COMPARISON OF MEASURED AND PREDICTED RESPONSE OF SIX MNROAD ASPHALT TEST SECTIONS

by

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ABSTRACT

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SIX MNROAD ASPHALT TEST SECTIONS

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The study, sponsored by MnROAD, aimed to compare the measured and predicted values of strains and stresses for six cells 33, 34, 35, 77, 78 and 79 of the third MnROAD experiments. Cells 33, 34 and 35 were constructed for studying the polyphosphoric acid study while cells 77, 78 and 79 for the fly-ash stabilization study, during 2007. Each cell is instrumented with three transverse strain gauges and three longitudinal strain gauges at the bottom of Hot Mix Asphalt (HMA) layer while three pressure cells were located at the top of the subgrade layer to measure vertical compressive stress.

The Falling Weight Deflectometer (FWD) data collected in April and May 2009 was analyzed in Modulus 6.0 to back-calculate the moduli for the three layers of each cell. Then the back-calculated moduli were corrected for the time and temperature when sensor strain and stresses were recorded. The temperature corrected moduli were processed in the linear-elastic Everstress forward calculation model to compute the normal strains and stresses under the 80 kip

truck loading. The measured stress and strain values were obtained using the Peak-Pick software developed by MnROAD. The Everstress results were compared with the strain calculated by Thompson model. It was found that the Everstress strain values were 20 to 30% greater than the ones computed by the Thompson Model.

The predicted transverse strains were in the same range as the measured transverse strains. The predicted longitudinal transverse strains were nearly 20% greater than the measured transverse strains. The predicted compressive stresses were nearly 20% less than the measured compressive stresses. The difference between predicted and measured transverse strains is smaller than that between the corresponding longitudinal strains. Both calculated and measured transverse strains are smaller than the corresponding longitudinal strains.

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CHAPTER 1

INTRODUCTION

Nearly 82 % of the paved roads in the USA are flexible pavements. The performance of these pavements depends upon factors such as the quality of the asphalt mixture, the base layer and the soil subgrade layer. Understanding and forming relations between these factors can help in extending the pavement life. Millions of dollars spent in construction, maintenance or rehabilitation of the roads can be saved this way.

Modeling is one of the techniques where a prototype is built, tried out and monitored for performance during its service life. Likewise, experimental pavement sections are built with different materials that enhance their performance or to find the pavement solution for a certain condition. They are studied from five to ten years for the layer interactions, the asphalt mixture properties and the effect of load and other environmental factors on pavement performance.

MnROAD, Minnesota’s Cold Weather Road Research Facility, is one of the major test roads that is collecting data from experimental test sections for more than 15 years. The data collected is publically available to students, faculty, researchers or anyone interested; therefore the facility has been used by many researchers from around the world (MnROAD 2006).

In the 1980s, the idea of MnROAD test road was explored by the Minnesota Department of Transportation (MnDOT). MnDOT led a task force that consisted of engineers and officials, Federal Highway Administration (FHWA) and Strategic Highway Research Program (SHRP) administrators, representatives of industry and experts from universities. In May 1987, the task force proposed plans for the interstate sections and low-volume test sections. The MnROAD facility was constructed from 1990 to 1994 at a cost of $25 million funded by state and federal sources (MnROAD 2006). A partnership between the Minnesota Department of Transportation and the Minnesota Local Road Research Board provided the operational funding for the first ten years. This funding has proven useful as its research has saved money for the state and federal governments (Ovik J 2000).

The data collected at MnROAD is obtained in two ways: directly measured values and predicted values, for example, direct measurement of asphalt temperature or its prediction from air temperature and humidity. For a pavement engineer, the measured values depend on the accuracy and repeatability of the sensor system placed in the pavement sections. The accuracy and the repeatability must be checked so that the data obtained can be used for studies, such as the validation of models or the calibration of the pavement performance models (Mateos and Snyder 2002). The predicted values are obtained by statistical, empirical or other methods. But all these calculations depend on the quality of the collected data set.

In pavements, the two important response parameters to measure are the strains produced at the bottom of the Hot Mix Asphalt (HMA) layer and the compressive stress at the top of the subgrade layer. If the strain developed is large, then the HMA layer will not resist fatigue cracking. Fatigue cracks are “bottom-up” cracks that develop at the bottom and propagate vertically in the HMA layer due to the large strains produced by repeated vehicle loading. Fatigue cracking can be decreased by the addition of polymers which increases the durability and ductility of the HMA layer. The stress at the top of the subgrade layer indicates the amount of rutting or permanent deformation taken by the pavement.

1.1. Objectives of the Study

This study has been supported by MnROAD which provided the measured data from in-pavement embedded sensors and the Falling Weight Deflectometer (FWD) data for six cells from their test sections constructed from 2007 to present. Three cells were built for the study of the effect of acids and polymers in the HMA mixture; and the other three cells were built for the study of fly-ash stabilization. The objective of this research was to determine the relation between the measured and the predicted values of the transverse and longitudinal strain produced at the bottom of HMA layer and the stress developed at the surface of the subgrade layer. This work will provide a methodology for use in further research involving the relation between measured and predicted response of flexible pavements.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction to MnROAD

MnROAD is a cold weather testing laboratory which consists of a full-scale pavement test track facility located 40 miles northwest of Minneapolis, near Albertville. It is unique and independent, owned and operated by the Minnesota Department of Transportation (MnDOT). Its aim is to investigate faster methods to build roads, to attain a maximum service life and make pavements less expensive to construct and maintain. The idea came about in MnDOT in the early 1980s. With the help of engineers and officials in MnDOT, the Federal Highway Administration, the Strategic Highway Research Program, and consultants from several universities, the first plans were drafted in 1987. The test tracks were constructed fromn 1990 to 1994, parallel to Interstate 94. The test tracks are divided into cells which comprise three different road segments:

- A 3.5 mile “Mainline” interstate roadway that carries traffic deviated from I-94 averaging 28,500 vehicles per day, with about 12.4% trucks.
- A 2.5 mile “Low-Volume” roadway (LVR) that is a closed loop roadway carrying a controlled 18 wheel, 5-axle tractor-semi-trailer, with known dimensions and weight, to simulate rural road conditions and axle loading.
- A farm road located in the MnROAD’s stockpile area.

Depending on the research project and its requirements, various test cells have been added or removed over the years.

2.1.1. A Review of MnROAD Experiments

Phase I of MnROAD experiments started in August 1994 and ended in 2004 (MnROAD 2006). Phase II started thereafter and continues until now. Concurrent with the test section plans, MnROAD engineers, with help from Dr. Matthew Witczak and University of Minnesota, developed 14 research objectives. They were to evaluate different design methods, pavement performance with different types of mixes, climate, truck axle and tire systems and to improve roadway instrumentation. Apart from hundreds of research projects on these objectives, MnROAD also acquired a great understanding of test track expertise as it is the first test track since the AASHO's test track in the 1960s. Many reports on construction, instrumentation, testing and data collection have been published. They started concentrating on climatic change and its effect on pavements since Minnesota develops low temperature thermal cracking. Non-pavement related research projects have also been conducted because of the specific features of the facility such as compaction control.

Phase II research has addressed topics such as composite pavements, unwoven geotextiles, effect of farm equipment, the use of carbon fly ash, taconite aggregates and recycled pavement materials. The investigations on thermal cracking and performance of permeable asphalt pavements in cold regions are continuing.

2.1.2. Test Track Expertise

Many lessons can be learned from all the aspects of test tracks and therefore MnROAD stores and publishes all the data recorded by the sensors, so others can analyze and benefit from it. MnROAD engineers had a detailed report of nearly 4,500 sensors that are placed during the construction of test tracks. The records also explore the causes of sensor failure and their survival rates. When the sensors placed in concrete pavement failed, full-depth coring was done and the new sensors were retrofitted at the bottom of the cores.

From the beginning of the construction of the test tracks, MnROAD engineers conducted extensive material testing. The properties of the subgrade to the aggregate in the various layers of the system as well as the weather conditions on every day were dutifully recorded in MnDOT reports. These reports are a library of road test expertise, and contain a detailed description of how the tests were conducted. Several reports characterize the subgrade, the base and the surface courses, the planning and construction of test sections and the forensic trenching done.

2.1.3. Data Acquisition and Verification

The most important product of MnROAD is its databases. They offer a wealth of construction, performance, material property, and response data on all of MnROAD's test sections. For this reason, MnROAD's detailed data has been used in many other research projects, including those by:

- the 2002 MEPDG (Mechanistic-Empirical Pavement Design Guide),
- the Finnish National Road Administration (FINRA) in laboratory tests on asphalt mixes,
- the US Army Corps of Engineers Cold Regions Research and Engineering Lab (CRREL) in testing frozen soils and modeling frost depths in subgrades and
- the state departments of transportation and universities around the nation in a wide variety of research projects.

The data that is needed is extracted and analyzed from the database release. To understand the database, an overview is given in Worel's "Guide to the MnROAD Database" (MnROAD 2006). In its first decade of operation MnROAD had acquired the ability to collect and verify data carefully. Cochran et al. (MnROAD 2006) describes the techniques used for the manual, non-automated observational data collected in MnROAD. While many of the documents dealing with the automated acquisition of data from sensors are now unrelated to MnROAD's current data acquisition and calibration procedures, they describe the considerable work that went into collecting dynamic response and environmental data. The most recent documents, by Strommen

(MnROAD 2006), illustrates the development of existing calibration procedures for MnROAD's MEGADAC data acquisition system, the system that collects pavement response data.

2.1.4. Cold Regions Research

MnDOT engineers started using the full-scale facility aiming to determine how thick a pavement should be to perform adequately in a cold-region environment. However, when the pavements started failing due to the cold temperature, they started to focus on the environmental effect. Therefore early research started focusing on topic such as predictions of frost depths or material responses to freezing (Bigl and Berg 1996) . As the seasons accumulated on the test sections, later research focused on two important phenomena:

- seasonal variation in pavements
- low-temperature cracking

Both areas were immediately influential as they saved the state of Minnesota millions of dollars annually in maintenance and rehabilitation costs (Ovik J 2000). Additionally MnROAD's experience in low-temperature cracking made it the best source of information on this relatively understudied phenomenon.

2.1.4.1. Seasonal Variations in Pavements and Seasonal Load Limits

Using data from MnROAD, (Ovik J 2000) conducted an analysis of the modulus in various layers of a flexible pavement system, to quantify the relationships between climate factors, subsurface environmental conditions and pavement material mechanical properties. The results were used in a mechanistic-empirical (M-E) design procedure for Minnesota conditions. She found that:

- The hot mix asphalt (HMA) modulus is at a minimum in the summer when temperatures were at a maximum.

- The base layer modulus is at a minimum in the early spring when the frozen subgrade thaws.
- The subgrade layer modulus is low in the late spring and summer and slowly recovers in the fall.
- For pavement design purposes in Minnesota, five seasons characterize the variations in pavement layer stiffness better than four seasons. The fifth season falls during the early spring-thaw period, when an excess of moisture is present in the foundation layers and the granular base has a minimum resilient modulus.

A typical moduli variation with the season for a pavement layer system consisting of a HMA surface layer over an aggregate base layer over a fine-grained soil subgrade layer is given in the Table 2.1.

Table 2.1 Seasonal Distribution of a typical Year for design purposes

Layer	Season I	Season II	Season III	Season IV	Season V
	Layers are frozen	Base thaws	Base recovers	High Temp. Low HMA Modulus	Standard Season
Beginning	FI > 90°C-days	TI > 14°C-days	End of Season II	3-day T_{avg} > 17°C	3-day T_{avg} < 17°C
Ending	TI > 14°C-days	Approx. 28 days later	3-day T_{avg} > 17°C	3-day T_{avg} < 17°C	FI > 90°C-days
HMA	High	High	Standard	Low	Standard
Base/Sub-base	High	Low	Low	Standard	Standard
Subgrade	High	High	Low	Low	Standard

(Ovik J 2000) led a pioneer thinking in spring and winter load restrictions for Minnesota's roadways, benefitting Minnesota since they were implemented. The MnDOT Office of Materials and Road Research continues to apply Ovik's understanding of seasonal variation in flexible pavement systems in many studies.

2.1.4.2. Low-Temperature Cracking

MnROAD engineers acknowledged the importance of a cold-region facility when they saw how winters started affecting the pavements. They began making close observation of low-temperature thermal cracking in the HMA test sections. There are various reports that detail the findings such as:

- Test section assessment reports describe in detail the damage done by the Minnesota's climatic extremes (MnROAD 2006)
- Use of MnROAD material and thermal cracking data to evaluate or develop thermal cracking models like Marasteanu et al. (MnROAD 2006)
- MnROAD's interest in preventing thermal cracking has led to experiments with new materials such as emulsified oil-gravel surfaces.

2.2. Falling Weight Deflectometer Test

Dynamic loading of pavement structures is very precise and simulates the realistic effect imposed by traffic loads in the longitudinal direction of the pavement. There are two cases of dynamic loading:

- The steady-state dynamic case is similar to the effect of the vehicle passing over the pavement section, and the loading period is related to the vehicle's speed.
- The time domain impulse loading is where an impulse load is applied on the pavement surface and deflection data is recorded in the time domain. Generally, several sensors are used to measure the deflection values on different points of pavement surface.

Falling Weight Deflectometer (FWD) is a device commonly used for transient impulse loading.

Falling Weight Deflectometer (FWD) is an impact loading device used for nondestructive testing of the structural capacity of pavements. It simulates the dynamic load applied by a truck wheel moving on the pavement surface by dropping a mass of known weight from various heights. The surface deflections are measured by a set of sensors (geophones) mounted on the pavement surface at specified locations. By knowing the surface magnitude of deflections and the thickness of the surface layer, it is possible to back-calculate the pavement moduli. FWD's setup presented in Figure 2.1 consists of a circular loading plate that transfers the falling weight impact to the pavement surface.

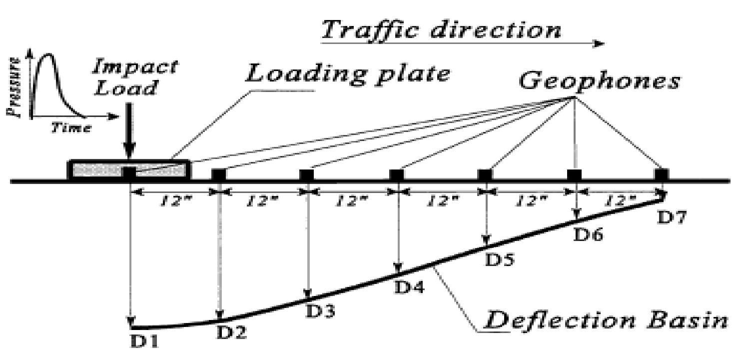


Figure 2.1 Typical Falling Weight Deflectometer Setup

The limitation of FWD is that it has to stop at each test point for several minutes throughout the measuring process.

(Nazarian and Boddapatti 1995) considered the dynamic nature of the FWD loading and calculated deflection basins with frequency of the pavement and the loading impulse as parameters. This was compared to the calculation based on static, linear-elastic analysis and the following conclusions were derived:

- FWD-pavement interaction influences the deflections. The influence decreases with the increase in the stiffness of the pavement.
- The dynamic nature of load affects the deflection measured at other distances.
- When bedrock is present, the deflections measured by different FWDs with different pulses vary even though the measurements are done in the same spot.
- If the dynamic loading is not considered in FWD, the remaining life is significantly overrated.

2.2.1. Difference between Static and Dynamic Response

The traditional method to analyze the FWD data uses the maximum deflections recorded by the geophones and the distance of the geophones from the center of the loading plate. A numerical optimization method performed to obtain inverse-mapping so that the measured deflection agrees with the deflections given by a numerical model. The optimization process can be carried out by employing an algorithm of parameter identification like a non-linear least-squares algorithm, a research in a database or a genetic algorithm.

All of the existing programs are based on the static load assumption, which uses only the maximum values of the FWD response history. This approach is very effective when the layer depths are known and uniform. However, the back-calculation based on the dynamic assumption will be more effective since it takes into account the dynamic effects of the pavement as well as the dynamic characteristics of the FWD.

(Picoux B 2009) tried to understand the difference between the static response and dynamic response of the pavement. They found that the dynamic response only shows the maximum deflections at the surface. The amplitude of the pavement deformations is almost the same in the dynamic loading case, as in static loading case for the first geophones. With the increase in the distance from the loading area, the dynamic deflections are slightly higher than the static ones as the absorbing boundaries simulate the semi-infinite field.

For a multi-layered model, a difference between static and dynamic exists and this difference is sensitive to the modulus of the soil and of the base. For average values of the soil modulus, the difference is less significant (less than 10%). The static model is less accurate because of surface waves. The viscoelastic property of AC layer can be efficiently considered in the dynamic process. The dynamic process is more complex and computational intensive than the static model. Therefore, the static model is preferred for its simplicity if it has acceptable error ranges.

2.2.2. Back-Calculation

The dynamic response of a pavement depends on the elastic modulus, thickness, Poisson ratios, mass densities, and damping ratios of each layer. Except the modulus, the variations of the other properties have only a slight influence on the dynamic response of the pavement, therefore they are assumed to be known. Commonly, the unknown parameters in a dynamic back-calculation analysis are the complex moduli (G*) and the thickness of the pavements layers. The complex modulus is the function of angular frequency (u) and the three material properties: slope of creep compliance curve (m), internal damping ratio and Young's modulus (E).

Creep compliance is a viscoelastic property that is related to internal damping of the asphalt layer and it is a function of inertia, which is considered for the base, sub-base, and subgrade layers in elastodynamic analyses. Young's modulus is the fundamental property of elasticity and is accounted for all flexible pavement layers. The viscoelastic properties of the AC layer can be characterized by creep compliance defined in the time domain, and the dynamic complex modulus considered in the frequency domain. For remaining layers, complex modulus is generally assumed independent of the frequency. Several material models, such as Kelvin and Maxwell, can be used to characterize these layers. (Goktepe, Agar and Hilmi Lav 2005)

Deflection data can be obtained in the time domain for the time domain impulse loads, and in the frequency domain for steady state vibratory loads. In order to use the dynamic loading data, Fourier analyses are usually conducted for the transformation of the domain. Then, elastodynamic analysis, such as Green function solution and dynamic Finite Element Models (FEM), are performed to calculate resulting surface deflections. Since loading and deflection data are in the frequency domain for steady-state vibratory tests, there is no need for a transformation in this type of back-calculation analysis.

Nevertheless, for impulse loads as those of the FWD test, the time (t) domain data must be transformed to the frequency (u) domain data. In this context, two methods are used:

- frequency domain fitting
- time domain fitting: computed deflections are in the frequency domain, inverse Fourier transformation should be carried out to compare calculated and measured deflections

The majority of dynamic back-calculation analyses have algorithms that take linear material behavior into account, instead of nonlinear. Furthermore, similar to the static back-calculation methods, optimization process of dynamic back-calculation can be performed by parameter identification or genetic algorithm routines. In essence, dynamic pavement (forward) response models fall into two categories depending on the solution methodologies, i.e., analytical and numerical.

The main software used in back calculation is MODULUS, ELSYMS, KENLAYER, ELMOD and MODCOMP. The first three are linear while the last two takes into account non-linearities also. KENLAYER allows material properties for each seasonal period while MODCOMP allows analyzing up to 15 layers.

2.2.5. Structural Response of Moving Loads in MnROAD Experiments

The following were validated with data from MnROAD by (Mateos and Snyder 2002)

- The measured strains varied linearly with the axle load.
- The axle loads and the tire pressure were found to have no effect on the apparent asphalt modulus.
- The longitudinal and transverse strain increased with a decrease in the vehicle speed.
- The transverse strain decreases significantly between the two tires of a dual wheel because the load is being concentrated at the edges of tires.
- The asphalt concrete acts as a linear viscoelastic material. Therefore the strain developed under a pass of a single wheel was higher in the transverse than the longitudinal direction.
- The response data recorded under FWD loading was most representative of data obtained from runs performed at speeds 30 to 60 mph. The FWD model underestimated the strains for low-speed runs at 5mph.

2.3. MnROAD Data Release

MnROAD collects and processes data and enters it into a database by the designated experts after several data quality checks. Most of the data collected are released online but some only can be obtained offline as they are bulky. The MnData source includes:

- Data Release 1.0 – January 2012 (MnROAD 2012)
- Oracle Database (database tables and views)
- Offline Data (Raw ERD, FWD history, WIM and Dynamic data to name a few)
- Web Site (www.mndot.gov/MnROAD)
- Reports (see MnROAD web site - Reports)
- Personal communication with Individual Researchers

The MnROAD Data Release User Guide describes what data has been collected, where it is stored, and how to access it (MnROAD 2012).

MnROAD has installed over 9,500 sensors over the last 17 years and each sensor type has unique testing frequencies and data handling procedures. These sensors are linked by fiber optics directly into the MnROAD's computerized data collection system and measure variables such as temperature, moisture, strain, deflection and frost depth. The variables are measured over, in and under the pavement (Table 2.2). There are two different types of pavement sensors:

- static or environmental sensors that measure the response due to slower changes like climate, shrinkage, creep, material expansion and contraction. The static sensors capture environmental data every 15 minutes.
- dynamic sensors that measure the response caused by the moving traffic. The dynamic pavement response sensors, triggered by the passage of heavy vehicles, take readings up to 2,000 times per second. They are mainly pressure gauges as shown in Figure 2.2.

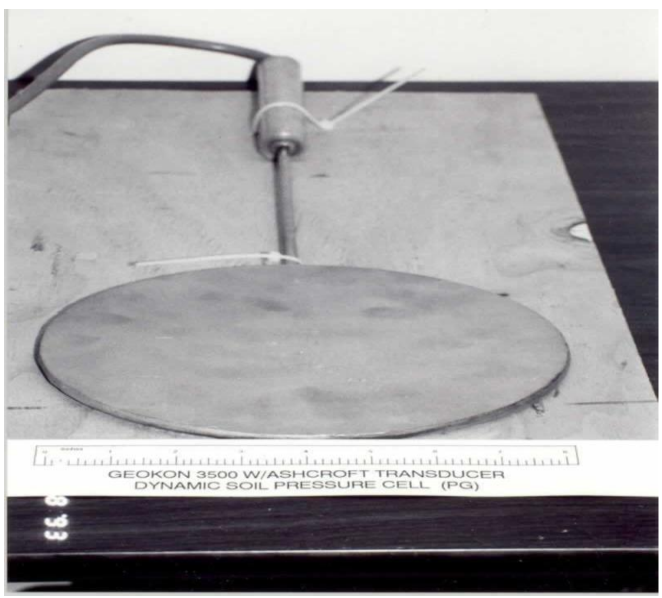


Figure 2.2 Typical Dynamic Pressure Gauge

Table 2.2 Data collected by MnROAD

Subject Area	Data Type	Examples of data collected at MnROAD
Cell Info	Cell data	Design, Construction, Maintenance, Cell Layer/Lift Thickness, Cell Events, Elevations, GIS Data
Field Monitoring	Rutting	Automated Laser Profile System (ALPS), 6-foot Straight Edge, Dipstick, Paper Traces, Pathways, PaveTech
	Ride	Pathways, PaveTech, LISA, Frost Pins, Faulting, Forensics, Curl and Warp
	Surface Characteristics	MnROAD Surface Type Summary, Sand Patch, British Pendulum, Texture Meter, Friction
	Noise	On-Board Sound Intensity (OBSI), Sound Absorption
	Cracking	Distress Surveys, Cupping
	Strength/Stiffness	Falling Weight Deflectometer (FWD), FWD Operation Video (wmv, 8.5 MB) Dynamic Cone Penetrometer (DCP)
Sensor Data	Pavement	Biaxial Strain Gage (BS), Concrete Embedment Strain Gage (CD, CE), Linear Variable Differential Transducer (DT), Horizontal Clip Gage (HC), Longitudinal Strain Gage (LE), Transverse Strain Gage (TE), Piezo-Accelerometer (PA), Dynamic Soil Pressure Cell (PG, PK), Steel Strain Gage (SS), Tiltmeter (TM), Vibrating Wire Strain Gage (VW)

Table 2.2 - *Continued*

Subject Area	Data Type	Examples of data collected at MnROAD
Sensor Data	Subsurface	Thermocouple (TC), Moisture Block (WM), Dynamic Pore Water Pressure Cell (DW), Thermistor (XD, XL, XT, XS), Open Stand Pipe (OS), Static Lateral Pressure Cell (PL), Static Soil Pressure Cell (PT), Resistivity Probe (RP), Static Pore Water Pressure Cell (SW), Tipping Bucket (TB), Time Domain Reflectometer (TD)
	Weather	Temperature, Precipitation, Humidity, Wind speed and direction & Solar radiation
	Traffic	MnROAD Semi Description, MnROAD Mainline Traffic, Mainline Traffic Forecast,
Lab Testing	Bituminous	Dynamic Shear Rheometer, Bending Beam Rheometer, Direct Tension, Repeated Creep, Zero Shear Viscosity, Dynamic Modulus, Indirect Tension Test, Fracture Toughness, Mix Designs, Gradations
	Concrete	Next Generation Automated Concrete Evaluation System (NG-ACE) Air Voids, Compression, Coefficient of Thermal Expansion, Poisson's Ratio, Mix Designs
	Unbound	Resilient Modulus, Proctor Curves, Field Density, Gradations, Unsaturated Material Properties

These data are formatted into a document that contains both spreadsheets as well as documents providing explanations. Customized requests are done and separate requests are needed for sensor and some raw data that are not released. The Data Release (MnROAD 2012) is separated into folders and organized as shown in Table 2.3.

Table 2.3 Database Structure of the Released data

Data category	Description
Introduction	Description of MnROAD database and its Research
Test Cell Descriptions	Description of Test Cells built at MnROAD. This includes excel cell maps, layer schematics, and tabular output from database.
Field Performance	Field performance data collection and documentation like distress, ride, FWD, skid, surface texture, OBSI, etc.
Sensor	Sensor documentation and location data. Actual sensor data must be requested separately at this time due to its complexity and size requirements.
Material sampling & Testing	Material sampling and laboratory testing data and documentation for soils, aggregates, asphalt and concrete mixture and components.
Weather Station	Weather data and documentation from the two on-site weather stations
Traffic loading	Traffic data and documentation including ESAL spreadsheet calculator that allows the calculation of ML and VR traffic for any cell and time period
Database Descriptions	Database schema (tables that makeup the MnROAD database) and the data dictionary (describes the fields that makeup the table).

2.4. Asphalt Rutting

Rutting consists of vertical depressions formed in the pavement surface along the wheel tracks. It is measured transversely across the depression using a string line or other appropriate straight edge. Rutting is considered significant when it approaches 0.4 inches in depth. The most likely causes for rutting in asphalt are improper mix design, production or improper placement. MnROAD initially measured rutting using equipment like straight-edge, Dipstick and Roll-o-matic; all were very tedious and manual.

Today, a Pavement Management Van and Automated Laser Profile System (ALPS) are used. The Pavement Management Van provides an average rut depth for the entire length of the cell, and so it does not capture the local maximum rut depth as it travels along each test cell. The ALPS methods provide enough data to determine both the maximum rut depth and volume of the water a rut might hold.

In 2003, MnROAD staff developed and constructed the ALPS (Figure 2.3) which uses a laser system to measure the wheel path rutting in MnROAD HMA test cells (MnROAD 2012). The ALPS consists of a high precision distance measurement laser mounted on a carriage that travels across a 14 foot long aluminum beam. HMA rutting tests are conducted three times each year, every 50 feet in both lanes for the length of each test cell. The beam and data acquisition equipment are mounted to an industrial style lawn mower and the ALPS device is aligned with the test points. As the laser travels across the beam, it captures distance measurements every 0.25 inch and data is collected over a length of 12 feet 10 inches. This result in 616 data points collected for each pass of the laser during data collection. The distance of travel also allows some other lane and shoulder overlap when collecting rutting data at MnROAD, because MnROAD contains 12-foot wide lanes.

Figure 2.3 ALPS Equipment Front View

All the profile data is collected and processed in a MS Excel sheet macro program written in Visual Basic and entered into the MnROAD database. This program calculates the maximum rut depth and location, along with the volume of water potentially stored in the rut, and formats the data for the MnROAD database (MnROAD 2012).

The program eliminates outlier data points and draws a digital straight edge over each wheel path. The rutting data is calculated by measuring the distance between the digital straight edge and the actual road profile. Some test points were painted on the surface of the HMA cells to ensure that long term trends in rutting can be observed by testing in the same locations each time. ALPS data for cells 33-34 start from 2007 to 2011. Cells 77-79 have rutting data from 2007 to 2011.

2.5. Ride Quality

Ride quality is a measure of the comfort level experienced by a passenger in a moving vehicle, including the vibration intensity and frequency; longitudinal, transverse, and vertical accelerations; jerk, pitch, yaw, and roll. MnDOT uses three indices to report and quantify both present and future pavement condition, as listed in Table 2.4. For each index, a higher value means a better pavement condition. The Pavement Quality Index is calculated from the Ride Quality Index and Surface Rating.

Table 2.4 Pavement properties and their scale

Index name	Pavement attribute Measured	Rating scale
Ride quality (RQI)	Pavement roughness	0.0-5.0
Surface Rating (SR)	Pavement distress	0.0-4.0
Pavement Quality Index (PQI)	Overall pavement quality	0.0-4.5

A Digital Inspection Vehicle (DIV) is driven to collect digital images of the pavement, pavement roughness, and pavement distress every year for all section. The data is then compared to understand the performance of different roadways, pavement designs, and the need for maintenance/rehabilitation. The Pavement Management unit also surveys MnROAD in the fall and spring of each year. A DIV van is shown in Figure 2.4 (MnROAD 2012).

Figure 2.4 Digital Inspection Vehicle

The first vans used by Pavement Management at MnROAD were made by Pavetech. Then a Pathways van with improved visual inspection technologies was used. Lasers were mounted across the front bumper to measure roughness and faulting of pavement test sections. The lasers measure the pavement's longitudinal profile and vertical deviations from a flat surface, which are used to calculate roughness. They take a measurement approximately every 1/8-inch as the van travels down the roadway at highway speed.

Four digital cameras mounted on top of the van record pavement distress such as cracking, patching, right of way images and condition of shoulder. The ride quality is measured twice a year and IRI, PSR, SR and RQI are available from 1999 to 2010 for all the cells. Data on IRI and Roline laser IRI is also available from 2009 to 2011 (MnROAD 2012).

2.6. Distress Surveys

Pavement distresses are the defects on the pavement surface: longitudinal and transverse cracking, alligator cracking, rutting, raveling and patching. They are symptoms which indicate a problem in the pavement. The type and severity of distress determines the amount of maintenance and/or rehabilitation needed. MnDOT uses the Surface Rating (SR), to quantify pavement distress by viewing and analyzing the digital images captured by the van (MnROAD 2012). The data collection and processing is done with Ride Quality Index survey twice a year.

