RESEARCH

2008-45

Report of Pavement Surface Characteristics Mini-Rodeo (Mn/DOT Test Data and Data Comparison)

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Technical Report Documentation Page

1. Report No. MN/RC 2008-45	2.	3. Recipients Accession No.
4. Title and Subtitle **Report of Pavement Surface Characteristics Mini-Rodeo (Mn/DOT Test Data and Data Comparison)**		5. Report Date July 2008 6.
7. Author(s) Bernard Igbafen Izevbekhai, P.E.		8. Performing Organization Report No.
9. Performing Organization Name and Address Minnesota Department Of Transportation Office Of Materials 1400 Gervais Avenue Maplewood MN 55109 Phone: 651 366 5454 Fax: 651366 5461		10. Project/Task/Work Unit No. MPR 6-(012), TPF 5-(134) 11. Contract (C) or Grant (G) No. 93028
12. Sponsoring Organization Name and Address Minnesota Department of Transportation 395 John Ireland Boulevard Mail Stop 330 St. Paul, Minnesota 55155		13. Type of Report and Period Covered Final Report 14. Sponsoring Agency Code
15. Supplementary Notes http://www.lrrb.org/pdf/200845.pdf		

16. Abstract (Limit: 200 words)

In June 2008, Rob Rasmussen and the Iowa State University / Transtec TPF 5-(124) team were in Minnesota to do some testing on cells in MnROAD. As Mn/DOT had only recently completed Spring On Board Sound Intensity (OBSI) and friction testing, the effort was considered as a Mini-Rodeo, few days removed. It facilitated comparison of our methods and results and particularly offered some degree of calibration.

Transtec-Mn/DOT equipment variability did have a pronounced effect on the parallel tests. Mann Whitney Wilcoxon data comparison statistic performed at 95% confidence level corroborated the inference that the data set was similar and in consequence, each of the 2 sets of data will be accepted as representing the sections tested. Comparing spring / summer 2008 data to 2007 fall data, there is an increase in OBSI value. Further work will ascertain if this observation is a weather-related time-series issue or if the actual durability of sustained low Tire-Pavement-Interaction-Noise (TPIN) in the innovative grind needs to be examined. This sudden noise increase in cells 60 to 63 has been attributed to rocking panels and joint-slap.

17. Document Analysis/Descriptors		18. Availability Statement	
On Board Sound Intensity Surface Characteristics Mann Whitney Wilcoxon	Pavement Noise MnROAD Joint slap	No restrictions. Document available from: National Technical Information Services, Springfield, Virginia 22161	
19. Security Class (this report) Unclassified	20. Security Class (this page) Unclassified	21. No. of Pages 41	22. Price

Report of Pavement Surface Characteristics Mini-Rodeo (Mn/DOT Test Data and Data Comparison)

By

Bernard I. Izevbekhai. P.E
Concrete Research Engineer,
Minnesota Department of Transportation

For

Spring of 2008 Testing by Minnesota Department of Transportation
(Pooled Fund Study TPF 5-134)
and
Iowa State University / Transtec
(Pooled Fund Study TPF 5-139)

July 2008

Published by:

Minnesota Department of Transportation
Research Services Section
395 John Ireland Boulevard, MS 330
St. Paul, Minnesota 55155-1899

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Acknowledgement
Author is indebted to Paul Wiegand and Rob Rasmussen, Rob Light and Rob Whirledge of the Iowa State University TPF 5-134 Study group that facilitated this Rodeo and Professor Lev Khazanovich of the University of Minnesota for his advice and guidance

Acknowledgements are due to John Pantelis, Mark Watson, Nathan Pederson and Ryan Rohne of Mn/DOT who assisted with the data collection and collation process.

Bernard I. Izevbekhai, P.E.
Research Operations Engineer
Minnesota Department of Transportation
Office of Materials
1400 Gervais Avenue
Maplewood, MN 55109
Phone: 651 366 5454 Fax: 651 366 5461
bernard.izevbekhai@dot.state.mn.us

July 2008

Introduction

Current Pavement surface characteristics research initiatives seek to accomplish among other things the actual tire-pavement interaction parameters. In the current initiatives that include Minnesota led Transportation Pooled Fund TPF 5-134 (Minnesota Study MPR 6-(012)), Iowa led TPF 5-(139) and Washington led TPF 5-135, the development and integration of the On-Board sound intensity testing has metamorphosed into a widely accepted protocol.

In June 2008, the Iowa State University/ Transtec Rob Rasmussen and TPF 5-(124) team were in Minnesota to do some testing on some cells at MnROAD. As Mn/DOT had only recently completed Spring OBSI and friction testing, the effort was considered as a Mini-Rodeo, few days removed. It facilitated comparison of our methods and results particularly with respect to the OBSI measurements.

Mn/DOT OBSI Data Collection Process

OBSI equipment consists of a Chevrolet Impala and eight intensity meters connected via four communication cables to a Bruel and Kjaer front-end collector connected to a dell laptop computer. The intensity meters are mounted on a rig system attached to a standard reference test tire that is installed at the rear left side of the vehicle and maintained at a temperature of 30 ˚C. After recording temperature, four intensity meters were plugged in to the B &K front-end unit, as well as 12v power supply and Ethernet (computer) cable. With this arrangement, the unit is capable of measuring repeatable tire pavement interaction noise of the tire pavement contact patch at a speed of 60 miles an hour, thus measuring approximately 440 ft within 5 seconds. Mounting the rig on a non-dedicated vehicle and calibration of the microphones as well as durometer evaluation of the tire prior to measurement are mandatory operational procedure, prior to data collection. The existing Excel programs and Fourier transform programs that facilitate analysis of the noise measured simplify subsequent data analysis. Implicit in the transforms are the window functions that facilitate the program. The Mn/DOT collection template is saved to the collection laptop's desktop for use in collection OBSI. Pulse software program is used to collect data. A texture noise degradation algorithm is being validated. It is believed that texture degradation results in a reduction of Tire Pavement Interaction Noise (TPIN) in concrete pavements while ageing of flexible pavements result in increase of tire pavement interaction noise. While texture degradation of rigid pavements causes a redistribution of friction into its constituents: hysteresis and adhesion the effect of the tire pavement noise suction component is attenuated by the averaging the reception of two sets of microphones, 2 each on the trailing edge and the leading edge of the contact patch.

Figure 1. Mn/DOT OBSI Set-Up. Rig System by Illingworth & Rodkin, Microphones from BRC/ GRAS and Front End Analyzer from Bruel & Kjaer. (OBSI was invented by Dr. Paul Donavan of Illingworth & Rodkin. The system is mounted on a Model 2006 Chevrolet Impala using a Standard Reference Test Tire in the rear right wheel.

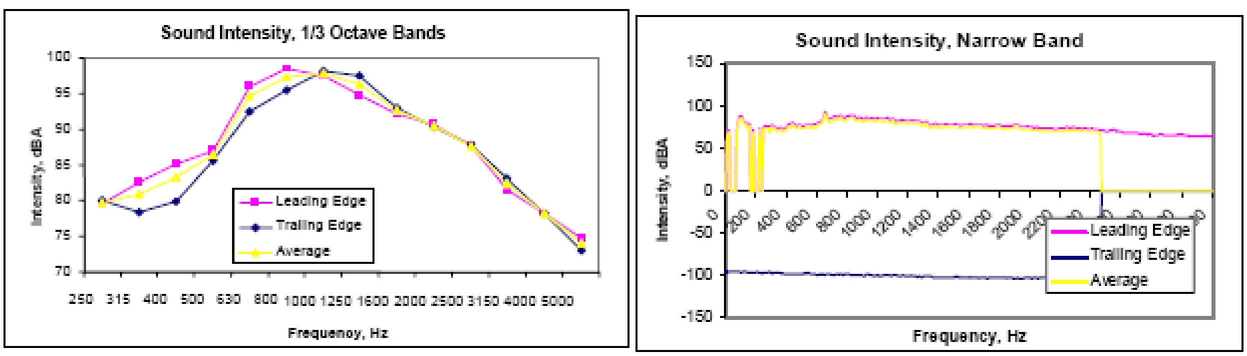

Figure 2. One third Octave and Narrow band Frequency Response of two sets of Microphones

The Mn/DOT standard equipment consists of a Bruel and Kjaer front end, a rig system developed by Illingworth and Rodkin, the Inventor of the OBSI method, and a set of sophisticated microphones supplied by BRC Engineering. The Rig is installed on the Standard Reference Test Tire and connected to the front-end frequency analyzer through a series of communication cables. The front-end is also linked to a laptop that allows direct analysis of the noise data. The Mn/DOT equipment is installed on a Chevrolet Impala. A convenient logarithm scale is used to mimic the human hearing spectrum. All of the MnROAD cells were measured except the transitional curves between the loops and the straight courses at the LVR cells. It was not practical to safely attain 60 mph measuring speed in these transitional curves and so it was not possible to measure Cells 54, 53, 52, and 40 on the LVR during the fall of 2007. In spring of

2008, another measurement strategy was studied. That strategy accommodated measurement of sub cells that are less than 500-feet. The latest strategy was not reported in this Rodeo.

Understanding Logarithmic Summation in OBSI

The OBSI agglomerates the component frequencies ranging from 500 hertz to 5000 hertz of the measured section. The component frequencies are logarithmically summed to give a unique OBSI value for that section. Based on the logarithmic summation, a reduction of three dBA is equivalent to a reduction of the reference traffic volume by 50 percent all things being equal. Two equal sources will increase the OBSI value by three dBA and three equal sources will increase the OBSI value by 4.7 dBA. Similarly, a reduction of 4.7 dBA is equivalent to a 60 percent reduction in traffic. This can be observed by substituting the OBSI difference as shown in equations 1 to 3. The logarithmic addition though the OBSI values typically appear clustered from 94 to 110 dBA, a difference of 0.5 is a significant research level deviation and a difference of 3 is usually felt by the driver or passenger.

$$L_s = 10 * \log 10 (^{10(l_1/10)} + 10^{(l2/10)} + 10^{(l_3/10)}) \ldots.+\ldots 10^{(l_n/10)}) \qquad 1$$

$$L + \Delta L = 10 \log_{10} (n \text{ X } 10^{L}) = (10 \times \log_{10} n) + L \qquad 2$$

$$\Delta L = 10 \times \log_{10} n \text{ or } n = 10^{(\Delta L / 10)} \qquad 3$$

Where n is the number of equivalent sources, L is the OBSI level, and **Δ** L is the Change in OBSI due to the increase from a unit source. This is the A-weighted scale that is simply explained by the following expatiation. If “n” similar sources generate a noise level i dBA, the total noise level is given by:

The OBSI analysis is based on the AASHTO TP 76-08 protocol. The OBSI parameter is the logarithmic sum of sound intensity at each of the designated frequencies of 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000 and 5000 Hz.

$$\textbf{OBSI} = 10 * \log [10^{\{SI_1/10\}} + 10^{\{SI_2/10\}} + \ldots. +10^{\{SI_{14}/10\}}]\ldots\ldots\ldots \qquad \textbf{(3)}$$

Where SI_1, SI_2 …, SI_{14} are sound intensities in dB at each of the 14 frequencies denoted by subscripts 1 to 14.

()

Consequently, if there are 2 sources with the same sound intensity, the cumulative intensity is thus 3 dBA higher than the individual intensity as shown below. This implies that a reduction of the sound intensity by 3 dBA is equivalent in effect to a traffic reduction to 50 % of original ADT.

$$DB(A)_{I2} = 10* \log [10^{(Ii/10)} + 10^{Ii/10)}] \text{ for 2 sources } \ldots\ldots..(5)$$

$= 10 \log [2 * 10^{(Ii/10)}]$ for 2 sources
$= 10 * (\text{Log } 2 + Ii)$

$DB(A)_{I\,2} = (I + 3)\ dB(A)$ ……………………………………………(6)
6

Similarly in the A-weighted metric a reduction of 4.7 dBA is equivalent to a 67% reduction in the overall noise level.

