NON-LOCK FRICTION TEST

A FIRST SHOT

PE-2014
Blacksburg, VA

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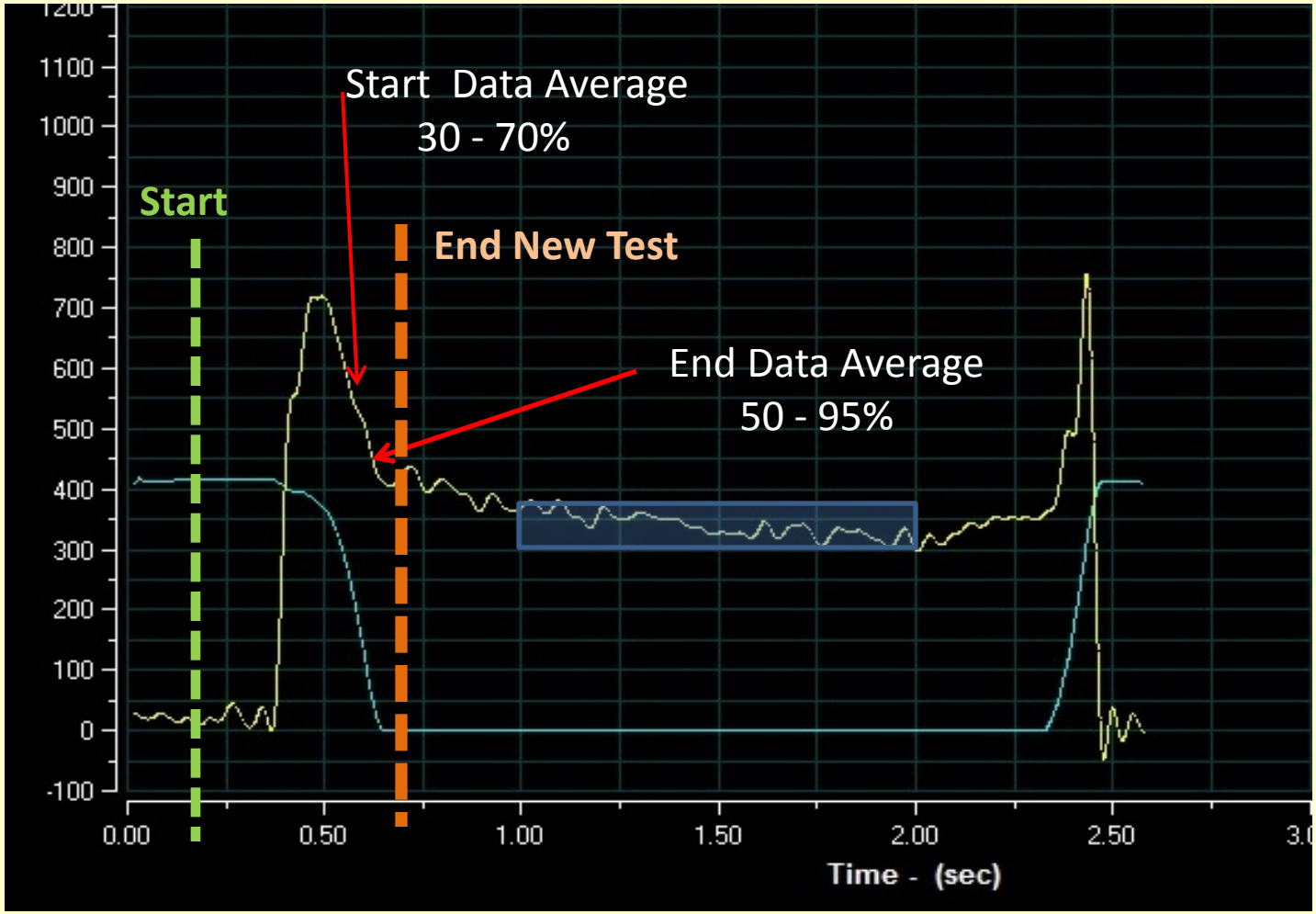
PRIMARY OBJECTIVES

