

Use of HMA to Reduce Wet Weather Accidents

Case Studies

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TxDOT's Mission Statement

The mission of the Texas Department of Transportation is to provide **safe**, effective and efficient movement of people and goods.

TxDOT's Vision Statement

The vision of the Texas Department of Transportation is to provide transportation systems and alternatives that are **comfortable, safe, durable, cost-effective**, accessible, environmentally sensitive and aesthetically appealing.

Safety

Highway Safety

- For most people, driving is the most dangerous activity that we are ever involved with
- The average person will be involved in 6 accidents in their lifetime
- By 1950, more Americans were killed in auto accidents than were killed in both world wars
- A high percentage of accidents happen in intersections and in horizontal or vertical curves
- Wet weather accidents account for a high percentage of highway fatalities

Highway Safety

- Almost all accidents are avoidable
- Speed kills.....differential speed kills
- Common attitude: "people just need to slow down and adapt to the conditions to avoid accidents"
- Fortunately we design highways for those that do not always do what they should

Examples of redundant design features

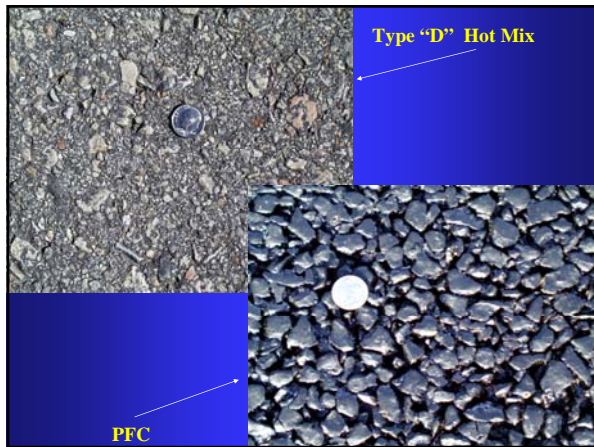
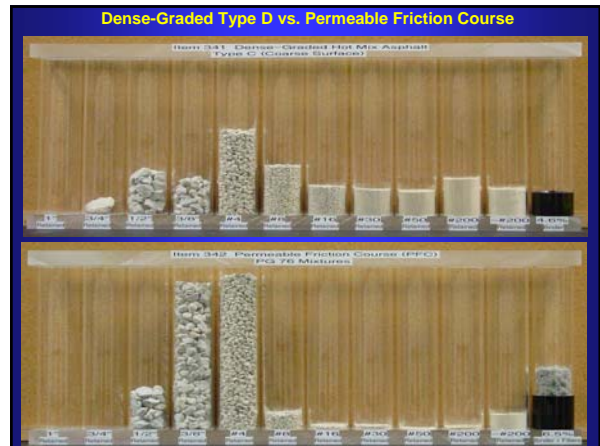
(features that give us a second chance)

- Bridge rail
- Guard rail
- Rumble strips
- Shoulders
- Median barriers
- Crash cushions
- Safety end treatments for culverts

How Can PFC Mixes Improve Safety?

- Reduces the risk of hydroplaning
- Drains the water off the roadway quicker
- Reduces spray
- Reduces glare
- Improves visibility of traffic markings
- Coarse macro-texture improves frictional characteristics

Question: Can we prove that these things actually reduce the occurrence of wet weather accidents?



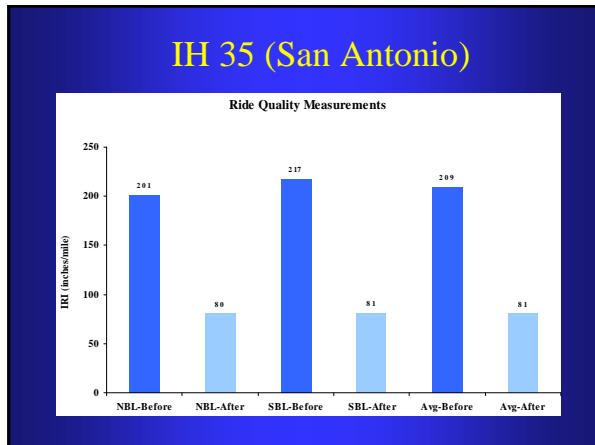
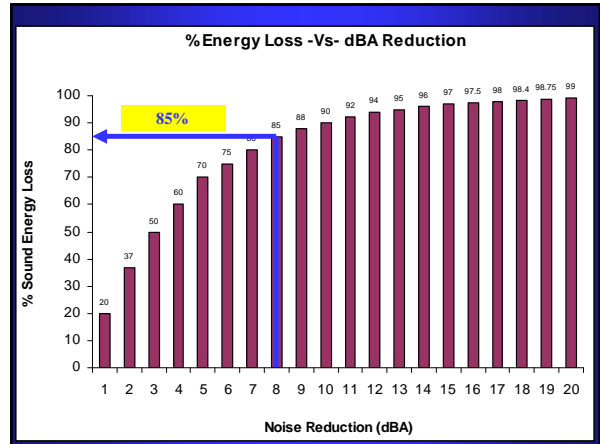
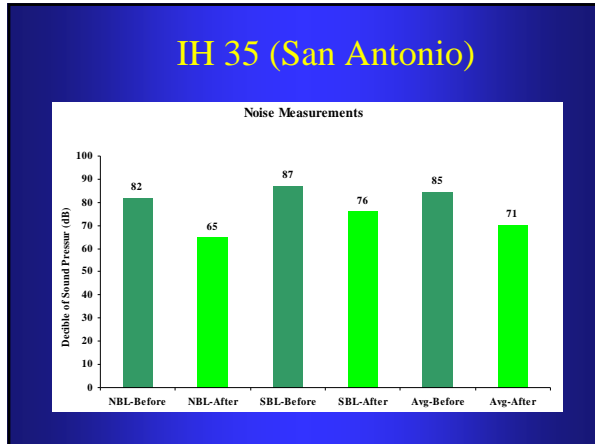
Case Study #1 IH 35 San Antonio District