Results of OBSI Testing
Results are available for all the cells in MnROAD except those that by proximity to the loop will not permit a measuring speed of 60 miles an hour. The results here represent our test results in the sections where transtec had also taken measurements. It includes the exposed aggregate surface caused by the hydro blasting process demonstrated on the 8th of April. Also included is the result of the OBSI test for a standard Minnesota astroturf drag recently constructed and finished on TH 694-TH 35E-TH 61 unweave the weave project. Results are shown in Tables A14 to A16.

Other Test Results
Although Transtec did not share the friction results from their dynamic friction tester, we have included herein results of ribbed and smooth tire friction tests on Cell 7, 8, and 37. Friction results are shown in Tables A22 and A23.

Comparison of Mn/DOT Results to Transtec's Results
Tables 1 and 2 show the data comparison process. Using the Mann-Whitney Wilcoxon Process of data comparison there is no significant disparity between Mn/DOT and Transtec data. Equipment variability does not seem to have a pronounced effect on the parallel tests. A radical change in OBSI value from cells 60 to 63 was observed. In fall of 2007, the TPIN was 99.7 dBA and the current measurement done by Transtec was 102.7 in June and 102.4 by Mn/DOT on July 15, 2008. The remarkable difference between fall and Spring data is attributed to rocking panels that are more predominant in cells 62 and 63 and are present in cells 60 to 61. The panel rocking and joint slap phenomena were not observed last fall. These whitetopping cells are all undoweled and in consequence, load transfer expected from the base (bituminous) is compromised. Variation in pavement thickness also played apart in the degree of joint slap and panel rocking. Cells 60 and 60 were built to 5 inches thick without mechanical load transfer and cell 62 and 63 are built to 4inches thick and also without mechanical load transfer devices. To investigate those 4 cells further, falling weight deflectometer (FWD) data will be examined in another report.

The Mann Whitney U test compares the means from two independent samples. The two samples being tested are the accident counts before texturing against the accident counts after the texturing. The null hypothesis (H_0) and the alternate hypothesis (H_a) were defined as follows:
• H_0: Two test results Mn/DOT and Transtec texturing are the same, within a 95 percent level of confidence.
• H_a: Two test results Mn/DOT and Transtec are different, within a 95 percent level of confidence

The Mann Whitney U test rank orders the data from both of the independent samples n_1, n_2. The sum of the ranks corresponding to each sample (n_1, n_2) can be denoted as (w_1,w_2) and the U statistics, u_1 or u_2 can be found as follows:

$$u_1 = w_1 - \frac{n_1(n_1+1)}{2} \quad \text{or} \quad u_2 = w_2 - \frac{n_2(n_2+1)}{2}$$

However when both n_1 and n_2 exceed 8, the sampling distribution of U_1 (or U_2) approaches the normal distribution and can be approximated as follows:

$$\mu_{U_1} = \frac{n_1 n_2}{2} \quad \text{and} \quad \sigma_{U_1} = \sqrt{\frac{n_1 n_2(n_1+n_2+1)}{12}} \quad \text{with} \quad Z = \frac{U_1 - \mu_{U_1}}{\sigma_{U_1}}$$

Mann Whitney Wilcoxon statistic is 0.196 which is less than 1.64 the critical statistic for this hypothesis validation of data similarity. In consequence, the data is similar to a 95 % confidence Level.

Conclusion

Equipment variability does not seem to have a pronounced effect on the parallel tests. A radical change in OBSI value from cells 60 to 63 was observed between the fall of 2007 and the Spring of 2008. The Spring/Summer 2008 results of Transtec and Mn/DOT were statistically similar in all cells tested. Further comparison done with the Mann Whitney Wilcoxon data comparison statistic corroborated the inference that the data set was similar and in consequence each set of data (Mn/DOT or Transtec) could be accepted as representing the sections tested.

Comparing spring / summer 2008 data to 2007 fall data, there is a remarkable increase in OBSI value. Further work will ascertain if this observation is a time series issue that is weather related or the actual durability of if the sustenance of low tire pavement interaction noise in the innovative grind. However, the relative quietness of innovative grind in comparison to other textures remained unchanged

Table 1. Comparison of OBSI Tests Mn/DOT TPF 5-134 and MPR 6-012 to Transtec (TPF 5-(139))

Location	**Surface**	**Surface Age(YRS)**	**Pavement Age**	**Mn/DOT OBSI(dBA)**	**Transtec OBSI(dBA)**	**Deviation (D)**	**SSD**
Cell 37 TS1	DG Single pass	1	14	99.7	99.5	0.2	0.04
Cell 37 TS2	DG Double Pass	1	14	100.7	100.6	0.1	0.01
Cell 37 TS3	DG Conventional	1	14	102.7	102.1	0.6	0.36
Cell 37 TS4	Random trans Tine	14	14	103.4			0
Cell 36 Inside lane	Random trans Tine	14	14	103	103.8	-0.8	0.64
Cell 32 Inside lane	Turf Drag	9	9	101.7	101.6	0.1	0.01
Cell 32 Outside	Turf Drag	9	9	101			0
Cell7 Passing	DG Single pass	1	14	100.2	100.7	-0.5	0.25
Cell7 driving	DG Single pass	1	14	99.9			0
Cell 8 Driving	DG Conventional	1	14	102.4			0
Cell 8 passing	DG Conventional	1	14	101.9	101	0.9	0.81
Cell 60-63 Driving	Turf Drag WT	4	14	101.6			0
Cell 60-63 passing	Turf Drag WT	4	14	102.4	102.7	-0.3	0.09
Cell 10 WB Passing	Random trans Tine	14	14	104.4	104.6	-0.2	0.04
Cell 11 WB Passing	Random trans Tine	14	14	104.5	104.3	0.2	0.04
Cell 9 WB Passing	Random trans Tine	14	14	104.3	104	0.3	0.09
TH 694 -TH 35E Unweave	Turf Drag	0.05	0.05	100.3			
Cell 13 HYDROBLAST	Hydro blast	0.3	14	103.6			
					Sum & SSD	**0.6**	**2.38**
					Mean Dev & RMSD	**0.05**	**0.47**

Table 2. Mann Whitney Wilcoxon U Test Results

Data set 1 Mn/DOT: 99.7 100.7 102.7 103 101.7 100.2 101.9 102.4 104.4 104.5 104.3
Data set 2 Transtec: 99.5 100.6 102.1 103.8 101.6 100.7 101 102.7 104.6 104.3 104

n_1	n_2	U	P (two-tailed)	P (one-tailed)
11	11	63.5	0.846998	0.423499
normal approx z = 0.196995			0.843832*	0.421916*

The two samples are not significantly different (P >= 0.05, two-tailed test).

Appendix A; Source Data

Table A1. Cell 37 Conventional Grind

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	79.1	4.4	0.9	76.5	8.4	0.6	78.0
315	77.8	4.0	0.9	82.5	2.7	0.8	80.8
400	82.3	1.8	1.0	81.5	2.7	0.8	82.0
500	83.8	1.9	1.0	83.5	2.7	0.9	83.6
630	92.4	1.4	1.0	88.0	1.6	1.0	90.7
800	97.0	0.7	1.0	94.8	0.9	1.0	96.0
1000	97.0	0.8	1.0	98.7	0.9	1.0	98.0
1250	94.2	0.9	1.0	96.2	0.9	1.0	95.3
1600	93.0	1.2	1.0	93.5	1.3	1.0	93.3
2000	91.0	1.1	1.0	90.7	0.9	1.0	90.9
2500	86.3	1.2	1.0	86.3	1.1	1.0	86.3
3150	80.5	1.2	0.9	81.3	0.9	0.9	80.9
4000	75.9	1.8	0.8	76.8	1.7	0.8	76.3
5000	72.0	1.4	0.7	71.5	2.7	0.6	71.7
A-wtd	102.7			102.9			102.8
Second Run							
250	80.9	2.2	0.9	83.1	1.3	0.6	82.1
315	77.7	3.1	0.9	82.1	2.8	0.7	80.4
400	82.6	1.2	1.0	80.9	2.7	0.8	81.8
500	83.2	2.0	1.0	83.4	2.4	0.9	83.3
630	91.9	1.5	1.0	87.7	1.6	1.0	90.3
800	96.6	0.7	1.0	94.3	1.0	1.0	95.6
1000	96.9	0.8	1.0	98.3	0.9	1.0	97.6
1250	94.2	1.0	1.0	96.2	1.0	1.0	95.3
1600	93.1	1.1	1.0	93.7	1.3	1.0	93.4
2000	90.9	1.0	1.0	90.4	0.9	1.0	90.7
2500	86.3	1.0	1.0	86.2	1.1	1.0	86.2
3150	80.5	1.1	0.9	81.2	0.9	0.9	80.8
4000	75.8	1.7	0.8	76.8	1.5	0.8	76.3
5000	72.0	1.4	0.7	71.5	2.6	0.6	71.7
A-wtd	102.5			102.7			102.6

Table A2. Cell 37 Innovative Grind 2 passes 6/13/08

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	85.8	-0.8	0.7	81.1	3.9	0.6	84.0
315	85.1	-0.9	0.8	83.9	1.4	0.7	84.5
400	86.2	0.7	0.9	82.6	2.5	0.8	84.7
500	87.1	1.2	1.0	85.3	2.5	1.0	86.3
630	91.1	1.4	1.0	88.9	1.6	1.0	90.1
800	96.4	0.7	1.0	94.1	0.9	1.0	95.4
1000	94.6	0.9	1.0	96.1	1.0	1.0	95.4
1250	92.3	0.8	1.0	94.4	0.7	1.0	93.5
1600	88.1	1.0	1.0	89.9	0.7	1.0	89.1
2000	86.5	1.1	1.0	86.7	0.9	1.0	86.6
2500	82.6	1.3	1.0	83.6	1.0	1.0	83.1
3150	77.7	1.2	1.0	78.6	0.9	0.9	78.2
4000	73.4	1.6	0.9	73.8	1.1	0.9	73.6
5000	70.5	1.6	0.7	70.5	1.9	0.7	70.5
A-wtd	100.8			100.9			100.9
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	88.3	-2.2	0.6	87.7	-1.4	0.6	88.0
315	86.0	-0.9	0.7	83.5	2.0	0.6	84.9
400	86.6	0.5	0.9	84.4	1.3	0.8	85.6
500	86.9	1.8	1.0	85.3	2.2	0.9	86.2
630	91.4	1.4	1.0	88.6	1.3	1.0	90.3
800	96.9	0.6	1.0	93.9	0.6	1.0	95.6
1000	94.3	0.9	1.0	95.3	0.8	1.0	94.8
1250	91.5	0.9	1.0	93.5	0.6	1.0	92.6
1600	87.9	1.3	1.0	88.9	0.8	1.0	88.5
2000	86.2	1.3	1.0	85.5	0.9	1.0	85.9
2500	82.8	1.4	1.0	82.7	1.1	1.0	82.7
3150	78.3	1.2	0.9	78.3	1.0	0.9	78.3
4000	74.7	1.7	0.8	74.0	1.3	0.8	74.4
5000	71.9	1.5	0.7	70.6	2.1	0.7	71.3
A-wtd	100.8			100.2			100.5