The percentage of each distress in the sample is determined and multiplied by a weighting factor to give a weighted percentage. The weighting factors are higher for higher severity levels of the same distress and higher for distress types that indicate more serious problems even if it is of lesser extent. All of the weighted percentages are summed to give the Total Weighted Distress (TWD) from which the SR is calculated with the equation:

$$SR = e^{1.386-0.045.\mathrm{TWD}}$$

CHAPTER 3

DATA SETUP

3.1. Test cell Descriptions

The Low Volume Road track now has 24 test cells, which are PCC, asphalt or composite pavements. Only Cells 33, 34, 35, 77, 28 and 79, which are asphalt pavement test cells are considered for the study. Cells 33, 34 and 35 have a clay subgrade, a 12" Class 6 Special gradation Gravel and a 4" Hot Mix Asphalt surface layer. The HMA layer was modified on September 2007 for the polyphosphoric acid (PPA) study. Each of the three cells has a different proportion of PPA, Styrene-Butadiene-Styrene (SBS) and lime. An HMA mix designation SPWEB340C indicates 12.5 mm Superpave mix, Traffic Level 3, 4% design air voids and PG 58-34 binder (Clyne and Palek 2008). The cells have the following binders:

- Cell 33- 0.75 % of PPA only
- Cell 34- 0.3 % of PPA + 1.0 % SBS polymer
- Cell 35- 2.0% of SBS polymer only

Polyphosphoric acid is a widely used modifier which significantly increases the high-temperature performance grade (PG) rating of asphalt pavements and delivers improved resistance to rutting and superior adhesion to moisture-sensitive compositions, with no loss of low-temperature properties and performance. It is an inorganic liquid which allows total miscibility with asphalt and can be used alone or in conjunction with a variety of organic polymers.

Styrene-Butadiene-Styrene (SBS) is a hard rubber-like substance that makes the asphalt to remain sturdy and durable for a long time. The presence of styrene makes the bitumen durable, while the rubber-like property is due to the presence of polybutadiene. It was found that by adding a small amount of acid, the amount of polymer can be reduced, which decreases the cost. MnROAD wants to build on these findings and assess the PPA mixes over a period of 5 years. (Clyne and Palek 2008)

Cells 77-79 were built with full depth reclamation base material and HMA test cells in October 2007 replacing cells 29 and 30 in the low-volume road loop. The three test cells 77, 78 and 79 are unique, with 4”HMA layers on top with 1.1% Elvaloy, 0.3% PPA and lime mixed in different proportions. Their structure is also different as one has gravel (78), one has fly ash (79) and the other reclaimed FDR (77). These sections were built to study the effect of both PPA and fly ash, to compare the performance to both a non-stabilized FDR and a conventional aggregate base (Clyne and Palek 2008).

Elvaloys are copolymers which are added to improve the flexibility, toughness and weatherability. Fly-ash is formed during combustion and its uses are widely researched. The fly ash used at MnROAD is Class C high carbon cementitious ash from the Riverside 8 plant. The carbon content is more than 5 % higher than the minimum specified by MnDOT. The test cell will be monitored for 10 years to compare the performance of the fly-ash stabilized base with the other bases. (Clyne and Palek 2008) So each cell has the following base materials:

- Cell 76- Full depth reclamation of 50% HMA + 50% Class 4 gravel (Non-stabilized)
- Cell 78- Class 6 sp. crushed stone aggregate base (from on-site stockpile)
- Cell 79-Full depth reclamation of 50% HMA + 50% Class 3 gravel (stabilized with 14% fly-ash)

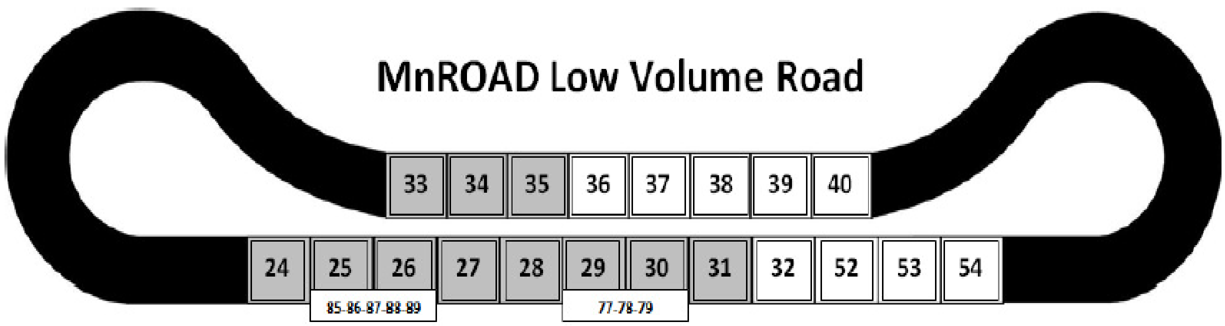


Figure 3.1 Cell schema of Low Volume Road

The diagram of the Low Volume Road track (MnROAD 2012) is shown in Figure 3.1. The cell maps and the pavement structure details are given in Appendix A.

3.2. Falling Weight Deflectometer Data

The dynamic response of a pavement system to a load is measured using the Falling Weight Deflectometer (FWD) (MnROAD 2012). The FWD device consists of a loading plate, weight package, geophone sensors, and data acquisition equipment. Mounted to a trailer, the equipment is designed to simulate the impulse load of a passing wheel. As the weight is lifted hydraulically and dropped in free fall, the plate applies a dynamic load to the pavement. A set of geophones, spaced at specific distances from the load plate, capture the resulting deflection basin. The deflection basin and the known load and layer thicknesses can be used to back-calculate the modulus of the underlying layers. The equipment used by MnROAD is the Dynatest Model 8000 which gives data in MS Access format.

MnROAD (MnROAD 2012) does “routine” FWD testing at the same test points for each test cell several times each year so that the unique seasonal response of the pavement structures is captured. Each HMA test cell has approximately 40 test points distributed 50 feet apart. Figure 3.2 below shows typical test locations in the HMA pavement. The FWD truck moves only in west direction in both lanes.

Outer Wheel path			9.5 ft
Midlane		Lane Offsets=	6 ft
Inner Wheel path	Inside lane		2.5 ft
Inner Wheel path			2.5 ft
Midlane			6 ft
Outer Wheel path	Outside lane		9.5 ft

Figure 3.2 Test locations in a flexible pavement cell in a LVR

The radius of the loading plate is 150 mm. The offsets of the sensor, time, location, surface and air temperature and deflection is given in an Excel sheet. The FWD data files were collected from 2007 to 2011 for cells 33, 34 and 35. The FWD data of cells 77-79 are in the same format and the tests were performed from 2008 to 2011 (MnROAD 2012). MnROAD used the following FWD test procedure for HMA cells:

- Pre-2008: Deflection data for 3 drops at each load level of 6000, 9000, and 15,000 lbs. Load history data was collected only for the 9000 lbs. load level drops.
- Post-2008: Deflection data for 1 drop at each load level of 6000, 9000, 12,000 lbs. Load history was collected only for specific research studies

3.3. Pavement Response Measurements

Sensors are mainly used to measure the load and environmental response of pavement structure such as temperature, moisture, strain, deflection and frost depth. The data from the sensor goes to road-side cabinets and by fiber-optic wires to the MnROAD database for storage and analysis. The sensors are placed on the wheel path and nearly at the center of each cell. In Low-Volume Road, only the inside lane is instrumented. The placement of the different sensors in cell 33 is shown in Figure 3.3 from the construction report (Clyne and Palek 2008).

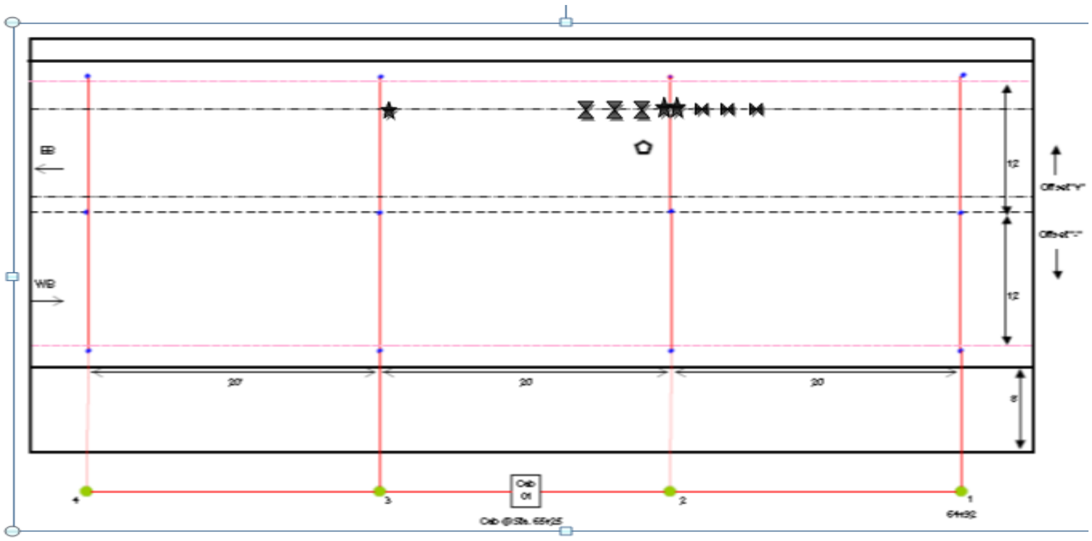


Figure 3.3 Placement of Sensors in Cell 33

The ☆ is the PG sensor and the other six sensors in the wheel path are the Longitudinal Strain (LE) and the Transverse Strain (TE) sensors. The ⬠ is the temperature sensor (Clyne and Palek 2008) . Sensors were calibrated in the laboratary and placed in the hole dug for each of them at appropriate depths. The hole was backfilled and compacted with a hand tamper wired to the appropriate equipment

Cells 33 to 35 each have 10 sensors embedded in the asphalt layer. The sensors are primarily of LE, TE and TC varieties (MnROAD 2012). They are:

- LE & TE Sensors measure strain response in HMA due to dynamic loads. Sensor designation “LE” means a strain sensor mounted longitudinally or parallel to the direction of traffic. “TE” indicates a strain sensor mounted transversely or perpendicular to the direction of traffic. Before 2008, the LE and TE strain sensors were an electrical resistance strain gauge embedded within a strip of glass-fiber reinforced epoxy, with transverse steel anchors at each end of the strip to form an H-shape. After 2007, the LE and TE strain sensors were replaced by an electrical resistance strain transducer, using a nylon rod with transverse steel anchors at each end to form an H-shape and have a 2 year lifespan. There are 3 LE and 3 TE sensors embedded in each cell at a depth of 3.98 inches (bottom of the HMA layer) near the outside wheel path.

- TC Sensor measures the temperature of a material in which it is embedded every 15 minutes. The Thermocouple sensor (TC) contains a pair of dissimilar metal alloy wires (usually copper and constantine) connected together near the point of measurement. It creates an open-circuit voltage, called the Seebeck voltage, which is proportional to the temperature difference between the point of interest and a reference junction. They are mounted on vertical “trees” used for profiling the vertical temperature. Each cell has 4 TC sensors in the same location, but at different depths.

Cells 77, 78 and 79 have 33 sensors, each of which are embedded not only in the asphalt layer but also in the clay, gravel and the reclaimed layers. They are basically of LE, TE, TC, PG and EC varieties. They are explained as:

- LE and TE sensors measure strain longitudinally and transversely at three locations each in cells 77, 78 and 79 at the same depth of 3.98 inches (bottom of HMA layer).
- TC sensors measure the temperature in each layer. There are 16 sensors which are embedded at the same position in varying levels in cells 77, 78 and 79 to determine the temperature difference at various depths within the HMA layer.
- PG or Pressure Gauge sensors measure vertical dynamic pressure in the base and subgrade layers due to the passing of the load vehicles. A PG sensor is a pressure-sensing device consisting of two 6 inch diameter steel plates welded together around their rims and connected to an electrical pressure transducer by a steel tube. The space between the plates and within the tube is filled with a liquid. The transducer responds to changes in pressure applied to the plates by the material in which the sensor is embedded. There are 3 PG sensors embedded for each cell at the top of the subgrade.

- EC sensor is designed to measure three soil moisture components: Volumetric water content, soil temperature and electrical conductivity collected from each of the three sensors every 15 minutes. Water content is determined using capacitance/frequency domain technology to measure the dielectric constant of the soil. Eight EC sensors have been installed in each test cell, typically at multiple depths to measure moisture in the pavement base and subgrade layers.

The section view of cell 77 is shown in Figure 3.4 and gives the placement of the sensors at different depths (Clyne and Palek 2008).

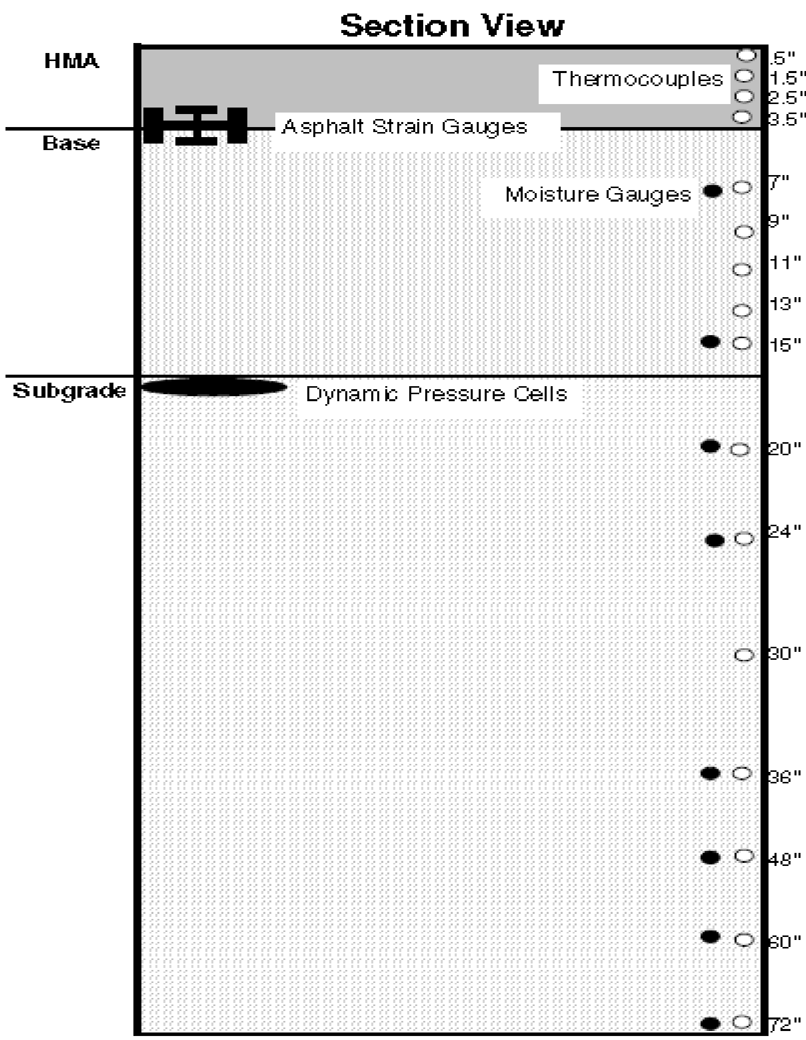


Figure 3.4 Position of Sensors- Section View of Cell 77

3.4. Material Sampling and Testing

Material testing involves observation, sampling and procedural testing of each component and storing the results in the database with care (MnROAD 2012). Sometimes materials are sent out for testing to state DOTs, FHWA and other laboratories. The test procedures follow AASHTO or ASTM standards, with occasional minor modifications by MnDOT.

3.5. Weather Data

(MnROAD 2012) has observed weather using the on-site weather stations since 1990. When needed, the missing values were obtained from the station at Buffalo, Minnesota. When older stations are AWS and CERRL; the newer stations are called the NW (North West) and SE (South East) stations due to their location. They use a variety of equipment to measure temperature, humidity, wind speed, wind direction and solar radiation. The data needed every 15 minutes by the stations are processed and combined into a standard format and fed into the database. Table 3.1 shows the operational life of the stations.

Table 3.1 Weather stations at MnROAD

Weather station	Start date	End date	MnROAD Database Table
AWS	September 26, 1990	February 17, 1997	WEATHER_AWS
CRREL	October 30,1990	April 18, 1997	WEATHER_CRREL
NW	March 21, 1997	Current	NW_WEATHER
SE (WIM Building)	April 30, 1998	Current	WEATHER_SE

The following changes are made to the data:

- Some of the data over the years has been influenced by external factors such as damaged sensors and so extreme data outliers have been corrected to better correlate with 30-year historical data from the Buffalo, Minnesota, weather station.

- PRECIP data has been manipulated at times using the following equation:

$$\text{Adjuted vaue}=\frac{\text{Precip Outlier}}{100 \text{ or } 1000} \times 2.54$$

  The denominators were used according to which value (100 or 1000) provided a value closest to the Buffalo averages.

- If there was no data in the WEATHER_COMPOSITE table for some of the months, the monthly average taken from the Buffalo summary was inserted.
- SOLAR_RAD_IN data and SOLAR_RAD_OUT data from 10/1994 – 4/1997 were both off by factors of ten. The SOLAR_RAD_IN data during this period was divided by ten and the SOLAR_RAD_OUT data was divided by 100 to be comparable to the rest of the WEATHER_COMPOSITE data.
- For the research the 15 min/QHR data has been compounded for one hour by manipulating the data using MS Excel Macros.

Relative humidity values are available from July 1993 while gust direction values are available only for some months of 2010 for which SOLAR_RAD_IN is not available. SOLAR_RAD_OUT data values are available only for the time period 1990 to 1997. Max Wind has some serious outliers. Otherwise continuous data is available from the start of using NW and SE stations.

3.6. Traffic Data

Since 1994, the pavement sections in Low Volume Road have been applied load by a truck with 18 wheels and 5 axles, with two different loading configurations. Thay are:

- The "heavy" load configuration with a gross vehicle weight of 102,000 lbs. (102K configuration).
- The “legal” load configuration with a gross vehicle weight of 80,000 lbs. (80K configuration).

A MnDOT employee drives the truck for 6 hours or 80 laps a day on average (MnROAD 2012). From 1994 through 2007, the 102K truck was driven on the outside lane of the LVR on Wednesdays, and the 80K truck was driven on the inside lane all other weekdays. This results in a similar number of equivalent single axle loads (ESALs) being delivered to both lanes even though the number of passes differs. The two loading configurations are given in Table 3.2.

Table 3.2 Loading Configurations used in LVR

<table>
<tr><th>Truck Configuration</th><th>Total Weight (lbs.)</th><th>Steer Axle</th><th>Front Axle Tractor Tandem</th><th>Back axle Tractor Tandem</th><th>Front Axle Trailer Tandem</th><th>Back Axle Trailer Tandem</th></tr>
<tr><td rowspan="2">80 K</td><td rowspan="2">79,400</td><td rowspan="2">11,800</td><td>16,900</td><td>16,600</td><td>16,100</td><td>18,100</td></tr>
<tr><td colspan="2">33,500</td><td colspan="2">34,100</td></tr>
<tr><td rowspan="2">102 K</td><td rowspan="2">102,500</td><td rowspan="2">12,400</td><td>22,100</td><td>22,800</td><td>21,700</td><td>23,500</td></tr>
<tr><td colspan="2">44,900</td><td colspan="2">45,200</td></tr>
</table>

Beginning in 2008, loading on the LVR has been done only with the 80K truck, five days per week and only on the inside lane to isolate the environmental effects on pavement performance (Clyne and Palek 2008). Figure 3.5 shows the 80 K International truck (MnROAD 2012).

Figure 3.5 The 80K truck used in LVR for loading

The truck driver records his daily laps in a table and also information relating each pass of the truck to the number of ESALs applied. This ESAL factor is derived based on the methodology described in 1993 AASHTO Design Guide, which takes into account the pavement structure, terminal serviceability, axle configuration and weight (MnROAD 2012). However, research has recently assumed a generic asphalt and concrete structure and assigned average ESAL factors to each type of pavement, as shown in Table 3.3 (MnROAD 2012).

Table 3.3 ESAL factors of the load configuration

Pavement type	80 K ESAL Factor	102 K ESAL Factor
HMA	2.35	7.0
PCC	3.75	11.5

The number of laps and ESAL factors are then combined in a database view to estimate the total number of ESALs per day on each pavement. This data is available from 1994 to 2011.

CHAPTER 4

LAYER MODULI BACK-CALCULATION FROM FWD DEFLECTION DATA

4.1. Processing FWD Data

The software selected for moduli back-calculation is Modulus 6.0. It can directly read FWD files in the format commonly used by FWD equipment manufacturers. Since the MnDOT FWD data files are in different format, they were processed to be read by Modulus 6.0 by using the other formatting options available in Modulus 6.0. Furthermore, the FWD data was classified by month, season, load level and surface or air temperature. This study classifies the data by air temperature.

The MnROAD FWD data (MnROAD 2012) for each cell from 2007 to 2011 was processed to be compatible with Modulus 6.0. It was divided by pre and post 2008 FWD procedures. The deflection data for the 9000 lbf. load level only was retained for further analysis. The loads were converted from kPa to lbf. and the deflection from microns to mils to be read by Modulus 6.0. For all the cells, these selected values were classified by the air temperature in the following drops, from 0-5, 5-10, 10-15, 15-20, 20-25, 25-30, 30-35 and 35-40°C. All of these operations were done in MS Excel and then saved as .prn or formatted text files to be read by Modulus 6.0.

4.2. Modulus 6.0

Modulus 6.0 was developed by Texas Department of Transportation to determine the remaining life and perform moduli back-calculation using the FWD deflection data in a WINDOWS platform. It was upgraded from the previous DOS version with the following features (Liu and Scullion 2001):

- It supports user data input function like ASCII formatted FWD data in addition to formats used by equipment manufacturer.
- A Graphic User Interface has been added for easier analysis of data.
- Manual back-calculation is allowed for detailed analysis of a single station or for finding suitable moduli ranges.
- A function for adding/leaving drops between the back-calculation runs was added
- The depth to bedrock is calculated before the FWD data is processed. This allows for more improved results when the users select a homogenous depth to bedrock stations.
- The F1 key can access the HTML based help system.

Modulus 6.0 opens with the screen shown in Figure 4.1. It has the following icons: Read FWD, Drop Select, Stat. Select, Remaining Life, Back-calculation, Segmentation, Chart Output, View Comment and Exit Program. Only some of these icons were used for analysis as only back-calculation was done using Modulus 6.0

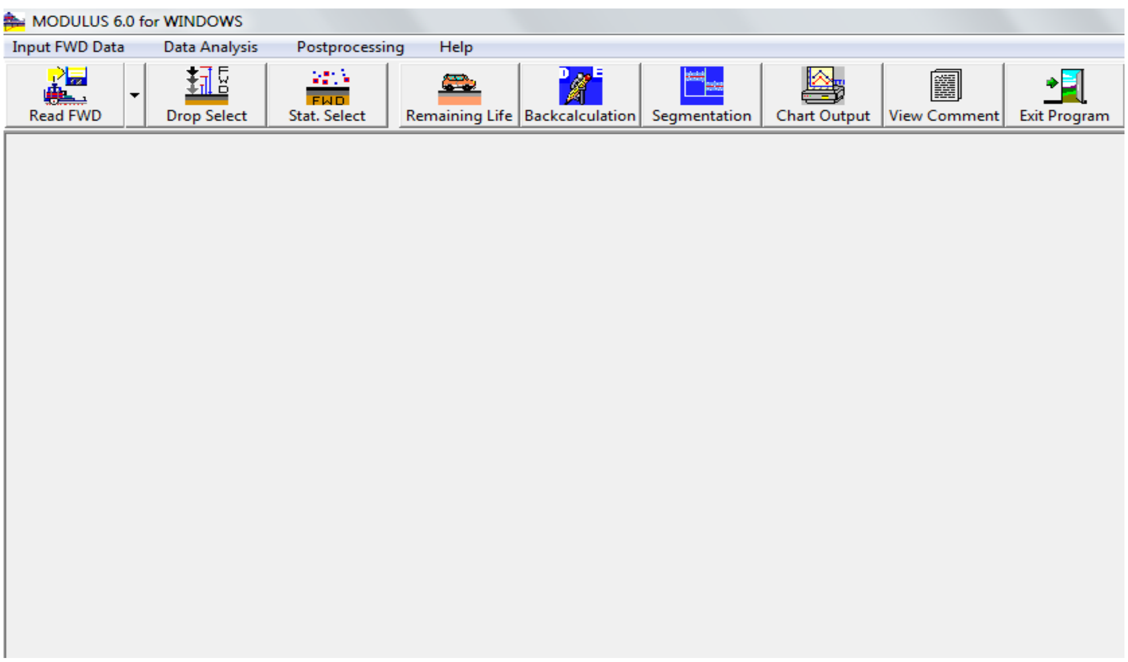


Fig 4.1 Modulus 6.0 Program Opening Dialog Box

The Read FWD icon has an option for the User Input Data where the space delimited data can be read by Modulus 6.0. Figure 4.2 shows a sample of the input data showing the load and deflection data for Cell 33. The first column is the load and the other columns are the deflection in mils at 0, 8, 12, 24, 36, 48 and 60 inches from the load, all of them with two decimal points. The file format, load and deflection units are specified.

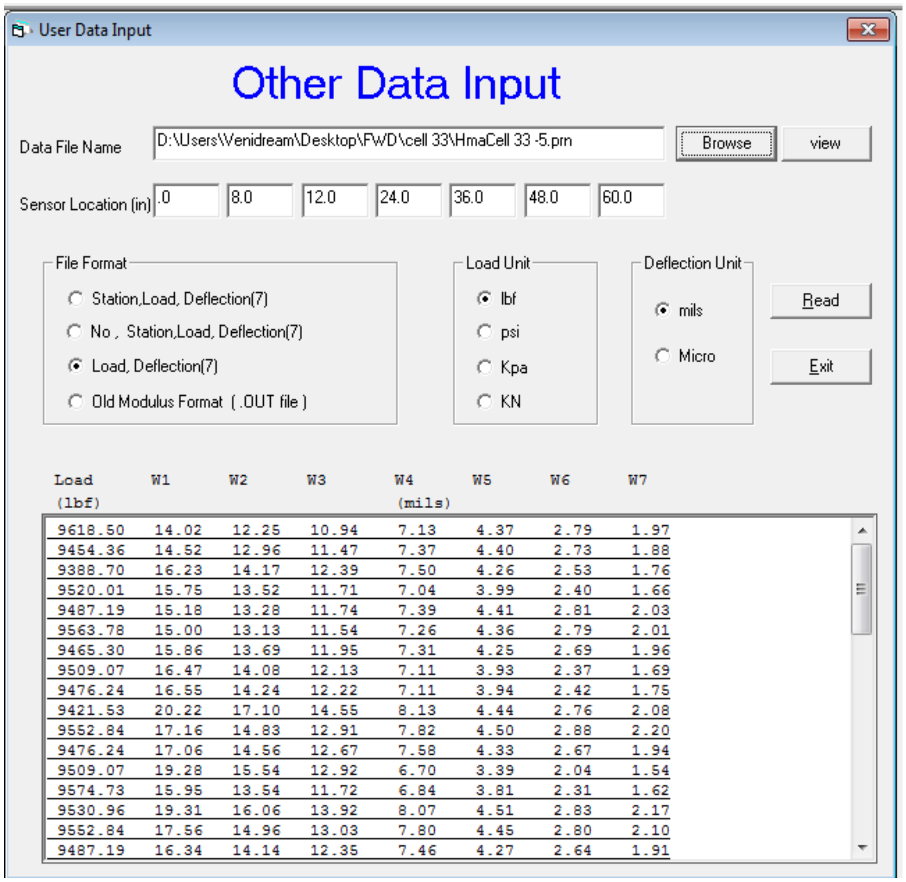


Figure 4.2 Input Data Format in Modulus 6.0

Modulus 6.0 prompts for an action allowing either the removal of the drop or the manual change of a value as shown in Figure 4.3.

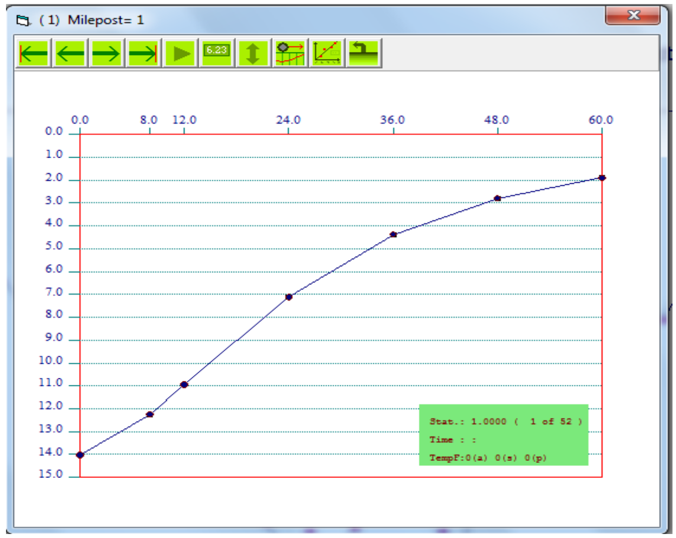
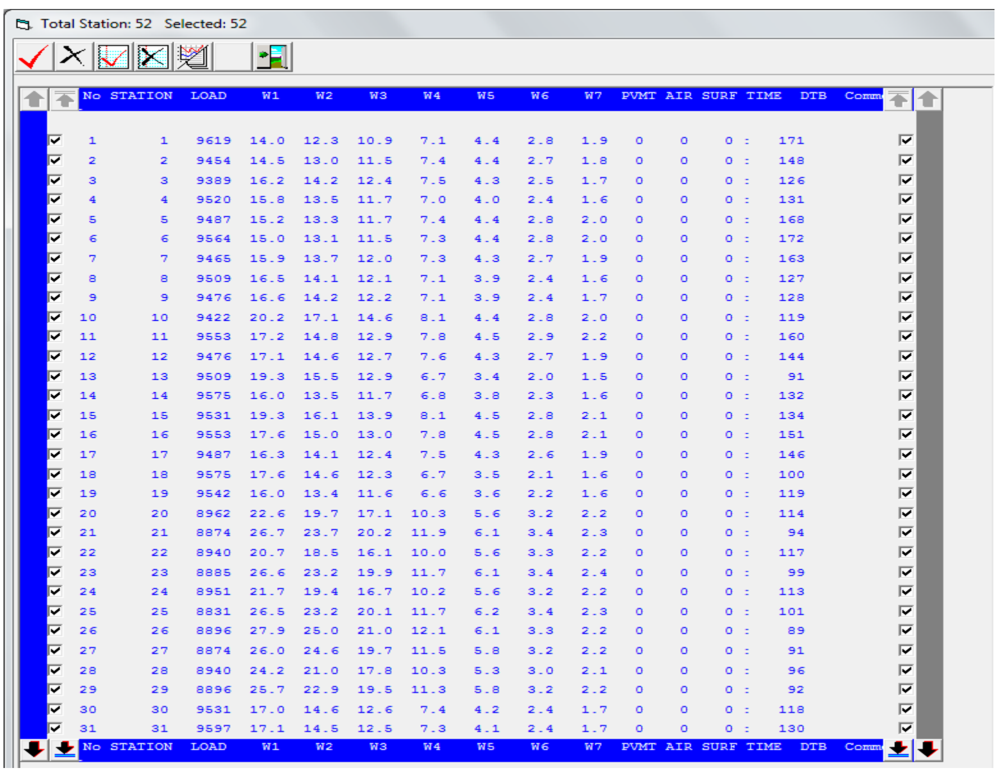


Figure 4.3 Typical Deflection Basin formed for a drop in Modulus 6.0



Total Station: 52 Selected: 52

No	STATION	LOAD	W1	W2	W3	W4	W5	W6	W7	PVMT	AIR	SURF	TIME	DTB	Comm
1	1	9619	14.0	12.3	10.9	7.1	4.4	2.8	1.9	0	0	0	:	171	
2	2	9454	14.5	13.0	11.5	7.4	4.4	2.7	1.8	0	0	0	:	148	
3	3	9389	16.2	14.2	12.4	7.5	4.3	2.5	1.7	0	0	0	:	126	
4	4	9520	15.8	13.5	11.7	7.0	4.0	2.4	1.6	0	0	0	:	131	
5	5	9487	15.2	13.3	11.7	7.4	4.4	2.8	2.0	0	0	0	:	168	
6	6	9564	15.0	13.1	11.5	7.3	4.4	2.8	2.0	0	0	0	:	172	
7	7	9465	15.9	13.7	12.0	7.3	4.3	2.7	1.9	0	0	0	:	163	
8	8	9509	16.5	14.1	12.1	7.1	3.9	2.4	1.6	0	0	0	:	127	
9	9	9476	16.6	14.2	12.2	7.1	3.9	2.4	1.7	0	0	0	:	128	
10	10	9422	20.2	17.1	14.6	8.1	4.4	2.8	2.0	0	0	0	:	119	
11	11	9553	17.2	14.8	12.9	7.8	4.5	2.9	2.2	0	0	0	:	160	
12	12	9476	17.1	14.6	12.7	7.6	4.3	2.7	1.9	0	0	0	:	144	
13	13	9509	19.3	15.5	12.9	6.7	3.4	2.0	1.5	0	0	0	:	91	
14	14	9575	16.0	13.5	11.7	6.8	3.8	2.3	1.6	0	0	0	:	132	
15	15	9531	19.3	16.1	13.9	8.1	4.5	2.8	2.1	0	0	0	:	134	
16	16	9553	17.6	15.0	13.0	7.8	4.5	2.8	2.1	0	0	0	:	151	
17	17	9487	16.3	14.1	12.4	7.5	4.3	2.6	1.9	0	0	0	:	146	
18	18	9575	17.6	14.6	12.3	6.7	3.5	2.1	1.6	0	0	0	:	100	
19	19	9542	16.0	13.4	11.6	6.6	3.6	2.2	1.6	0	0	0	:	119	
20	20	8962	22.6	19.7	17.1	10.3	5.6	3.2	2.2	0	0	0	:	114	
21	21	8874	26.7	23.7	20.2	11.9	6.1	3.4	2.3	0	0	0	:	94	
22	22	8940	20.7	18.5	16.1	10.0	5.6	3.3	2.2	0	0	0	:	117	
23	23	8885	26.6	23.2	19.9	11.7	6.1	3.4	2.4	0	0	0	:	99	
24	24	8951	21.7	19.4	16.7	10.2	5.6	3.2	2.2	0	0	0	:	113	
25	25	8831	26.5	23.2	20.1	11.7	6.2	3.4	2.3	0	0	0	:	101	
26	26	8896	27.9	25.0	21.0	12.1	6.1	3.3	2.2	0	0	0	:	89	
27	27	8874	26.0	24.6	19.7	11.5	5.8	3.2	2.2	0	0	0	:	91	
28	28	8940	24.2	21.0	17.8	10.3	5.3	3.0	2.1	0	0	0	:	96	
29	29	8896	25.7	22.9	19.5	11.3	5.8	3.2	2.2	0	0	0	:	92	
30	30	9531	17.0	14.6	12.6	7.4	4.2	2.4	1.7	0	0	0	:	118	
31	31	9597	17.1	14.5	12.5	7.3	4.1	2.4	1.7	0	0	0	:	130	

Figure 4.4 Modulus 6.0 Box Showing All the Drops For Selection

The Stat. Select icon calculates the depth to bedrock with the HMA thickness and the sensor distance given and shows the list of all the drops, as shown in Figure 4.4. The drops can be selected or unselected between the back-calculation runs.