IH 35 – San Antonio PFC Overlay on Existing CRCP

- Existing concrete pavement
 - ❖ Relatively sound structurally (Durable)
 - ❖ Approximately 20 years old (Durable)
 - ❖ Ride Quality was poor (IRI = 200) (Comfort?)
 - ❖ Skid numbers were in the single digits (Safety?)

A-R PFC Overlay on CRCP IH 35 San Antonio

- 1.5 inch overlay with Asphalt Rubber PFC
 - Improved the ride quality of the existing CRCP by approximately 61%.
 - Reduced the noise levels by at least 8 decibels
 - Wet weather accident reduction?



Climatic & Accident Data

IH 35 San Antonio: Before and After A-R PFC Overlay

<p><u>July 2001-June 2002</u></p> <ul style="list-style-type: none"> • Total Precipitation: – 31.78 inches • Total Days with... – Measurable precipitation: 69 • Major Accidents: 85 • Major Accidents on Days with Precipitation: 39 	<p><u>Nov 2002-Oct 2003</u></p> <ul style="list-style-type: none"> • Total Precipitation: – 32.63 inches • Total Days with... – Measurable precipitation: 99 • Major Accidents: 48 • Major Accidents on Days with Precipitation: 19
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Climate data obtained from National Oceanographic and Atmospheric Administration

Case Study #2

RM 1431 Austin District

- ### Austin District Use of PFC
- First project: 2003 – US 183 Williamson Co.
 - Second project: 2004 Emergency contract on RM 1431 in Travis Co. – “dead man’s curve”
 - Other projects: RM 620, Lp. 360, IH 35 Travis Co., IH 35 Hays Co., US 290 etc

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Factors in Wet Weather Accidents (RM 1431)

- Pavement was wet and slick
- Hydroplaning coming out of a curve
- Vehicle slid into oncoming traffic
- Driver failed to control speed to avoid accident
- Driver failed to adjust to roadway conditions
- Other vehicle did not have time to take evasive action

RM 1431 – Travis County – Pictures from Feb 14, 2004

2001 – 2003: 124 Total Accidents

2001 – 2003: 68 Wet Weather Accidents

2001 – 2003: 6 Fatalities, 62 Injuries (13 incapacitating)

Note: Project length is only 2 miles long

Proactive Measures Taken by the Austin District to Reduce Accidents

- Reduced speed limit
- Increased police enforcement of speed limit
- Warning/caution signs
- Rumble strips & raised pavement markers
- Overlay with PFC in Feb. 2004
- Long term plan to reconstruct and straighten out curves etc. (\$11 million + contract)

Accident Data: FM 1431 - Travis County - Near Jonestown
(PFC mixture was placed in February 2004)

Year	2001	2002	2003	2004	2005	2006	AVG 2001 to 2003	AVG 2004 to 2006	% Change in Avg. since PFC
Total # of accidents	25	48	36	17	6	22	36.3	15.0	-58.7
Dry weather accidents	10	22	13	15	5	21	16.0	13.7	-8.6
Wet weather accidents	15	26	23	2	1	1	21.3	1.3	-93.8
Fatalities	0	1	5	0	0	1	2.0	0.3	-83.3
Total injuries	25	16	21	6	2	13	20.7	7.0	-66.1
Incapacitating injuries*	6	4	3	0	1	0	4.3	0.3	-92.3
Non-incapacitating injuries	19	12	18	6	1	5	16.3	4.0	-75.6
Annual rainfall (inches)	42.9	38.0	21.4	52.0	22.3	34.7	33.4	36.3	8.7
Total rain days (>0.1 in.)	57	56	37	70	45	43	50.0	52.7	5.3

* Some of these injuries later became fatalities
Source: Cedar Park Police Department & Austin Mabry Weather Station

Safety is a Major Quality of Life Issue



Summary

- Recent accident data suggests that PFC mixes can be effective at reducing the occurrence of wet weather accidents
- PFC should not be used everywhere but the use of PFC should be strongly considered in areas prone to wet weather accidents. (undivided highways, curves, intersections)
- Safety is a very high priority in TxDOT's mission and vision and the effective use of PFC mixes can have a significant influence on safety