Table A3. Cell 37 Innovative 2 passes TS2 6/16/08

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	83.6	-0.4	0.6	#NUM!	#NUM!	0.4	#NUM!
315	83.4	-1.8	0.6	84.6	-1.1	0.6	84.0
400	81.2	0.8	0.8	81.1	1.7	0.7	81.1
500	80.7	2.3	0.9	81.9	1.8	0.9	81.3
630	85.2	1.6	1.0	84.6	1.9	1.0	84.9
800	91.3	0.8	1.0	90.2	0.9	1.0	90.8
1000	94.5	0.7	1.0	96.1	0.7	1.0	95.4
1250	91.6	0.5	1.0	94.3	0.5	1.0	93.2
1600	87.8	1.0	1.0	90.0	0.6	1.0	89.1
2000	88.6	0.9	1.0	88.8	0.6	1.0	88.7
2500	85.2	1.1	1.0	85.6	0.7	1.0	85.4
3150	79.7	1.0	1.0	81.5	0.4	0.9	80.7
4000	77.2	1.0	0.9	79.2	0.1	1.0	78.3
5000	72.8	1.0	0.8	73.8	0.6	0.8	73.3
A-wtd	99.0			100.3			99.7
Second Run							
250	84.9	-1.3	0.5	#NUM!	#NUM!	0.5	#NUM!
315	85.3	-3.1	0.5	78.0	6.8	0.6	83.0
400	82.0	0.7	0.8	82.4	1.5	0.7	82.2
500	80.4	2.8	0.9	79.5	4.1	0.8	80.0
630	85.6	1.5	1.0	83.5	2.1	0.9	84.7
800	91.5	0.9	1.0	90.6	0.9	1.0	91.1
1000	94.8	0.7	1.0	96.6	0.7	1.0	95.8
1250	91.8	0.6	1.0	94.3	0.6	1.0	93.2
1600	87.6	1.1	1.0	89.7	0.7	1.0	88.8
2000	87.4	1.0	1.0	88.2	0.6	1.0	87.8
2500	84.7	1.2	1.0	85.1	0.9	1.0	84.9
3150	79.7	1.0	1.0	80.8	0.7	0.9	80.3
4000	77.3	1.0	0.9	78.7	0.3	1.0	78.1
5000	73.1	1.1	0.8	73.9	0.9	0.8	73.5
A-wtd	99.0			100.4			99.8

Table A4. Cell 37 Innovative 1 pass

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	85.7	-2.6	0.5	83.4	1.2	0.5	84.7
315	84.9	-2.8	0.7	73.1	10.9	0.6	82.2
400	82.0	-0.3	0.8	78.2	4.5	0.7	80.5
500	80.9	1.9	0.9	79.7	3.6	0.8	80.3
630	84.9	1.6	1.0	82.8	2.2	0.9	84.0
800	90.8	0.9	1.0	89.9	1.0	1.0	90.4
1000	95.0	0.7	1.0	97.1	0.7	1.0	96.1
1250	91.4	0.5	1.0	94.0	0.5	1.0	92.9
1600	87.0	1.1	1.0	89.4	0.6	1.0	88.3
2000	87.4	1.0	1.0	87.4	0.6	1.0	87.4
2500	84.7	1.0	1.0	84.4	0.9	1.0	84.6
3150	79.2	1.0	1.0	79.6	0.8	0.9	79.4
4000	75.9	1.1	0.9	77.8	0.3	1.0	77.0
5000	72.4	1.3	0.8	73.3	1.1	0.8	72.9
A-wtd	98.8			100.3			99.6
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	85.0	-1.0	0.6	78.3	7.1	0.5	82.9
315	83.5	-1.2	0.6	81.4	2.8	0.6	82.6
400	79.7	1.9	0.8	78.6	3.9	0.7	79.2
500	80.6	2.2	0.9	80.2	3.2	0.8	80.4
630	84.1	1.9	1.0	82.0	2.6	0.9	83.2
800	90.9	0.9	1.0	90.1	1.1	1.0	90.5
1000	95.4	0.7	1.0	97.6	0.7	1.0	96.6
1250	92.3	0.5	1.0	94.7	0.5	1.0	93.7
1600	87.2	1.1	1.0	89.7	0.7	1.0	88.7
2000	87.8	1.0	1.0	87.7	0.6	1.0	87.7
2500	85.1	1.1	1.0	84.8	0.9	1.0	85.0
3150	79.0	1.1	0.9	80.0	0.8	0.9	79.5
4000	76.2	1.1	0.9	78.7	0.2	1.0	77.7
5000	72.4	1.4	0.8	73.7	1.1	0.8	73.1
A-wtd	99.2			100.8			100.1

Table A5. Cell 37 Original Transverse Tined TS4

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	88.1	-1.7	0.7	86.2	-0.1	0.6	87.2
315	82.9	1.2	0.8	83.5	2.9	0.7	83.3
400	85.6	1.2	0.9	81.9	3.8	0.8	84.2
500	86.4	2.0	1.0	86.5	2.3	1.0	86.5
630	94.1	1.5	1.0	90.6	1.6	1.0	92.7
800	99.1	0.7	1.0	96.4	0.8	1.0	98.0
1000	96.9	1.1	1.0	98.5	1.1	1.0	97.7
1250	94.2	1.1	1.0	96.5	1.0	1.0	95.5
1600	92.7	1.1	1.0	94.0	1.1	1.0	93.4
2000	90.3	0.8	1.0	89.8	0.8	1.0	90.1
2500	84.7	0.9	1.0	84.7	0.9	1.0	84.7
3150	79.4	1.0	1.0	79.7	0.9	0.9	79.6
4000	75.4	1.2	0.9	74.6	1.0	0.9	75.0
5000	72.3	1.3	0.7	71.0	2.0	0.7	71.7
A-wtd	103.4			103.3			103.4
Second Run							
250	85.5	0.3	0.7	79.8	6.4	0.6	83.5
315	84.8	-1.1	0.7	84.3	2.0	0.7	84.5
400	85.6	1.0	0.9	81.2	3.8	0.8	83.9
500	86.1	1.5	1.0	85.4	2.5	0.9	85.7
630	93.9	1.4	1.0	90.1	1.6	1.0	92.4
800	98.8	0.7	1.0	96.3	0.9	1.0	97.7
1000	96.8	1.0	1.0	98.4	1.1	1.0	97.7
1250	94.4	1.0	1.0	96.9	0.9	1.0	95.8
1600	92.4	1.1	1.0	93.8	0.9	1.0	93.2
2000	90.1	1.0	1.0	89.8	0.8	1.0	90.0
2500	85.1	1.1	1.0	85.3	0.9	1.0	85.2
3150	79.4	1.0	1.0	80.3	0.7	0.9	79.9
4000	74.8	1.3	0.9	74.9	1.0	0.9	74.8
5000	71.5	1.3	0.7	70.6	2.1	0.7	71.1
A-wtd	103.3			103.3			103.3

Table A6. Cell 32 LVR Eastbound (ADT)

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	81.8	3.1	0.8	86.7	-1.0	0.5	84.9
315	79.9	3.7	0.9	86.4	-0.7	0.7	84.3
400	82.4	2.2	1.0	80.7	3.7	0.8	81.6
500	84.0	2.1	1.0	83.1	2.9	0.9	83.6
630	88.3	1.5	1.0	85.7	2.1	1.0	87.2
800	93.9	0.7	1.0	92.2	1.0	1.0	93.1
1000	96.1	0.8	1.0	98.1	0.7	1.0	97.2
1250	91.6	1.0	1.0	93.9	0.7	1.0	92.9
1600	90.7	1.1	1.0	91.6	1.0	1.0	91.2
2000	89.2	1.1	1.0	88.9	0.8	1.0	89.0
2500	84.3	1.3	1.0	84.8	1.1	1.0	84.5
3150	78.8	1.3	0.9	80.0	1.0	0.9	79.4
4000	74.9	2.0	0.8	75.3	2.0	0.8	75.1
5000	71.4	1.7	0.7	70.7	2.9	0.6	71.1
A-wtd	100.5			101.4			101.0
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	82.6	2.9	0.9	81.9	3.1	0.6	82.3
315	82.0	2.3	0.9	83.2	2.9	0.8	82.6
400	83.0	2.3	1.0	82.2	3.5	0.8	82.6
500	84.7	1.7	1.0	85.2	2.0	0.9	85.0
630	88.3	1.5	1.0	86.3	1.6	1.0	87.5
800	93.7	0.8	1.0	92.1	0.9	1.0	93.0
1000	96.0	0.8	1.0	98.0	0.7	1.0	97.1
1250	91.3	1.0	1.0	93.9	0.7	1.0	92.8
1600	90.8	1.1	1.0	92.0	0.9	1.0	91.4
2000	89.1	1.0	1.0	89.1	0.8	1.0	89.1
2500	84.6	1.2	1.0	85.1	1.0	1.0	84.9
3150	78.9	1.3	0.9	79.9	1.1	0.9	79.4
4000	74.8	2.1	0.8	75.4	2.0	0.8	75.1
5000	71.0	1.8	0.7	70.6	3.0	0.6	70.8
A-wtd	100.5			101.5			101.0

Table A7. Cell 32 WB (ATD)

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	87.2		0.8	86.0	-0.3	0.6	86.6
315	83.7		0.8	86.3	0.2	0.8	85.2
400	82.4		0.9	82.9	0.8	0.8	82.7
500	84.4	2.2	1.0	82.9	2.4	0.9	83.7
630	88.7	1.6	1.0	86.8	2.1	1.0	87.9
800	95.3	0.9	1.0	93.0	1.0	1.0	94.3
1000	96.3	1.2	1.0	98.2	1.0	1.0	97.4
1250	91.6	1.2	1.0	94.3	0.9	1.0	93.2
1600	91.5	1.1	1.0	92.2	1.0	1.0	91.9
2000	90.3	0.9	1.0	89.9	0.8	1.0	90.1
2500	85.6	1.0	1.0	86.1	0.7	1.0	85.9
3150	80.0	0.9	1.0	80.8	0.5	0.9	80.4
4000	75.8	1.0	0.9	76.3	0.5	0.9	76.1
5000	72.0	0.9	0.8	71.4	1.6	0.7	71.7
A-wtd	101.2			101.8			101.5
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	88.9	-0.6	0.8	88.1	-1.4	0.6	88.5
315	86.8	-0.5	0.8	87.3	0.0	0.7	87.0
400	83.7	1.4	0.8	83.3	1.8	0.8	83.5
500	85.5	1.6	0.9	83.7	2.0	0.9	84.7
630	89.2	1.6	1.0	88.1	1.8	1.0	88.7
800	95.2	0.9	1.0	93.0	1.1	1.0	94.2
1000	96.5	1.0	1.0	98.5	0.9	1.0	97.6
1250	92.7	1.1	1.0	95.2	0.7	1.0	94.1
1600	92.1	1.1	1.0	92.6	1.0	1.0	92.4
2000	90.4	0.9	1.0	90.1	0.8	1.0	90.3
2500	86.0	1.0	1.0	86.4	0.7	1.0	86.2
3150	80.7	0.9	1.0	81.4	0.6	0.9	81.0
4000	76.4	1.0	0.9	76.9	0.6	0.9	76.7
5000	72.8	1.0	0.8	72.1	1.7	0.7	72.5
A-wtd	101.5			102.2			101.9

