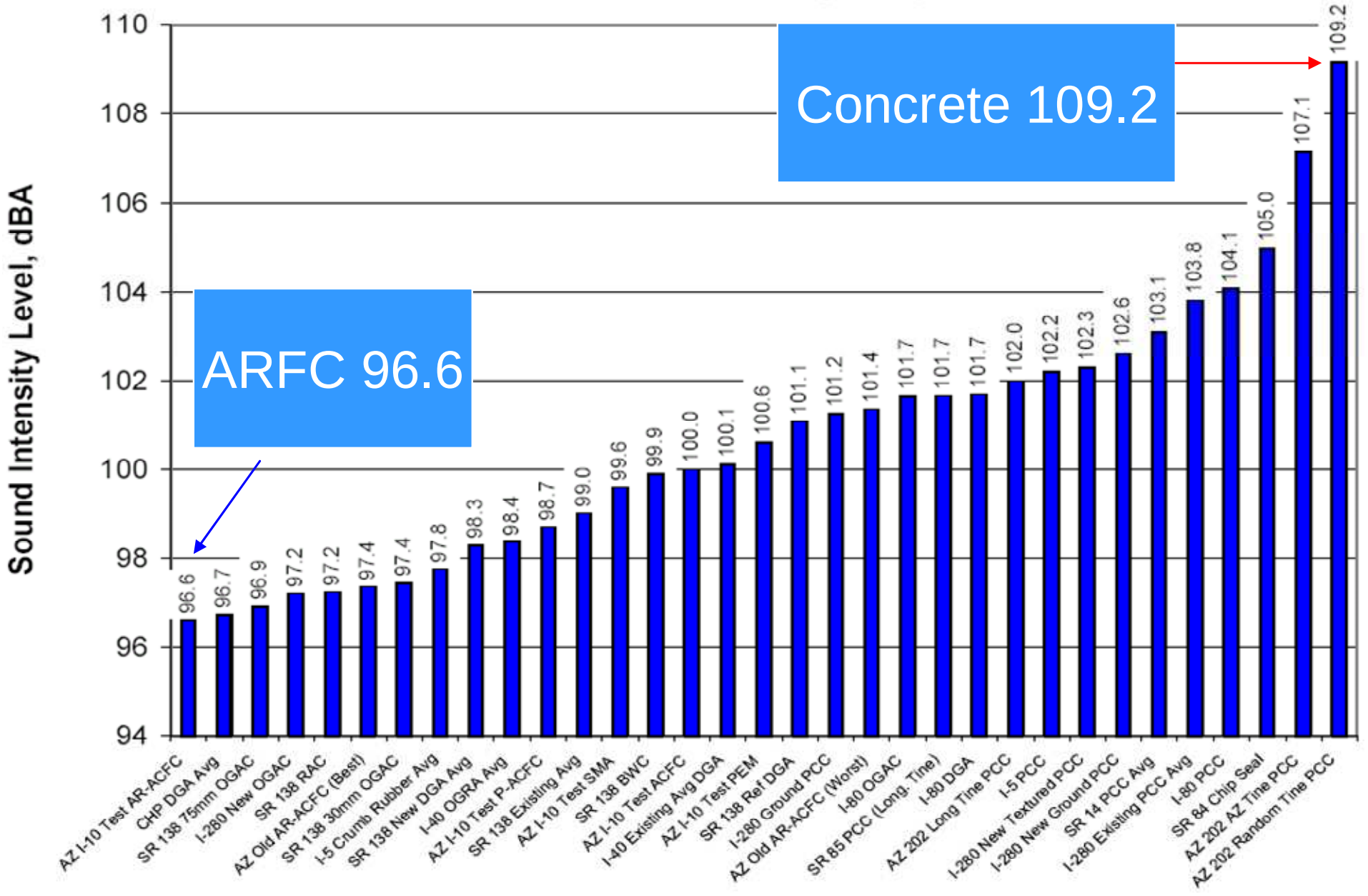
HMA % of Miles
With Fatigue Cracking
20 %