- Many more samples per mile (5-10 times)
  - Challenge areas are typically short
    - Near Traffic Control Devices
    - Curves, Ramps
- Be more like current vehicles with anti-lock brakes

CONSIDERATIONS

- Values primarily pavement dependent
- Focus on microtexture
- Reduce tire wear
- Less vehicle speed dependence
- Optimize water consumption

PLANNED TEST



SKID 7 – A PORTRAIT

EQUIPMENT CHANGES

- High Performance Brake Components
- Rapid Response Water Control
- 1 KHz Data Rates
- Increased Air Capacity
- Modified Equipment Control Software
- Modified Data Collection Software
- Modified Data Analysis Software

ADDITIONAL UPGRADES

- Texture Laser in test wheel-path
- GPS – location of each test
- Tire Temperature with each test
- Automatic Load Leveling (Hitch Height)
- 450 Gallons of water

INITIAL
TEST PAVEMENTS

- **Three approximately 1 mile sections**
  - **MD170 – Recently Paved Asphalt**
  - **MD648H – Worn, Uneven Asphalt**
  - **IS97 – Concrete**

E-274 COMPARISON

SECTION	2002 Truck	2014 Truck	Difference
MD170	37.3	38.3	+ 1.0
MD648H	31.1	31.8	+ 0.7
IS97	41.3	42.7	+ 1.4

Sample Interval 0.1 mile
Averages of ~ 30 values collected over 3 passes

(Average speeds within 0.3 mph maximum)

SIMULATED N-L TEST

SIMULATED N-L RESULTS

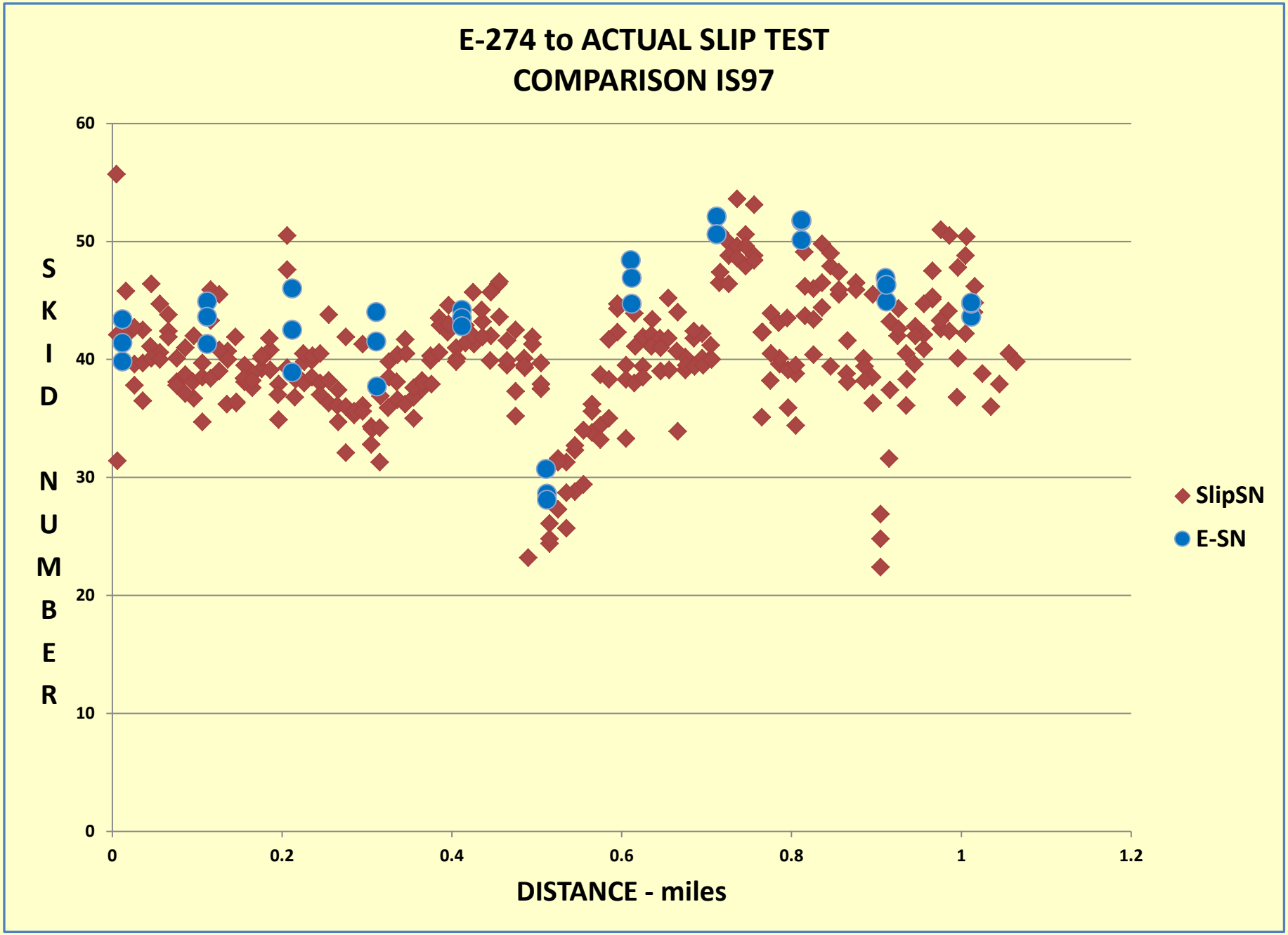
SECTION	E-274	N-L TEST	Difference
MD170	39.2	43.2	+ 4.0
MD648H	33.3	37.7	+ 4.4
IS97	42.7	45.2	+ 2.5