Table A8. Hydro Basting Cell 14 (April 08) During TPF 5-135 Pooled Fund Meeting

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	82.1	3.1	0.8	85.8	-1.6	0.7	84.3
315	83.4	2.9	0.9	85.8	-0.4	0.9	84.7
400	87.3	1.1	1.0	85.8	1.2	0.9	86.6
500	88.6	1.1	1.0	87.7	1.2	1.0	88.2
630	93.7	1.3	1.0	91.2	1.1	1.0	92.6
800	98.8	0.3	1.0	96.4	0.3	1.0	97.7
1000	96.9	0.7	1.0	98.1	0.6	1.0	97.5
1250	95.4	0.6	1.0	96.2	0.7	1.0	95.8
1600	94.1	0.7	1.0	94.4	0.6	1.0	94.2
2000	91.7	0.7	1.0	90.6	0.7	1.0	91.2
2500	87.7	0.6	1.0	87.0	0.6	1.0	87.3
3150	83.3	0.3	1.0	82.4	0.4	1.0	82.9
4000	79.1	0.4	0.9	77.7	1.0	0.9	78.4
5000	76.4	0.5	0.9	74.8	1.1	0.8	75.6
A-wtd	103.8			103.3			103.6
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	78.2	6.5	0.8	85.2	-1.7	0.8	83.0
315	83.7	1.6	0.9	83.8	0.8	0.9	83.8
400	86.2	1.5	1.0	84.3	2.1	1.0	85.3
500	88.4	1.2	1.0	88.0	1.0	1.0	88.2
630	94.3	1.2	1.0	92.1	1.1	1.0	93.3
800	99.1	0.2	1.0	96.7	0.2	1.0	98.1
1000	96.8	0.7	1.0	98.2	0.5	1.0	97.5
1250	94.9	0.6	1.0	95.9	0.6	1.0	95.5
1600	94.4	0.6	1.0	94.4	0.6	1.0	94.4
2000	91.8	0.7	1.0	91.1	0.6	1.0	91.5
2500	88.1	0.5	1.0	87.2	0.6	1.0	87.7
3150	83.6	0.3	1.0	82.8	0.4	1.0	83.2
4000	79.4	0.4	0.9	78.0	1.0	0.9	78.8
5000	76.6	0.5	0.9	75.2	0.9	0.8	76.0
A-wtd	103.9			103.5			103.7

Table A9. Cells 60-63 Astroturf Drag White Topping 6' Joint Spacing

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	(dB(A))
250	**84.4**	**-0.1**	**0.6**	**#NUM!**	**#NUM!**	**0.5**	#NUM!
315	**82.6**	**0.6**	**0.6**	**81.9**	**3.0**	**0.8**	82.3
400	**82.9**	**1.0**	**0.8**	**80.0**	**3.2**	**0.8**	81.7
500	**82.3**	**1.7**	**0.9**	**81.9**	**2.7**	**0.9**	82.1
630	**87.2**	**1.6**	**1.0**	**84.6**	**1.7**	**1.0**	86.1
800	**94.5**	**0.7**	**1.0**	**92.2**	**0.4**	**1.0**	93.5
1000	**95.3**	**0.7**	**1.0**	**94.6**	**0.7**	**1.0**	95.0
1250	**89.4**	**1.1**	**1.0**	**90.7**	**1.2**	**1.0**	90.1
1600	**89.9**	**0.9**	**1.0**	**90.2**	**1.0**	**1.0**	90.0
2000	**89.5**	**0.9**	**1.0**	**88.9**	**0.8**	**1.0**	89.2
2500	**85.9**	**0.8**	**1.0**	**87.1**	**0.7**	**1.0**	86.6
3150	**80.8**	**0.6**	**1.0**	**82.3**	**0.4**	**1.0**	81.6
4000	**78.2**	**0.7**	**0.9**	**77.7**	**0.9**	**0.9**	77.9
5000	**75.6**	**1.0**	**0.9**	**72.8**	**1.8**	**0.8**	74.4
A-wtd	**100.1**			**99.4**			**99.8**
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	**81.9**	**1.7**	**0.5**	**74.5**	**8.8**	**0.6**	**79.6**
315	**81.2**	**1.7**	**0.6**	**81.9**	**2.8**	**0.8**	**81.6**
400	**82.4**	**1.2**	**0.8**	**77.9**	**5.1**	**0.8**	**80.7**
500	**82.0**	**1.8**	**0.9**	**82.1**	**1.8**	**0.9**	**82.0**
630	**86.8**	**1.5**	**1.0**	**84.2**	**1.8**	**1.0**	**85.7**
800	**94.2**	**0.6**	**1.0**	**92.0**	**0.4**	**1.0**	**93.3**
1000	**94.8**	**0.8**	**1.0**	**94.0**	**0.6**	**1.0**	**94.4**
1250	**89.3**	**1.0**	**1.0**	**90.0**	**1.1**	**1.0**	**89.7**
1600	**89.6**	**0.9**	**1.0**	**90.0**	**0.9**	**1.0**	**89.8**
2000	**89.3**	**0.8**	**1.0**	**89.5**	**0.6**	**1.0**	**89.4**
2500	**85.3**	**0.8**	**1.0**	**86.4**	**0.7**	**1.0**	**85.9**
3150	**80.2**	**0.6**	**1.0**	**81.9**	**0.4**	**1.0**	**81.1**
4000	**77.6**	**0.6**	**0.9**	**77.5**	**0.7**	**0.9**	**77.5**
5000	**75.1**	**1.0**	**0.9**	**72.3**	**1.6**	**0.8**	**73.9**
A-wtd	**99.7**			**99.1**			**99.4**

Table A10. Cell 7 Driving Lane

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	84.8	-1.4	0.4	81.8	0.7	0.5	83.5
315	81.3	-0.2	0.4	79.1	3.0	0.6	80.3
400	81.5	-0.2	0.6	78.4	2.4	0.7	80.2
500	79.4	2.2	0.8	78.7	3.2	0.9	79.1
630	83.8	1.9	1.0	81.4	2.6	1.0	82.8
800	90.1	0.6	1.0	88.4	0.9	1.0	89.3
1000	96.1	0.5	1.0	96.9	0.5	1.0	96.5
1250	92.0	0.2	1.0	94.5	0.4	1.0	93.4
1600	89.6	0.7	1.0	90.2	0.4	1.0	89.9
2000	89.3	0.7	1.0	88.6	0.6	1.0	89.0
2500	86.4	0.7	1.0	86.1	0.6	1.0	86.2
3150	81.7	0.3	1.0	81.1	0.2	1.0	81.4
4000	78.6	0.2	0.9	79.3	0.2	1.0	79.0
5000	74.9	0.6	0.9	75.4	0.4	1.0	75.2
A-wtd	99.8			100.4			100.1
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	82.8	0.1	0.4	79.7	2.7	0.5	81.5
315	81.0	-0.6	0.4	79.7	1.9	0.6	80.4
400	80.2	0.6	0.7	75.9	4.7	0.7	78.6
500	78.2	2.6	0.8	77.8	2.9	0.9	78.0
630	83.5	1.7	1.0	80.8	2.1	1.0	82.3
800	89.9	0.6	1.0	88.3	0.9	1.0	89.2
1000	96.5	0.5	1.0	97.3	0.5	1.0	96.9
1250	92.1	0.2	1.0	94.9	0.5	1.0	93.7
1600	89.4	0.7	1.0	90.7	0.5	1.0	90.1
2000	89.1	0.7	1.0	88.7	0.5	1.0	88.9
2500	86.6	0.7	1.0	85.9	0.6	1.0	86.2
3150	81.8	0.3	1.0	81.4	0.2	1.0	81.6
4000	78.8	0.2	0.9	79.4	0.1	1.0	79.1
5000	75.0	0.6	0.9	75.4	0.4	1.0	75.2
A-wtd	99.9			100.7			100.3

Table A11. Cell 7 Passing Lane

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	83.8	-1.9	0.5	79.7	1.4	0.6	82.2
315	73.5	6.8	0.5	#NUM!	#NUM!	0.7	#NUM!
400	78.8	1.6	0.7	71.9	8.1	0.8	76.6
500	76.3	4.0	0.9	76.9	2.8	0.9	76.6
630	80.7	2.1	1.0	78.3	2.6	1.0	79.7
800	88.4	0.8	1.0	87.3	0.8	1.0	87.9
1000	96.3	0.5	1.0	96.2	0.7	1.0	96.2
1250	92.3	0.2	1.0	95.0	0.5	1.0	93.9
1600	89.4	0.8	1.0	90.7	0.4	1.0	90.1
2000	89.7	0.8	1.0	90.0	0.6	1.0	89.9
2500	86.6	0.8	1.0	87.0	0.6	1.0	86.8
3150	81.9	0.4	1.0	81.9	0.2	1.0	81.9
4000	78.0	0.3	0.9	79.2	0.1	1.0	78.6
5000	74.4	0.6	0.9	75.4	0.4	1.0	74.9
A-wtd	99.7			100.4			100.1
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	#NUM!	#NUM!	0.3	76.4	4.9	0.5	#NUM!
315	78.6	1.4	0.4	76.1	5.7	0.7	77.5
400	78.7	2.0	0.6	74.6	6.1	0.8	77.1
500	77.9	2.2	0.8	76.5	3.3	0.9	77.3
630	81.6	1.5	1.0	78.4	2.8	0.9	80.3
800	89.6	0.6	1.0	88.2	0.8	1.0	88.9
1000	95.9	0.5	1.0	96.2	0.6	1.0	96.0
1250	91.7	0.2	1.0	94.2	0.4	1.0	93.1
1600	89.6	0.7	1.0	90.2	0.4	1.0	89.9
2000	89.4	0.7	1.0	89.5	0.5	1.0	89.4
2500	86.5	0.7	1.0	86.9	0.5	1.0	86.7
3150	81.7	0.3	1.0	82.0	0.1	1.0	81.9
4000	78.1	0.2	0.9	79.2	0.0	1.0	78.7
5000	74.6	0.7	0.9	74.9	0.4	0.9	74.7
A-wtd	99.5			100.1			99.8

Table A12. Cell 8 Conventional Full Grind PL

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	78.0	6.4	0.5	83.5	-0.1	0.6	81.5
315	81.7	1.9	0.6	80.8	2.8	0.8	81.3
400	83.0	2.6	0.9	79.0	4.5	0.8	81.4
500	85.9	1.3	1.0	85.1	1.7	1.0	85.5
630	92.5	1.2	1.0	89.8	1.3	1.0	91.3
800	97.8	0.3	1.0	95.0	0.4	1.0	96.6
1000	96.3	0.6	1.0	97.0	0.7	1.0	96.7
1250	94.8	0.3	1.0	96.3	0.5	1.0	95.6
1600	90.8	0.7	1.0	92.9	0.5	1.0	92.0
2000	89.4	0.7	1.0	88.9	0.6	1.0	89.2
2500	86.0	0.7	1.0	85.9	0.5	1.0	85.9
3150	80.7	0.3	1.0	80.1	0.4	1.0	80.4
4000	76.7	0.3	0.9	76.1	0.5	0.9	76.4
5000	74.0	0.5	0.9	74.0	0.6	0.9	74.0
A-wtd	102.6			102.3			102.4
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	83.6	0.0	0.6	82.9	0.3	0.6	83.3
315	80.0	1.9	0.6	79.8	4.4	0.8	79.9
400	85.2	1.3	0.9	82.8	1.4	0.9	84.2
500	85.8	1.5	1.0	85.2	1.8	1.0	85.5
630	91.8	1.3	1.0	89.9	1.4	1.0	91.0
800	97.1	0.3	1.0	94.9	0.5	1.0	96.2
1000	95.8	0.7	1.0	96.5	0.7	1.0	96.2
1250	94.7	0.4	1.0	96.3	0.5	1.0	95.6
1600	90.3	0.7	1.0	92.7	0.4	1.0	91.6
2000	88.9	0.7	1.0	88.7	0.6	1.0	88.8
2500	85.7	0.7	1.0	85.6	0.6	1.0	85.6
3150	80.5	0.4	1.0	79.9	0.4	1.0	80.2
4000	76.5	0.3	0.9	76.1	0.5	0.9	76.3
5000	73.7	0.6	0.9	73.6	0.7	0.9	73.6
A-wtd	102.1			102.1			102.1