4.2.1. Analysis using Modulus 6.0

The Back-calculation icon opens the dialog box Modulus Input shown in Figure 4.5 where this information is entered:

- The seven sensor positions where deflection is measured are entered in inches
- The number of layers
- The layer thicknesses
- The moduli range according to each cell characteristics.
- The asphalt temperature is taken as 75°C
- The Poisson ratio as 0.35 for HMA surface layer, 0.40 for the gravel base and 0.45 for the subgrade

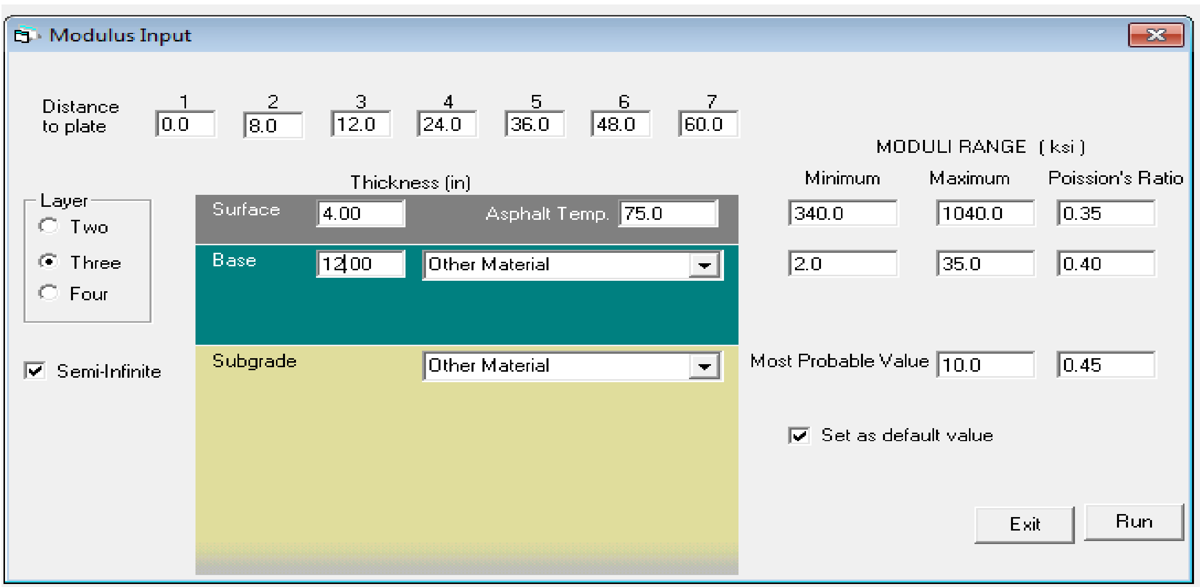


Figure 4.5 Modulus 6.0 Dialog Box for Running Back-calculation

The subgrade thickness is automatically calculated and displayed but it's usually taken as semi-infinite as it minimizes the computed difference between calculated and measured deflections. Running is done iteratively until the moduli ranges are adjusted to give reasonable results. The results of the back-calculation for cells 33, 34, 35 and 79 showing the moduli for all the three pavement layers are given in Appendix B .

4.2.2. Cell 77 and 78 Deflection Data

When the FWD data of the cells 77 and 78 was analyzed, several inconsistencies were observed:

- There were deflections above 70 mils as well as very low deflections of 2 to 3 mils in the same time period for the same load levels and temperature levels. Table 4-1 shows a sample of the original data given by MnROAD for 4/8/09 and 4/13/09 for cell 77. The first column is the station number and DEF1 to DEF7 represent the deflection measured by the seven geophones.
- Deflections above 70 mils at the HMA surface are recorded which is too high. In this case, Modulus 6.0 boundaries could not process the data, especially when so much variance is present. Using very small amount of data when running back-calculation leads to decrease in the accuracy of the results.

For example, Station 5 has a deflection of 46.85 mils on 4/8/09 while it has 27.19 mils deflection on 4/13/09 which is nearly half the deflection from 4/8/09 in a period of 5 days as shown in Table 4.1. This cannot be attributed to the stiffening of the pavement alone; a measurement error must be the cause.

Table 4.1 Sample FWD Data from Cell 77

SN	DATE	Temp (°C)	Stress (lbf.)	DEF1 (mils)	DEF2 (mils)	DEF3 (mils)	DEF4 (mils)	DEF5 (mils)	DEF6 (mils)	DEF7 (mils)
5	4/8/09	10.22	8594.57	46.85	36.70	28.69	11.55	4.41	2.39	0.08
4	4/8/09	8.88	8528.96	51.17	39.54	30.51	11.54	4.19	2.21	0.08
3	4/8/09	7.00	8703.91	38.76	30.89	24.43	10.33	4.02	2.06	0.07
2	4/8/09	7.27	8572.70	49.74	37.77	28.88	10.94	4.04	2.39	0.07
1	4/8/09	7.83	8627.37	42.98	35.06	28.61	12.98	5.12	2.46	0.07
5	4/13/09	6.94	8819.69	27.19	22.72	19.14	9.91	4.69	2.49	1.76
3	4/13/09	6.72	8852.52	23.02	19.29	16.25	9.06	4.61	2.35	1.47
1	4/13/09	6.72	8874.40	23.45	20.13	17.29	9.82	5.00	2.57	1.63
5	4/13/09	6.44	8743.09	29.46	24.31	20.25	10.49	4.92	2.46	1.69
3	4/13/09	6.55	8830.64	24.15	20.07	16.77	8.96	4.31	2.12	1.40
1	4/13/09	6.72	8874.40	25.26	21.45	18.61	10.54	5.33	2.69	1.72

The reason for such erroneous values is found in the construction report which explains in detail the challenges faced while building the cells. The cells turned out different from the construction plans (Clyne and Palek 2008). When the cells were built in the summer and fall 2007 there was extreme weather pattern where weather was very dry during grading. But after that it rained so much that it set a record of rainfall in the Twin Cities. This caused soft conditions in the exposed base and subgrade. So when cells 77 and 78 were paved, the trucks sank and formed ruts greater than 4 inches, as shown in Figure 4.6. To salvage the cells, the base layers were removed and the subgrade was dried by running a chisel plow. The sensors were also reinstalled.

Figure 4.6 Rutting Caused in Cell 77 and 78

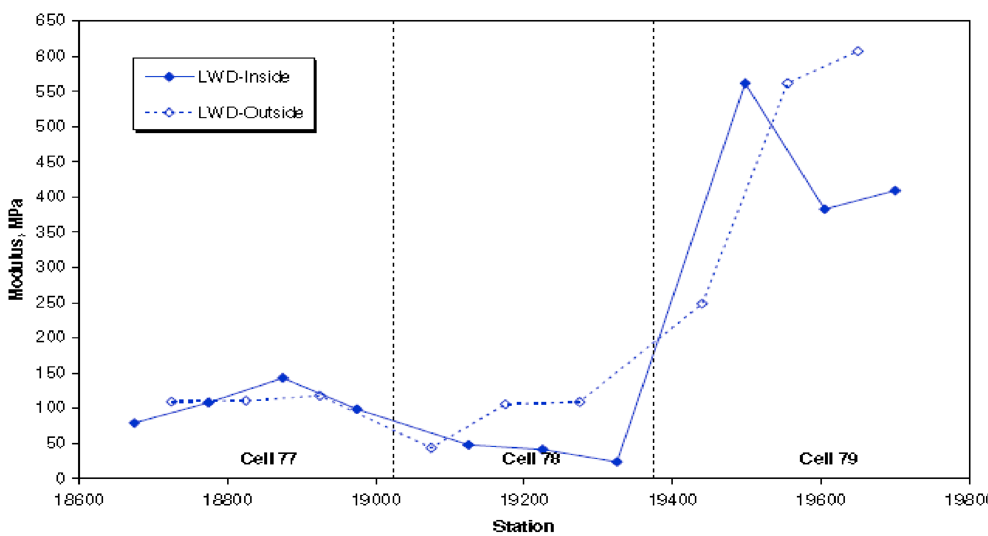


Figure 4.7 Light weight Deflectometer Data for Cells 77, 78 and 79

Lightweight Deflectometer (LWD) tests were conducted on the cells during construction to find the stiffness of the subgrade and base during this period (Clyne and Palek 2008). Figure 4.7 indicates the variance within each cell as well as between cells 77, 78 and 79. It also shows that the base stiffness is significantly higher for cell 79 than for Cell 77 and 78, as a result of fly-ash stabilization.

LWD tests were also taken at the same point during a period of time in cells 77 and 78 to determine the effect of rainfall on the base and subgrade stiffness. Figure 4.8 shows the inside lane modulus before the rain on 8/17/07, in the middle of the rainfall on 10/02/07 and two days later on 10/04/07. The average modulus drops. After the rains, the improvement project started.

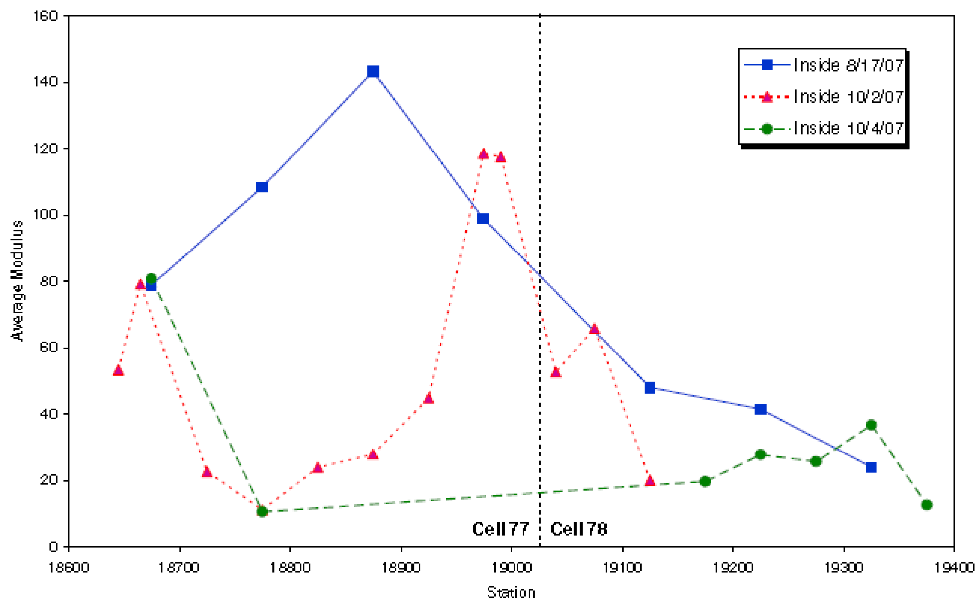


Figure 4.8 LWD Values of Cells 77 and 78 before and during rainfall

Also, the amount of HMA quantity used was increased by 12.7% (Clyne and Palek 2008). Nearly additional 300 tons was used to pave throughout all the eight cells which can be due to different reasons: increased width of paving or unit weight of bituminous used. But when the thickness of the HMA layer was checked with cores, all cells seem to have a mean thickness near 4” except Cell 77 whose HMA thickness varied from 3.25” to 7.25” (Table 4.2).

Table 4.2 Results from HMA coring of the cells

Cell	Station	Offset	Total HMA Thickness (inches)	Top Lift (inches)	Bottom Lift (inches)
33	6512	6	5	2.25	2.75
33	6751	-2.2	4.375	2.25	2.125
33	6562	8.9	4.375	2	2.375
34	7203	6	4.875	2.5	2.375
34	7052	-6	4	2.25	1.75
34	7401	-1	4.25	2.125	2.125
35	7723	6	4.5	2.125	2.375
35	7702	4.9	4	2.125	1.875
35	7751	11	4.25	2.25	2
77	18763	-6	5.125	2.875	2.25
77	18781	-12.1	7.25	3	4.25
77	18758	7.1	3.25	2	1.25
78	19185	-6	4	2.25	1.75
79	19554	-2	4.25	2.5	1.75
79	19436	3.6	4.875	2.5	2.375
79	19717	2.3	4.25	2.25	2

Back-calculation becomes difficult due to the high thickness variability within one cell. The typical deviation allowed for HMA layer is 0.25 inches but the lift thickness deviated by more than 2.0" for Cell 77. Due to these problems in the construction of Cells 77 and 78, back-calculation and further analysis was not done.

4.3. Comparison of HMA Moduli ranges of the Cells

From the result files of Modulus 6.0 (Appendix B) the moduli ranges of the HMA layer adjusted for each temperature range and cell are listed in Table 4.3.

Table 4.3 Comparison of Cells 33, 34 and 35 by Their HMA Moduli Ranges

Temperature Range in °C	Cell 33		Cell 34		Cell 35	
	Moduli Range in ksi	Mean Moduli in ksi	Moduli Range in ksi	Mean Moduli in ksi	Moduli Range in ksi	Mean Moduli in ksi
0 – 5	785-3700	1957	200-5000	2055	200-2500	1317
5 – 10	330-2850	977	225-2840	1051	300-2200	1114
10 – 15	280-1800	852	300-1800	838	125-1800	755
15 – 20	300-650	408	200-500	309	150-950	395
20 – 25	200-930	461	180-1050	480	150-700	384
25 – 30	150-1000	311	150-575	281	115-500	274
30 – 35	150-700	276	125-450	236	130-470	232
35 – 40	150-750	320	150-500	250	150-400	251

From Table 4.3, Cell 34 has higher moduli values than Cells 33 and 35. In Cell 33, in the 30-35°C and 35-40°C temperature ranges, the HMA moduli is comparatively higher than those of Cell 34 and 35 showing that adding acid increases stiffness at higher temperature. Also, at low temperature ranges, Cell 33 is not adversely affected by low temperature cracking since its HMA moduli is high but not as high as that of Cell 34.

But when the temperature range rises from 5-10°C to 0-5°C, the HMA moduli values in Cells 33 and 34 drops by roughly half, while the drop in Cell 35 is more gradual (Figure 4.9). The drop in layer stiffness that can be seen for all the three cells in the temperature range of 15-20°C is because this temperature range is recorded only for April and May when there is softening of the layers and the moduli is biased to these months.

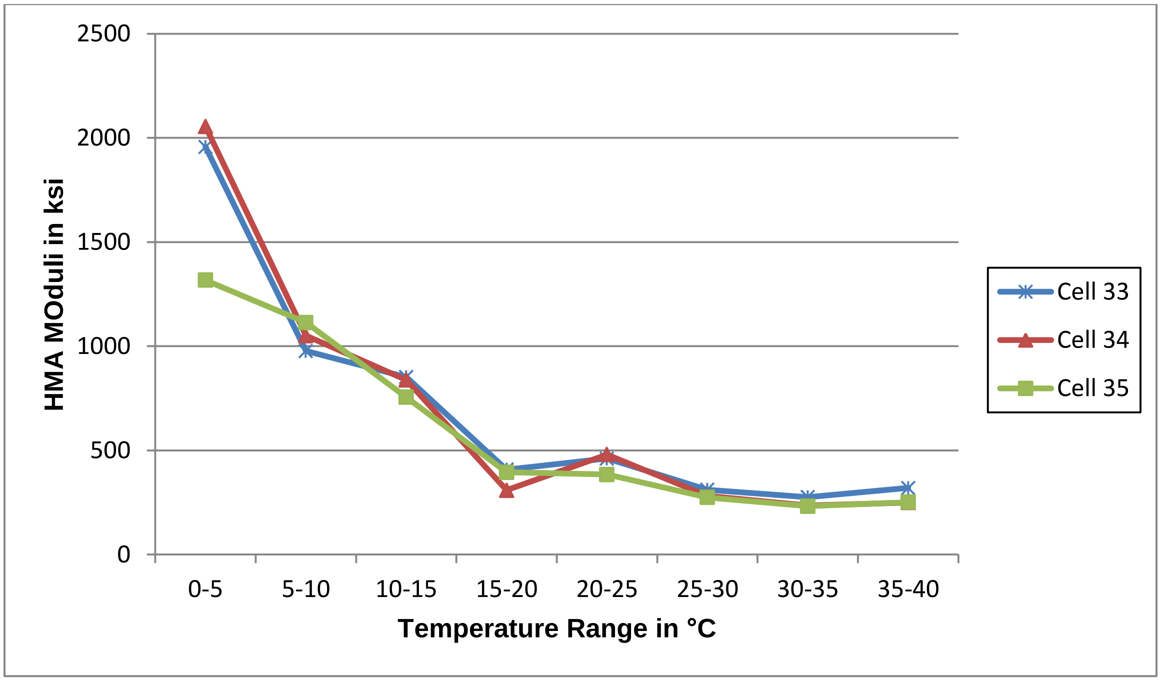


Figure 4.9 Comparison of Average Moduli of Cells with Temperature

CHAPTER 5

THEORETICAL ESTIMATION OF PAVEMENT RESPONSE

5.1. Thompson Formula for Flexural Strain

Dr. Marshall R. Thompson, Professor Emeritus at the University of Illinois at Urbana-Champaign, has conducted research in the area of back and forward calculation (Thompson 2003). He proposed a model to calculate the flexural strain at the bottom of the asphalt layer:

$$\text{Log}\,(e_{HMA}) = 5.746 - 1.589 \times \log(T_{HMA}) - 0.774 \times \log(E_{HMA}) - 0.097 \times \log(E_{Ri})$$

Where:

- e_{HMA} =HMA flexural strain, in micro-strain (10^{-6} in/in)
- T_{HMA} =HMA thickness in inches
- E_{HMA} =HMA modulus in ksi
- E_{Ri} =Subgrade modulus in ksi

This model was used to calculate the strains at the bottom of the HMA layer using data obtained from the back-calulated moduli from Modulus 6.0 for cells 33, 34, 35 and 79. Strains computed with Thompson's model are tabulated with Modulus 6.0 results in Appendix B. The average strain for each temperature category of cells 33, 34 and 35 is plotted to show the increase in strain with the increase in temperature in Figure 5.1. There seems to be a drop in the average strain at 20-25 and 35-40 °C temperature ranges. The drop is due to the addition of additives which stiffen the mixes at higher temperatures.

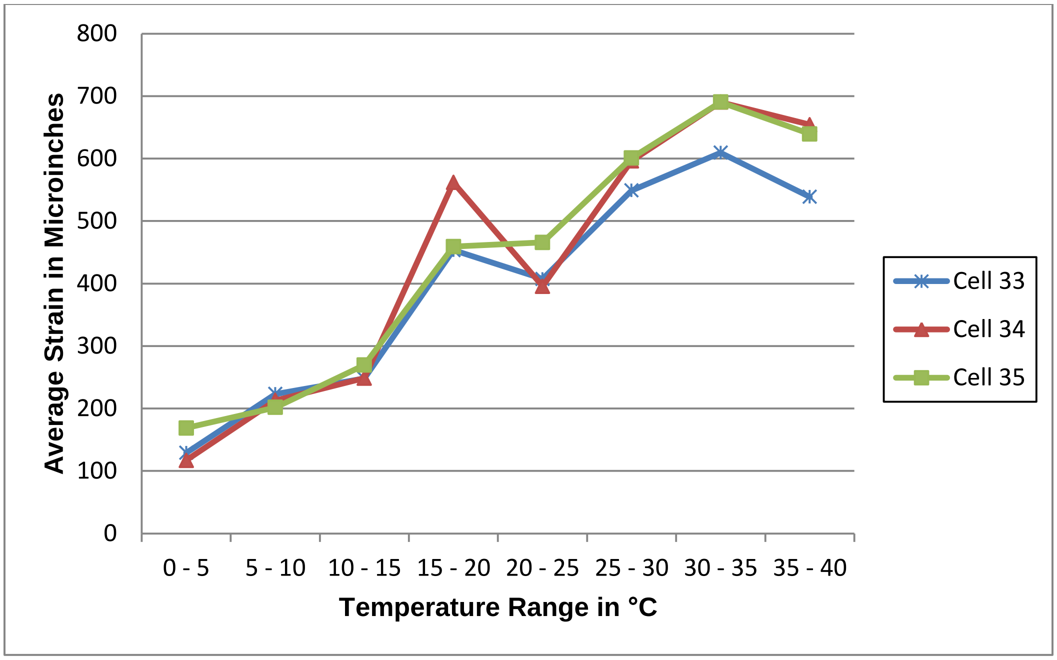


Figure 5.1 Average strain by Thompson Formula for different Temperatures

Cells 33 and 34 develop less strain at the lower temperature ranges while the strain in Cell 33 is less than that in the other cells at higher temperature ranges. This shows that adding Poly Phosphoric acid increases the stiffness for pavements present in cold temperature also. The increase in strain in temperature range 15-20°C is because the data for this range is from April and May when thawing takes place.

5.2. Temperature Correction

The back-calculated moduli for cells 33, 34, 35 and 79 were found at the time and temperature when the FWD testing was done. These moduli need to be corrected for the time and temperature when the sensor data was collected in order to compare measured and predicted strains. Sensor information was provided for April 2009 only. Therefore, from the back-calculated files, only the April and May 2009 data for the cells were retained. As only the outer wheel path of the inside lane was instrumented, only the drops in this area was taken for further analysis.

The moduli correction is done by two equations: the Bells 3 equation for predicting the pavement temperature at mid-depth and the Chen equation to find the moduli at the reference temperature. The Bells3 equation was developed for routine testing (Fernando and Liu 2001) :

$$T_d = 0.95 + 0.892 \text{ x } IR + (\log_{10}(d)-1.25)\ (-0.448xIR+0.621xT_{(1\text{-day})} +1.83\sin(hr_{18}-15.5)) +0.042xIR\sin(hr_{18}-13.5)$$

Where

- T_d = Pavement temperature at depth d, in °C
- IR = Surface temperature measured with FWD by infrared temperature gauge in °C
- d = Depth at which temperature is predicted in mm (taken as mid-depth= 50.88mm)
- $T_{(1\text{-day})}$ = Average of previous day's high and low air temperatures in °C
- hr_{18} = Time of the day in 24-hour system calculated using 18 hour-cycle asphalt temperature rise and fall time.
- Sin = Sine function on an 18-hour clock system, where 2π radians equals one 18-hour cycle, as shown in Figure 5.2.

Bells 3 equation has a R^2 of 0.975 and a standard error of estimate 1.9°C. The values to be used in the equation were taken from the weather data and FWD data files provided by MnROAD (MnROAD 2012). The average predicted temperature and modulus were taken for further calculation.

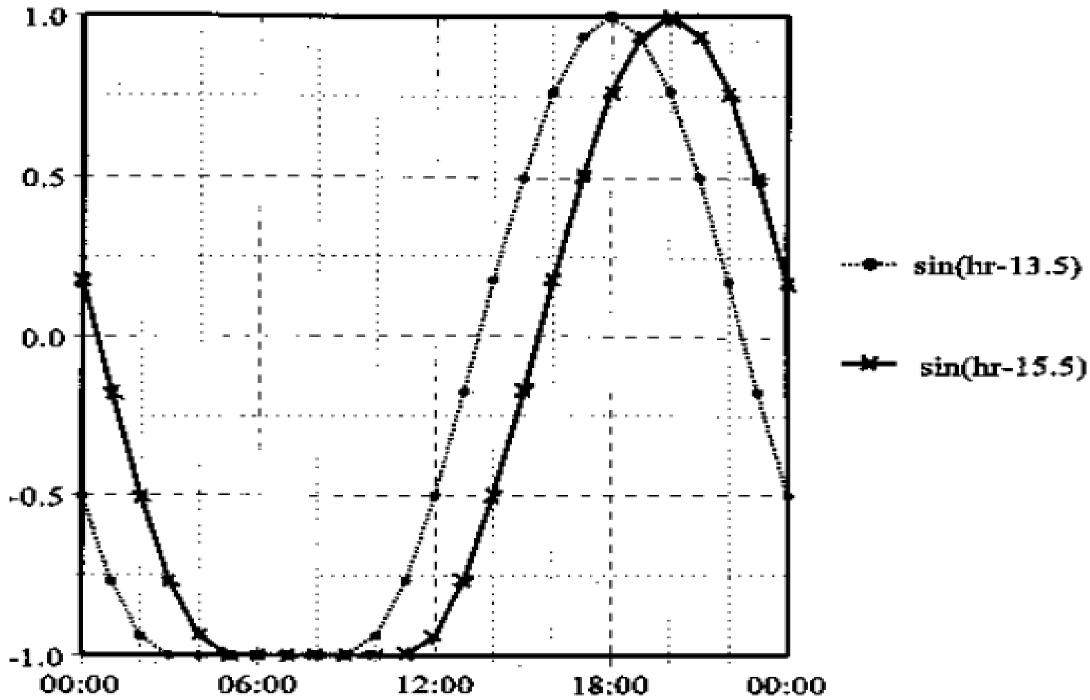


Figure 5.2 18-hour cycle sine function

Then, the modulus was corrected with the Chen equation given below (Fernando and Liu 2001). The Chen equation allows the correction to be made for any user-specified reference temperature. For the study, the reference temperature is the temperature at which the sensor information was obtained and they were also calculated by the Bells 3 equation.

$$E_{Tr} = E_T\left(\frac{T}{Tr}\right)^{2.4462}$$

Where

- E_{Tr} = Asphalt modulus at reference temperature in ksi. Here, the temperature at the time of strain/stress measurements was used as the reference temperature.
- E_T = Back-calculated moduli in ksi at temperature T (in °F)

- T_r = Reference temperature to which asphalt modulus is converted (in °F)

All the results were given in Appendix C and the end results are tabulated in Table 5.1.

Table 5.1 Corrected Modulus of the Cells 33, 34, 35 and 79

Cell	FWD tested Date	Corrected To Date	Predicted Pavement Temp °F	Reference Temp °F	HMA Moduli ksi	HMA Corrected Moduli ksi	Base Modulus ksi	Subgrade Modulus ksi
33	4/7/09	4/3/09	66.0	59.4	482.3	624.8	2.8	19.6
34	4/7/09 4/14/09	4/3/09	70.0	54.7	508.5	931.1	3.4	15.3
34	5/8/09	4/28/09	70.0	75.4	508.5	424.6	4.0	13.7
35	4/7/09 4/14/09	4/3/09	76.0	60.5	399.6	697.7	3.6	16.0
35	5/6/09	4/28/09	76.0	75.8	399.6	401.5	4.7	15.2
79	4/8/09 4/13/09 4/14/09	4/6/09	66.0	60.4	561.7	698.0	3.5	13.3
79	5/7/09	4/28/09	66.0	66.3	561.7	555.5	5.7	10.6

5.3. EverStress 2.0

The Everstress 2.0 program (Washington State Department of Transportation 2005) is used to determine vertical stress, transverse and longitudinal strain and deflections in a layered semi-infinite system under circular surface loads, such as under a wheel load. The program can be used to evaluate up to five layers, 20 loads and estimate the response in up to 50 evaluation points. Materials can be specified as stress dependent or not. It was developed from the WESLEA layered elastic analysis program developed by the U.S. Army Corps of Engineers.

The data required for the analysis are entered in the dialog box opened through Prepare Input File option (Figure 5.3). The Modulus data in Table 5.1 was entered for analysis in this box.