N-L Test – 70% to 95% Slip (Lock-up)
Averages of ~ 30 tests on each surface
Average of 12% increase on Asphalt Surfaces
A 6 % increase on the Concrete

ACTUAL NON-LOCK RESULTS

SECTION	E-274	N-L TEST	Difference
MD170	39.2	38.2	-1.0
MD648H	33.3	28.3	-5.0
IS97	42.7	40.2	-2.5

E-274 Results – average of ~ 30 tests
N-L Results – average of ~ 300 tests (next day)
Even Pavements – 3-6% Reduction
Uneven Pavement – 17% Reduction


E-274 to ACTUAL SLIP TEST
COMPARISON IS97
SKID NUMBER
60
50
40
30
20
10
0
0
0.2
0.4
0.6
0.8
1
1.2
DISTANCE - miles
SlipSN
E-SN

THREE RUNS - IS97 @ 0.01 mile interval

NETWORK TESTING PROPOSED PROTOCOL

SECTION LENGTH	TEST INTERVAL
> 1 mile	0.04 miles
0.5 to 1 mile	0.02 miles
< 0.5 miles	0.01 miles

PRIMARY NETWORK TEST COMPARISON

SECTION	E-274	N-L TEST	Difference
MD170	38.5	35.2	-3.3
MD648H	31.0	29.0	-2.0
IS97	45.3	40.9	- 4.4

- Three interlaced runs each site
- E-274 tests @ 0.2 mile interval (~ 15 tests)
- N-L tests @0.04 mile interval (~ 75 tests)

SPEED EFFECT COMPARISON

SECTION	25.7	30.4	35.3	40.4	45.3	50.4	Slope
MD170	36.9	36.4	36.0	36.3	36.6	36.0	?
MD648H	x	x	x	x	x	x	x
IS97	x	x	x	x	x	x	x

Averages of ~ 80 tests @ each speed
There is no obvious significant trend

SPEED CHART


SPEED EFFECT MD170
SKID NUMBER
50
45
40
35
30
25
20
20
25
30
35
40
45
50
55
SPEED
SlipSNAvg

IMMEDIATE ISSUES

- **Get Bugs Out**
- **Improve Water Control**
- **Resolve the SN Differences**
- **Test More Pavement Types for Speed Relationship**

TO-DO LIST

- Try Different Percent Slip Numbers
- Examine Using Test Tire Speed for Test Limits
- Increase Range of Pavement Types Tested
- Examine Influence of Tire Temperature
- Evaluate Speed vs. Slip Speed vs. Value
- Add Estimated Mean Texture Depth to Mix

THANK-YOU