Table A13. Cell 8 Conventional Full Grind Driving Lane

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	**IL(dD(A))**	**PI**	**Coh**	**IL(dD(A))**	**PI**	**Coh**	**IL (dB(A))**
250	**71.9**	**10.8**	**0.5**	**78.3**	**3.7**	**0.6**	76.2
315	**77.9**	**3.8**	**0.6**	**80.4**	**2.4**	**0.8**	79.3
400	**83.5**	**1.5**	**0.9**	**77.9**	**4.2**	**0.9**	81.6
500	**85.3**	**1.4**	**1.0**	**83.7**	**1.7**	**1.0**	84.6
630	**91.1**	**1.3**	**1.0**	**89.0**	**1.5**	**1.0**	90.2
800	**96.8**	**0.4**	**1.0**	**94.4**	**0.6**	**1.0**	95.8
1000	**96.0**	**0.7**	**1.0**	**96.6**	**0.7**	**1.0**	96.3
1250	**93.6**	**0.4**	**1.0**	**95.2**	**0.5**	**1.0**	94.5
1600	**90.9**	**0.7**	**1.0**	**92.2**	**0.5**	**1.0**	91.6
2000	**89.6**	**0.7**	**1.0**	**88.9**	**0.6**	**1.0**	89.3
2500	**86.3**	**0.6**	**1.0**	**85.9**	**0.5**	**1.0**	86.1
3150	**81.0**	**0.3**	**1.0**	**80.4**	**0.4**	**1.0**	80.7
4000	**77.5**	**0.2**	**0.9**	**76.9**	**0.4**	**0.9**	77.2
5000	**74.6**	**0.3**	**0.9**	**74.1**	**0.6**	**0.9**	74.3
A-wtd	**101.9**			**101.7**			**101.8**
			Second Run				
Freq (Hz)	**IL(dD(A))**	**PI**	**Coh**	**IL(dD(A))**	**PI**	**Coh**	**IL (dB(A))**
250	**83.8**	**-0.5**	**0.5**	**81.2**	**1.3**	**0.6**	82.7
315	**83.3**	**-1.0**	**0.6**	**77.7**	**5.4**	**0.8**	81.4
400	**83.7**	**0.9**	**0.9**	**79.8**	**3.1**	**0.9**	82.1
500	**85.7**	**1.2**	**1.0**	**84.8**	**1.3**	**1.0**	85.3
630	**91.0**	**1.3**	**1.0**	**90.0**	**1.3**	**1.0**	90.5
800	**96.1**	**0.4**	**1.0**	**93.8**	**0.6**	**1.0**	95.1
1000	**96.2**	**0.6**	**1.0**	**96.9**	**0.7**	**1.0**	96.6
1250	**94.3**	**0.3**	**1.0**	**96.0**	**0.5**	**1.0**	95.2
1600	**91.1**	**0.7**	**1.0**	**92.5**	**0.5**	**1.0**	91.8
2000	**89.7**	**0.7**	**1.0**	**88.9**	**0.6**	**1.0**	89.3
2500	**86.5**	**0.6**	**1.0**	**85.8**	**0.6**	**1.0**	86.1
3150	**81.4**	**0.3**	**1.0**	**80.4**	**0.4**	**1.0**	80.9
4000	**77.8**	**0.1**	**0.9**	**77.1**	**0.5**	**0.9**	77.5
5000	**75.2**	**0.3**	**0.9**	**74.3**	**0.6**	**0.9**	74.7
A-wtd	**101.9**			**101.9**			**101.9**

Table A14. TH 694-35E-TH 61 Test Section Innovative Standard Minnesota Astroturf Drag Seg. 1

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	80.5	2.3	0.8	79.2	3.7	0.7	79.9
315	80.3	1.6	0.9	80.5	3.1	0.8	80.4
400	83.6	1.4	1.0	77.3	5.8	0.9	81.5
500	84.6	1.6	1.0	82.8	2.6	1.0	83.8
630	89.0	1.4	1.0	85.9	1.8	1.0	87.7
800	95.0	0.7	1.0	92.2	1.2	1.0	93.8
1000	95.1	0.8	1.0	96.3	1.2	1.0	95.7
1250	90.9	0.9	1.0	93.5	1.1	1.0	92.4
1600	90.5	1.1	1.0	90.9	1.4	1.0	90.8
2000	88.6	1.0	1.0	87.9	1.1	1.0	88.3
2500	83.9	1.0	1.0	83.5	1.2	1.0	83.7
3150	78.3	0.9	1.0	77.9	1.2	0.9	78.1
4000	74.4	1.5	0.9	73.4	2.0	0.8	73.9
5000	71.3	1.1	0.8	69.9	2.5	0.7	70.6
A-wtd	100.4			100.4			100.4
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	80.2	3.0	0.8	81.2	1.9	0.7	80.8
315	80.3	2.2	0.9	80.8	3.2	0.8	80.5
400	83.1	1.5	1.0	80.7	2.3	0.9	82.0
500	83.6	2.0	1.0	82.7	2.4	1.0	83.2
630	88.4	1.4	1.0	85.0	2.0	1.0	87.0
800	94.3	0.7	1.0	91.7	1.2	1.0	93.2
1000	95.5	0.7	1.0	96.7	1.1	1.0	96.1
1250	91.0	0.8	1.0	93.5	1.0	1.0	92.4
1600	90.3	1.1	1.0	90.7	1.3	1.0	90.5
2000	88.8	0.9	1.0	87.9	1.1	1.0	88.4
2500	83.9	1.1	1.0	83.6	1.3	1.0	83.7
3150	78.3	0.9	1.0	78.1	1.1	0.9	78.2
4000	74.5	1.4	0.8	73.6	1.9	0.8	74.0
5000	71.2	1.0	0.8	70.0	2.6	0.7	70.7
A-wtd	100.3			100.4			100.3

Table A15. TH 694-35E-TH 61 Test Section Innovative Standard Minnesota Astroturf Drag Seg. 2

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	83.0	0.7	0.9	82.8	0.6	0.7	82.9
315	80.1	2.8	0.9	83.0	1.7	0.9	81.8
400	85.0	1.1	1.0	80.4	3.5	0.9	83.3
500	85.5	1.4	1.0	83.9	2.4	1.0	84.8
630	90.1	1.3	1.0	87.0	1.6	1.0	88.8
800	95.6	0.6	1.0	92.9	1.1	1.0	94.4
1000	94.9	0.8	1.0	96.1	1.2	1.0	95.6
1250	91.5	0.9	1.0	93.9	1.1	1.0	92.9
1600	89.1	1.2	1.0	90.0	1.4	1.0	89.5
2000	87.1	1.0	1.0	86.3	1.2	1.0	86.7
2500	82.3	1.2	1.0	82.8	1.2	1.0	82.6
3150	76.7	1.1	0.9	77.2	1.2	0.9	77.0
4000	73.1	1.6	0.8	72.5	2.0	0.8	72.8
5000	69.8	1.4	0.7	68.8	2.6	0.7	69.3
A-wtd	100.5			100.4			100.4
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	84.3	-0.5	0.9	79.7	3.5	0.7	82.6
315	82.2	0.7	0.9	81.2	3.4	0.9	81.7
400	84.9	1.3	1.0	81.7	2.5	0.9	83.6
500	85.2	1.7	1.0	83.8	2.4	1.0	84.5
630	89.9	1.4	1.0	86.7	1.8	1.0	88.6
800	96.0	0.6	1.0	93.1	1.1	1.0	94.8
1000	94.8	0.8	1.0	95.7	1.3	1.0	95.3
1250	91.5	0.9	1.0	93.9	1.1	1.0	92.8
1600	89.3	1.2	1.0	90.0	1.4	1.0	89.7
2000	87.0	1.0	1.0	86.2	1.2	1.0	86.6
2500	82.2	1.2	1.0	82.2	1.4	1.0	82.2
3150	76.9	1.0	0.9	77.1	1.2	0.9	77.0
4000	73.2	1.5	0.8	72.4	1.8	0.8	72.8
5000	70.0	1.2	0.7	69.0	2.4	0.7	69.5
A-wtd	100.5			100.3			100.4

Table A16. TH 694-35E-TH 61 Test Section Innovative Standard Minnesota Astroturf Drag Seg. 3

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	81.0	3.1	0.8	79.5	4.1	0.7	80.3
315	80.3	2.1	0.9	79.1	4.9	0.8	79.8
400	84.8	1.3	1.0	80.8	3.2	0.9	83.2
500	85.7	1.6	1.0	84.2	2.5	1.0	85.0
630	89.9	1.3	1.0	86.7	1.9	1.0	88.6
800	95.6	0.6	1.0	93.0	1.2	1.0	94.5
1000	94.9	0.7	1.0	96.0	1.1	1.0	95.5
1250	91.0	0.9	1.0	93.6	1.1	1.0	92.5
1600	89.4	1.2	1.0	89.9	1.5	1.0	89.7
2000	87.1	1.0	1.0	86.6	1.2	1.0	86.9
2500	82.1	1.3	1.0	82.6	1.4	1.0	82.3
3150	76.9	1.2	0.9	77.4	1.3	0.9	77.2
4000	73.4	1.7	0.8	73.0	2.2	0.8	73.2
5000	70.3	1.4	0.7	69.3	2.8	0.7	69.8
A-wtd	100.4			100.3			100.4
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	81.0	3.1	0.8	79.5	4.1	0.7	80.3
315	80.3	2.1	0.9	79.1	4.9	0.8	79.8
400	84.8	1.3	1.0	80.8	3.2	0.9	83.2
500	85.7	1.6	1.0	84.2	2.5	1.0	85.0
630	89.9	1.3	1.0	86.7	1.9	1.0	88.6
800	95.6	0.6	1.0	93.0	1.2	1.0	94.5
1000	94.9	0.7	1.0	96.0	1.1	1.0	95.5
1250	91.0	0.9	1.0	93.6	1.1	1.0	92.5
1600	89.4	1.2	1.0	89.9	1.5	1.0	89.7
2000	87.1	1.0	1.0	86.6	1.2	1.0	86.9
2500	82.1	1.3	1.0	82.6	1.4	1.0	82.3
3150	76.9	1.2	0.9	77.4	1.3	0.9	77.2
4000	73.4	1.7	0.8	73.0	2.2	0.8	73.2
5000	70.3	1.4	0.7	69.3	2.8	0.7	69.8
A-wtd	100.4			100.3			100.4

Table A17. Cell 10 Transverse Tined

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	82.0	5.3	0.7	85.8	-0.1	0.7	84.3
315	83.0	2.1	0.7	84.8	1.8	0.9	84.0
400	84.7	1.6	0.9	81.4	3.9	0.9	83.4
500	86.1	2.0	1.0	86.1	1.8	1.0	86.1
630	93.6	1.4	1.0	90.3	1.4	1.0	92.2
800	99.9	0.4	1.0	97.1	0.8	1.0	98.7
1000	99.5	0.9	1.0	99.9	1.0	1.0	99.7
1250	98.4	0.7	1.0	100.4	0.9	1.0	99.5
1600	96.9	0.9	1.0	96.9	1.0	1.0	96.9
2000	95.2	0.8	1.0	94.5	0.8	1.0	94.9
2500	90.8	0.5	1.0	90.4	0.5	1.0	90.6
3150	85.0	0.2	1.0	83.8	0.2	1.0	84.4
4000	80.0	0.3	0.9	78.6	0.6	0.9	79.4
5000	77.5	0.3	0.9	75.0	0.9	0.8	76.4
A-wtd	105.8			105.6			105.7
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	85.7	1.6	0.7	85.7	0.4	0.7	85.7
315	85.4	0.2	0.7	85.9	1.0	0.8	85.6
400	85.6	1.2	0.9	81.5	3.9	0.9	84.0
500	86.2	2.2	1.0	86.7	1.7	1.0	86.5
630	94.3	1.4	1.0	91.5	1.3	1.0	93.1
800	100.3	0.5	1.0	97.5	0.8	1.0	99.1
1000	99.2	1.1	1.0	99.7	1.0	1.0	99.4
1250	98.1	0.8	1.0	100.0	0.9	1.0	99.2
1600	96.0	0.9	1.0	96.2	1.0	1.0	96.1
2000	94.0	0.7	1.0	93.9	0.7	1.0	94.0
2500	90.2	0.6	1.0	90.1	0.5	1.0	90.1
3150	84.1	0.3	1.0	83.5	0.2	1.0	83.8
4000	79.1	0.3	0.9	78.0	0.4	0.9	78.6
5000	76.3	0.5	0.9	74.1	0.9	0.8	75.4
A-wtd	105.6			105.4			105.5