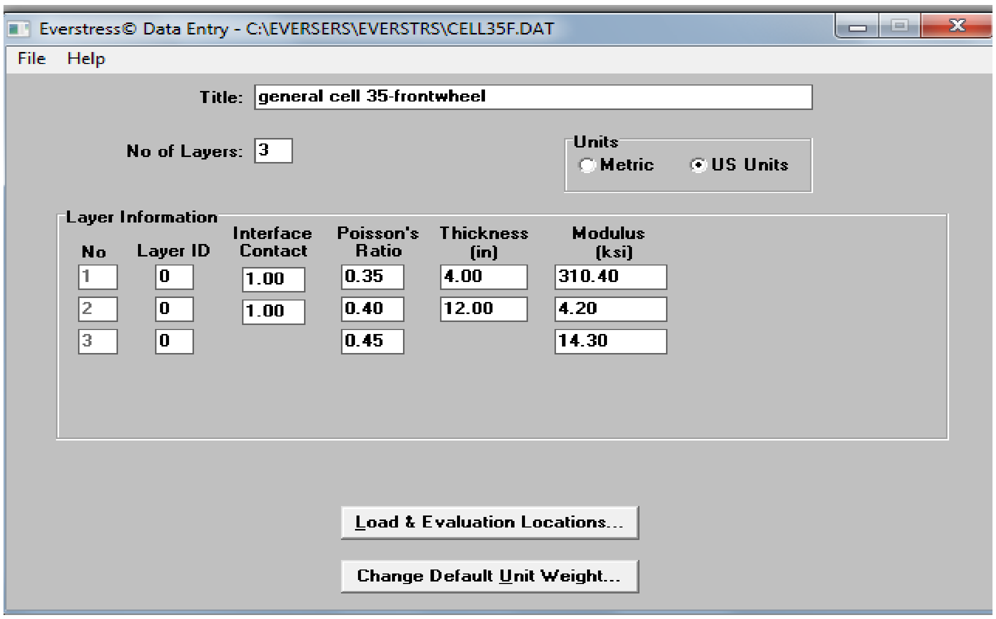


Figure 5.3 Evertsress Data Entry for Cell 35-Front Wheel Configuration

The drops of cells 33, 34, 35 and 79 are each analyzed in Everstress using this information:

- The number of layers (three for cells 33, 34, 35 and 79)
- The layer ID which is assumed to be 0 as the moduli is treated to be insensitive to stress
- The layer thicknesses (which differs for each cell)
- The moduli of the layers back-calculated for each drop
- The Poisson ratio (0.35 for HMA layer, 0.4 for the base and o.45 for the subgrade layer)

The load points and the evaluation points can be selected in the Load& Evaluation Points Screen shown in Figure 5.4. The following data points should be included for analysis:

- The number of loads acting on the pavement-The Everstress program allows a maximum of 20 loads. For each load, the magnitude of load, the contact pressure of the applied load and the co-ordinates indicating the position of load application should be specified.
- The number of evaluation points-The program allows up to 50 evaluation points (All combination of X, Y and Z locations are considered). In Figure 5.4, 6 points of (X, Y) each having two depth locations are analyzed. A total of 12 points are analyzed for the loads applied.

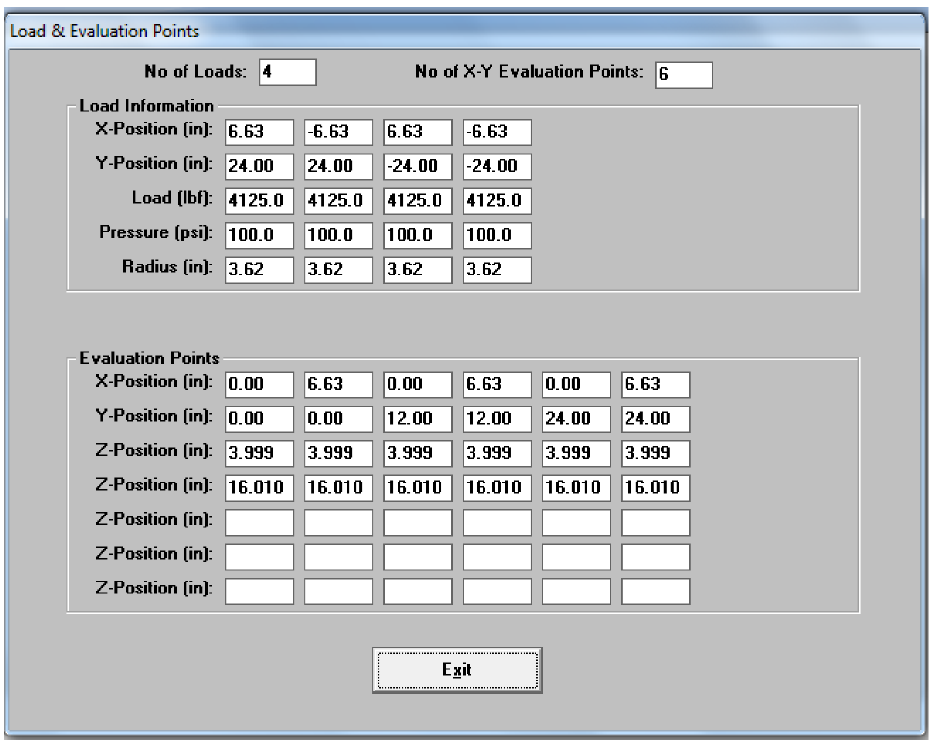


Figure 5.4 Load & Evaluation Points Dialog Box of Everstress Program

5.3.1 Analysis Using Everstress 2.0

In the MnROAD study, the load was applied by the 80 kip truck (Figure 5.5) which drives around the Low Volume Road loop every weekday. The front wheel applies a higher load compared to the rear wheel. The front and rear wheel configurations of the 80 kip loading truck are shown in Figure 5.5 (MnROAD 2012) .

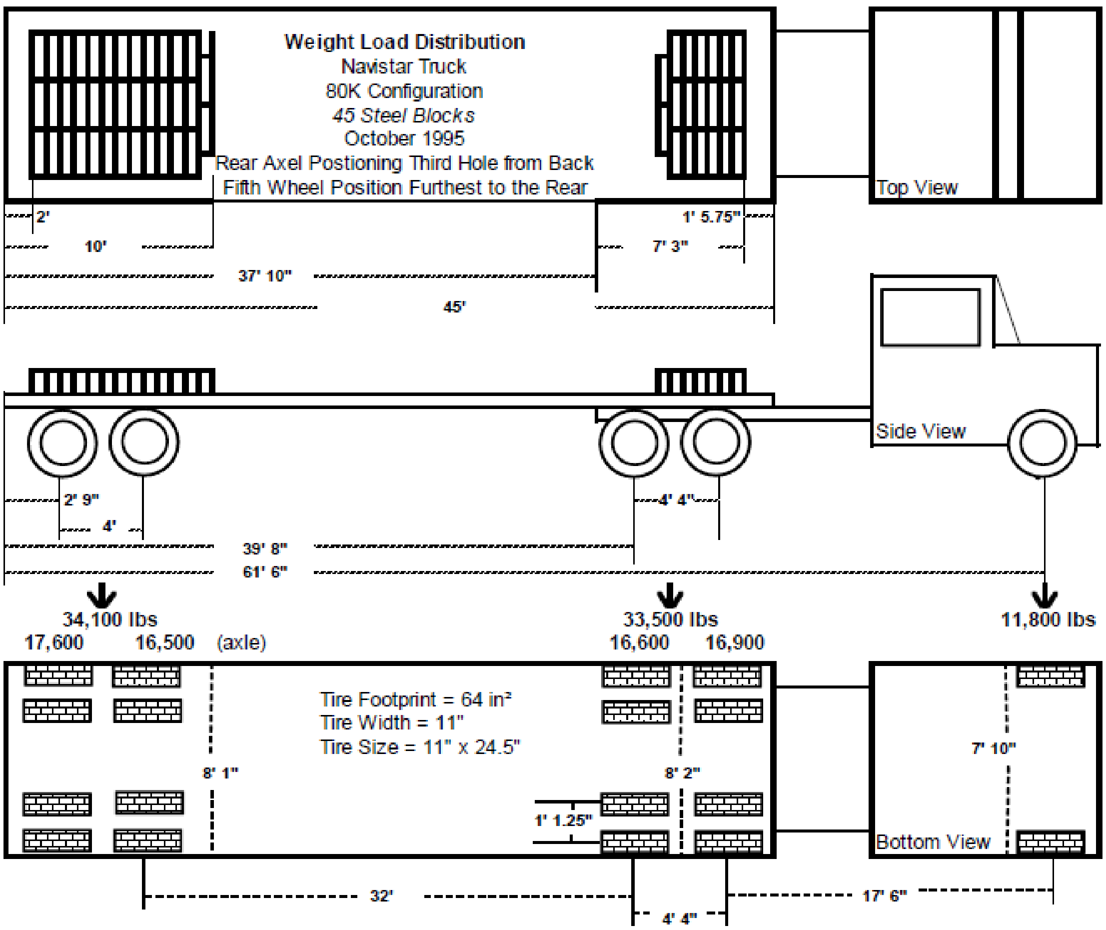


Figure 5.5 Characteristics of the 80 KIP Truck

The co-ordinate system is explained in Figure 5.6. For the front wheel, only the point where the load is applied (0, 0) is evaluated for strain and stress development. For the rear wheel, along with the point of application of load (6.63, 24), the gap where the first rear axle has passed before the second rear axle crosses is also evaluated to understand the sudden drop in strain. Also, to understand the difference in the strain values calculated by Everstress and Thompson formula, a third configuration is also analyzed. The depth or Z value at which all (X, Y) are evaluated is 3.99 inches which is the bottom of HMA layer and 16.01 inches for cells 33, 34 and 35 and 12.01 inches for cell 79 which is the top of the sub-grade layer. The three different configurations are described in Table 5.2.

Table 5.2: Input Configurations used in Everstress for all the Cells

No	Configuration Type	Load (lbf.)	Vertical pressure (psi)	Radius (inches)	Load points	Evaluation points	Values taken from the result
1	For Front Wheel	5900	100	4.33	(0,0)	(0,0)	Strains at the bottom of HMA layer and Stress at the top of subgrade
2	For Rear Wheel	4125	100	3.62	(6.63,24) (-6.63,24) (6.63,-24) (-6.63,-24)	(0,0) (6.63,0) (0,24) (6.63,24)	Strains at the bottom of HMA layer and stress at the top of subgrade
3	For Comparing with Marshall Thompson strain Formula	9000	82.02	5.91	(0,0)	(0,0)	Strain at the bottom of the HMA layer

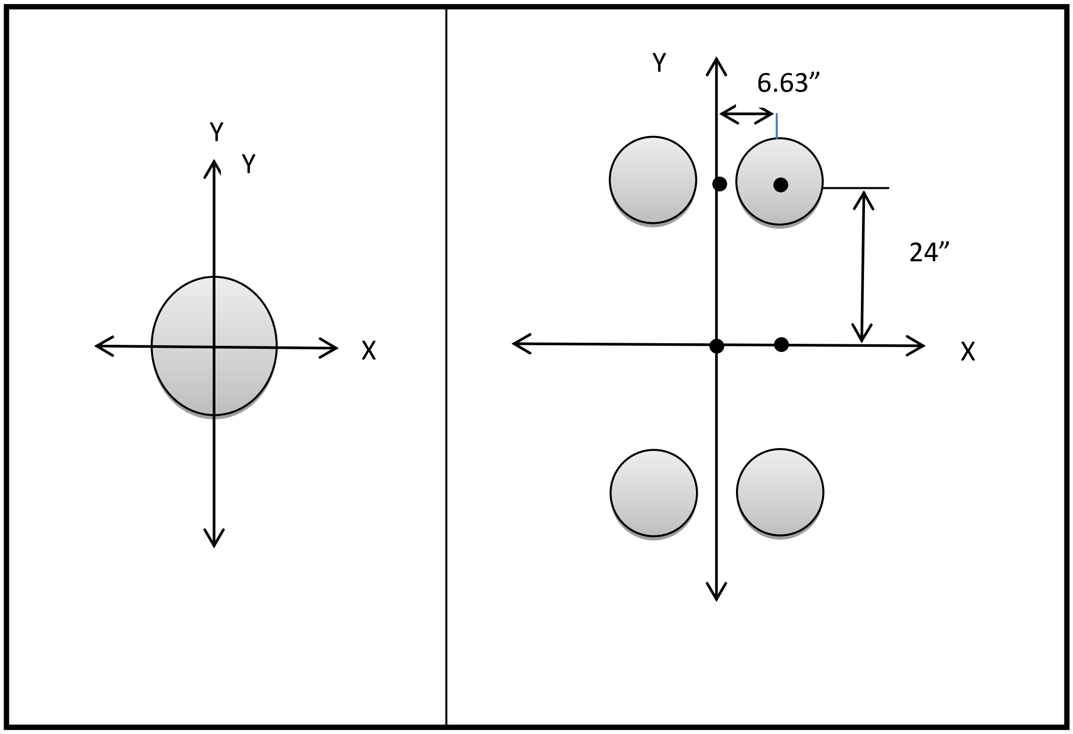


Figure 5.6 Co-ordinate System of Front and Rear Wheel Configurations

All these configurations were run in the Everstress program and the results are given in Appendix D.

5.4. Everstress Results for Front and Rear Wheel Configuration

In Appendix D, the results of front and rear wheel configurations are tabulated by selecting the normal strains (E_{xx} and E_{yy}) at the bottom of HMA layer and the normal stress S_{zz} at the top of subgrade. E_{xx} and E_{yy} show the potential for fatigue cracking and S_{zz} indicates the rutting performance of the subgrade. They were the predicted strains and stresses. In Chapter 6 these are will be compared to the corresponding measured values.

Table 5.3 Predicted Values of TE, LE and Pressure for Each Cell

		CELL 33	CELL34		CELL 35		CELL 79	
Date		4/3/09	4/3/09	4/28/09	4/3/09	4/28/09	4/6/09	4/28/09
Front Wheel	Max TE	382.1	270.2	497.9	338.8	502.5	332.3	377.4
	Max LE	382.1	270.2	497.9	338.8	502.5	332.3	377.4
	Max P	-4.6	-4.0	-5.4	-4.6	-5.8	-5.7	-6.5
Rear Wheel	Max TE	265.8	194.2	336.6	236.6	336.3	230.5	258.0
	Max LE	371.9	261.6	483.4	329.3	486.7	322.8	364.6
	Max P	-5.7	-5.1	-6.6	-5.7	-6.9	-6.8	-7.5

Table 5.3 shows that the strains produced are higher for the front wheel than for the rear wheel as the load applied is higher and concentrated as a single tire. But the pressure produced in the subgrade is higher for the rear wheel configuration, as the rear wheel as a whole is applying load with four tires. Cell 35 has the highest transverse and longitudinal strains, since it has only polymer present in the binder. Cells 34 and 79, which have both polymer and acid present in their binder, have the next highest strains.

5.5. Comparison of Everstress Results with Thompson Model Values

The strain values obtained by two forward calculation techniques used in the study are given for cells 33, 34, 35 and 79 in Appendix D. Most of the strain values obtained by Everstress are 20 to 30% greater than the ones computed by the Thompson model. For each cell, the increase in strain value between the two methods varies a little but they all decrease from 4/3/09 to 4/28/09, as shown in Table 5.4.

Table 5.4 Ratio of Strain Values Obtained from the Thompson Model to Everstress Results

Cell	Date	Ratio of Strain Values From Thompson Model to Everstress Results
33	4/3/09	1: 1.47
34	4/3/09	1: 1.40
	4/28/09	1: 1.34
35	4/3/09	1: 1.39
	4/28/09	1: 1.30
79	4/6/09	1: 1.33
	4/28/09	1: 1.22

CHAPTER 6

COMPARISON BETWEEN THE MEASURED AND PREDICTED VALUES

6.1. Peak-Pick for Sensor Value

The MnROAD Offline Data Peak-picking program was developed by the Electrical and Computer Science Department of University of Minnesota for MnDOT (Srirangarajan and Tewfik 2007). The program was developed in MATLAB and the user interface gives great flexibility and maximum speed to the user.

The dynamic values of transverse and longitudinal strain and stress measured from the sensors placed in cells 33, 34, 35, 77, 78 and 79 cells were obtained from the MnROAD engineers, along with the Peak-Pick program. The sensor data given for cells 33, 34, 35 and 79 is shown in Table 6.1. The predicted data for these dates were already obtained from Everstress and are shown in Appendix C.

Each sensor file contains the data recorded when the truck passes over the cell. The passes are spaced nearly 15 minutes apart. Each file contains information from all the sensors for the same truck lap: transverse strain sensor (TE), longitudinal strain sensor (LE) and the pressure gauges (PG); they are listed in Table 6.1 for each cell. The SC or Soil Moisture sensor data is available for Cell 79 and can be analyzed in Peak-Pick program but these results were not used in this study.

Table 6.1 Dynamic Sensor Data Given By MnROAD

Cell Number	Date	No. of Files Given	Sensors	Relative Dates available in FWD data
33	4/3/2009	18	TE201, TE202, TE203,LE201, LE202, LE203, PG201, PG202	4/7/2009
	4/28/2009	17		-
34	4/3/2009	18	TE201, TE202, TE203,LE201, LE202, LE203, PG201, PG202	4/7/2009 and 4/14/2009
	4/28/2009	17		5/8/2009
35	4/3/2009	17	TE201, TE202, TE203,LE201, LE202, LE203, PG201, PG202	4/7/2009 and 4/14/2009
	4/28/2009	17		5/6/2009
	4/29/2009	12		5/6/2009
79	4/6/2009	16	TE001, TE002, TE003,LE001, LE002, LE003, PG001, PG002, SC101, SC102	4/8/2009, 4/13/2009 and 4/14/2009
	4/28/2009	10		5/7/2009

6.1.1. Analysis By Peak-Pick Program

The response dignal data processing with the Peak-Pick program is easy as it allows selection of multiple files if the sensors present in the files are same. The program was used to analyze the original files with the following initial conditions:

- Select Peak-pick Mode - Auto Mode was generally used where the program automatically analyses and picks the peaks of the input. The waveforms which are noisy and their patterns which don't conform to the trend formed by the truck tire wheels were termed "Not analyzed" and put in a different folder. Some of these can be salvaged by using the Manual Mode where the filtered signal was shown and the axle response and baseline points were selected manually.
- Data Delimiter - It is the symbol comma which is used in the original files to separate each point
- Baseline -The option Initial & Final is used since the baseline stay the same
- Data file -The program can read files in DOS and Windows format. The original files were in the National Instruments or NI format.
- Plotting - The plotting feature is turned on and so the plotted waveform for all the files can be compared with the picked values
- Trigger - The original files given by MnROAD didn't have trigger values in their files.
- Time Stamp -The files were not attached to any time stamp
- Number of Axles -The program analyses up to 6 axles, since the 80 KIP truck has 5 axles.
- Sensor Designators - MnROAD should be selected
- Trace Quality - It is assumed to be good.
- Veh Type - MnROAD should be used

The values are given in the dialog box shown in Figure 6.1. The input files were selected and the folder where the output files are to be stored is specified before analysis. Also the sensors which are to be analyzed should be selected before running. Since results are needed for the transverse and longitudinal strain and vertical pressure sensors, all the sensors can be selected simultaneously.

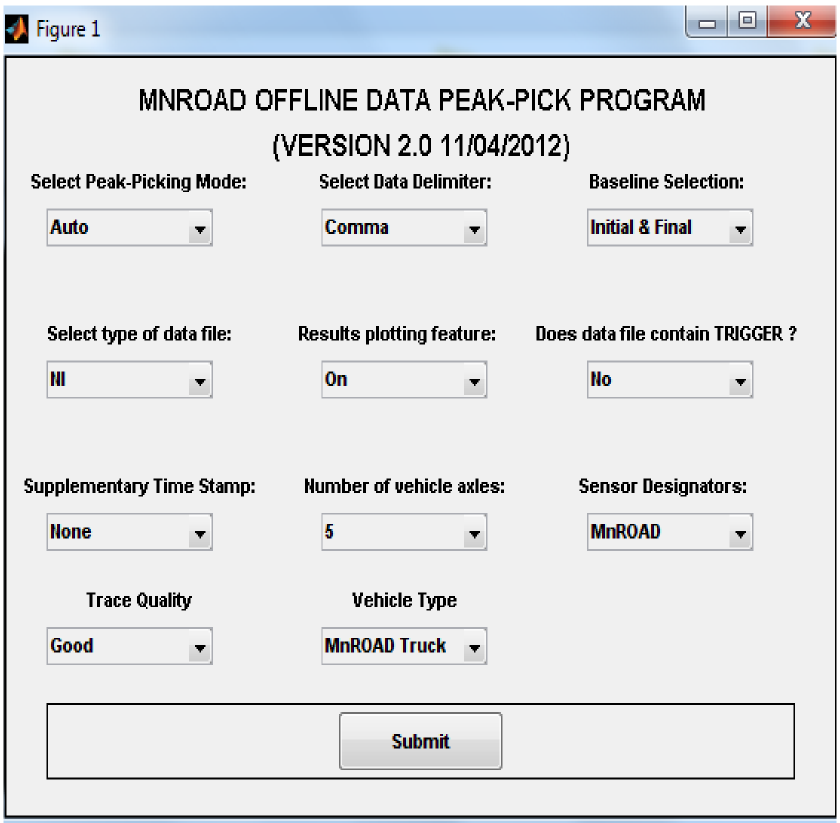


Figure 6.1 MnROAD Offline Data Peak-Pick program 2.0 Input Dialog Box

6.1.2. Measured Pavement Response

The Peak-Pick program (Srirangarajan and Tewfik 2007) reports three types of points in a typical signal:

- Axle Response Points: The points were identified as the response due to the vehicle axles. These can either be peaks or troughs and are named as identifiers starting with ‘AX’.
- Inflection Points: The tail of the axle responses or the local maxima or minima around the axle responses are the inflection points. These are assigned identifiers starting with ‘IP’.
- Baseline Points: The points which are representative of the base line in the response are Baseline points. The baseline points are assigned identifiers starting with ‘B’.

The Figure 6.2 (Srirangarajan and Tewfik 2007) shows the points identified in a typical signal.

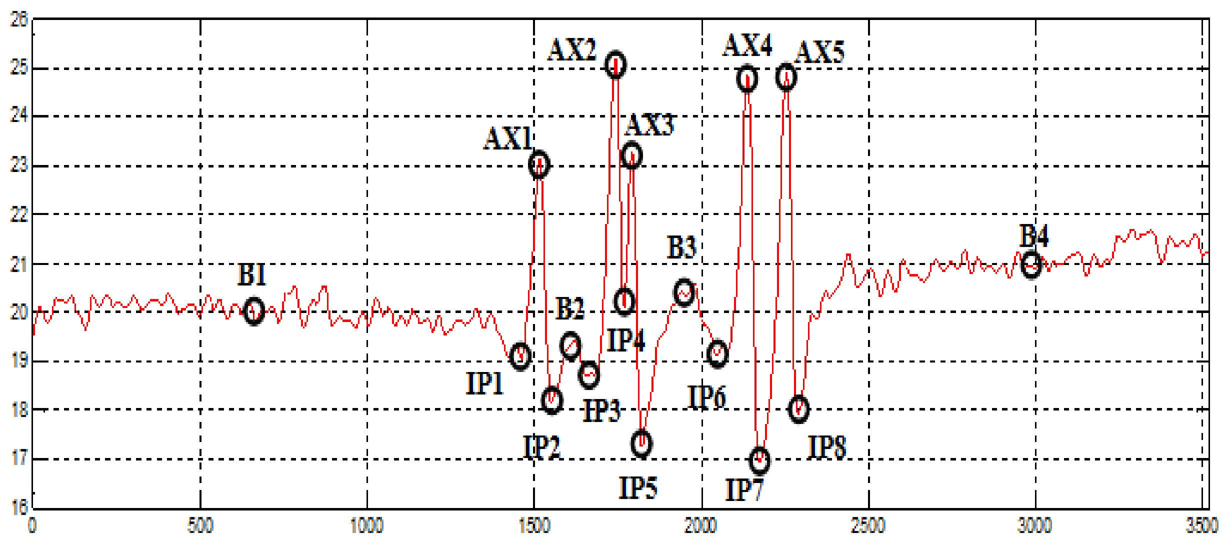


Figure 6.2 Waveform produced by passing of the truck and Main Identifiers

All these points were identified by the program and given in the result file with their values. For post processing of these files, the data for the transverse and longitudinal strain sensor values and the vertical pressure sensor values were separated.

6.1.3. Post-processing Peak-Pick Results

For both the transverse and longitudinal strain and stress sensor values from the Peak-Pick, the B1, AX1, AX4 and IP7 were the points which are needed for the study. The values are in micro strain for the strain sensors and psi for the vertical pressure/ stress sensor.

Table 6.2 Three Different scenarios compared in this study

Scenario	Value taken from Peak-Pick results	Comparative Value from Everstress program or Predicted values	Comment
Front Wheel	B1-AX1	Maximum Values from Appendix D of Everstress Front wheel Configuration Results	This is the response recorded when the front wheel passes over the sensor
Rear Wheel-1	B1-AX4	Maximum Values from Appendix D of Everstress Rear wheel Configuration Results	This is the response when the first of the rear axle wheel passes over the sensor
Rear Wheel Gap-2	B1-IP7	Minimum Values from Appendix D of Everstress Rear wheel Configuration Results	This is the response measured after the first wheel and before the second wheel of the rear axle pass above the sensor.

The Peak-pick result files and the values tabulated for each scenario is given in Appendix E. The vertical pressure values obtained from the sensor tabulation can be directly compared to the stress values from the Everstress program. But in the collection of transverse and longitudinal strain sensor values, some aspects are worth mentioning:

- The first response data collection sessions were on 04/03/09 for Cells 33, 34 and 35 and on 04/06/09 for Cells 77, 78 and 79. After reviewing the data, MnROAD engineers discovered that all transverse and longitudinal strain sensors were wired backwards either at the terminal block for the lead wires or within the terminal block mounted on the National Instruments chassis. This issue was corrected in the following data collection on 28/04/09. The 04/03/09 and 04/06/09 data was still useable since the peaks measured in compression were corrected to tension for comparison.
- The first data collection was MnROAD's first efforts with a new National Instruments (NI) data collection system. The method chosen for calculating transverse and longitudinal strain from the sensor output was "Full-Bridge 1." This transverse and longitudinal strain formula was chosen because of a recommendation from NI support staff. Other selected factors include sensor excitation voltage of 5 volts and gauge factor of 2. But it was found that the result was calculated using bending strain formula rather than axial strain formula and therefore, the formula for computing the strain must be modified.
- The Gauge Factor (GF) used in calculating the transverse and longitudinal strain is not correct for the gauges used, since each gauge has a different sensitivity (change in voltage due to loading) due to variations in transducer materials and transducer assembly. The specific gauge factor for each sensor is given in Table 6.3.

Table 6.3 Specific Gauge Value for each Sensor

Cell	Gauge Type	Gauge #	Gauge Factor (GF)	Cell	Gauge Type	Gauge #	Gauge Factor (GF)
33	TE	201	2.915	35	TE	201	3.479
33	TE	202	2.926	35	TE	202	3.393
33	TE	203	3.27	35	TE	203	3.662
33	LE	201	2.855	35	LE	201	3.375
33	LE	202	3.353	35	LE	202	3.751
33	LE	203	3.387	35	LE	203	3.561
34	TE	201	3.414	79	TE	001	3.296
34	TE	202	3.333	79	TE	002	3.224
34	TE	203	3.474	79	TE	003	3.238
34	LE	201	3.304	79	LE	001	3.041
34	LE	202	3.519	79	LE	002	3.293
34	LE	203	3.541	79	LE	003	3.432

Two equations are used on the resulting bending transverse and longitudinal strain values to correct the data from Peak-Pick to axial transverse and longitudinal strain values;

Equation 1: Bending Strain Formula, Full-Bridge 1

$$V_r = \epsilon_b \times GF$$

Where ϵ_b is strain due to bending and Gauge Factor (GF) is 2 for all sensors. All the strain data obtained from the Peak-Pick program were converted to raw voltage data.

Equation 2: Axial Strain Formula, Full-Bridge 3

$$\epsilon_a = [-2 * (V_r)] / [GF (\Upsilon +1) – V_r (\Upsilon – 1)]$$

Where ϵ_a is axial strain, V_r is the voltage ratio, and Υ is Poisson’s Ratio for asphalt (0.35). The second step using Equation 2 was to re-compute transverse and longitudinal strain using the axial formula and apply the gauge factor (GF) for each specific gauge. The corrected transverse and longitudinal strain values for each cell are given in Appendix E, along with vertical stress values.

6.2. Comparison of Measured and Predicted values

The corrected strains and stresses reported in Appendix E are summarized in Table 6.4. Information on the lateral offset of the truck wheels and the speed of the truck was not available at the time the thesis was written for the cells discussed in this study; it will be available later. Therefore, the maximum values recorded from multiple runs were used in comparison since:

- The maximum values are formed when the tires are directly above the sensor.
- The pressure cells (stress sensors) usually record low values when they are not working properly. Therefore, maximum values are of interest.

None of the three pressure gauges in cell 35 were working on 4/28/09. They are compared with the maximum and minimum values from the Everstress results or the predicted values taken from Appendix C and shown in Table 6.5. For clarity, the dates for which measured and predicted response was compared are given in Table 6.5.

Table 6.4 Measured Strains and Stresses for the Cells 33, 34, 35 and 79

Category	Cell	33	34		35		79	
	Date	4/3/09	4/3/09	4/28/09	4/3/09	4/28/09	4/6/09	4/28/09
Front Wheel	Max TE	283.78	326.70	561.87	235.76	511.10	276.04	308.58
	Max LE	265.79	278.61	420.11	279.30	487.29	274.93	355.31
	Max P	-6.77	-4.96	-8.56	-5.92		-7.89	-9.41
Rear Wheel 1	Max TE	195.85	196.79	294.37	200.23	323.54	309.86	391.65
	Max LE	230.21	251.05	369.54	279.44	458.96	249.69	324.37
	Max P	-6.71	-5.97	-8.74	-6.26		-8.34	-9.90
Rear Wheel Gap 2	Min TE	22.60	17.30	15.30	9.70	17.90	25.50	24.20
	Min LE	-42.10	-47.00	-46.40	-45.30	-44.90	-24.50	-14.90
	Min P	-1.90	-1.50	-0.60	-1.10		-1.90	-1.00

Table 6.5 Predicted Strains and Stresses for the Cells 33, 34, 35 and 79

Category	Cell	33	34		35		79	
	Date	4/3/09	4/3/09	4/28/09	4/3/09	4/28/09	4/6/09	4/28/09
Front Wheel	Max TE	382.1	270.2	497.9	338.8	502.5	332.3	377.4
	Max LE	382.1	270.2	497.9	338.8	502.5	332.3	377.4
	Max P	-4.6	-4.0	-5.4	-4.6	-5.8	-5.7	-6.5
Rear Wheel 1	Max TE	265.8	194.2	336.6	236.6	336.3	230.5	258.0
	Max LE	371.9	261.6	483.4	329.3	486.7	322.8	364.6
	Max P	-5.7	-5.1	-6.6	-5.7	-6.9	-6.8	-7.5
Rear Wheel Gap 2	Min TE	68.9	61.4	64.4	62.2	56.0	57.3	53.7
	Min LE	-142.6	-98.3	-166.7	-123.0	-160.3	-116.9	-119.1
	Min P	-3.1	-3.1	-2.6	-3.0	-2.5	-2.6	-2.3

The values in the table are plotted in Figure 6.3 to 6.6 to show how the measured transverse strain varied with the predicted transverse strain. For both the front and the rear wheel (Figures 6.3 and 6.4), the predicted transverse strains were 0.7 to 1.4 times the measured transverse strains. When they were averaged, the predicted transverse strains were nearly the same range as the measured transverse strains (Figure 6.6) as the points were distributed above and below the equality line. When comparing the transverse strains for the rear wheel gap, the predicted strains were nearly 3.5 times the corresponding measured strains (Figure 6.5).