Asphalt Rubber % Of Miles
With Fatigue Cracking
2 %

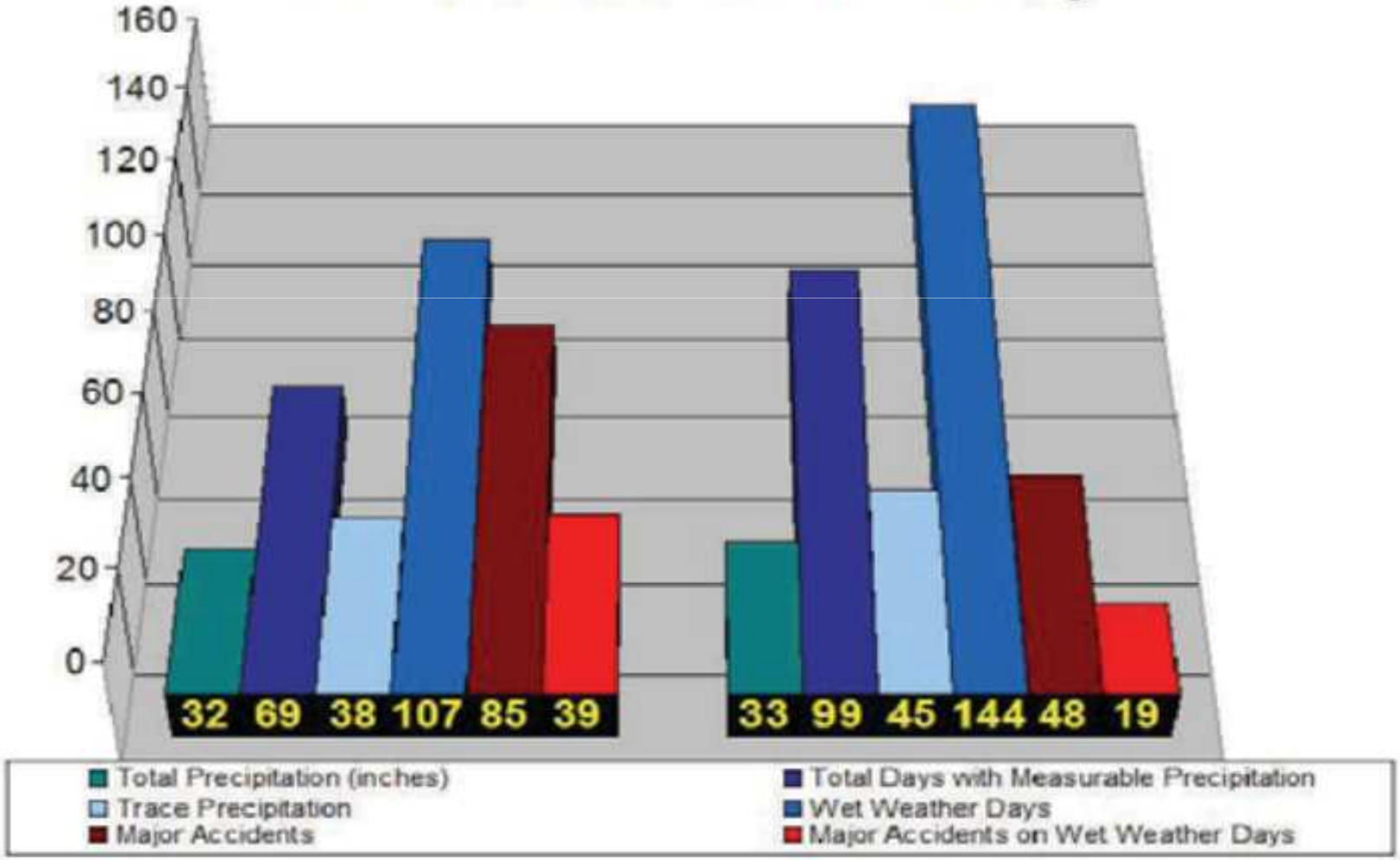

COST (RMB) /1000 PASSES
20
15
10
5
0
CONV
TB
SBS
AR

Tire/Pavement Noise Sound Intensity

California & Arizona Highways



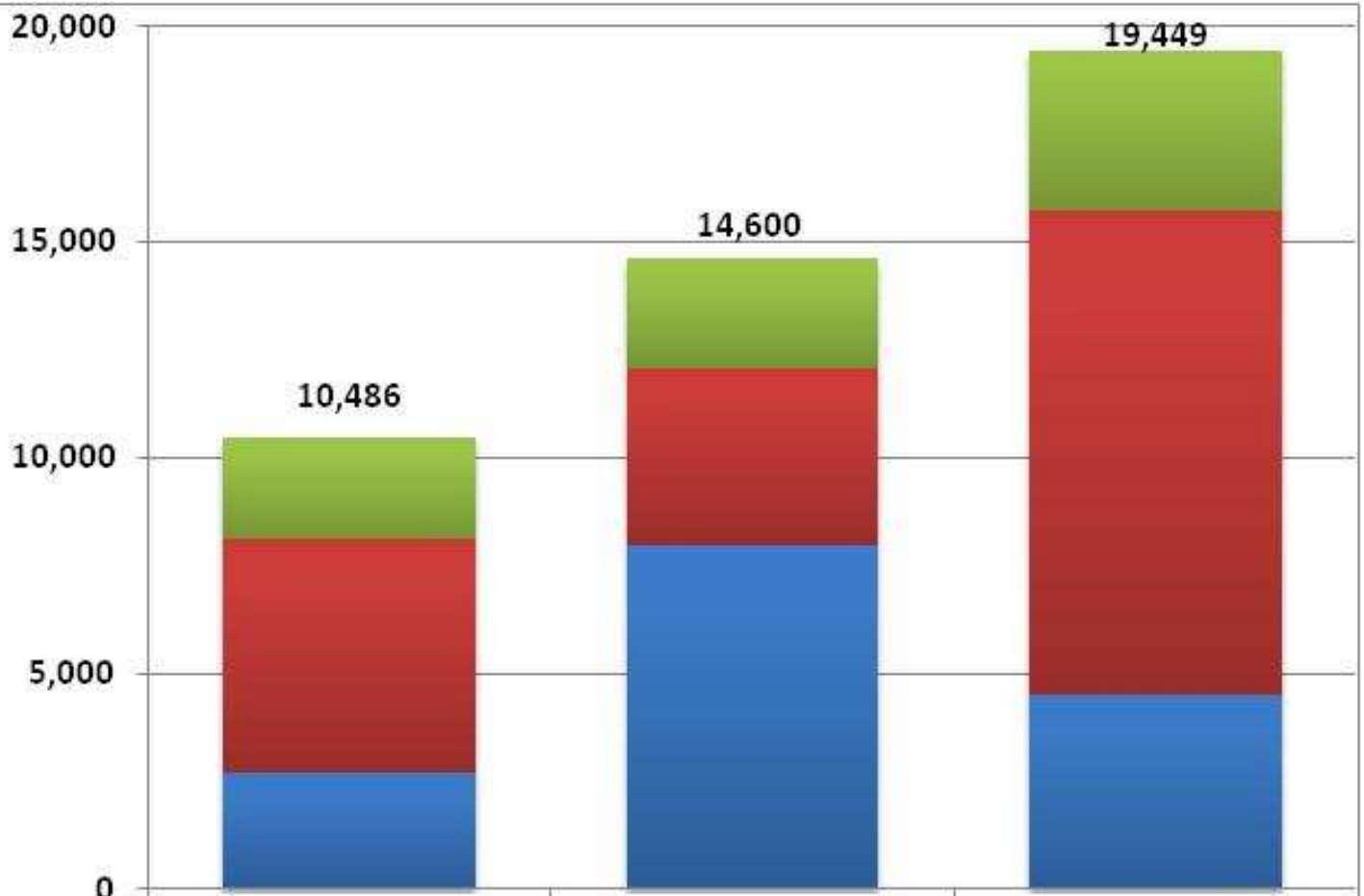
Weather and Accident Data I-35 One Year Before and One Year After AR PFC Overlay



Summary
(BTUs/Pound of Rubber)

ADC (bury tires in landfields)	TDF (burning tires)	CRM IN ASPHALT RUBBER
-790	**+13,500**	**+133,400 to +243,400**

Total Annual kg CO2 Eq. / km



	AR 50mm, Base 150mm	UTW 50mm, HMA 50mm, Base 150mm	HMA 100mm, Base 150mm
Transportation kg An. CO2 Eq. / km	2,386	2,526	3,722
Mixing kg An. CO2 Eq. / km	5,381	4,124	11,210
Production kg An. CO2 Eq. / km	2,718	7,951	4,517

	Energy Savings kJ/lane-km	Saved Metric Tons of CO2 per lane-km
AR Gap Graded	1375962879	100.4
AR Open Graded	3059839016	223.3

Are these good and sustainable benefits of using asphalt rubber?

- Higher Safety (Friction and Noise)
- High Cost/Benefit Ratio
- Lower Maintenance costs
- Saves Resources
- Saves Energy
- Reduces CO_2 emissions

Are these good and sustainable benefits of using asphalt rubber?

- **Saves lives**

Sustainable Roads with Asphalt Rubber?

- **Every scrap tire on this planet should be converted to asphalt rubber?**

- **..YES SURE (if you are a tax payer that does not make a living out of the road industry.....)**
- **.. YES.... if you are responsible for safe and cost effective road networks**

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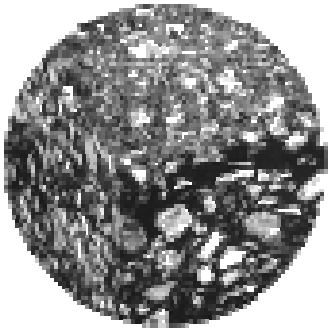

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