Table A18. Cell 11 Passing Lane

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	81.6	2.8	0.6	83.3	-0.8	0.6	82.5
315	83.6	-1.5	0.6	81.3	2.2	0.8	82.6
400	82.3	2.5	0.9	79.0	4.9	0.9	80.9
500	84.2	2.0	1.0	85.4	1.9	1.0	84.8
630	93.9	1.5	1.0	89.1	1.1	1.0	92.1
800	98.1	0.4	1.0	95.6	0.8	1.0	97.0
1000	98.5	0.7	1.0	99.5	0.8	1.0	99.0
1250	95.5	0.8	1.0	97.1	0.8	1.0	96.4
1600	97.0	0.7	1.0	96.3	0.7	1.0	96.7
2000	94.6	0.7	1.0	93.9	0.6	1.0	94.3
2500	90.5	0.6	1.0	90.0	0.4	1.0	90.2
3150	84.7	0.2	1.0	84.0	0.1	1.0	84.3
4000	80.1	0.1	1.0	78.7	0.3	1.0	79.5
5000	77.0	0.3	0.9	74.8	0.8	0.9	76.1
A-wtd	104.7			104.3			104.5
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	#NUM!	#NUM!	0.5	80.4	2.9	0.6	#NUM!
315	80.0	2.7	0.6	80.1	3.8	0.7	80.0
400	83.3	1.5	0.8	80.4	3.7	0.9	82.1
500	84.5	2.0	0.9	85.5	1.9	1.0	85.0
630	93.8	1.6	1.0	89.2	1.3	1.0	92.1
800	98.2	0.4	1.0	96.0	0.8	1.0	97.2
1000	98.5	0.6	1.0	99.4	0.8	1.0	99.0
1250	95.6	0.8	1.0	97.1	0.8	1.0	96.4
1600	96.9	0.7	1.0	96.3	0.7	1.0	96.6
2000	94.5	0.7	1.0	93.6	0.6	1.0	94.1
2500	90.3	0.5	1.0	89.8	0.4	1.0	90.0
3150	84.5	0.2	1.0	83.9	0.1	1.0	84.2
4000	79.8	0.1	1.0	78.5	0.3	1.0	79.2
5000	76.7	0.4	0.9	74.4	0.8	0.9	75.7
A-wtd	104.7			104.3			104.5

Table A19. Cell 9 Passing Lane

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	83.9	-0.1	0.4	82.2	1.3	0.6	83.1
315	70.7	11.3	0.5	79.4	4.8	0.7	76.9
400	80.0	4.7	0.8	77.6	6.0	0.8	79.0
500	83.4	2.5	0.9	84.1	1.9	0.9	83.8
630	94.5	1.5	1.0	88.8	1.4	1.0	92.5
800	97.3	0.5	1.0	95.2	0.6	1.0	96.4
1000	98.2	0.7	1.0	99.2	0.8	1.0	98.7
1250	96.3	0.7	1.0	98.1	0.8	1.0	97.3
1600	96.2	0.7	1.0	96.0	0.7	1.0	96.1
2000	94.4	0.7	1.0	93.6	0.6	1.0	94.0
2500	90.0	0.6	1.0	89.9	0.4	1.0	90.0
3150	84.6	0.2	1.0	83.8	0.1	1.0	84.2
4000	79.8	0.2	0.9	78.6	0.3	1.0	79.3
5000	76.7	0.4	0.9	74.4	0.8	0.9	75.7
A-wtd	104.4			104.3			104.3
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	80.3	3.4	0.5	76.3	7.1	0.6	78.7
315	82.4	-0.3	0.6	80.4	3.9	0.8	81.5
400	84.2	1.0	0.9	80.3	3.6	0.9	82.7
500	84.7	1.8	0.9	85.2	1.6	1.0	85.0
630	94.3	1.5	1.0	89.9	1.2	1.0	92.7
800	98.0	0.4	1.0	95.4	0.6	1.0	96.9
1000	98.1	0.7	1.0	98.8	0.9	1.0	98.5
1250	96.5	0.6	1.0	98.2	0.8	1.0	97.5
1600	95.9	0.7	1.0	96.5	0.7	1.0	96.2
2000	94.2	0.7	1.0	93.5	0.7	1.0	93.9
2500	90.1	0.6	1.0	89.6	0.4	1.0	89.8
3150	84.3	0.2	1.0	83.2	0.2	1.0	83.8
4000	79.5	0.1	1.0	77.9	0.4	1.0	78.8
5000	76.5	0.3	0.9	74.1	0.8	0.9	75.5
A-wtd	104.5			104.3			104.4

Table A20. Cell 36 Inside Lane LVR Transverse Tined

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	80.6	2.9	0.8	82.2	-0.4	0.8	81.5
315	79.6	1.9	0.8	82.3	2.2	0.9	81.2
400	84.6	1.0	0.9	80.3	3.7	1.0	83.0
500	85.1	2.1	1.0	86.6	2.2	1.0	85.9
630	92.7	2.0	1.0	89.8	1.7	1.0	91.5
800	97.9	1.3	1.0	95.8	1.4	1.0	97.0
1000	96.9	1.4	1.0	98.8	1.0	1.0	98.0
1250	93.7	1.4	1.0	96.7	0.8	1.0	95.4
1600	90.3	1.8	1.0	92.6	1.0	1.0	91.6
2000	88.3	1.5	1.0	89.7	0.7	1.0	89.1
2500	84.1	1.7	0.9	85.2	0.7	1.0	84.7
3150	78.2	1.8	0.6	80.0	0.5	1.0	79.2
4000	73.9	2.6	0.3	75.1	0.3	1.0	74.5
5000	70.7	3.1	0.3	70.1	0.9	0.8	70.4
A-wtd	102.5			103.2			102.8
Second Run							
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	68.3	16.3	0.7	85.1	-2.1	0.7	82.2
315	73.1	8.5	0.7	82.6	0.7	0.8	80.1
400	82.0	3.3	0.9	78.9	3.4	0.9	80.7
500	84.5	2.6	1.0	84.0	2.3	1.0	84.3
630	94.0	1.6	1.0	89.8	1.6	1.0	92.4
800	98.5	0.9	1.0	95.4	0.9	1.0	97.2
1000	97.8	1.0	1.0	99.1	1.0	1.0	98.5
1250	94.4	0.9	1.0	96.9	0.8	1.0	95.8
1600	91.3	1.3	1.0	92.8	0.9	1.0	92.1
2000	89.2	1.1	1.0	89.3	0.7	1.0	89.3
2500	84.9	1.1	1.0	85.3	0.7	1.0	85.1
3150	79.0	1.3	0.7	80.2	0.5	1.0	79.6
4000	75.1	1.8	0.4	75.2	0.3	1.0	75.2
5000	71.3	3.1	0.3	69.9	1.2	0.8	70.7
A-wtd	103.3			103.2			103.2

Table A21. Friction Data from Cell 37

			FRICTION #							
Condition	**Date**	**Test Code**	**Ribbed1**	**Ribbed2**	**Ribbed3**	**Ribbed4**	**Smooth1**	**Smooth2**	**Smooth3**	**Smooth4**
Pre -Grind	6/18/2007	**PreGrind**	64.5	65.7	64.9	60.4	48.1	41	42.9	40.8
Post Grind	6/22/2007	**TS1**	50.7	49.7	50.3	48.8	48.6	48	47.7	46
Post Grind	6/22/2007	**TS2**	51.2	49.4	52.7	48.7	52.9	49.6	51.5	46.7
Post Grind	6/22/2007	**TS3**	57.6	60.2	56.5	60	55.9	55.5	51.2	50.7
Post Grind	6/22/2007	**TS4**	65.1	65.1	66.3	65.5	46.9	43.3	47.9	39.1

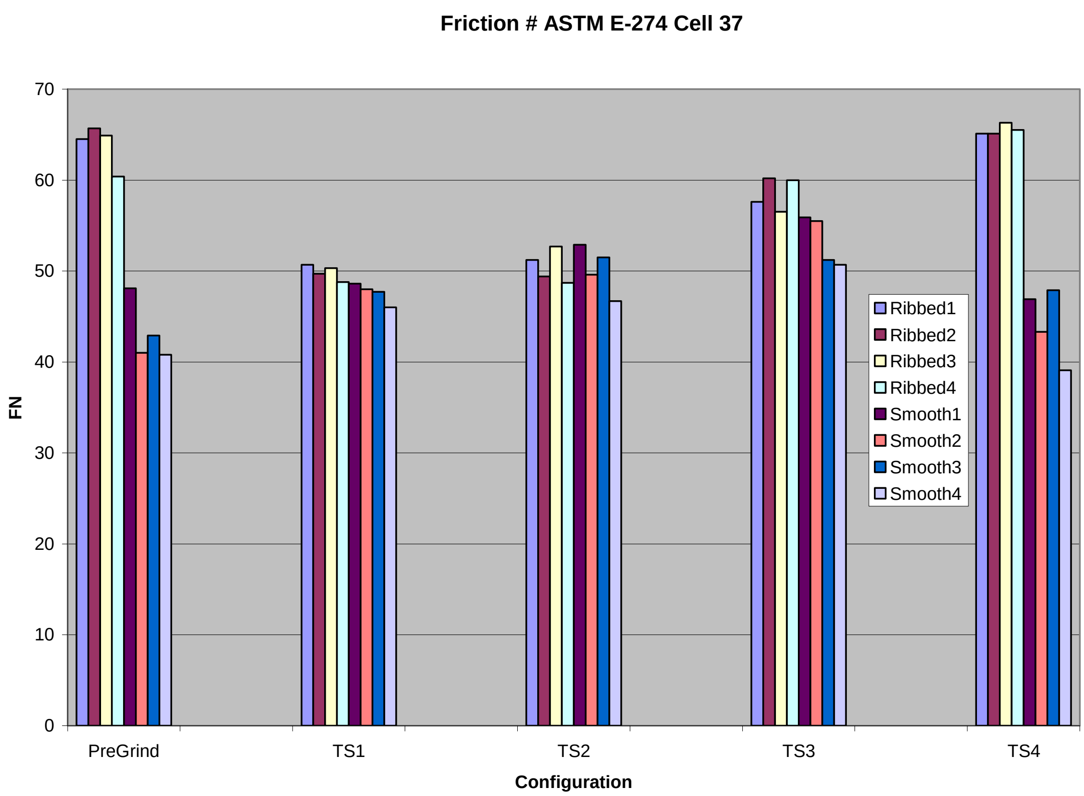

Figure A1. Cell 37 Friction Data

Table A22. Some Texture Measurements on Cell 37

Measured By Bernard Izevbekhai
Arash Moin
Date 6/19/07

Sand Patch ASTM E-965
Cell 37
Time 10:00am
Temp 65 Deg F

Station	DIA1	DIA 2	DIA 3	RUN 1	RUN 2	RUN 3	Average	Vol mm3	Texture (mm)	REMARKS
TX9 TS3	**16**	**16**	**15**	**408**	**408**	**382.5**	399.5	68300	0.545	
TX9 TS1	13	14	15	**331.5**	**357**	**382.5**	357	68300	0.683	
TX8TS1	13	13	12	**331.5**	**331.5**	**306**	323	68300	0.834	
TX7 TS1	12.5	13	14	**318.75**	**331.5**	**357**	335.75	68300	0.772	
TX6 TS1	17	15	14	**433.5**	**382.5**	**357**	391	68300	0.569	
TX5 TS1	17.5	19.5	19.5	**446.25**	**497.25**	**497.25**	480.25	68300	0.377	
TX4 TS1	14	15	16	**357**	**382.5**	**408**	382.5	68300	0.595	
TX3 TS1	12	15	14	**306**	**382.5**	**357**	348.5	68300	0.716	
TX2 TS1	13	14	15	**331.5**	**357**	**382.5**	357	68300	0.683	
TX 1TS1	15	16	16	**382.5**	**408**	**408**	399.5	68300	0.545	
									0.632	