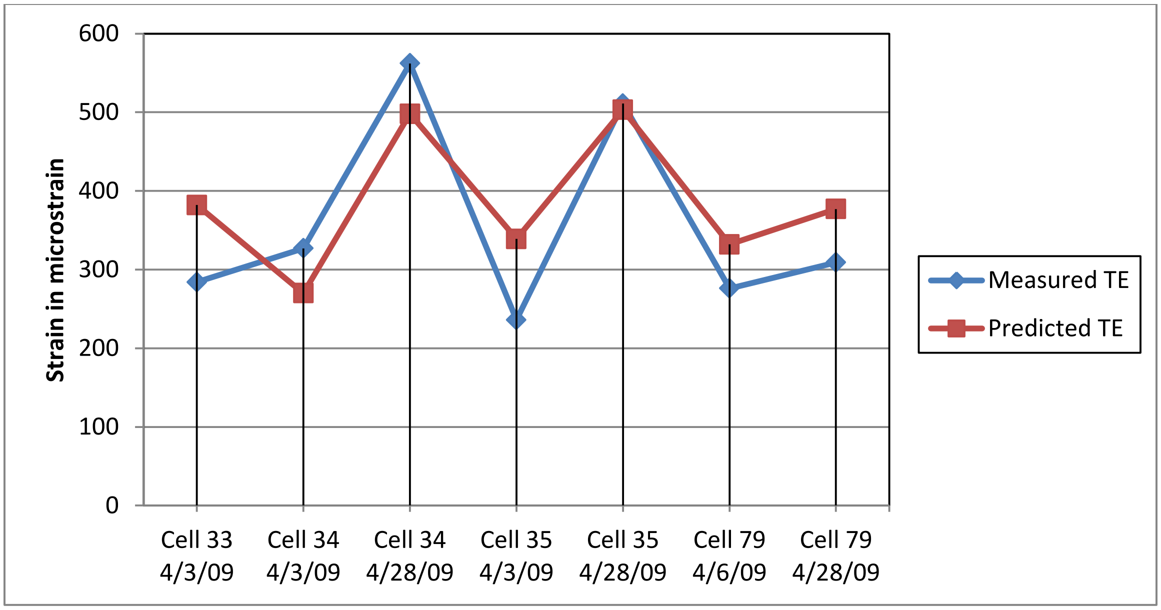


Figure 6.3 Measured and Predicted Transverse Strains for the Front Wheel

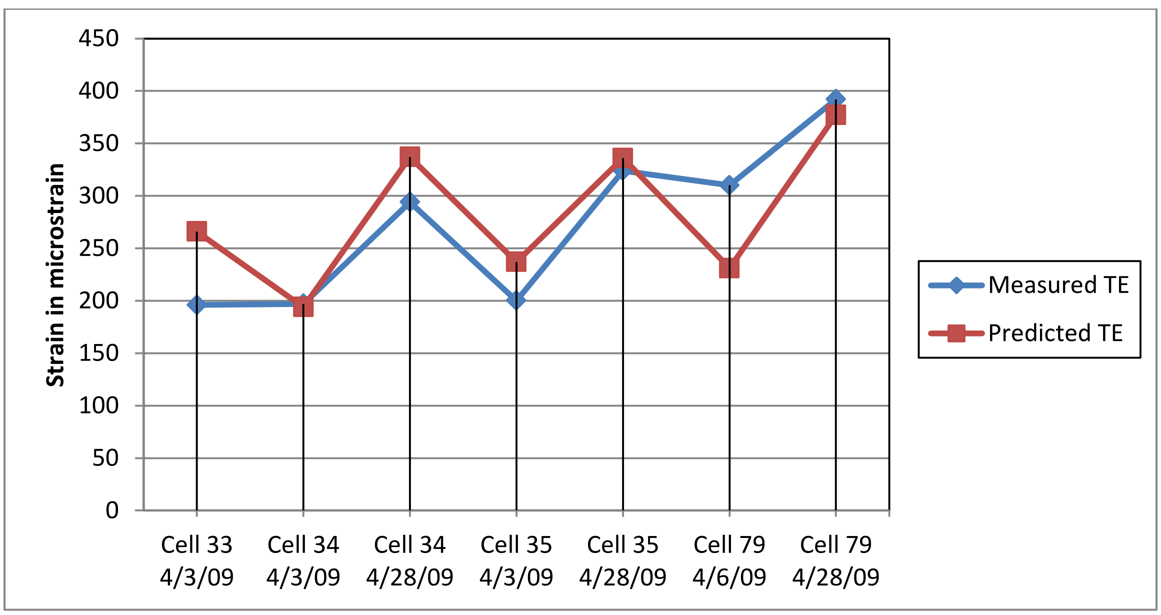


Figure 6.4 Measured and Predicted Transverse Strains for the Rear Wheel

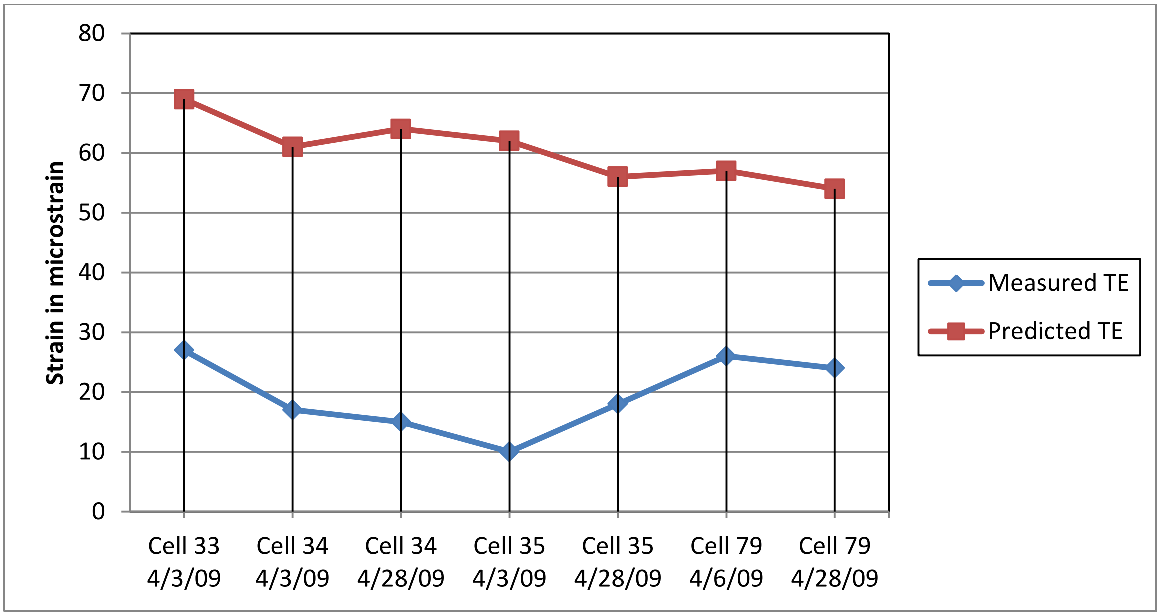


Figure 6.5 Measured and Predicted Transverse Strains for the Rear Wheel Gap

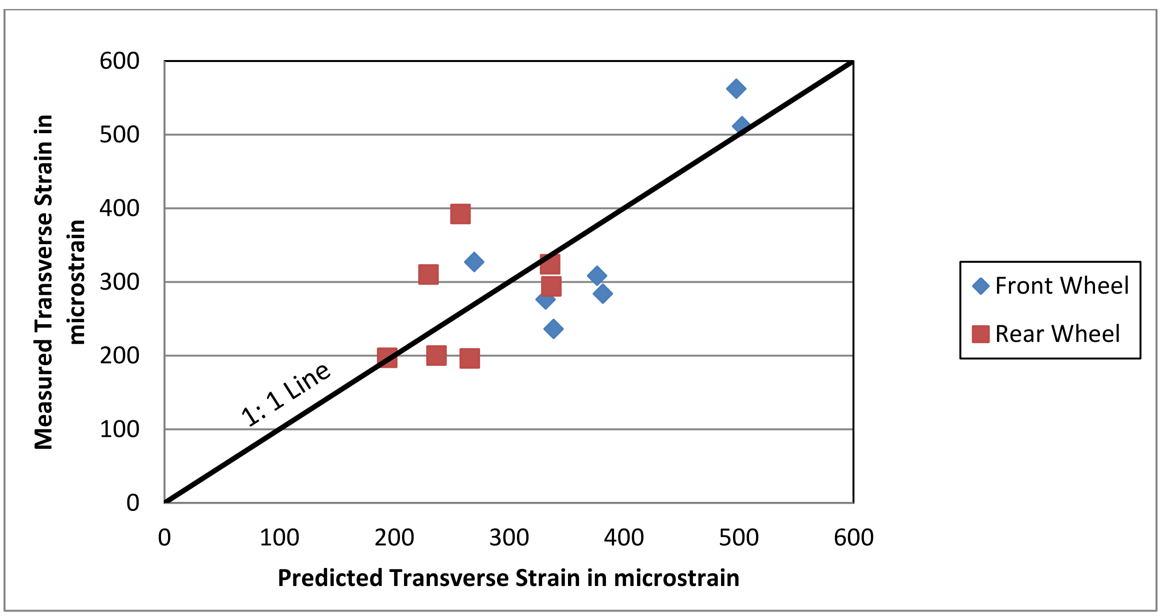


Figure 6.6 Measured and Predicted Transverse Strains for Front and Rear Wheel

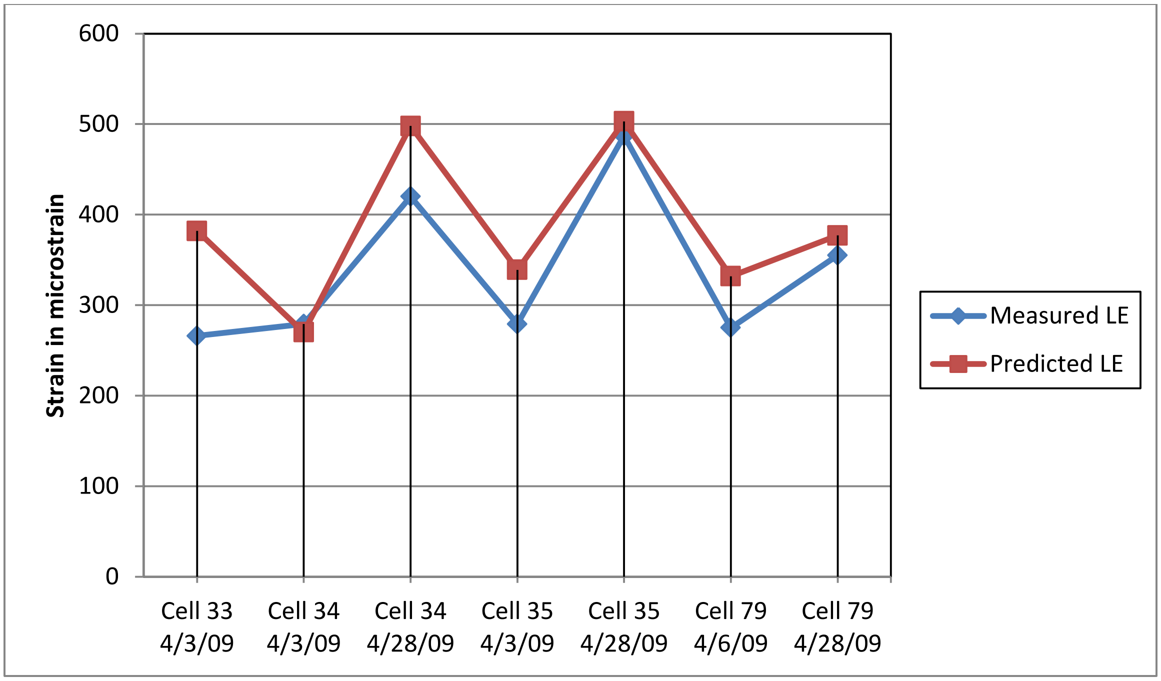


Figure 6.7 Measured and Predicted Longitudinal Strains for the Front Wheel

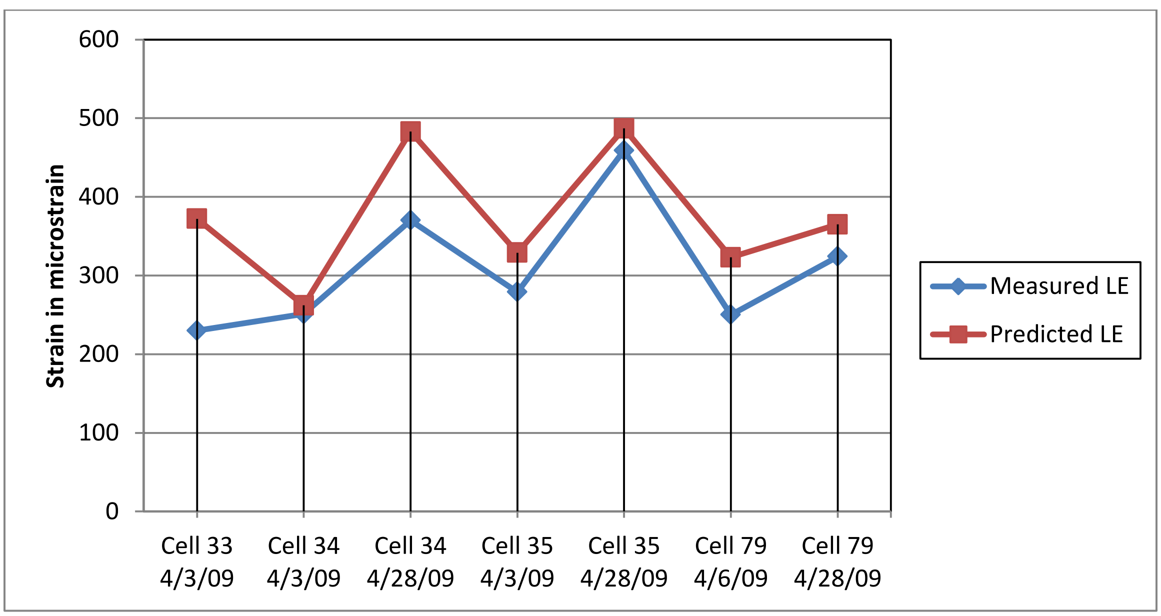


Figure 6.8 Measured and Predicted Longitudinal Strains for the Rear Wheel

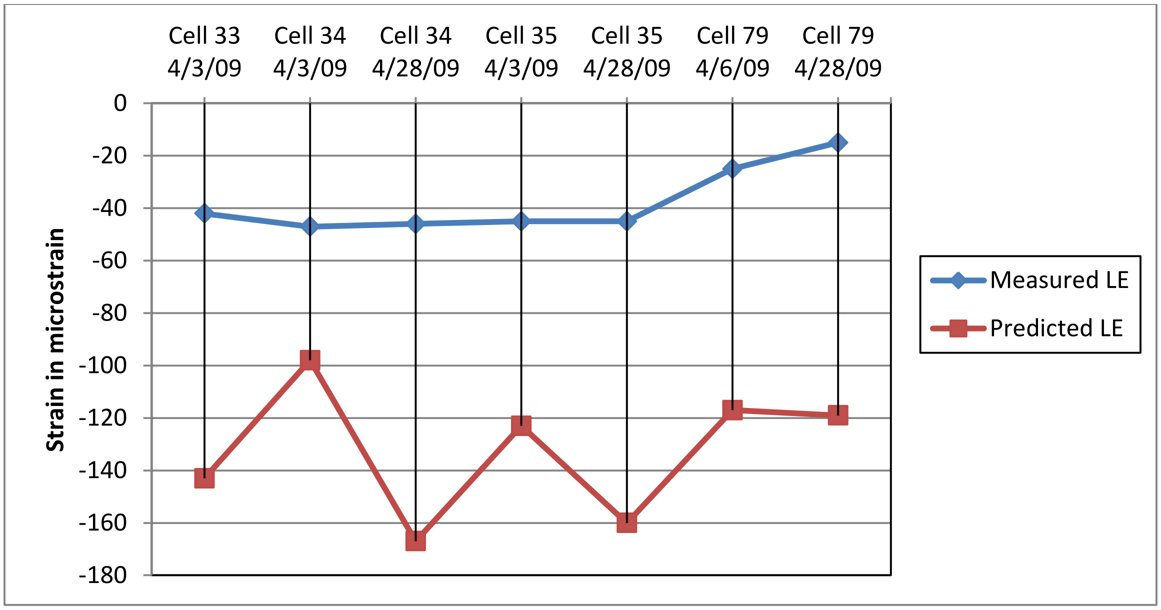


Figure 6.9 Measured and Predicted Longitudinal Strains for the Rear Wheel Gap

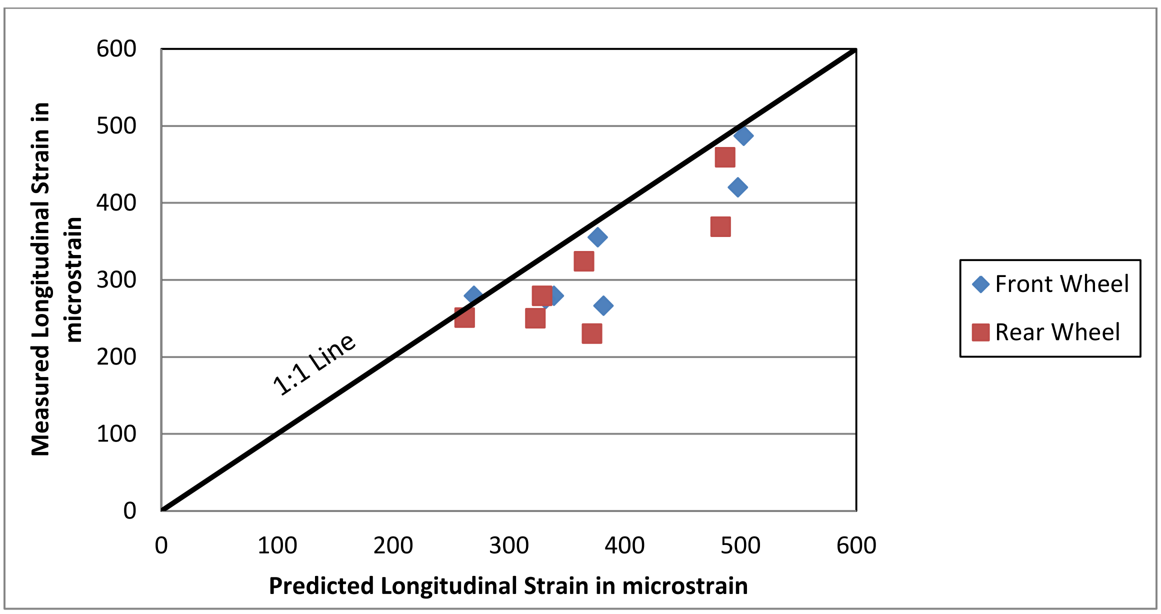


Figure 6.10 Measured and Predicted Longitudinal Strains for Front and Rear Wheel

Figures 6.7 to 6.10 indicate that the predicted longitudinal strains were nearly 1.0 to 1.6 times higher than the measured longitudinal strains for the front and rear wheel. The difference between the measured and predicted longitudinal strains is always larger than the corresponding difference between the measured and the predicted transverse strains. On average, the predicted longitudinal strains were nearly 1.2 times the measured longitudinal strains, as most of the points are under the equality line in Figure 6.10. For the rear wheel gap (Figure 6.9), the predicted longitudinal strains were nearly 4.0 times higher than the measured longitudinal strains; they were compressive strains when all other strains were in tensile.

Both predicted and measured vertical stresses were negative as they all were compressive stresses. The predicted compressive stresses for the front wheel are 0.7 times the measured stress (Figure 6.11) while the predicted compressive stresses for the rear wheel are 0.8 times their corresponding measured values (Figure 6.12). Figure 6.13 shows that the measured stresses are always higher than the predicted stresses.

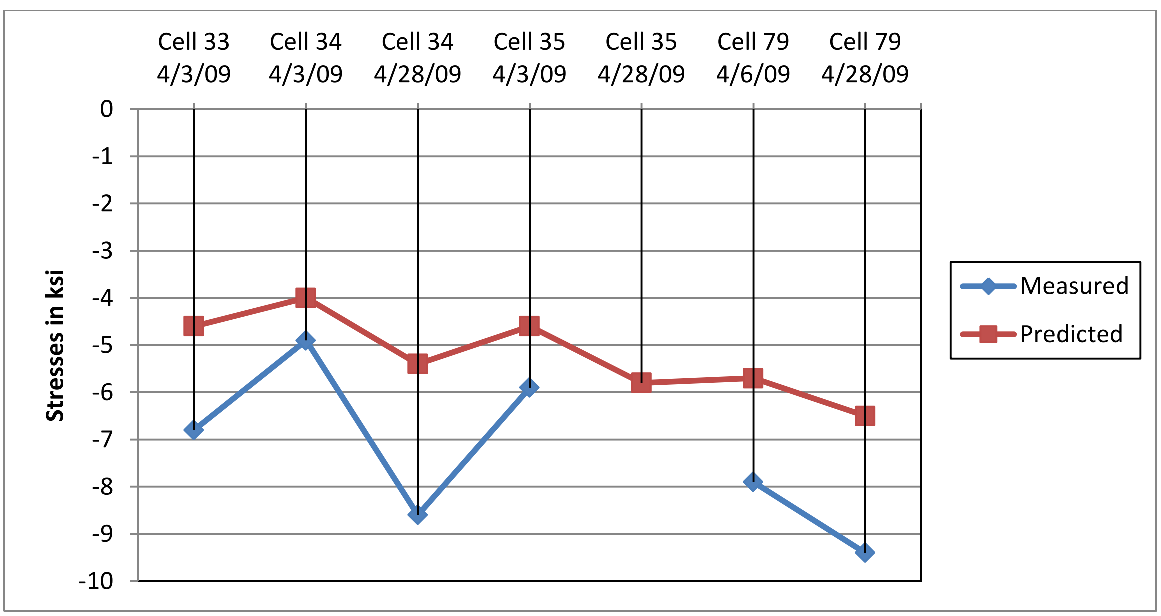


Figure 6.11 Measured and Predicted Vertical Stresses for the Front Wheel

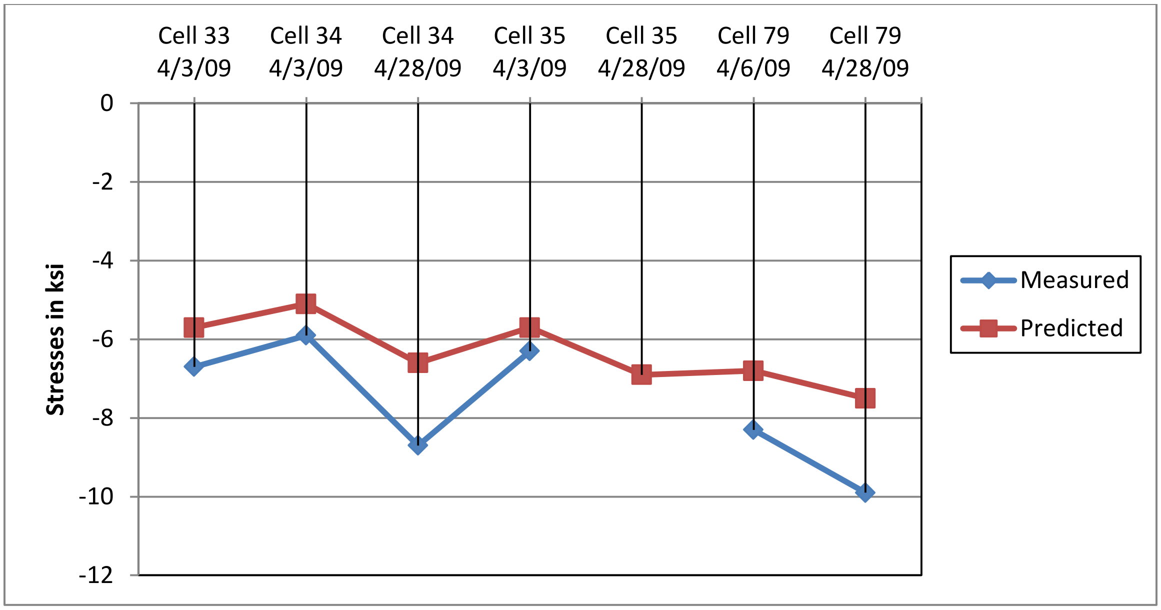


Figure 6.12 Measured and Predicted Vertical Stresses for the Rear Wheel

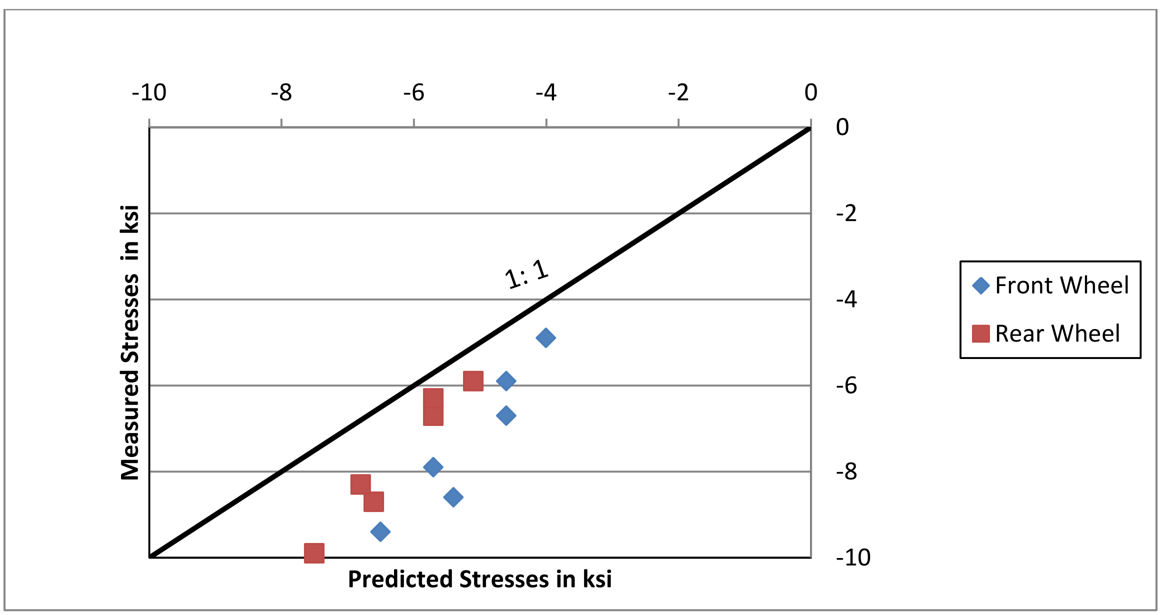


Figure 6.13 Measured and Predicted Vertical Stresses for the Front and Rear Wheels

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

The objective of this study was to compare the measured and predicted strains and stresses for six test cells at MnROAD Low Volume Road (LVR) loop constructed in 2007. The dynamic data and the Falling Weight Deflectometer data obtained from six asphalt pavement cells were selected for the study: 33, 34, 35, 77, 78 and 79. Cells 33, 33 and 35 were constructed for the polyphosphoric acid study and cells 77, 78 and 78 for the fly-ash stabilization study. The only traffic applied on the cells was with an 80 kip, 5 axle truck that makes 80 laps on the LVR loop every weekday. Each cell was instrumented with three transverse strain gauges, three longitudinal strain gauges and three pressure cells located at the bottom of the HMA layer.

Modulus 6.0 was used to back-calculate the layer moduli using the FWD deflection data. Moduli ranges were adjusted until the best back-calculation moduli were obtained for the three layers of the pavement structure. Then the back-calculated moduli were corrected for temperature recorded on the dates when pavement response was recorded using the Bells 3 and Chen equations. The corrected moduli were used in Everstress 2.0 to predict the normal strains and stresses under the 80 kip truck loading. The predicted stresses and strains were compared to the measured values recorded by the embedded sensors. The measured values were processed using the Peak-Pick software.

The following conclusions were drawn from the results of moduli backcalculation:

- In Cell 33, at higher temperature ranges, the asphalt layer modulus is higher than those of Cells 34 and 35. This indicates that adding acid gives much higher stiffness at higher temperature to the asphalt concrete.

- Cell 34, which has both Poly Phosphoric Acid and Styrene-Butadiene-Styrene polymer in its asphalt binder, has a higher asphalt layer modulus than the other cells, followed by Cell 33 which has just PPA, and then by Cell 35 which has just SBS polymer in the asphalt binder.
- The deviation in the asphalt layer moduli from the pattern for the three cells in the temperature range of 15-20°C is because that data was available only for April and May month when spring thawing softens the foundation layers.

The prediction of strain values done by two techniques indicated that:

- The strain predicted by Thompson Model was the smallest for Cell 33 at lower temperature as well as higher temperature ranges when compared to that obtained for cells 34 and 35. This shows that adding PPA to the asphalt binder increases the stiffness of the asphalt concrete layer.
- As indicated by Everstress 2.0 results, Cell 35 had the highest strains since it contains polymer in the asphalt binder. Cells 34 and 79 also have higher strains compared to Cell 33.
- The strains predicted by the Everstress linear elastic forward calculation model are 20 to 30% larger than the strains computed by the Thompson model.

When the measured response values processed using the Peak-Pick program were compared to the response values predicted by Everstress model, the following conclusions were drawn:

- The measured transverse strains were similar to the corresponding predicted transverse strains while the predicted longitudinal strain was nearly 1.2 times the corresponding measured longitudinal strain. The predicted stresses were 0.7 to 0.8 times the corresponding measured stresses.
- The difference between the corresponding predicted and measured transverse strains is smaller than that between the corresponding longitudinal strains.

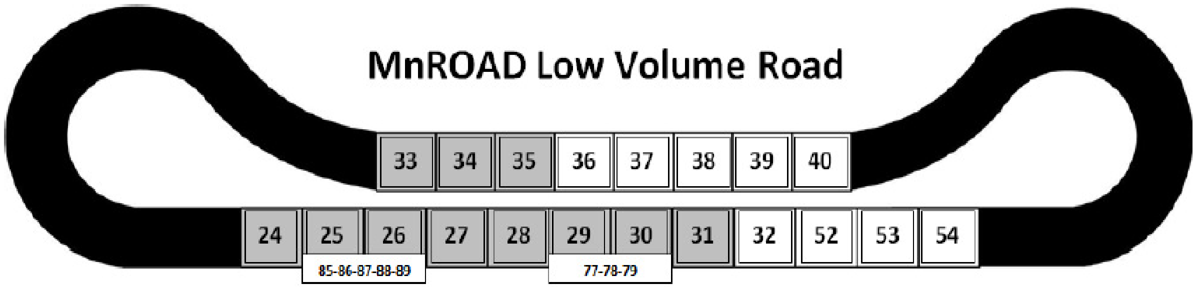
- Both calculated and measured transverse strains are smaller than the corresponding longitudinal strains.

The recommendations made from this study were:

- The comparison between measured and predicted pavement response should be repeated once the data on the the speed and the lateral-offset of the truck is available.
- In this study, the prediction of pavement response was done using a linear-elastic forward calculation model (Everstress). The strains predicted by Everstress were similar to those measured under the loading vehicle. However, the pavement response should be predicted with more advanced models that consider the speed of the loading vehicle as well as the visco-elastic properties of the asphalt concrete layers and the stress dependency behavior of unbound pavement foundation layers.
- The sensors installed at the MnROAD project provide a bonanza of information on the response of the experimental pavement structures. Therefore, it would be very useful to the engineering community that the comparison between measured and predicted pavement response would be conducted for other experimental cells constructed at MnROAD.

APPENDIX A

CELL MAPS AND PAVEMENT STRUCTURE



Acid Modified	33	4" 58-34 PPA; 12" Class 6; Clay	Sep 07	Current
Acid Modified	34	4" 58-34 SBS+PPA; 12" Class 6; Clay	Sep 07	Current
Acid Modified	35	4" 58-34 SBS; 12" Class 6; Clay	Sep 07	Current
Original PCC	36	6" Trans Tined 15x12 1" dowel; 5" Class 5; Sand	Jul 93	Current
Original PCC	37	6" Trans Tined 12x12; 5" Class 5; Sand; 2007 PCC Grind Strips	Jul-93	Current
Original PCC	38	6" Trans Tined 15x12 1" dowel; 5" Class 5; Clay	Jul 93	Current
Original PCC	40	5.5"-7.0" Trans Tined 15x12; 5" Class 5; Clay	Jul 93	Current
Pervious Overlay	39	4" Perv Overlay; 6" 20x12 1" dowel; 5" Class 5; Clay	Oct 08	Current
Aging Study	24	3" 58-34; 4" Class 6; Sand; 100' Fog Seals 2008 2009 2010 2011 2012	Oct 08	Current
Mesabi Hard Rock	31	4" 64-34; 4" Class 5; 12" Class 3; Clay	Sep 04	Current
Mesabi Hard Rock	54	7.5" Astro Turf 15'x12' 1" dowel; 12" Class 6; Clay	Oct 04	Current
Concrete Initiatives	32	5" Astro Turf 10x12; Class 1f; 6" Class 1c; Clay	Jun 00	Current
Concrete Initiatives	52	7.5" Astro Turf 15x13/14 Var Dowels; 5" Class 4; Clay	Jun 00	Current
Concrete Initiatives	53	12" Trans Broom 15x12 1.5" SS dowels PCC Shld; 5" Class 5; 36" SG; Clay	Oct 08	Current

Pervious & Porous Pavements	64	7" Pervious PCC; 12" CA-15; Type V Geo-Textile; Clay	2007	Current
Pervious & Porous Pavements	74	4" Pervious PCC; 6" Washed Stone; Type V Geo-Textile; Clay	Aug 06	Current
Pervious & Porous Pavements	85	7" Pervious PCC; 4" RR Ballast; 8" CA-15; Type V Geo-Textile; Sand	Oct 08	Current
Pervious & Porous Pavements	86	5" Porous HMA; 4" RR Ballast; 10" CA-15; Type V Geo-Textile; Sand	Oct 08	Current
Pervious & Porous Pavements	87	4" Control; 4" Mesabi Ballast; 11" CA-15; Type V Geo-Textile; Clay Sand	Oct 08	Current
Pervious & Porous Pavements	88	5" Porous HMA; 4" RR Ballast; 10" CA-15; Type V Geo-Textile; Clay	Oct 08	Current
Pervious & Porous Pavements	89	7" Pervious PCC; 4" RR Ballast; 8" CA-15; Type V Geo-Textile; Clay	Oct 08	Current
GCBD Fabric	27	2" 52-34; 2" 58-34; 6" Class 5; GCBD; 2009 Chip Seal; 7" Clay Borrow; Clay	Aug 06	Current
Stabilized Full Depth Reclamation	28	6" SFDR + Chip Seal; 4" Class 5; 7" Clay Borrow; Clay	Sep 11	Current
Stabilized Full Depth Reclamation	77	4" 58-34 Elvaloy + PPA; 8" FDR; Clay	Oct 07	Current
Stabilized Full Depth Reclamation	78	4" 58-34 Elvaloy + PPA; 8" Class 6; Clay	Oct 07	Current
Stabilized Full Depth Reclamation	79	4" 58-34 Elvaloy + PPA; 8" FDR + Fly Ash; Clay	Sep 07	Current
Implements of Husbandry	83	3.5" 58-34; 8" Class 5; Clay	Oct 07	Current
Implements of Husbandry	84	5.5" 58-34; 9" Class 5; Clay	Oct 07	Current

APPENDIX B

MODULUS 6.0 RESULTS FOR CELLS 33, 34, 35 AND 79

Modulus 6.0 0utput For Cell 33 in Temperature Range 0 to 5°C (Cell33-temp5.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	11/18/2009	Outside	OuterWheelPath	3662.7	6.6	21.6	79.7
2	11/18/2009	Outside	OuterWheelPath	3571.8	4.8	23.2	80.7
3	11/18/2009	Outside	OuterWheelPath	2753.6	4.4	23.8	98.5
4	11/18/2009	Outside	OuterWheelPath	2616.6	5.7	23.7	102.5
5	11/18/2009	Outside	Midlane	3034.2	6.2	20.9	92.5
6	11/18/2009	Outside	Midlane	3052.0	6.7	21.0	92.0
7	11/18/2009	Outside	Midlane	2616.5	6.4	21.1	103.6
8	11/18/2009	Outside	Midlane	2339.2	5.7	23.4	111.9
9	11/18/2009	Outside	Midlane	2227.9	6.2	22.4	116.7
10	11/18/2009	Inside	OuterWheelPath	1579.9	5.9	18.8	154.9
11	11/18/2009	Inside	OuterWheelPath	2362.4	6.2	19.7	112.9
12	11/18/2009	Inside	OuterWheelPath	2325.1	5.9	20.8	113.7
13	11/18/2009	Inside	OuterWheelPath	1346.4	7.0	23.8	171.3
14	11/18/2009	Inside	OuterWheelPath	2356.9	6.5	23.6	111.2
15	11/18/2009	Inside	Midlane	1779.0	6.6	18.7	141.4
16	11/18/2009	Inside	Midlane	2221.8	6.3	19.9	118.3
17	11/18/2009	Inside	Midlane	2531.2	5.8	21.5	106.1
18	11/18/2009	Inside	Midlane	1756.0	6.7	24.2	139.3
19	11/18/2009	Inside	Midlane	2164.4	6.9	24.4	118.4
20	3/19/2010	Outside	OuterWheelPath	1880.6	2.7	18.3	135.7
21	3/19/2010	Outside	OuterWheelPath	1485.8	2.1	17.4	163.6
22	3/19/2010	Outside	OuterWheelPath	2289.1	2.5	19.6	115.8
23	3/19/2010	Outside	OuterWheelPath	1481.6	2.3	16.8	164.6
24	3/19/2010	Outside	OuterWheelPath	2072.0	2.5	19.2	125.3
25	3/19/2010	Outside	OuterWheelPath	1530.0	2.1	17.1	160.2
26	3/19/2010	Outside	OuterWheelPath	1380.8	2.0	17.8	172.8
27	3/19/2010	Outside	OuterWheelPath	1449.9	2.2	18.0	166.2
28	3/19/2010	Outside	OuterWheelPath	1524.0	2.8	18.3	159.7
29	3/19/2010	Outside	OuterWheelPath	1546.2	2.1	18.8	157.5
30	11/16/2010	Outside	OuterWheelPath	2411.9	4.9	23.5	109.2
31	11/16/2010	Outside	OuterWheelPath	2204.8	6.0	22.4	117.6
32	11/16/2010	Outside	Midlane	2655.4	6.9	20.1	103.0
33	11/16/2010	Outside	Midlane	2192.2	6.2	20.4	119.2
34	11/16/2010	Outside	Midlane	1963.4	5.9	22.0	128.9
35	11/16/2010	Outside	Midlane	1847.7	5.9	22.9	134.6
36	11/16/2010	Inside	Midlane	1883.8	6.0	23.4	132.3
37	11/16/2010	Inside	OuterWheelPath	1904.8	5.7	19.1	133.8
38	11/16/2010	Inside	OuterWheelPath	1138.2	5.5	22.3	196.3

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	11/16/2010	Inside	OuterWheelPath	2021.5	5.2	22.5	125.8
40	2/16/2011	Inside	Midlane	2646.1	18.5	49.7	94.6
41	2/16/2011	Inside	Midlane	2244.9	13.4	55.1	106.3
42	2/16/2011	Inside	Midlane	2451.6	13.0	52.9	99.7
43	11/4/2011	Inside	OuterWheelPath	829.4	4.7	17.1	257.4
44	11/4/2011	Inside	OuterWheelPath	1067.9	5.8	16.8	212.0
45	11/4/2011	Inside	OuterWheelPath	1187.1	5.0	16.9	195.2
46	11/4/2011	Inside	OuterWheelPath	1243.6	5.6	17.4	187.8
47	11/4/2011	Inside	OuterWheelPath	1220.7	4.9	18.5	189.4
48	11/4/2011	Inside	OuterWheelPath	1113.0	5.2	18.6	203.3
49	11/4/2011	Inside	OuterWheelPath	790.5	4.6	22.6	260.0
50	11/4/2011	Inside	OuterWheelPath	1274.5	5.9	22.4	179.8
51	11/4/2011	Inside	OuterWheelPath	1241.8	5.0	22.0	183.8
52	11/4/2011	Inside	OuterWheelPath	1316.9	4.7	22.2	175.5

Modulus 6.0 0utput For Cell 33 in Temperature Range 5 to 10°C (Cell33-temp10.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	11/9/2007	Inside	Midlane	1313.7	7.0	19.3	178.2
2	11/9/2007	Inside	Midlane	947.9	7.6	18.7	230.1
3	11/9/2007	Inside	Midlane	1166.6	8.0	19.3	195.4
4	11/9/2007	Inside	Midlane	845.3	6.7	19.5	250.4
5	11/9/2007	Inside	Midlane	1057.3	7.2	20.2	209.9
6	11/9/2007	Inside	Midlane	952.1	6.7	21.3	226.5
7	11/9/2007	Inside	Midlane	913.8	6.9	24.2	230.9
8	11/9/2007	Inside	Midlane	920.7	7.7	24.0	229.7
9	11/9/2007	Inside	Midlane	860.4	7.3	22.9	243.2
10	11/9/2007	Outside	Midlane	709.8	5.7	18.5	288.2
11	11/9/2007	Outside	Midlane	856.2	7.7	18.4	249.4
12	11/9/2007	Outside	Midlane	824.0	6.5	18.5	256.7
13	11/9/2007	Outside	Midlane	1032.2	7.2	19.6	214.4
14	11/9/2007	Outside	Midlane	900.5	6.6	21.0	236.8
15	11/9/2007	Outside	Midlane	909.6	6.5	22.0	233.9
16	11/9/2007	Outside	Midlane	692.7	5.9	25.1	285.1
17	11/9/2007	Outside	Midlane	938.3	6.9	25.3	225.2
18	11/9/2007	Outside	Midlane	932.4	6.9	25.7	226.0
19	11/9/2007	Outside	Midlane	921.6	7.2	24.3	229.3
20	3/19/2008	Outside	Midlane	504.8	4.6	24.1	365.6
21	3/19/2008	Outside	Midlane	335.7	4.3	23.0	503.7
22	4/28/2008	Outside	OuterWheelPath	532.5	4.1	14.6	368.3
23	4/28/2008	Outside	OuterWheelPath	506.0	4.1	14.7	382.9
24	4/28/2008	Outside	OuterWheelPath	682.3	4.1	16.4	300.6
25	4/28/2008	Outside	OuterWheelPath	563.5	3.8	15.9	349.6
26	4/28/2008	Outside	OuterWheelPath	563.3	3.5	15.2	351.2
27	4/28/2008	Outside	OuterWheelPath	582.8	3.5	16.9	338.6
28	4/28/2008	Outside	OuterWheelPath	550.2	3.7	17.5	352.8
29	4/28/2008	Outside	OuterWheelPath	510.6	3.8	17.9	373.0
30	4/28/2008	Outside	OuterWheelPath	566.6	3.6	17.3	345.3
31	3/23/2009	Outside	OuterWheelPath	1192.4	3.2	31.7	183.1
32	3/23/2009	Outside	OuterWheelPath	1384.9	3.1	31.5	163.1
33	3/23/2009	Outside	OuterWheelPath	1282.6	3.3	32.8	172.4
34	3/23/2009	Outside	OuterWheelPath	959.0	2.7	26.9	220.1
35	3/23/2009	Outside	OuterWheelPath	972.7	2.9	28.6	216.5
36	3/23/2009	Outside	Midlane	1157.4	3.0	29.7	188.5
37	3/23/2009	Outside	Midlane	1207.9	3.0	29.8	182.3
38	3/23/2009	Outside	Midlane	1048.6	2.8	28.1	204.6

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	3/23/2009	Outside	Midlane	895.9	2.8	27.5	231.6
40	3/23/2009	Outside	Midlane	823.9	2.6	26.4	248.1
41	3/23/2009	Inside	OuterWheelPath	785.7	2.6	26.2	257.5
42	3/23/2009	Inside	OuterWheelPath	1080.9	3.0	29.5	198.9
43	3/23/2009	Inside	OuterWheelPath	1104.6	2.9	28.5	196.2
44	3/23/2009	Inside	OuterWheelPath	680.7	2.7	27.4	286.5
45	3/23/2009	Inside	OuterWheelPath	1141.5	3.0	29.7	190.5
46	3/23/2009	Inside	Midlane	854.0	2.6	25.9	241.7
47	3/23/2009	Inside	Midlane	1008.2	2.7	26.7	211.9
48	3/23/2009	Inside	Midlane	1099.2	2.8	27.9	197.4
49	3/23/2009	Inside	Midlane	796.2	2.6	26.3	254.8
50	3/23/2009	Inside	Midlane	992.6	2.8	28.4	213.2
51	4/7/2009	Outside	OuterWheelPath	631.8	2.9	21.1	311.3
52	4/7/2009	Outside	OuterWheelPath	508.1	2.8	19.1	372.1
53	4/7/2009	Outside	OuterWheelPath	708.5	2.8	22.5	283.1
54	4/7/2009	Outside	OuterWheelPath	459.1	2.8	18.6	403.5
55	4/7/2009	Outside	OuterWheelPath	601.3	2.9	21.0	323.6
56	4/7/2009	Outside	OuterWheelPath	492.7	2.7	20.2	379.0
57	4/7/2009	Outside	OuterWheelPath	495.1	2.5	21.4	375.5
58	4/7/2009	Outside	OuterWheelPath	492.5	2.6	21.0	377.7
59	4/7/2009	Outside	OuterWheelPath	465.2	2.9	20.9	394.9
60	4/7/2009	Outside	OuterWheelPath	492.7	2.6	20.6	378.3
61	4/7/2009	Outside	Midlane	517.2	2.4	19.2	366.8
62	4/7/2009	Outside	Midlane	382.3	2.5	16.9	469.3
63	4/7/2009	Outside	Midlane	525.8	2.6	19.4	361.8
64	4/7/2009	Outside	Midlane	332.4	2.3	16.6	523.9
65	4/7/2009	Outside	Midlane	439.3	2.5	18.6	417.5
66	4/7/2009	Outside	Midlane	408.8	2.5	19.2	440.1
67	4/7/2009	Outside	Midlane	428.4	2.5	20.3	422.1
68	4/7/2009	Outside	Midlane	369.9	2.3	19.4	475.0
69	4/7/2009	Outside	Midlane	368.6	2.6	19.5	476.1
70	4/7/2009	Outside	Midlane	388.9	2.4	18.8	458.4
71	4/7/2009	Inside	Midlane	387.7	2.6	17.1	463.7
72	4/7/2009	Inside	Midlane	479.1	2.8	17.5	392.7
73	4/7/2009	Inside	Midlane	394.3	2.5	16.8	458.5
74	4/7/2009	Inside	Midlane	450.6	2.8	17.7	411.4
75	4/7/2009	Inside	Midlane	459.8	2.8	18.0	404.3
76	4/7/2009	Inside	Midlane	401.4	2.7	18.3	448.4
77	4/7/2009	Inside	Midlane	354.2	2.6	20.2	489.3
78	4/7/2009	Inside	Midlane	454.4	2.9	21.2	401.6
79	4/7/2009	Inside	Midlane	424.8	2.9	21.6	422.3

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
80	4/7/2009	Inside	Midlane	450.6	2.8	20.5	405.6
81	4/7/2009	Inside	OuterWheelPath	370.0	2.8	16.8	481.6
82	4/7/2009	Inside	OuterWheelPath	495.1	2.9	17.4	383.1
83	4/7/2009	Inside	OuterWheelPath	470.8	2.7	17.4	398.3
84	4/7/2009	Inside	OuterWheelPath	540.0	2.8	18.5	356.1
85	4/7/2009	Inside	OuterWheelPath	515.5	2.8	19.1	368.0
86	4/7/2009	Inside	OuterWheelPath	487.8	2.6	19.0	384.2
87	4/7/2009	Inside	OuterWheelPath	366.7	2.7	21.1	474.3
88	4/7/2009	Inside	OuterWheelPath	537.8	2.8	21.7	351.7
89	4/7/2009	Inside	OuterWheelPath	545.3	2.7	23.5	345.3
90	4/7/2009	Inside	OuterWheelPath	477.1	3.0	21.3	386.6
91	5/8/2009	Outside	OuterWheelPath	438.1	5.4	13.7	431.0
92	5/8/2009	Outside	OuterWheelPath	362.5	5.3	13.3	500.5
93	5/8/2009	Outside	OuterWheelPath	499.4	5.3	14.1	388.4
94	5/8/2009	Outside	OuterWheelPath	374.2	4.8	13.5	487.6
95	5/8/2009	Outside	OuterWheelPath	459.9	5.0	14.6	412.6
96	5/8/2009	Outside	OuterWheelPath	417.5	4.8	14.1	446.1
97	5/8/2009	Outside	OuterWheelPath	438.1	4.4	15.2	426.7
98	5/8/2009	Outside	OuterWheelPath	429.4	4.4	15.4	432.8
99	5/8/2009	Outside	OuterWheelPath	430.2	4.9	16.1	430.3
100	5/8/2009	Outside	OuterWheelPath	402.0	4.4	15.0	456.6
101	5/8/2009	Outside	Midlane	420.6	4.2	12.9	447.4
102	5/8/2009	Outside	Midlane	357.4	4.1	12.4	509.5
103	5/8/2009	Outside	Midlane	461.9	4.0	13.1	415.5
104	5/8/2009	Outside	Midlane	330.0	3.6	12.6	541.1
105	5/8/2009	Outside	Midlane	382.9	4.2	13.3	479.7
106	5/8/2009	Outside	Midlane	350.9	4.0	13.4	512.9
107	5/8/2009	Outside	Midlane	395.2	3.8	14.6	463.9
108	5/8/2009	Outside	Midlane	370.7	3.8	14.7	487.2
109	5/8/2009	Outside	Midlane	358.9	4.6	14.9	498.9
110	5/8/2009	Outside	Midlane	367.8	4.1	14.3	491.4
111	10/26/2009	Outside	OuterWheelPath	2085.1	6.8	18.9	124.9
112	10/26/2009	Outside	OuterWheelPath	2573.2	5.0	22.5	104.3
113	10/26/2009	Outside	Midlane	1972.5	5.5	20.7	129.2
114	10/26/2009	Outside	Midlane	1727.8	5.6	23.2	141.6
115	10/26/2009	Outside	Midlane	1643.9	5.8	22.3	147.7
116	10/26/2009	Inside	OuterWheelPath	1737.0	6.4	19.1	143.7
117	10/26/2009	Inside	OuterWheelPath	1788.9	5.8	20.4	139.6
118	10/26/2009	Inside	OuterWheelPath	1155.2	5.7	24.5	192.3
119	10/26/2009	Inside	OuterWheelPath	1865.0	5.3	24.0	133.0
120	10/26/2009	Inside	Midlane	1357.9	6.2	18.2	174.7
121	10/26/2009	Inside	Midlane	1667.2	5.8	18.9	148.5
122	10/26/2009	Inside	Midlane	1883.4	5.5	20.7	133.9
123	10/26/2009	Inside	Midlane	1416.2	5.8	24.6	164.2

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
124	3/17/2010	Outside	OuterWheelPath	1005.1	2.8	16.3	222.9
125	3/17/2010	Outside	OuterWheelPath	1198.8	2.6	16.7	194.0
126	3/17/2010	Outside	OuterWheelPath	1151.0	2.5	16.7	200.2
127	3/17/2010	Outside	OuterWheelPath	923.9	2.3	17.3	236.5
128	3/17/2010	Outside	OuterWheelPath	906.1	2.5	17.1	240.4
129	3/17/2010	Inside	OuterWheelPath	735.9	2.8	15.1	285.8
130	3/17/2010	Inside	OuterWheelPath	960.9	3.1	14.5	233.4
131	3/17/2010	Inside	OuterWheelPath	957.5	3.0	16.2	231.5
132	3/17/2010	Inside	OuterWheelPath	585.0	2.7	17.1	337.2
133	3/17/2010	Inside	OuterWheelPath	1010.8	2.9	18.5	219.2
134	3/17/2010	Inside	Midlane	1250.9	2.5	17.0	187.4
135	3/17/2010	Inside	Midlane	1247.2	2.7	16.1	188.8
136	3/17/2010	Inside	Midlane	1104.0	2.7	15.8	207.9
137	3/17/2010	Inside	Midlane	999.5	2.4	17.1	222.8
138	3/17/2010	Inside	Midlane	889.5	2.3	17.0	244.0
139	3/17/2010	Inside	Midlane	924.1	2.4	16.2	238.0
140	10/18/2010	Outside	OuterWheelPath	2037.1	6.1	19.6	126.7
141	10/18/2010	Outside	OuterWheelPath	2438.3	5.7	21.0	109.5
142	10/18/2010	Outside	OuterWheelPath	2365.7	5.5	21.9	111.7
143	10/18/2010	Outside	OuterWheelPath	1942.2	4.9	23.4	129.2
144	10/18/2010	Outside	OuterWheelPath	1827.9	5.7	23.3	135.5
145	10/18/2010	Outside	Midlane	2044.6	5.8	19.8	126.2
146	10/18/2010	Outside	Midlane	1996.2	6.5	20.2	128.3
147	10/18/2010	Outside	Midlane	1751.6	6.0	20.7	141.7
148	10/18/2010	Outside	Midlane	1587.5	5.6	22.7	151.5
149	10/18/2010	Outside	Midlane	1543.0	5.9	23.5	154.4
150	10/18/2010	Inside	OuterWheelPath	1069.6	6.2	17.5	210.9
151	10/18/2010	Inside	OuterWheelPath	1608.3	5.8	18.6	152.9
152	10/18/2010	Inside	OuterWheelPath	1625.9	5.6	20.1	150.5
153	10/18/2010	Inside	OuterWheelPath	1097.2	5.8	23.9	200.7
154	10/18/2010	Inside	OuterWheelPath	1658.9	6.0	23.4	146.0
155	10/18/2010	Inside	Midlane	1275.1	5.5	17.7	183.9
156	10/18/2010	Inside	Midlane	1493.6	5.4	17.9	162.5
157	10/18/2010	Inside	Midlane	1734.0	6.4	18.1	144.6
158	10/18/2010	Inside	Midlane	1356.8	5.8	23.9	170.2
159	10/18/2010	Inside	Midlane	1563.8	6.3	23.9	152.5
160	11/16/2010	Outside	OuterWheelPath	2772.5	6.0	20.4	99.4
161	11/16/2010	Outside	OuterWheelPath	2850.0	8.2	19.2	97.9
162	11/16/2010	Outside	OuterWheelPath	2850.0	5.9	21.0	97.1
163	11/16/2010	Outside	Midlane	2646.6	6.3	20.0	103.3
164	11/16/2010	Inside	Midlane	1617.3	5.5	18.3	152.5
165	11/16/2010	Inside	Midlane	1941.8	5.7	18.0	132.6
166	11/16/2010	Inside	Midlane	2206.5	5.1	20.8	118.4
167	11/16/2010	Inside	Midlane	1575.9	5.3	23.8	151.7
168	11/16/2010	Inside	OuterWheelPath	1220.7	6.0	17.2	190.7
169	11/16/2010	Inside	OuterWheelPath	1972.2	5.7	18.2	130.9

Modulus 6.0 0utput For Cell 33 in Temperature Range 10 to 15°C (Cell33-temp15.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	11/9/2007	Inside	Midlane	937.4	6.2	24.0	226.6
2	3/19/2008	Outside	OuterWheelPath	442.9	5.0	29.3	397.0
3	3/19/2008	Outside	OuterWheelPath	530.5	4.1	27.6	347.3
4	3/19/2008	Outside	OuterWheelPath	560.6	3.8	30.8	329.2
5	3/19/2008	Outside	OuterWheelPath	516.8	3.8	30.8	350.6
6	3/19/2008	Outside	OuterWheelPath	555.6	4.6	30.2	332.1
7	3/19/2008	Outside	OuterWheelPath	544.6	4.3	32.4	335.0
8	3/19/2008	Inside	Midlane	329.9	3.7	21.8	513.2
9	3/19/2008	Inside	Midlane	440.2	4.4	22.6	409.1
10	3/19/2008	Inside	Midlane	381.0	3.9	23.0	456.7
11	3/19/2008	Inside	Midlane	442.7	4.5	23.4	405.9
12	3/19/2008	Inside	Midlane	413.4	4.2	23.4	428.0
13	3/19/2008	Inside	Midlane	375.3	4.3	24.0	460.1
14	3/19/2008	Inside	Midlane	327.6	3.8	27.1	505.2
15	3/19/2008	Inside	Midlane	435.1	4.0	24.2	410.0
16	3/19/2008	Inside	Midlane	420.0	4.1	25.4	419.4
17	3/19/2008	Inside	Midlane	440.9	4.0	24.6	405.2
18	3/19/2008	Inside	OuterWheelPath	297.9	4.9	29.3	539.6
19	3/19/2008	Inside	OuterWheelPath	404.1	5.8	26.6	430.2
20	3/19/2008	Inside	OuterWheelPath	446.2	5.7	26.8	398.2
21	3/19/2008	Inside	OuterWheelPath	367.3	5.4	27.6	461.6
22	3/19/2008	Inside	OuterWheelPath	476.2	5.7	26.5	379.0
23	3/19/2008	Inside	OuterWheelPath	432.2	5.5	27.3	407.4
24	3/19/2008	Inside	OuterWheelPath	421.8	5.2	28.1	414.0
25	3/19/2008	Inside	OuterWheelPath	388.3	4.0	38.8	427.8
26	3/19/2008	Inside	OuterWheelPath	452.2	5.2	27.6	392.9
27	3/19/2008	Inside	OuterWheelPath	514.0	5.0	28.7	354.5
28	3/19/2008	Inside	OuterWheelPath	497.5	4.9	28.1	364.3
29	3/19/2008	Outside	Midlane	460.6	4.6	24.9	391.3
30	3/19/2008	Outside	Midlane	317.8	4.4	26.2	518.9
31	3/19/2008	Outside	Midlane	399.1	5.0	24.9	437.2
32	3/19/2008	Outside	Midlane	370.4	4.4	25.1	462.8
33	3/19/2008	Outside	Midlane	371.7	4.1	26.3	459.5
34	3/19/2008	Outside	Midlane	372.7	4.9	25.9	459.2
35	3/19/2008	Outside	Midlane	361.6	4.7	26.6	468.9
36	4/6/2010	Outside	Midlane	1571.9	3.5	17.3	156.7
37	4/6/2010	Outside	Midlane	1573.0	3.7	17.6	156.4

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
38	4/6/2010	Outside	Midlane	1279.4	3.6	17.1	184.0
39	4/6/2010	Outside	Midlane	1153.2	3.2	18.4	198.0
40	4/6/2010	Outside	Midlane	1151.1	3.6	18.9	197.8
41	4/6/2010	Outside	OuterWheelPath	1585.6	3.7	17.4	155.6
42	4/6/2010	Outside	OuterWheelPath	1798.7	3.6	17.8	140.8
43	4/6/2010	Outside	OuterWheelPath	1782.1	3.2	18.7	141.2
44	4/6/2010	Outside	OuterWheelPath	1290.0	2.7	18.6	181.4
45	4/6/2010	Outside	OuterWheelPath	1284.6	3.5	18.9	181.7
46	4/6/2010	Inside	OuterWheelPath	872.0	3.9	15.0	250.8
47	4/6/2010	Inside	OuterWheelPath	1295.8	3.5	15.7	183.7
48	4/6/2010	Inside	OuterWheelPath	1276.4	3.7	16.7	184.8
49	4/6/2010	Inside	OuterWheelPath	842.7	3.7	19.2	251.4
50	4/6/2010	Inside	OuterWheelPath	1323.7	3.7	19.7	176.8
51	4/6/2010	Inside	Midlane	988.4	3.7	14.9	227.7
52	4/6/2010	Inside	Midlane	1152.3	3.5	15.1	202.0
53	4/6/2010	Inside	Midlane	1355.4	3.5	17.2	175.9
54	4/6/2010	Inside	Midlane	1037.1	3.3	19.3	214.0
55	4/6/2010	Inside	Midlane	1172.8	3.9	19.4	194.5
56	9/20/2010	Outside	OuterWheelPath	1325.2	5.8	18.8	177.5
57	9/20/2010	Outside	OuterWheelPath	1541.1	6.0	19.4	157.4
58	9/20/2010	Outside	OuterWheelPath	1467.0	5.5	20.5	162.7
59	9/20/2010	Outside	OuterWheelPath	1235.2	4.8	22.3	184.3
60	9/20/2010	Outside	OuterWheelPath	1187.5	5.7	22.4	189.9
61	9/20/2010	Outside	Midlane	1348.4	5.3	18.6	175.3
62	9/20/2010	Outside	Midlane	1277.9	6.2	18.9	182.4
63	9/20/2010	Outside	Midlane	1100.1	5.6	19.5	204.2
64	9/20/2010	Outside	Midlane	1070.6	5.3	22.0	206.1
65	9/20/2010	Outside	Midlane	993.0	6.1	22.0	218.5
66	9/20/2010	Inside	OuterWheelPath	735.8	5.1	17.5	281.8
67	9/20/2010	Inside	OuterWheelPath	1023.1	5.5	18.1	217.6
68	9/20/2010	Inside	OuterWheelPath	1014.9	5.4	19.3	217.6
69	9/20/2010	Inside	OuterWheelPath	761.5	5.2	24.0	266.1
70	9/20/2010	Inside	OuterWheelPath	1088.7	5.3	23.3	202.4
71	9/20/2010	Inside	Midlane	825.3	5.1	16.9	258.7
72	9/20/2010	Inside	Midlane	942.8	4.9	17.5	232.6
73	9/20/2010	Inside	Midlane	1125.3	5.0	20.0	200.2
74	9/20/2010	Inside	Midlane	912.9	5.2	23.5	231.7
75	9/20/2010	Inside	Midlane	1041.5	5.5	24.0	208.8
76	5/13/2011	Outside	OuterWheelPath	1051.4	3.7	15.3	216.6
77	5/13/2011	Outside	OuterWheelPath	1498.3	3.4	16.8	163.1
78	5/13/2011	Outside	OuterWheelPath	965.4	3.7	15.1	231.6
79	5/13/2011	Outside	OuterWheelPath	1306.2	3.6	16.9	181.3
80	5/13/2011	Outside	OuterWheelPath	1008.9	3.5	15.6	223.2