Arash Moin
Date 6/22/07

Sand Patch Test
Cell 37
Time 11:10 AM

Station	DIA1	DIA 2	DIA 3	RUN 1	RUN 2	RUN 3	Average	Vol mm3	Texture (mm)	REMARKS
TX9 TS3	11	11	10.5	280.5	280.5	267.75	276.25	68300	1.140	Closest to middle yellow line
TX8 TS3	11.5	11.5	12	293.25	293.25	306	297.5	68300	0.983	
TX7 TS3	11	10.5	10.5	280.5	267.75	267.75	272	68300	1.176	
TX6 TS3	10	11	10.5	255	280.5	267.75	267.75	68300	1.214	
TX5 TS3	10.5	10.5	9	267.75	267.75	229.5	255	68300	1.338	
TX4 TS3	10.5	10	10.5	267.75	255	267.75	263.5	68300	1.253	
TX3 TS3	10	9	9	255	229.5	229.5	238	68300	1.536	
TX2 TS3	10	9	8.5	255	229.5	216.75	233.75	68300	1.592	
TX1 TS3	9	10	10	229.5	255	255	246.5	68300	1.432	
									1.296	

Station	DIA1	DIA 2	DIA 3	RUN 1	RUN 2	RUN 3	Average	Vol mm3	Texture (mm)	REMARKS
TX9 TS2	11	12	12.5	280.5	306	318.75	301.75	68300	0.956	
TX8 TS2	9	9.5	9.5	229.5	242.25	242.25	238	68300	1.536	2nd closest to middle yellow line
TX7 TS2	9	9	9	229.5	229.5	229.5	229.5	68300	1.652	
TX6 TS2	9.5	10.5	10.5	242.25	267.75	267.75	259.25	68300	1.295	
TX5 TS2	10	11	11.5	255	280.5	293.25	276.25	68300	1.140	
TX4 TS2	12	12	12.5	306	306	318.75	310.25	68300	0.904	
TX3 TS2	10.5	10	10	267.75	255	255	259.25	68300	1.295	
TX2 TS2	11	10	10	280.5	255	255	263.5	68300	1.253	
TX1 TS2	10	9	9.5	255	229.5	242.25	242.25	68300	1.483	
									1.279	

Station	DIA1	DIA 2	DIA 3	RUN 1	RUN 2	RUN 3	Average	Vol mm3	Texture (mm)	REMARKS
TX9 TS1	12	13	12.5	306	331.5	318.75	318.75	68300	0.856	3rd closest to middle yellow line
TX8 TS1	12	12	13	306	306	331.5	314.5	68300	0.880	
YX7 TS1	12	12.5	12.5	306	318.75	318.75	314.5	68300	0.880	
TX6 TS1	12	13	13	306	331.5	331.5	323	68300	0.834	
TX5 TS1	12	12.5	12.5	306	318.75	318.75	314.5	68300	0.880	
TX4 TS1	12	12	12	306	306	306	306	68300	0.929	
TX3 TS1	12	12	12.5	306	306	318.75	310.25	68300	0.904	
TX2 TS1	13	12.5	13	331.5	318.75	331.5	327.25	68300	0.812	
TX1 TS1	13	12.5	12.5	331.5	318.75	318.75	323	68300	0.834	
									0.868	

Station	DIA1	DIA 2	DIA 3	RUN 1	RUN 2	RUN 3	Average	Vol mm3	Texture (mm)	REMARKS
TX9 TS4	13	13.5	13	331.5	344.25	331.5	335.75	68300	0.772	4th closest to(furthest from middle yellow li
TX8 TS4	13.5	13.5	14	344.25	344.25	357	348.5	68300	0.716	
TX7 YS4	13	12.5	13	331.5	318.75	331.5	327.25	68300	0.812	
TX6 TS4	12.5	12.5	13	318.75	318.75	331.5	323	68300	0.834	
TX5 TS4	15	15	15.5	382.5	382.5	395.25	386.75	68300	0.582	
TX4 TS4	14	15	14.5	357	382.5	369.75	369.75	68300	0.636	
TX3 TS4	12	11.5	12	306	293.25	306	301.75	68300	0.956	
TX2 TS4	12	10	12	306	255	306	289	68300	1.042	
TX1 TS4	14	13	13	357	331.5	331.5	340	68300	0.753	
									0.789	

Table A23. Post Grind Friction Measurement Cells 7 & 8

CELL	LANE	DAY	TIME	FN	SPEED	AIR TEMP	TIRE_TYPE	EQUIPMENT	DATE_UPDA	Type
7	Driving	Tuesday	10:32 AM	53.6	40.4	52	Ribbed	Mn/DOT - 1295 Friction	22-Oct-07	Innovative
7	Driving	Tuesday	10:32 AM	54.7	40.3	52	Ribbed	Mn/DOT - 1295 Friction	22-Oct-07	Innovative
7	Driving	Tuesday	10:32 AM	51.2	42.1	52	Smooth	Mn/DOT - 1295 Friction	22-Oct-07	Innovative
7	Driving	Tuesday	10:32 AM	47.4	41.4	52	Smooth	Mn/DOT - 1295 Friction	22-Oct-07	Innovative
7	Passing	Tuesday	11:08 AM	47.4	42	52	Ribbed	Mn/DOT - 1295 Friction	22-Oct-07	Innovative
7	Passing	Tuesday	11:08 AM	49.3	41.4	52	Ribbed	Mn/DOT - 1295 Friction	22-Oct-07	Innovative
7	Passing	Tuesday	11:08 AM	48.8	41.2	52	Smooth	Mn/DOT - 1295 Friction	22-Oct-07	Innovative
7	Passing	Tuesday	11:08 AM	44.6	40.8	52	Smooth	Mn/DOT - 1295 Friction	22-Oct-07	Innovative
8	Driving	Tuesday	10:32 AM	85.9	40.3	52	Ribbed	Mn/DOT - 1295 Friction	22-Oct-07	Conventional
8	Driving	Tuesday	10:32 AM	80.2	41.3	52	Ribbed	Mn/DOT - 1295 Friction	22-Oct-07	Conventional
8	Driving	Tuesday	10:32 AM	63.5	41.4	52	Smooth	Mn/DOT - 1295 Friction	22-Oct-07	Conventional
8	Driving	Tuesday	10:32 AM	62.7	40.4	52	Smooth	Mn/DOT - 1295 Friction	22-Oct-07	Conventional
8	Passing	Tuesday	11:08 AM	62.6	40.4	52	Ribbed	Mn/DOT - 1295 Friction	22-Oct-07	Conventional
8	Passing	Tuesday	11:08 AM	65.2	41.2	52	Ribbed	Mn/DOT - 1295 Friction	22-Oct-07	Conventional
8	Passing	Tuesday	11:08 AM	64.2	41	52	Smooth	Mn/DOT - 1295 Friction	22-Oct-07	Conventional
8	Passing	Tuesday	11:08 AM	73.1	40.2	52	Smooth	Mn/DOT - 1295 Friction	22-Oct-07	Conventional

Table A24. Cell 60 - 61 Driving Lane 7/15 08

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	#NUM!	#NUM!	0.8	79.7	3.3	0.6	#NUM!
315	81.7	2.2	0.9	83.4	1.3	0.8	82.6
400	82.2	2.2	1.0	83.1	1.8	0.9	82.7
500	83.5	2.1	1.0	83.7	2.1	1.0	83.6
630	86.8	1.7	1.0	85.1	1.8	1.0	86.0
800	93.3	0.9	1.0	92.3	0.9	1.0	92.9
1000	98.1	0.8	1.0	100.5	0.5	1.0	99.5
1250	91.2	1.1	1.0	93.3	0.7	1.0	92.4
1600	92.2	1.1	1.0	92.9	0.9	1.0	92.5
2000	91.7	0.9	1.0	91.7	0.6	1.0	91.7
2500	87.6	1.1	1.0	87.7	0.8	1.0	87.7
3150	81.7	0.8	0.9	83.1	0.4	0.9	82.4
4000	78.9	1.3	0.9	79.2	1.2	0.9	79.1
5000	74.9	1.3	0.8	74.8	2.4	0.7	74.9
A-wtd	**101.7**			**103.0**			**102.4**
			Second Run				
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	79.7	2.4	0.7	80.5	2.2	0.5	80.1
315	74.7	5.8	0.8	78.4	4.4	0.7	76.9
400	79.7	2.2	0.9	77.0	5.1	0.8	78.5
500	80.8	3.1	1.0	80.9	2.5	0.9	80.8
630	86.7	1.7	1.0	84.8	1.6	1.0	85.9
800	93.8	1.0	1.0	93.1	0.8	1.0	93.5
1000	98.4	0.8	1.0	100.7	0.5	1.0	99.7
1250	91.4	1.1	1.0	93.6	0.8	1.0	92.6
1600	91.8	1.1	1.0	93.0	0.9	1.0	92.4
2000	91.4	0.9	1.0	91.4	0.6	1.0	91.4
2500	87.5	1.1	1.0	87.9	0.8	1.0	87.7
3150	81.7	0.8	1.0	83.1	0.4	0.9	82.4
4000	78.5	1.3	0.9	79.0	1.1	0.9	78.8
5000	74.5	1.3	0.8	74.5	2.2	0.7	74.5
A-wtd	**101.8**			**103.2**			**102.5**