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
81	5/13/2011	Outside	OuterWheelPath	1110.6	3.2	17.1	205.3
82	5/13/2011	Outside	OuterWheelPath	991.7	3.2	16.8	224.5
83	5/13/2011	Outside	OuterWheelPath	840.0	3.8	16.4	255.9
84	5/13/2011	Outside	OuterWheelPath	885.9	3.3	16.1	246.0
85	5/13/2011	Outside	Midlane	1132.3	3.3	15.6	204.1
86	5/13/2011	Outside	Midlane	1117.5	3.4	15.7	206.1
87	5/13/2011	Outside	Midlane	756.5	3.0	14.4	281.0
88	5/13/2011	Outside	Midlane	975.1	3.5	15.7	229.0
89	5/13/2011	Outside	Midlane	820.6	3.2	15.6	261.9
90	5/13/2011	Outside	Midlane	848.5	3.2	16.0	254.5
91	5/13/2011	Outside	Midlane	828.7	2.9	16.7	258.2
92	5/13/2011	Outside	Midlane	791.7	3.5	16.4	267.9
93	5/13/2011	Outside	Midlane	840.4	3.2	16.1	256.3
94	5/13/2011	Inside	OuterWheelPath	587.0	3.5	13.4	344.4
95	5/13/2011	Inside	OuterWheelPath	804.4	3.8	13.6	269.5
96	5/13/2011	Inside	OuterWheelPath	799.0	3.5	13.5	271.1
97	5/13/2011	Inside	OuterWheelPath	878.1	3.6	14.2	250.8
98	5/13/2011	Inside	OuterWheelPath	826.9	3.6	14.7	261.8
99	5/13/2011	Inside	OuterWheelPath	761.3	3.5	14.9	278.7
100	5/13/2011	Inside	OuterWheelPath	532.7	3.4	17.1	362.6
101	5/13/2011	Inside	OuterWheelPath	770.9	3.9	16.8	272.9
102	5/13/2011	Inside	OuterWheelPath	863.6	3.4	17.4	249.1
103	5/13/2011	Inside	OuterWheelPath	831.6	3.5	16.6	257.6
104	5/13/2011	Inside	Midlane	619.3	3.3	13.4	330.4
105	5/13/2011	Inside	Midlane	766.4	3.9	13.7	279.6
106	5/13/2011	Inside	Midlane	747.5	3.4	13.6	285.2
107	5/13/2011	Inside	Midlane	805.3	3.8	14.2	268.1
108	5/13/2011	Inside	Midlane	863.9	3.5	15.0	252.6
109	5/13/2011	Inside	Midlane	738.6	3.6	15.1	285.0
110	5/13/2011	Inside	Midlane	660.6	3.5	16.6	307.9
111	5/13/2011	Inside	Midlane	785.9	3.8	17.3	268.1
112	5/13/2011	Inside	Midlane	759.6	3.7	17.2	275.4
113	5/13/2011	Inside	Midlane	819.8	3.6	16.8	260.2

Modulus 6.0 0utput For Cell 33 in Temperature Range 15 to 20°C (Cell33-temp20.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	4/14/2009	Outside	OuterWheelPath	645.9	16.6	10.2	328.4
2	4/14/2009	Outside	OuterWheelPath	501.0	10.2	10.7	397.9
3	4/14/2009	Outside	OuterWheelPath	474.2	11.5	11.7	411.6
4	4/12/2011	Outside	OuterWheelPath	394.2	3.3	14.0	466.7
5	4/12/2011	Outside	OuterWheelPath	428.3	3.1	13.9	438.0
6	4/12/2011	Outside	OuterWheelPath	398.3	2.9	14.3	462.1
7	4/12/2011	Outside	OuterWheelPath	391.1	2.6	14.4	468.3
8	5/31/2011	Outside	OuterWheelPath	382.0	3.9	14.6	476.3
9	5/31/2011	Outside	OuterWheelPath	305.2	4.2	13.7	570.2
10	5/31/2011	Outside	OuterWheelPath	373.9	3.7	13.9	486.6
11	5/31/2011	Outside	OuterWheelPath	383.9	4.0	14.3	475.4
12	5/31/2011	Outside	OuterWheelPath	318.6	3.9	14.0	550.4
13	5/31/2011	Outside	OuterWheelPath	423.7	3.8	15.5	437.0
14	5/31/2011	Outside	OuterWheelPath	346.3	3.6	14.4	514.6
15	5/31/2011	Outside	OuterWheelPath	420.7	3.3	16.7	436.3
16	5/31/2011	Outside	OuterWheelPath	390.6	3.2	16.7	462.1
17	5/31/2011	Outside	OuterWheelPath	362.2	4.0	17.1	488.8
18	5/31/2011	Outside	OuterWheelPath	362.2	3.4	15.8	492.5
19	5/31/2011	Outside	Midlane	465.4	3.5	14.3	409.6
20	5/31/2011	Outside	Midlane	379.8	3.5	13.6	481.7
21	5/31/2011	Outside	Midlane	403.9	3.6	13.8	458.7
22	5/31/2011	Outside	Midlane	310.5	3.2	13.2	564.6
23	5/31/2011	Outside	Midlane	373.8	3.5	14.2	485.7
24	5/31/2011	Outside	Midlane	345.6	3.4	14.8	514.0
25	5/31/2011	Outside	Midlane	365.6	3.3	15.7	489.3
26	5/31/2011	Outside	Midlane	351.1	3.2	16.0	503.9
27	5/31/2011	Outside	Midlane	338.3	3.8	16.6	516.8
28	5/31/2011	Inside	Midlane	418.0	2.8	12.3	451.7
29	5/31/2011	Inside	Midlane	409.5	4.0	12.6	457.8
30	5/31/2011	Inside	Midlane	405.9	2.4	12.2	462.4
31	5/31/2011	Inside	Midlane	421.2	3.7	13.2	445.9
32	5/31/2011	Inside	Midlane	436.9	3.3	13.7	431.9
33	5/31/2011	Inside	Midlane	406.0	3.4	14.2	455.6
34	5/31/2011	Inside	Midlane	408.7	3.3	16.8	445.9
35	5/31/2011	Inside	Midlane	448.8	3.7	17.2	413.8
36	5/31/2011	Inside	Midlane	420.9	3.6	17.4	434.4
37	5/31/2011	Inside	Midlane	458.1	3.5	16.7	408.5
38	5/31/2011	Inside	OuterWheelPath	326.0	3.3	12.4	547.1

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	5/31/2011	Inside	OuterWheelPath	417.8	3.8	13.0	449.4
40	5/31/2011	Inside	OuterWheelPath	400.2	2.9	12.8	465.3
41	5/31/2011	Inside	OuterWheelPath	448.0	3.5	13.4	424.5
42	5/31/2011	Inside	OuterWheelPath	480.9	3.4	13.8	400.7
43	5/31/2011	Inside	OuterWheelPath	436.0	3.5	14.7	429.7
44	5/31/2011	Inside	OuterWheelPath	380.0	3.3	17.3	470.4
45	5/31/2011	Inside	OuterWheelPath	475.3	3.8	17.5	395.2
46	5/31/2011	Inside	OuterWheelPath	469.7	3.4	17.4	399.0
47	5/31/2011	Inside	OuterWheelPath	449.7	3.7	16.4	415.1

Modulus 6.0 0utput For Cell 33 in Temperature Range 20 to 25°C (Cell33-temp25.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	4/14/2009	Outside	Midlane	567.3	12.3	9.9	364.2
2	4/14/2009	Outside	Midlane	567.8	13.1	10.1	363.2
3	4/14/2009	Outside	Midlane	513.8	10.2	10.2	392.0
4	4/14/2009	Outside	Midlane	447.3	8.5	11.6	431.0
5	6/16/2009	Outside	OuterWheelPath	685.1	4.7	16.0	300.4
6	6/16/2009	Outside	OuterWheelPath	797.4	4.4	16.6	266.1
7	6/16/2009	Outside	OuterWheelPath	799.9	4.2	17.8	263.7
8	6/16/2009	Outside	OuterWheelPath	660.8	3.9	18.7	304.2
9	6/16/2009	Outside	OuterWheelPath	636.1	4.7	19.7	311.8
10	6/16/2009	Outside	Midlane	705.9	3.7	15.5	294.4
11	6/16/2009	Outside	Midlane	686.2	4.2	15.8	300.4
12	6/16/2009	Outside	Midlane	587.6	4.0	18.6	333.4
13	6/16/2009	Outside	Midlane	583.3	4.6	19.2	334.2
14	6/16/2009	Inside	OuterWheelPath	636.0	4.6	16.6	317.0
15	6/16/2009	Inside	OuterWheelPath	487.8	4.7	21.3	380.0
16	6/16/2009	Inside	OuterWheelPath	679.5	4.8	21.0	294.4
17	6/16/2009	Inside	Midlane	604.6	4.2	16.1	330.7
18	6/16/2009	Inside	Midlane	548.0	5.0	20.6	348.4
19	8/3/2009	Inside	OuterWheelPath	234.4	4.8	14.3	696.5
20	8/3/2009	Inside	OuterWheelPath	238.6	4.5	13.6	690.3
21	8/3/2009	Inside	OuterWheelPath	249.8	5.9	13.8	665.3
22	8/3/2009	Inside	OuterWheelPath	233.0	4.9	13.7	702.6
23	8/3/2009	Inside	OuterWheelPath	282.6	5.7	14.8	600.6
24	8/5/2009	Inside	OuterWheelPath	222.5	4.7	12.9	732.4
25	8/5/2009	Inside	OuterWheelPath	243.0	5.5	12.6	685.7
26	8/5/2009	Inside	OuterWheelPath	218.2	4.6	12.4	746.4
27	8/5/2009	Inside	OuterWheelPath	263.0	5.4	13.4	641.1
28	8/5/2009	Inside	OuterWheelPath	264.3	5.2	13.9	636.4
29	8/5/2009	Inside	OuterWheelPath	260.2	5.3	14.5	641.5
30	8/5/2009	Inside	OuterWheelPath	227.2	4.8	18.8	694.8
31	8/5/2009	Inside	OuterWheelPath	324.9	6.1	18.0	529.0
32	8/5/2009	Inside	OuterWheelPath	285.8	5.5	17.8	584.8
33	8/5/2009	Inside	OuterWheelPath	274.8	5.6	17.6	603.5
34	6/3/2010	Outside	OuterWheelPath	464.5	4.7	14.9	408.6
35	6/3/2010	Outside	OuterWheelPath	503.2	4.5	14.6	384.8
36	6/3/2010	Outside	OuterWheelPath	498.0	4.5	16.1	384.2
37	6/3/2010	Outside	OuterWheelPath	446.0	4.1	17.3	415.6

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
38	6/3/2010	Outside	OuterWheelPath	446.4	4.9	17.9	413.9
39	6/3/2010	Outside	Midlane	464.5	4.0	14.2	410.5
40	6/3/2010	Outside	Midlane	428.7	4.6	14.5	435.9
41	6/3/2010	Outside	Midlane	367.8	4.3	14.9	489.5
42	6/3/2010	Outside	Midlane	347.3	4.1	16.4	507.0
43	6/3/2010	Outside	Midlane	354.0	4.9	17.4	496.7
44	6/3/2010	Inside	Midlane	341.1	3.1	12.6	527.4
45	6/3/2010	Inside	Midlane	353.0	2.5	12.3	514.8
46	6/3/2010	Inside	Midlane	413.6	4.3	13.9	450.0
47	6/3/2010	Inside	Midlane	346.6	3.8	17.6	504.3
48	6/3/2010	Inside	Midlane	410.7	4.2	18.9	439.2
49	6/3/2010	Inside	OuterWheelPath	310.4	3.9	13.1	565.2
50	6/3/2010	Inside	OuterWheelPath	346.1	3.8	13.0	519.9
51	6/3/2010	Inside	OuterWheelPath	400.7	4.1	14.4	459.6
52	6/3/2010	Inside	OuterWheelPath	348.2	4.1	19.1	498.5
53	6/3/2010	Inside	OuterWheelPath	442.6	4.4	19.3	413.6
54	7/28/2010	Outside	Midlane	769.1	4.5	16.8	273.4
55	7/28/2010	Outside	Midlane	711.5	5.1	16.7	290.5
56	7/28/2010	Outside	Midlane	701.0	4.8	17.7	292.2
57	7/28/2010	Outside	Midlane	701.4	4.4	19.6	289.2
58	7/28/2010	Outside	Midlane	672.3	5.0	20.1	298.1
59	7/28/2010	Outside	OuterWheelPath	788.1	4.8	17.3	267.5
60	7/28/2010	Outside	OuterWheelPath	845.9	4.8	17.5	252.9
61	7/28/2010	Outside	OuterWheelPath	906.2	4.5	18.9	238.0
62	7/28/2010	Outside	OuterWheelPath	799.4	4.2	19.8	261.1
63	7/28/2010	Outside	OuterWheelPath	788.1	4.9	21.3	262.1
64	7/28/2010	Inside	OuterWheelPath	534.2	4.4	15.6	365.0
65	7/28/2010	Inside	OuterWheelPath	615.9	4.9	15.7	326.8
66	7/28/2010	Inside	OuterWheelPath	713.8	5.2	17.6	288.3
67	7/28/2010	Inside	OuterWheelPath	595.5	5.3	22.3	324.2
68	7/28/2010	Inside	OuterWheelPath	752.4	5.7	21.9	271.0
69	7/28/2010	Inside	Midlane	565.6	3.7	14.6	351.5
70	7/28/2010	Inside	Midlane	582.5	3.8	14.9	342.9
71	7/28/2010	Inside	Midlane	762.6	4.7	17.5	274.1
72	7/28/2010	Inside	Midlane	675.8	4.9	21.5	295.0
73	7/28/2010	Inside	Midlane	697.8	5.6	22.3	286.7
74	9/27/2010	Outside	OuterWheelPath	536.3	6.4	17.7	359.5
75	9/27/2010	Outside	OuterWheelPath	633.9	6.4	17.2	316.7
76	9/27/2010	Outside	OuterWheelPath	609.6	6.4	18.4	324.4
77	9/27/2010	Outside	OuterWheelPath	540.7	5.7	19.4	354.1
78	9/27/2010	Outside	OuterWheelPath	482.5	6.6	20.0	385.6
79	9/27/2010	Outside	Midlane	533.3	5.6	16.3	364.0
80	9/27/2010	Outside	Midlane	482.5	6.5	16.5	392.8

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
81	9/27/2010	Outside	Midlane	449.8	6.0	16.9	413.8
82	9/27/2010	Outside	Midlane	416.6	5.9	19.1	433.9
83	9/27/2010	Inside	Midlane	366.6	4.5	14.4	492.4
84	9/27/2010	Inside	Midlane	372.2	4.4	14.1	487.6
85	9/27/2010	Inside	Midlane	466.6	4.7	16.3	403.6
86	9/27/2010	Inside	Midlane	390.0	5.0	19.7	455.3
87	9/27/2010	Inside	Midlane	458.9	5.2	20.1	400.6
88	9/27/2010	Inside	OuterWheelPath	340.6	4.4	15.3	518.1
89	9/27/2010	Inside	OuterWheelPath	396.7	4.5	14.9	461.7
90	9/27/2010	Inside	OuterWheelPath	440.2	4.7	16.7	421.2
91	9/27/2010	Inside	OuterWheelPath	372.9	4.8	21.4	467.6
92	4/12/2011	Outside	OuterWheelPath	359.0	3.0	14.8	499.1
93	4/12/2011	Outside	Midlane	367.9	2.5	13.0	495.9
94	4/12/2011	Outside	Midlane	313.7	2.6	12.3	564.0
95	4/12/2011	Outside	Midlane	321.4	2.6	12.6	552.3
96	4/12/2011	Outside	Midlane	298.5	2.7	13.6	580.5
97	4/12/2011	Outside	Midlane	258.2	2.8	14.1	647.1
98	4/12/2011	Inside	Midlane	281.4	3.1	12.2	614.0
99	4/12/2011	Inside	Midlane	289.9	2.8	11.8	602.0
100	4/12/2011	Inside	Midlane	359.8	3.0	13.0	504.5
101	4/12/2011	Inside	Midlane	276.3	3.0	14.5	612.4
102	4/12/2011	Inside	Midlane	329.6	3.1	15.5	530.8
103	4/12/2011	Inside	OuterWheelPath	285.5	3.0	12.6	605.3
104	4/12/2011	Inside	OuterWheelPath	327.6	2.9	12.5	544.6
105	4/12/2011	Inside	OuterWheelPath	368.1	3.3	14.0	492.1
106	4/12/2011	Inside	OuterWheelPath	274.9	3.0	16.4	607.5
107	4/12/2011	Inside	OuterWheelPath	368.5	3.2	16.4	484.2
108	9/7/2011	Outside	OuterWheelPath	355.5	4.5	14.2	504.9
109	9/7/2011	Outside	OuterWheelPath	330.9	4.7	14.6	532.3
110	9/7/2011	Outside	OuterWheelPath	360.9	4.8	14.9	496.7
111	9/7/2011	Outside	OuterWheelPath	284.0	4.2	14.7	598.7
112	9/7/2011	Outside	OuterWheelPath	375.2	4.2	16.1	478.4
113	9/7/2011	Outside	OuterWheelPath	348.0	4.0	16.3	506.5
114	9/7/2011	Outside	OuterWheelPath	341.5	4.0	17.8	509.6
115	9/7/2011	Outside	OuterWheelPath	340.3	4.0	19.1	507.5
116	9/7/2011	Outside	OuterWheelPath	335.3	5.1	19.4	512.5
117	9/7/2011	Outside	OuterWheelPath	309.3	3.7	18.3	548.7

Modulus 6.0 0utput For Cell 33 in Temperature Range 25 to 30°C (Cell33-temp30.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	8/6/2007	Outside	OuterWheelPath	404.7	5.0	14.2	456.7
2	8/6/2007	Outside	OuterWheelPath	568.9	7.3	15.8	347.3
3	8/6/2007	Outside	OuterWheelPath	484.7	5.7	14.6	396.1
4	8/6/2007	Outside	OuterWheelPath	617.7	6.5	16.2	325.0
5	8/6/2007	Outside	OuterWheelPath	658.3	6.2	17.6	306.9
6	8/6/2007	Outside	OuterWheelPath	527.8	5.8	22.1	356.2
7	8/6/2007	Outside	OuterWheelPath	308.6	6.3	18.9	547.9
8	8/6/2007	Outside	OuterWheelPath	934.7	6.0	23.6	227.4
9	8/6/2007	Outside	OuterWheelPath	582.7	7.3	21.8	330.4
10	10/3/2007	Outside	OuterWheelPath	174.9	4.7	17.3	857.7
11	10/3/2007	Outside	OuterWheelPath	199.6	6.3	17.1	775.2
12	10/3/2007	Outside	OuterWheelPath	183.3	4.7	16.7	829.9
13	10/3/2007	Outside	OuterWheelPath	210.3	5.7	17.5	742.8
14	10/3/2007	Outside	OuterWheelPath	223.5	5.7	18.6	704.4
15	10/3/2007	Outside	OuterWheelPath	218.6	6.2	19.7	712.6
16	10/3/2007	Outside	OuterWheelPath	200.9	5.7	20.1	759.3
17	10/3/2007	Outside	OuterWheelPath	265.2	6.5	23.2	604.0
18	10/3/2007	Outside	OuterWheelPath	251.2	6.0	23.6	628.8
19	10/3/2007	Outside	OuterWheelPath	240.2	6.8	23.4	651.6
20	10/4/2007	Outside	Midlane	158.7	4.4	15.1	937.0
21	10/4/2007	Outside	Midlane	180.6	5.9	16.0	843.0
22	10/4/2007	Outside	Midlane	171.1	4.0	15.5	881.7
23	10/4/2007	Outside	Midlane	187.9	5.8	16.7	814.1
24	10/4/2007	Outside	Midlane	197.9	5.3	18.1	776.0
25	10/4/2007	Outside	Midlane	199.9	5.7	19.2	765.6
26	10/4/2007	Outside	Midlane	231.2	4.8	23.1	671.9
27	10/4/2007	Outside	Midlane	263.9	6.0	23.8	604.8
28	10/4/2007	Outside	Midlane	224.5	6.6	22.5	689.2
29	10/4/2007	Outside	Midlane	224.8	6.7	22.5	688.5
30	5/22/2008	Inside	OuterWheelPath	178.4	3.7	13.6	864.6
31	5/22/2008	Inside	OuterWheelPath	192.5	4.7	13.1	818.1
32	5/22/2008	Inside	OuterWheelPath	163.8	3.8	13.1	927.0
33	5/22/2008	Inside	OuterWheelPath	183.3	4.7	13.4	847.8
34	5/22/2008	Inside	OuterWheelPath	198.0	4.5	14.1	794.8
35	5/22/2008	Inside	OuterWheelPath	202.6	4.1	14.4	779.2
36	5/22/2008	Inside	OuterWheelPath	190.2	3.8	18.7	797.7
37	5/22/2008	Inside	OuterWheelPath	213.5	4.7	18.4	730.6
38	5/22/2008	Inside	OuterWheelPath	215.7	5.1	17.9	726.8

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	7/3/2008	Inside	OuterWheelPath	297.0	4.6	18.5	565.6
40	7/3/2008	Inside	OuterWheelPath	266.7	4.3	18.7	614.1
41	7/3/2008	Inside	OuterWheelPath	256.1	4.6	17.9	636.3
42	8/18/2008	Outside	OuterWheelPath	331.1	5.6	15.6	528.6
43	8/18/2008	Outside	OuterWheelPath	319.3	6.0	18.7	534.2
44	9/8/2009	Outside	OuterWheelPath	295.6	7.3	14.8	580.1
45	9/8/2009	Outside	OuterWheelPath	302.0	6.8	14.3	572.4
46	9/8/2009	Outside	OuterWheelPath	340.6	7.4	15.2	518.5
47	9/8/2009	Outside	OuterWheelPath	271.1	6.5	14.9	619.8
48	9/8/2009	Outside	OuterWheelPath	350.8	6.6	16.1	504.0
49	9/8/2009	Outside	OuterWheelPath	332.6	6.4	15.9	525.8
50	9/8/2009	Outside	OuterWheelPath	345.7	5.7	17.0	507.0
51	9/8/2009	Outside	OuterWheelPath	338.5	6.2	17.4	514.2
52	9/8/2009	Outside	OuterWheelPath	329.9	7.1	17.8	523.4
53	9/8/2009	Outside	OuterWheelPath	305.3	6.3	16.6	559.5
54	9/8/2009	Outside	Midlane	315.3	6.3	14.0	554.8
55	9/27/2010	Outside	Midlane	399.0	6.6	19.6	447.5
56	9/27/2010	Inside	OuterWheelPath	479.4	4.7	20.5	386.6
57	10/8/2010	Outside	OuterWheelPath	445.3	7.0	17.4	415.8
58	10/8/2010	Outside	OuterWheelPath	376.1	7.8	17.1	474.7
59	10/8/2010	Outside	OuterWheelPath	502.2	7.5	17.8	378.1
60	10/8/2010	Outside	OuterWheelPath	389.2	6.7	17.7	460.8
61	10/8/2010	Outside	OuterWheelPath	485.9	6.7	18.7	386.0
62	10/8/2010	Outside	OuterWheelPath	424.3	6.2	18.0	430.3
63	10/8/2010	Outside	OuterWheelPath	463.1	5.8	19.5	399.0
64	10/8/2010	Outside	OuterWheelPath	436.2	5.5	19.5	417.9
65	10/8/2010	Outside	OuterWheelPath	412.5	7.2	20.4	434.5
66	10/8/2010	Outside	OuterWheelPath	373.6	6.4	19.7	470.7
67	6/29/2011	Inside	OuterWheelPath	234.3	4.1	12.2	707.5
68	6/29/2011	Inside	OuterWheelPath	245.3	3.7	12.7	680.2
69	6/29/2011	Inside	OuterWheelPath	247.6	3.7	14.0	668.9
70	6/29/2011	Inside	OuterWheelPath	233.1	3.6	17.6	685.5
71	6/29/2011	Inside	OuterWheelPath	261.4	4.3	16.3	632.0
72	6/29/2011	Inside	OuterWheelPath	258.8	3.9	16.5	636.2
73	6/29/2011	Inside	OuterWheelPath	265.0	4.1	16.1	626.1
74	6/29/2011	Inside	Midlane	219.9	4.2	11.6	746.8
75	9/7/2011	Inside	Midlane	262.1	4.7	13.6	641.9
76	9/7/2011	Inside	Midlane	307.4	5.8	14.1	565.4
77	9/7/2011	Inside	Midlane	250.9	4.3	12.9	667.4
78	9/7/2011	Inside	Midlane	272.8	5.7	14.4	618.9
79	9/7/2011	Inside	Midlane	313.3	5.1	15.5	552.1
80	9/7/2011	Inside	Midlane	294.8	5.5	16.7	574.5
81	9/7/2011	Inside	Midlane	314.0	5.2	20.3	536.9

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	9/7/2011	Inside	Midlane	315.3	6.4	19.7	536.7
83	9/7/2011	Inside	Midlane	317.2	5.5	21.0	530.9
84	9/7/2011	Inside	OuterWheelPath	268.9	4.6	14.7	624.6
85	9/7/2011	Inside	OuterWheelPath	306.0	6.1	15.1	563.7
86	9/7/2011	Inside	OuterWheelPath	268.5	5.0	14.2	627.4
87	9/7/2011	Inside	OuterWheelPath	312.1	5.7	15.4	554.1
88	9/7/2011	Inside	OuterWheelPath	312.3	5.8	16.0	551.7
89	9/7/2011	Inside	OuterWheelPath	310.3	5.8	17.0	551.2
90	9/7/2011	Inside	OuterWheelPath	317.4	5.2	22.6	526.9
91	9/7/2011	Inside	OuterWheelPath	335.3	6.6	20.0	511.0
92	9/7/2011	Inside	OuterWheelPath	336.6	6.1	20.3	508.8
93	9/7/2011	Inside	OuterWheelPath	327.8	6.4	19.9	520.3

Modulus 6.0 0utput For Cell 33 in Temperature Range 30 to 35°C (Cell33-temp35.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	7/16/2007	Inside	OuterWheelPath	398.5	5.7	14.6	460.9
2	7/16/2007	Inside	OuterWheelPath	461.9	6.6	15.7	408.3
3	7/16/2007	Inside	OuterWheelPath	453.2	5.9	14.9	416.4
4	7/16/2007	Inside	OuterWheelPath	274.0	8.9	12.6	624.8
5	7/16/2007	Inside	OuterWheelPath	492.3	6.7	17.3	385.0
6	7/16/2007	Inside	OuterWheelPath	504.3	5.6	17.7	377.0
7	7/16/2007	Inside	OuterWheelPath	476.5	5.2	19.1	391.1
8	7/16/2007	Inside	OuterWheelPath	458.1	5.2	20.0	401.4
9	7/16/2007	Inside	OuterWheelPath	680.8	7.1	22.0	292.7
10	7/16/2007	Inside	OuterWheelPath	541.6	7.3	19.7	353.1
11	8/8/2007	Outside	OuterWheelPath	263.2	6.3	14.4	636.3
12	8/8/2007	Outside	OuterWheelPath	345.2	9.0	15.7	511.5
13	8/8/2007	Outside	OuterWheelPath	355.2	5.8	14.8	503.2
14	8/8/2007	Outside	OuterWheelPath	413.1	7.5	16.2	443.8
15	8/8/2007	Outside	OuterWheelPath	378.2	8.2	17.0	473.0
16	8/8/2007	Outside	OuterWheelPath	409.3	7.2	17.5	443.6
17	8/8/2007	Outside	OuterWheelPath	373.6	6.8	22.0	465.7
18	8/8/2007	Outside	OuterWheelPath	270.2	6.9	20.6	602.2
19	8/8/2007	Outside	OuterWheelPath	579.7	7.7	22.4	330.9
20	8/8/2007	Outside	OuterWheelPath	415.7	8.9	21.5	429.7
21	7/15/2008	Outside	OuterWheelPath	263.6	5.3	14.1	636.9
22	7/15/2008	Outside	OuterWheelPath	238.9	5.9	14.4	685.8
23	7/15/2008	Outside	OuterWheelPath	303.7	5.5	14.3	570.0
24	7/15/2008	Outside	OuterWheelPath	312.8	4.7	15.5	552.7
25	7/15/2008	Outside	OuterWheelPath	294.4	5.0	16.0	577.5
26	7/15/2008	Outside	OuterWheelPath	291.3	4.5	17.7	576.6
27	7/15/2008	Outside	OuterWheelPath	285.4	4.8	19.0	581.8
28	7/15/2008	Outside	OuterWheelPath	292.3	6.1	19.7	569.1
29	7/15/2008	Outside	OuterWheelPath	267.6	4.6	18.0	614.7
30	7/21/2008	Outside	OuterWheelPath	186.3	5.5	12.7	841.6
31	7/21/2008	Outside	OuterWheelPath	199.6	5.8	13.0	796.1
32	7/21/2008	Outside	OuterWheelPath	203.1	6.0	12.8	786.6
33	7/21/2008	Outside	OuterWheelPath	177.6	4.4	12.5	874.7
34	7/21/2008	Outside	OuterWheelPath	191.1	5.3	13.8	818.6
35	7/21/2008	Outside	OuterWheelPath	216.2	4.6	15.6	735.2
36	7/21/2008	Outside	Midlane	176.3	3.7	10.6	893.9
37	7/21/2008	Outside	Midlane	158.7	4.5	10.9	967.1
38	7/21/2008	Outside	Midlane	159.9	4.4	11.1	959.7

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	7/21/2008	Outside	Midlane	154.1	4.7	11.8	981.7
40	7/21/2008	Outside	Midlane	169.3	4.9	16.8	882.0
41	7/21/2008	Outside	Midlane	171.7	5.9	17.2	870.5
42	7/21/2008	Outside	Midlane	167.1	5.2	15.6	897.4
43	7/21/2008	Outside	Midlane	157.1	5.1	14.7	946.8
44	7/22/2008	Inside	Midlane	178.4	2.8	9.6	894.3
45	7/22/2008	Inside	Midlane	180.9	3.9	10.4	877.8
46	7/22/2008	Inside	Midlane	168.3	2.6	10.3	929.2
47	7/22/2008	Inside	Midlane	184.5	4.5	10.9	860.6
48	7/22/2008	Inside	Midlane	178.2	4.0	11.7	878.0
49	7/22/2008	Inside	Midlane	182.6	4.3	12.7	854.8
50	7/22/2008	Inside	OuterWheelPath	192.2	3.1	11.5	829.5
51	7/22/2008	Inside	OuterWheelPath	212.0	4.4	11.6	768.2
52	7/22/2008	Inside	OuterWheelPath	173.6	3.4	11.5	897.5
53	7/22/2008	Inside	OuterWheelPath	224.8	4.3	12.5	728.8
54	7/22/2008	Inside	OuterWheelPath	226.2	4.1	13.4	720.5
55	7/22/2008	Inside	OuterWheelPath	228.3	4.0	13.9	712.8
56	7/22/2008	Inside	OuterWheelPath	215.4	4.0	18.4	725.6
57	7/22/2008	Inside	OuterWheelPath	210.1	3.8	17.3	744.2
58	7/22/2008	Inside	OuterWheelPath	277.6	5.0	18.1	597.2
59	8/18/2008	Inside	OuterWheelPath	268.6	5.0	15.8	620.8
60	7/21/2009	Outside	OuterWheelPath	267.2	5.7	14.5	628.5
61	7/21/2009	Outside	OuterWheelPath	308.3	5.8	15.1	560.4
62	7/21/2009	Outside	OuterWheelPath	277.7	6.2	16.5	602.4
63	7/21/2009	Outside	OuterWheelPath	282.9	5.3	17.8	589.5
64	7/21/2009	Outside	OuterWheelPath	267.8	6.5	19.3	610.2
65	7/21/2009	Outside	Midlane	275.3	5.4	13.9	616.7
66	7/21/2009	Outside	Midlane	274.5	5.4	14.2	616.8
67	7/21/2009	Outside	Midlane	242.7	5.3	15.3	673.5
68	7/21/2009	Outside	Midlane	266.8	5.2	18.1	615.8
69	7/21/2009	Outside	Midlane	241.5	6.0	18.7	663.1
70	7/21/2009	Inside	Midlane	262.3	4.0	12.6	646.3
71	7/21/2009	Inside	Midlane	238.6	4.0	12.5	696.0
72	7/21/2009	Inside	Midlane	290.2	5.1	14.7	588.8
73	7/21/2009	Inside	Midlane	251.6	4.9	19.0	641.4
74	7/21/2009	Inside	Midlane	268.4	5.7	19.4	608.9
75	7/21/2009	Inside	OuterWheelPath	252.3	4.2	13.8	660.2
76	7/21/2009	Inside	OuterWheelPath	256.2	4.4	13.8	652.4
77	7/21/2009	Inside	OuterWheelPath	314.6	4.8	15.6	550.0
78	7/21/2009	Inside	OuterWheelPath	271.2	4.9	21.3	598.6
79	7/21/2009	Inside	OuterWheelPath	326.9	5.6	20.1	520.9
80	6/29/2011	Inside	OuterWheelPath	207.5	3.3	12.2	777.3
81	6/29/2011	Inside	OuterWheelPath	212.7	3.2	11.5	766.9