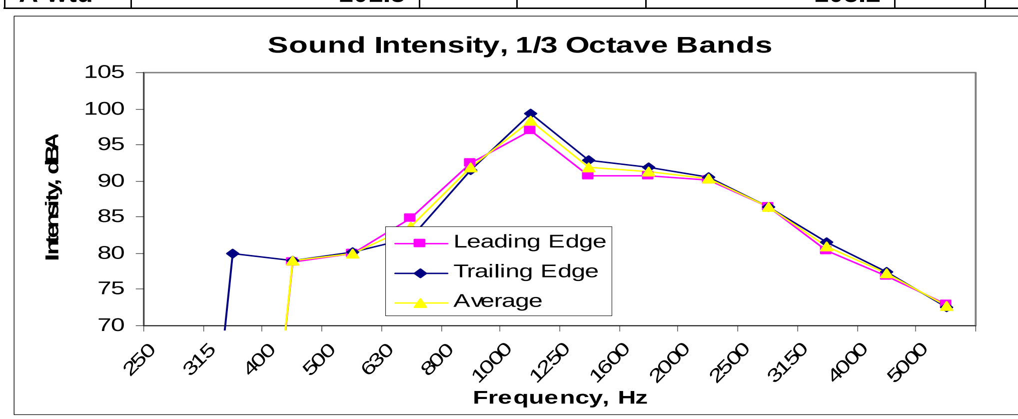

Figure A2. Third Octave Band Noise Spectra Cell 60 - 61 Driving Lane 7/15 08

Table A25. Cells 60 -61 Passing Lane 7/15 08

Freq (Hz)	Leading Edge IL(dD(A))	PI	Coh	Trailing Edge IL(dD(A))	PI	Coh	AVG IL (dB(A))
250	75.3	6.9	0.7	#NUM!	#NUM!	0.5	#NUM!
315	73.5	7.4	0.8	74.9	8.1	0.7	74.2
400	79.2	2.5	0.9	74.8	6.9	0.8	77.5
500	81.1	2.2	1.0	80.0	3.0	0.9	80.6
630	85.4	1.8	1.0	83.5	2.0	1.0	84.5
800	92.3	0.9	1.0	91.3	0.9	1.0	91.8
1000	97.2	0.9	1.0	99.7	0.6	1.0	98.6
1250	91.3	1.1	1.0	94.1	0.7	1.0	93.0
1600	91.1	1.2	1.0	92.2	0.9	1.0	91.7
2000	90.5	1.0	1.0	90.6	0.7	1.0	90.6
2500	86.7	1.1	1.0	87.9	0.6	1.0	87.4
3150	80.7	0.8	1.0	82.0	0.3	1.0	81.4
4000	76.8	1.0	0.9	77.6	0.6	0.9	77.3
5000	72.9	1.0	0.8	72.5	1.8	0.7	72.7
A-wtd	**100.8**			**102.4**			**101.6**
				Second Run			
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	73.4	8.5	0.6	79.4	4.1	0.6	77.3
315	79.2	1.8	0.8	77.7	6.0	0.7	78.5
400	79.1	2.9	0.9	77.3	4.8	0.8	78.3
500	80.8	2.9	1.0	80.0	3.5	0.9	80.4
630	85.7	1.8	1.0	83.8	2.1	1.0	84.9
800	92.7	0.8	1.0	91.7	0.9	1.0	92.2
1000	97.3	0.9	1.0	99.4	0.6	1.0	98.5
1250	91.6	1.0	1.0	93.7	0.7	1.0	92.7
1600	91.0	1.2	1.0	92.2	1.0	1.0	91.6
2000	90.7	1.1	1.0	90.7	0.8	1.0	90.7
2500	86.6	1.1	1.0	87.5	0.7	1.0	87.1
3150	80.8	0.9	1.0	82.0	0.5	0.9	81.4
4000	76.9	1.4	0.9	78.0	1.0	0.9	77.5
5000	73.1	1.3	0.8	72.8	2.2	0.7	72.9
A-wtd	**100.9**			**102.2**			**101.6**

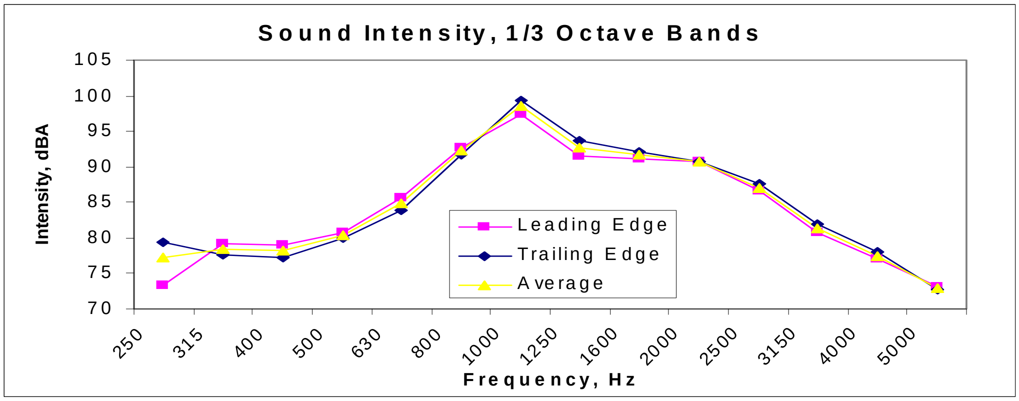

Figure A3. Third Octave Spectra for PL Cells 60 -61 Cells 60 -61 Passing Lane 7/15 08

Table A26. Cells 62 -63 Driving Lane 7/1508

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	79.6	7.7	0.9	83.5	2.1	0.7	82.0
315	80.9	4.6	0.9	83.3	2.9	0.8	82.3
400	83.6	1.9	1.0	81.4	3.1	0.9	82.7
500	86.2	2.3	1.0	85.7	2.1	1.0	85.9
630	92.0	1.7	1.0	90.5	1.5	1.0	91.3
800	98.6	1.0	1.0	96.1	1.1	1.0	97.5
1000	98.8	1.3	1.0	100.1	1.2	1.0	99.5
1250	97.5	1.3	1.0	99.5	1.2	1.0	98.6
1600	93.3	1.8	1.0	94.7	1.8	1.0	94.1
2000	91.6	1.2	1.0	92.2	0.9	1.0	91.9
2500	86.9	1.2	1.0	88.1	0.9	1.0	87.5
3150	81.2	0.8	1.0	82.1	0.6	0.9	81.7
4000	77.3	1.1	0.9	77.5	1.1	0.8	77.4
5000	73.9	0.9	0.8	73.4	1.9	0.7	73.6
A-wtd	**104.3**			**104.8**			**104.5**
			Second Run				
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	85.8	1.4	0.9	82.8	2.2	0.7	84.6
315	79.6	5.8	0.9	84.8	1.5	0.9	82.9
400	83.1	2.2	1.0	81.0	3.9	0.9	82.2
500	86.1	2.4	1.0	85.9	2.5	1.0	86.0
630	91.7	1.7	1.0	90.2	1.7	1.0	91.0
800	98.6	1.0	1.0	96.2	1.2	1.0	97.6
1000	99.2	1.3	1.0	100.5	1.2	1.0	99.9
1250	97.4	1.4	1.0	99.6	1.3	1.0	98.6
1600	94.1	1.9	1.0	95.6	1.9	1.0	94.9
2000	92.2	1.1	1.0	92.7	0.9	1.0	92.5
2500	87.6	1.1	1.0	88.5	0.8	1.0	88.1
3150	81.7	0.7	1.0	82.5	0.4	1.0	82.1
4000	77.8	0.9	0.9	77.9	0.8	0.9	77.8
5000	75.0	0.5	0.9	74.0	1.5	0.8	74.5
A-wtd	**104.5**			**105.1**			**104.8**

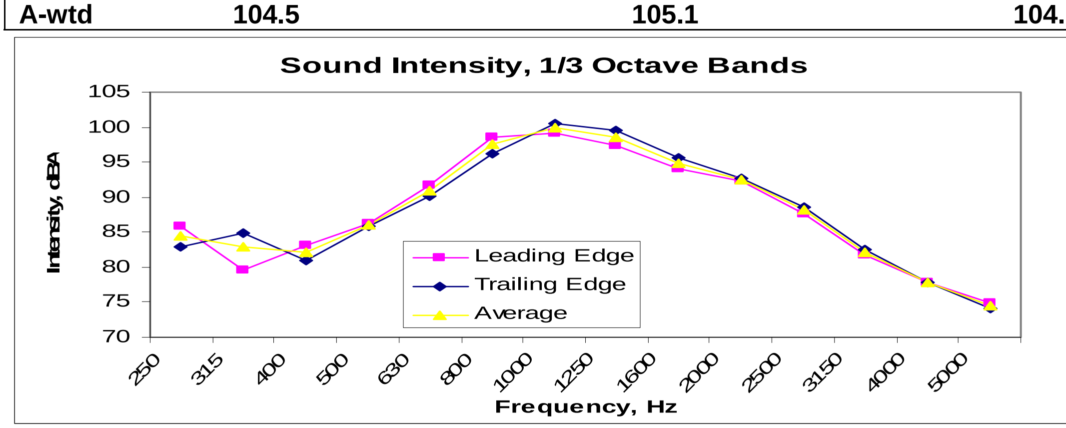

Figure A4. Cells 62-63 Driving Lane Third Octave Spectra

Table A27. Cells 62-63 Passing Lane

	Leading Edge			Trailing Edge			AVG
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	83.1	2.9	0.9	82.2	2.9	0.7	82.7
315	78.2	5.6	0.9	83.2	2.3	0.8	81.4
400	82.6	2.2	1.0	79.9	4.2	0.9	81.5
500	84.6	2.7	1.0	85.1	2.0	1.0	84.9
630	91.7	1.6	1.0	89.0	1.5	1.0	90.6
800	98.9	0.8	1.0	96.1	1.0	1.0	97.7
1000	99.4	1.1	1.0	100.6	1.1	1.0	100.1
1250	99.1	1.1	1.0	101.0	1.0	1.0	100.1
1600	94.5	1.8	1.0	95.7	1.7	1.0	95.2
2000	93.4	1.1	1.0	93.0	0.9	1.0	93.2
2500	88.3	1.1	1.0	89.3	0.7	1.0	88.8
3150	82.4	0.6	1.0	83.0	0.4	1.0	82.7
4000	78.0	0.7	0.9	77.9	0.6	0.9	77.9
5000	74.6	0.5	0.9	73.6	1.3	0.8	74.1
A-wtd	**105.1**			**105.6**			**105.3**
				Second Run			
Freq (Hz)	IL(dD(A))	PI	Coh	IL(dD(A))	PI	Coh	IL (dB(A))
250	74.4	12.3	0.9	82.0	3.9	0.7	79.7
315	77.5	6.6	0.9	83.9	1.9	0.8	81.8
400	83.3	2.0	1.0	81.4	2.9	0.9	82.5
500	85.5	2.6	1.0	85.7	2.2	1.0	85.6
630	91.8	1.6	1.0	89.3	1.7	1.0	90.7
800	98.9	0.8	1.0	96.2	1.0	1.0	97.8
1000	99.5	1.2	1.0	100.7	1.1	1.0	100.2
1250	98.5	1.4	1.0	100.5	1.2	1.0	99.6
1600	94.3	1.9	1.0	95.8	2.0	1.0	95.1
2000	93.2	1.1	1.0	93.2	0.9	1.0	93.2
2500	88.2	1.1	1.0	89.5	0.7	1.0	88.9
3150	82.2	0.6	1.0	82.7	0.4	1.0	82.4
4000	77.8	0.7	0.9	77.7	0.6	0.9	77.8
5000	74.4	0.5	0.9	73.4	1.5	0.8	73.9
A-wtd	**105.0**			**105.5**			**105.2**

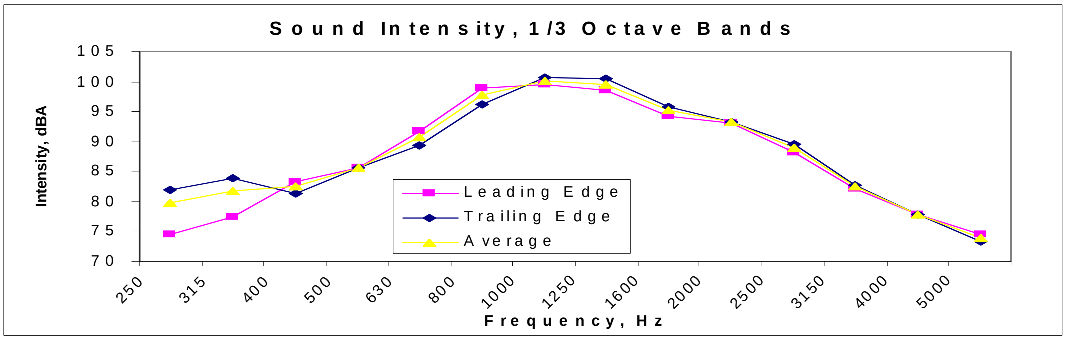

Figure A5. Third Octave band Spectra For Cells 62-63 Passing Lane