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	6/29/2011	Inside	OuterWheelPath	265.3	3.9	13.2	637.8
83	6/29/2011	Inside	Midlane	210.1	3.2	11.4	774.9
84	6/29/2011	Inside	Midlane	216.4	3.7	12.0	753.6
85	6/29/2011	Inside	Midlane	244.4	3.2	12.6	682.7
86	6/29/2011	Inside	Midlane	221.2	3.8	13.6	732.0
87	6/29/2011	Inside	Midlane	229.2	3.6	16.3	699.7
88	6/29/2011	Inside	Midlane	261.6	4.6	16.9	629.5
89	6/29/2011	Inside	Midlane	229.9	4.0	16.8	696.1
90	6/29/2011	Inside	Midlane	223.9	4.2	16.0	713.8

Modulus 6.0 0utput For FWD Cell 33 in Temperature Range 35 to 40°C (Cell33-temp40.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	7/30/2007	Inside	OuterWheelPath	346.6	6.0	14.5	513.9
2	7/30/2007	Inside	OuterWheelPath	365.8	7.1	15.6	489.4
3	7/30/2007	Inside	OuterWheelPath	341.9	6.5	14.3	520.0
4	7/30/2007	Inside	OuterWheelPath	293.1	5.8	14.6	584.7
5	7/30/2007	Inside	OuterWheelPath	445.7	7.0	17.1	416.3
6	7/30/2007	Inside	OuterWheelPath	415.1	6.4	17.3	439.3
7	7/30/2007	Inside	OuterWheelPath	343.8	5.8	18.6	504.8
8	7/30/2007	Inside	OuterWheelPath	394.4	5.3	20.2	450.2
9	7/30/2007	Inside	OuterWheelPath	642.6	7.4	22.0	306.0
10	7/30/2007	Inside	OuterWheelPath	459.9	8.1	18.8	402.6
11	7/30/2007	Outside	OuterWheelPath	199.4	4.8	13.3	794.9
12	7/30/2007	Outside	OuterWheelPath	216.4	7.9	14.5	739.9
13	7/30/2007	Outside	OuterWheelPath	209.7	5.3	13.6	762.9
14	7/30/2007	Outside	OuterWheelPath	298.7	6.3	15.5	572.8
15	7/30/2007	Outside	OuterWheelPath	263.9	7.4	16.2	627.8
16	7/30/2007	Outside	OuterWheelPath	239.6	7.6	16.5	675.3
17	7/30/2007	Outside	OuterWheelPath	305.2	5.8	21.9	544.8
18	7/30/2007	Outside	OuterWheelPath	224.2	5.7	19.6	699.2
19	7/30/2007	Outside	OuterWheelPath	328.4	8.0	21.1	516.6
20	7/30/2007	Outside	OuterWheelPath	308.3	8.0	21.2	542.3
21	8/1/2007	Outside	Midlane	220.0	3.9	11.6	746.5
22	8/1/2007	Outside	Midlane	246.7	7.4	14.3	669.5
23	8/1/2007	Outside	Midlane	223.7	4.1	12.3	732.8
24	8/1/2007	Outside	Midlane	250.1	6.4	14.4	662.0
25	8/1/2007	Outside	Midlane	265.6	6.7	16.1	625.0
26	8/1/2007	Outside	Midlane	259.1	6.9	16.9	634.2
27	8/1/2007	Outside	Midlane	277.8	6.1	20.9	588.6
28	8/1/2007	Outside	Midlane	199.2	5.6	19.4	766.9
29	8/1/2007	Outside	Midlane	337.8	7.4	22.0	503.4
30	8/1/2007	Outside	Midlane	291.0	8.4	20.8	568.1
31	8/7/2007	Inside	OuterWheelPath	409.5	6.3	14.9	450.4
32	8/7/2007	Inside	OuterWheelPath	490.9	7.2	16.6	387.4
33	8/7/2007	Inside	OuterWheelPath	464.4	6.3	15.2	407.9
34	8/7/2007	Inside	OuterWheelPath	390.4	6.1	15.6	465.3
35	8/7/2007	Inside	OuterWheelPath	564.6	6.9	18.0	344.9
36	8/7/2007	Inside	OuterWheelPath	513.5	6.1	18.1	371.0
37	8/7/2007	Inside	OuterWheelPath	543.6	5.1	19.3	352.8
38	8/7/2007	Inside	OuterWheelPath	469.8	5.6	20.8	392.1

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	8/7/2007	Inside	OuterWheelPath	737.3	7.8	22.7	274.3
40	8/7/2007	Inside	OuterWheelPath	694.1	6.9	21.0	289.6
41	8/7/2007	Inside	Midlane	292.1	5.4	12.8	593.8
42	8/7/2007	Inside	Midlane	292.0	7.5	14.5	586.8
43	8/7/2007	Inside	Midlane	300.4	6.5	13.9	576.4
44	8/7/2007	Inside	Midlane	274.1	5.9	14.1	617.9
45	8/7/2007	Inside	Midlane	310.0	8.3	16.3	553.9
46	8/7/2007	Inside	Midlane	370.1	6.4	17.7	479.1
47	8/7/2007	Inside	Midlane	390.6	6.0	19.3	455.6
48	8/7/2007	Inside	Midlane	350.8	6.1	21.0	491.1
49	8/7/2007	Inside	Midlane	426.9	9.0	22.0	420.0
50	8/7/2007	Inside	Midlane	500.9	8.2	21.0	372.8
51	8/7/2007	Outside	Midlane	224.9	4.5	12.3	729.7
52	8/7/2007	Outside	Midlane	252.6	7.6	14.8	655.1
53	8/7/2007	Outside	Midlane	223.1	4.9	12.7	732.0
54	8/7/2007	Outside	Midlane	242.1	7.2	14.7	677.5
55	8/7/2007	Outside	Midlane	292.7	7.3	16.6	578.0
56	8/7/2007	Outside	Midlane	278.2	6.9	17.4	598.5
57	8/7/2007	Outside	Midlane	305.9	6.2	21.3	545.3
58	8/7/2007	Outside	Midlane	215.2	6.1	19.6	721.7
59	8/7/2007	Outside	Midlane	370.3	7.8	22.5	467.8
60	8/7/2007	Outside	Midlane	288.9	8.8	21.4	569.7
61	7/15/2008	Outside	Midlane	158.3	5.1	11.9	960.7
62	7/15/2008	Outside	Midlane	166.8	5.0	11.9	922.6
63	7/15/2008	Outside	Midlane	166.7	3.7	11.5	926.1
64	7/15/2008	Outside	Midlane	159.5	5.0	13.3	944.9
65	7/15/2008	Outside	Midlane	167.1	5.5	14.7	902.6
66	7/15/2008	Outside	Midlane	182.0	4.5	16.6	835.0
67	7/21/2008	Outside	OuterWheelPath	198.7	5.3	14.2	792.0
68	7/21/2008	Outside	Midlane	159.1	5.0	13.6	944.7
69	7/21/2008	Outside	Midlane	150.0	5.0	15.0	979.4
70	8/18/2008	Inside	OuterWheelPath	274.4	5.3	16.6	607.7
71	8/18/2008	Inside	OuterWheelPath	256.4	5.2	22.4	622.1
72	8/18/2008	Inside	OuterWheelPath	325.4	6.5	21.1	520.3
73	8/18/2008	Inside	OuterWheelPath	302.9	6.4	21.9	548.0
74	8/18/2008	Inside	OuterWheelPath	276.9	7.1	21.4	588.7
75	8/18/2008	Inside	OuterWheelPath	299.7	6.7	20.4	556.3

Modulus 6.0 0utput For Cell 34 in Temperature Range 0 to 5°C (Cell34-temp5.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	3/19/2010	Outside	OuterWheelPath	1714.9	1.9	17.2	146.6
2	3/19/2010	Outside	OuterWheelPath	1767.3	1.9	17.7	142.8
3	3/19/2010	Outside	OuterWheelPath	1384.8	2.2	15.8	174.4
4	3/19/2010	Outside	OuterWheelPath	1599.0	2.0	18.6	153.6
5	3/19/2010	Outside	OuterWheelPath	2278.5	1.9	18.6	116.8
6	3/19/2010	Outside	OuterWheelPath	1759.8	2.0	17.6	143.4
7	3/19/2010	Outside	OuterWheelPath	1673.3	2.2	17.2	149.4
8	3/19/2010	Outside	OuterWheelPath	1848.7	1.9	18.7	137.2
9	3/19/2010	Outside	OuterWheelPath	1781.3	2.0	18.4	141.4
10	3/19/2010	Outside	OuterWheelPath	1543.7	1.9	18.1	158.3
11	2/16/2011	Outside	OuterWheelPath	2697.5	16.0	58.0	91.8
12	2/16/2011	Outside	OuterWheelPath	2338.7	12.3	56.8	102.7
13	2/16/2011	Outside	OuterWheelPath	3081.1	19.1	58.9	82.7
14	2/16/2011	Outside	OuterWheelPath	2704.1	24.9	62.2	91.0
15	2/16/2011	Outside	OuterWheelPath	2899.4	15.5	54.5	87.3
16	2/16/2011	Outside	Midlane	2358.1	14.2	60.4	101.4
17	2/16/2011	Outside	Midlane	2678.1	9.7	59.8	92.0
18	2/16/2011	Outside	Midlane	2904.9	12.1	56.9	86.8
19	2/16/2011	Outside	Midlane	2461.4	13.2	61.9	97.9
20	2/16/2011	Outside	Midlane	2566.6	11.0	58.6	95.3
21	2/16/2011	Inside	OuterWheelPath	1910.2	29.8	63.7	118.8
22	2/16/2011	Inside	OuterWheelPath	2220.6	24.1	61.3	106.1
23	2/16/2011	Inside	OuterWheelPath	2048.7	16.7	51.1	115.0
24	2/16/2011	Inside	OuterWheelPath	4045.4	30.0	72.4	65.6
25	2/16/2011	Inside	OuterWheelPath	1371.8	19.8	56.5	155.3
26	2/16/2011	Inside	Midlane	1796.2	15.6	60.6	125.2
27	2/16/2011	Inside	Midlane	2268.2	13.2	59.4	104.7
28	2/16/2011	Inside	Midlane	2028.2	22.9	49.1	116.3
29	2/16/2011	Inside	Midlane	2431.4	21.7	60.9	99.0
30	2/16/2011	Inside	Midlane	1283.5	16.6	56.0	163.6
31	11/4/2011	Inside	OuterWheelPath	2161.0	5.1	21.1	120.2
32	11/4/2011	Inside	OuterWheelPath	1403.2	4.2	22.2	167.1
33	11/4/2011	Inside	OuterWheelPath	1319.8	3.9	21.7	175.6
34	11/4/2011	Inside	OuterWheelPath	587.1	3.9	16.7	337.1
35	11/4/2011	Inside	OuterWheelPath	999.6	3.9	19.0	220.5

Modulus 6.0 0utput For Cell 34 in Temperature Range 5 to 10°C (Cell34-temp10.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	11/9/2007	Inside	Midlane	1106.3	6.9	20.6	202.3
2	11/9/2007	Inside	Midlane	1275.5	7.2	21.7	180.3
3	11/9/2007	Inside	Midlane	1147.1	7.1	21.3	196.0
4	11/9/2007	Inside	Midlane	1258.2	7.0	22.1	181.9
5	11/9/2007	Inside	Midlane	1569.3	5.9	22.0	153.3
6	11/9/2007	Inside	Midlane	1379.8	7.6	22.6	169.0
7	11/9/2007	Inside	Midlane	1073.0	6.8	23.1	204.8
8	11/9/2007	Inside	Midlane	1112.7	6.8	20.9	201.1
9	11/9/2007	Inside	Midlane	1132.4	5.5	23.1	196.5
10	11/9/2007	Inside	Midlane	1098.4	5.6	22.8	201.4
11	11/9/2007	Outside	Midlane	746.8	5.9	20.5	274.3
12	11/9/2007	Outside	Midlane	696.8	5.5	21.9	287.6
13	11/9/2007	Outside	Midlane	819.0	5.6	22.8	252.8
14	11/9/2007	Outside	Midlane	812.6	5.7	21.4	255.9
15	11/9/2007	Outside	Midlane	1173.3	4.0	21.4	192.6
16	11/9/2007	Outside	Midlane	1197.7	7.8	21.4	189.5
17	11/9/2007	Outside	Midlane	809.3	5.4	22.4	255.5
18	11/9/2007	Outside	Midlane	889.6	5.3	22.7	237.2
19	11/9/2007	Outside	Midlane	499.7	4.9	19.9	375.4
20	11/9/2007	Outside	Midlane	869.5	5.6	22.3	241.9
21	4/28/2008	Outside	OuterWheelPath	722.2	4.0	15.5	289.2
22	4/28/2008	Outside	OuterWheelPath	835.1	3.5	17.8	255.0
23	4/28/2008	Outside	OuterWheelPath	609.7	3.8	15.9	328.9
24	4/28/2008	Outside	OuterWheelPath	857.0	4.0	18.2	249.4
25	4/28/2008	Outside	OuterWheelPath	1158.9	3.2	19.1	196.6
26	4/28/2008	Outside	OuterWheelPath	896.2	4.2	17.7	241.6
27	4/28/2008	Outside	OuterWheelPath	725.3	3.6	17.3	285.2
28	4/28/2008	Outside	OuterWheelPath	797.0	3.7	17.1	265.5
29	4/28/2008	Outside	OuterWheelPath	709.0	3.3	17.3	290.3
30	4/28/2008	Outside	OuterWheelPath	655.9	3.5	16.8	309.2
31	3/23/2009	Outside	OuterWheelPath	1336.6	2.3	22.6	173.2
32	3/23/2009	Outside	OuterWheelPath	1064.1	2.5	24.1	205.3
33	3/23/2009	Outside	OuterWheelPath	1701.2	2.5	24.8	142.4
34	3/23/2009	Outside	OuterWheelPath	1355.3	2.6	26.2	168.9
35	3/23/2009	Outside	OuterWheelPath	1448.9	2.6	26.3	160.3
36	3/23/2009	Outside	Midlane	1342.7	2.2	22.0	173.0
37	3/23/2009	Outside	Midlane	1391.0	2.5	24.0	166.9
38	3/23/2009	Outside	Midlane	1662.8	2.5	21.7	146.8

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	3/23/2009	Outside	Midlane	1348.8	2.8	25.0	170.3
40	3/23/2009	Outside	Midlane	1275.8	2.6	25.6	177.4
41	3/23/2009	Inside	OuterWheelPath	1229.9	2.7	23.7	183.8
42	3/23/2009	Inside	OuterWheelPath	1181.7	2.9	25.6	188.2
43	3/23/2009	Inside	OuterWheelPath	1346.5	3.3	22.0	172.6
44	3/23/2009	Inside	OuterWheelPath	1464.5	3.4	25.1	159.7
45	3/23/2009	Inside	OuterWheelPath	729.1	2.9	22.7	276.7
46	3/23/2009	Inside	Midlane	1042.7	2.6	20.9	211.5
47	3/23/2009	Inside	Midlane	1229.8	2.8	25.6	182.5
48	3/23/2009	Inside	Midlane	1441.1	2.9	20.9	164.6
49	3/23/2009	Inside	Midlane	1474.2	3.0	24.7	159.1
50	3/23/2009	Inside	Midlane	716.4	2.7	22.2	281.1
51	4/7/2009	Outside	OuterWheelPath	649.1	3.3	14.4	316.4
52	4/7/2009	Outside	OuterWheelPath	599.8	3.4	15.5	334.0
53	4/7/2009	Outside	OuterWheelPath	465.3	3.2	14.5	409.1
54	4/7/2009	Outside	OuterWheelPath	565.2	3.4	15.7	349.2
55	4/7/2009	Outside	OuterWheelPath	881.1	2.6	17.0	245.8
56	4/7/2009	Outside	OuterWheelPath	672.0	3.6	15.9	305.1
57	4/7/2009	Outside	OuterWheelPath	573.7	3.2	16.1	344.4
58	4/7/2009	Outside	OuterWheelPath	642.6	3.6	15.7	316.2
59	4/7/2009	Outside	OuterWheelPath	623.5	3.2	16.1	322.9
60	4/7/2009	Outside	OuterWheelPath	580.5	3.0	16.0	341.5
61	4/7/2009	Outside	Midlane	519.8	2.6	13.5	378.1
62	4/7/2009	Outside	Midlane	515.6	2.8	14.4	378.1
63	4/7/2009	Outside	Midlane	486.9	3.1	14.1	396.1
64	4/7/2009	Outside	Midlane	525.5	3.6	15.2	370.7
65	4/7/2009	Outside	Midlane	676.4	2.8	14.3	306.7
66	4/7/2009	Outside	Midlane	626.8	3.4	15.8	322.2
67	4/7/2009	Outside	Midlane	484.3	3.0	15.0	395.3
68	4/7/2009	Outside	Midlane	493.8	2.7	14.5	390.7
69	4/7/2009	Outside	Midlane	455.1	2.7	14.9	415.1
70	4/7/2009	Outside	Midlane	463.4	2.7	14.9	409.3
71	4/7/2009	Inside	Midlane	360.3	2.9	13.0	504.0
72	4/7/2009	Inside	Midlane	369.5	2.8	13.8	491.4
73	4/7/2009	Inside	Midlane	408.8	2.7	13.9	454.1
74	4/7/2009	Inside	Midlane	418.0	2.9	13.6	447.3
75	4/7/2009	Inside	Midlane	593.1	2.2	12.8	343.2
76	4/7/2009	Inside	Midlane	709.3	3.8	14.8	294.6
77	4/7/2009	Inside	Midlane	463.4	2.9	14.5	410.4
78	4/7/2009	Inside	Midlane	457.5	2.8	14.6	414.2
79	4/7/2009	Inside	Midlane	288.2	2.6	13.4	597.3
80	4/7/2009	Inside	Midlane	452.3	3.1	15.2	416.3
81	4/7/2009	Inside	OuterWheelPath	443.6	3.2	14.8	423.7

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	4/7/2009	Inside	OuterWheelPath	477.3	3.2	15.2	399.3
83	4/7/2009	Inside	OuterWheelPath	393.8	3.0	14.7	464.9
84	4/7/2009	Inside	OuterWheelPath	440.9	3.3	14.2	427.4
85	4/7/2009	Inside	OuterWheelPath	591.9	2.8	12.4	344.8
86	4/7/2009	Inside	OuterWheelPath	731.2	4.1	14.7	288.0
87	4/7/2009	Inside	OuterWheelPath	533.9	3.4	14.5	367.8
88	4/7/2009	Inside	OuterWheelPath	480.1	3.1	15.3	397.2
89	4/7/2009	Inside	OuterWheelPath	307.2	3.1	13.6	567.7
90	4/7/2009	Inside	OuterWheelPath	447.7	3.2	14.9	420.4
91	5/8/2009	Outside	OuterWheelPath	365.2	4.5	12.8	499.5
92	5/8/2009	Outside	OuterWheelPath	319.4	4.7	13.8	550.1
93	5/8/2009	Outside	OuterWheelPath	282.3	4.5	13.3	607.4
94	5/8/2009	Outside	OuterWheelPath	350.3	5.5	14.5	509.7
95	5/8/2009	Outside	OuterWheelPath	507.0	4.6	15.8	379.6
96	5/8/2009	Outside	OuterWheelPath	338.1	4.4	14.3	524.5
97	5/8/2009	Outside	OuterWheelPath	367.3	4.7	14.0	493.0
98	5/8/2009	Outside	OuterWheelPath	332.7	4.1	13.9	532.6
99	5/8/2009	Outside	OuterWheelPath	327.4	4.1	14.2	538.1
100	5/8/2009	Outside	Midlane	297.8	3.8	12.0	588.6
101	5/8/2009	Outside	Midlane	309.8	3.8	12.5	568.6
102	5/8/2009	Outside	Midlane	296.4	3.7	12.6	588.0
103	5/8/2009	Outside	Midlane	323.8	4.6	13.7	544.6
104	5/8/2009	Outside	Midlane	363.4	4.4	14.0	497.1
105	5/8/2009	Outside	Midlane	289.6	3.8	13.6	594.2
106	5/8/2009	Outside	Midlane	339.3	3.7	13.4	526.4
107	5/8/2009	Outside	Midlane	320.1	3.5	13.5	550.3
108	5/8/2009	Inside	Midlane	296.2	3.6	12.0	591.1
109	5/8/2009	Inside	Midlane	311.1	3.4	13.1	564.2
110	5/8/2009	Inside	Midlane	328.9	3.5	13.2	540.0
111	5/8/2009	Inside	Midlane	349.4	3.6	12.9	516.5
112	5/8/2009	Inside	Midlane	452.7	3.4	12.6	423.6
113	5/8/2009	Inside	Midlane	539.9	4.6	13.7	366.7
114	5/8/2009	Inside	Midlane	366.7	3.6	13.8	494.3
115	5/8/2009	Inside	Midlane	350.8	3.4	13.2	513.8
116	5/8/2009	Inside	Midlane	239.9	3.2	12.1	695.3
117	5/8/2009	Inside	Midlane	354.7	3.6	13.3	509.0
118	5/8/2009	Inside	OuterWheelPath	392.3	4.0	13.3	470.8
119	5/8/2009	Inside	OuterWheelPath	440.7	3.9	14.0	428.1
120	5/8/2009	Inside	OuterWheelPath	364.7	3.6	13.5	497.4
121	5/8/2009	Inside	OuterWheelPath	399.4	4.1	13.0	465.4
122	5/8/2009	Inside	OuterWheelPath	542.0	4.4	12.9	367.7
123	5/8/2009	Inside	OuterWheelPath	614.3	4.9	14.4	330.2
124	5/8/2009	Inside	OuterWheelPath	467.1	4.0	14.7	407.4
125	5/8/2009	Inside	OuterWheelPath	429.3	3.9	14.0	436.9
126	5/8/2009	Inside	OuterWheelPath	300.5	3.6	13.0	580.0
127	5/8/2009	Inside	OuterWheelPath	378.6	3.8	13.8	482.2

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
128	10/26/2009	Outside	OuterWheelPath	1748.4	5.6	20.3	142.1
129	10/26/2009	Outside	OuterWheelPath	1439.5	5.7	20.3	165.2
130	10/26/2009	Outside	OuterWheelPath	2422.4	4.8	26.0	107.8
131	10/26/2009	Outside	OuterWheelPath	1818.5	5.5	22.2	136.7
132	10/26/2009	Outside	OuterWheelPath	1997.0	5.0	21.9	127.3
133	10/26/2009	Outside	Midlane	1659.6	5.3	20.3	148.0
134	10/26/2009	Outside	Midlane	1878.9	5.1	21.7	133.6
135	10/26/2009	Outside	Midlane	2375.8	5.2	22.1	111.2
136	10/26/2009	Outside	Midlane	1775.3	5.8	22.7	138.9
137	10/26/2009	Outside	Midlane	1795.4	4.6	22.7	137.7
138	10/26/2009	Inside	OuterWheelPath	1604.5	4.8	20.6	151.7
139	10/26/2009	Inside	OuterWheelPath	1504.6	4.9	21.5	158.8
140	10/26/2009	Inside	OuterWheelPath	1987.7	5.0	19.2	129.4
141	10/26/2009	Inside	OuterWheelPath	1818.0	5.7	22.4	136.6
142	10/26/2009	Inside	OuterWheelPath	959.1	4.7	19.0	227.7
143	10/26/2009	Inside	Midlane	1373.8	5.2	19.0	172.4
144	10/26/2009	Inside	Midlane	1547.1	4.9	21.4	155.4
145	10/26/2009	Inside	Midlane	2114.6	4.0	20.4	122.6
146	10/26/2009	Inside	Midlane	1863.9	5.3	22.8	133.8
147	10/26/2009	Inside	Midlane	983.1	4.3	19.2	223.1
148	3/17/2010	Outside	OuterWheelPath	1082.2	2.1	18.0	208.5
149	3/17/2010	Outside	OuterWheelPath	925.1	2.1	17.2	236.4
150	3/17/2010	Inside	Midlane	900.8	2.0	15.1	244.4
151	3/17/2010	Inside	Midlane	1055.6	1.9	16.6	214.2
152	3/17/2010	Inside	Midlane	1218.7	2.0	17.7	190.5
153	3/17/2010	Inside	Midlane	1008.1	2.3	17.2	221.2
154	3/17/2010	Inside	Midlane	962.9	2.0	17.0	229.4
155	10/18/2010	Outside	OuterWheelPath	1723.3	5.6	20.4	143.7
156	10/18/2010	Outside	OuterWheelPath	1401.1	5.5	20.4	168.6
157	10/18/2010	Outside	OuterWheelPath	2283.3	5.1	24.6	113.5
158	10/18/2010	Outside	OuterWheelPath	1719.9	5.3	21.9	142.9
159	10/18/2010	Outside	OuterWheelPath	1865.8	4.6	22.4	133.9
160	10/18/2010	Outside	Midlane	1537.6	5.3	20.1	157.1
161	10/18/2010	Outside	Midlane	1701.7	5.2	21.4	144.4
162	10/18/2010	Outside	Midlane	2166.8	5.8	21.6	119.7
163	10/18/2010	Outside	Midlane	1670.6	5.4	22.5	145.8
164	10/18/2010	Outside	Midlane	1590.1	4.8	22.2	151.6
165	10/18/2010	Inside	OuterWheelPath	1427.8	4.6	19.5	166.9
166	10/18/2010	Inside	OuterWheelPath	1441.0	4.0	20.8	164.7
167	10/18/2010	Inside	OuterWheelPath	1932.3	5.2	19.0	132.4
168	10/18/2010	Inside	OuterWheelPath	1806.0	4.8	21.7	137.7
169	10/18/2010	Inside	OuterWheelPath	881.1	4.2	17.3	245.4
170	10/18/2010	Inside	Midlane	1302.0	4.3	18.4	180.3
171	10/18/2010	Inside	Midlane	1537.0	3.9	21.0	156.5
172	10/18/2010	Inside	Midlane	2041.6	4.0	20.4	126.0
173	10/18/2010	Inside	Midlane	1826.0	4.4	22.7	136.0

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
174	10/18/2010	Inside	Midlane	940.7	3.8	18.8	231.4
175	11/16/2010	Outside	OuterWheelPath	2169.8	5.3	20.7	120.0
176	11/16/2010	Outside	OuterWheelPath	1706.0	5.8	20.3	144.9
177	11/16/2010	Outside	OuterWheelPath	2839.1	5.0	23.8	96.2
178	11/16/2010	Outside	OuterWheelPath	2129.0	5.5	22.4	120.9
179	11/16/2010	Outside	OuterWheelPath	2305.2	5.0	22.3	113.7
180	11/16/2010	Outside	Midlane	1853.1	5.5	19.7	136.3
181	11/16/2010	Outside	Midlane	2130.5	5.1	21.0	121.6
182	11/16/2010	Outside	Midlane	2684.5	5.1	21.4	101.5
183	11/16/2010	Outside	Midlane	2090.5	5.2	22.9	122.3
184	11/16/2010	Outside	Midlane	1943.0	4.9	22.6	129.6
185	11/16/2010	Inside	Midlane	1599.4	4.5	19.2	153.1
186	11/16/2010	Inside	Midlane	1765.0	4.2	21.5	140.3
187	11/16/2010	Inside	Midlane	2497.7	3.3	21.6	107.2
188	11/16/2010	Inside	Midlane	1940.8	5.1	21.6	130.3
189	11/16/2010	Inside	Midlane	1035.3	4.0	18.9	214.7
190	11/16/2010	Inside	OuterWheelPath	1586.1	4.8	19.4	153.9
191	11/16/2010	Inside	OuterWheelPath	1599.2	4.3	20.6	152.1
192	11/16/2010	Inside	OuterWheelPath	2159.6	4.4	18.7	121.7
193	11/16/2010	Inside	OuterWheelPath	1993.4	5.2	21.3	127.8
194	11/16/2010	Inside	OuterWheelPath	940.3	4.6	17.6	232.9
195	5/13/2011	Outside	OuterWheelPath	1163.6	3.1	15.0	200.6
196	5/13/2011	Outside	OuterWheelPath	1158.9	3.4	15.5	200.6
197	5/13/2011	Outside	OuterWheelPath	964.2	3.6	15.3	231.6
198	5/13/2011	Outside	OuterWheelPath	1600.2	3.0	17.8	154.2
199	5/13/2011	Outside	OuterWheelPath	1134.4	3.3	16.8	202.3
200	5/13/2011	Outside	OuterWheelPath	1178.4	3.1	16.8	196.5
201	5/13/2011	Outside	OuterWheelPath	1076.7	3.1	15.9	211.8
202	5/13/2011	Outside	Midlane	999.0	3.1	15.0	225.7
203	5/13/2011	Outside	Midlane	1064.7	3.1	15.7	213.9
204	5/13/2011	Outside	Midlane	1129.9	3.9	17.5	202.2
205	5/13/2011	Outside	Midlane	1418.6	3.1	16.8	170.2
206	5/13/2011	Outside	Midlane	1329.9	3.5	17.8	177.9
207	5/13/2011	Outside	Midlane	1029.7	3.0	16.9	218.0
208	5/13/2011	Outside	Midlane	1102.6	3.2	16.5	207.2
209	5/13/2011	Outside	Midlane	1011.2	2.8	16.8	221.2
210	5/13/2011	Outside	Midlane	904.0	2.8	15.9	242.5

Modulus 6.0 0utput For Cell 34 in Temperature Range 10 to15°C (Cell34-temp15.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	3/19/2008	Outside	OuterWheelPath	630.5	4.8	29.2	302.2
2	3/19/2008	Outside	OuterWheelPath	697.8	5.1	32.6	276.4
3	3/19/2008	Outside	OuterWheelPath	519.8	4.6	30.1	349.8
4	3/19/2008	Outside	OuterWheelPath	595.1	4.6	28.9	316.3
5	3/19/2008	Outside	OuterWheelPath	800.8	4.8	29.6	250.8
6	3/19/2008	Outside	OuterWheelPath	632.8	6.0	31.1	299.5
7	3/19/2008	Outside	OuterWheelPath	564.5	5.2	31.5	326.7
8	3/19/2008	Outside	OuterWheelPath	682.5	5.8	29.7	283.7
9	3/19/2008	Outside	OuterWheelPath	660.8	4.8	33.4	287.6
10	3/19/2008	Outside	OuterWheelPath	602.0	5.2	35.1	307.6
11	3/19/2008	Inside	Midlane	338.2	4.1	26.8	493.4
12	3/19/2008	Inside	Midlane	307.1	3.8	30.6	524.9
13	3/19/2008	Inside	Midlane	371.7	4.2	30.1	453.5
14	3/19/2008	Inside	Midlane	400.0	4.2	27.8	431.8
15	3/19/2008	Inside	Midlane	480.2	4.7	24.1	380.1
16	3/19/2008	Inside	Midlane	683.3	6.5	27.8	285.3
17	3/19/2008	Inside	Midlane	402.0	4.7	30.9	425.7
18	3/19/2008	Inside	Midlane	385.2	4.3	30.3	440.9
19	3/19/2008	Inside	Midlane	319.8	3.2	32.0	506.5
20	3/19/2008	Inside	Midlane	430.8	4.6	30.9	403.5
21	3/19/2008	Inside	OuterWheelPath	353.0	4.7	34.6	465.6
22	3/19/2008	Inside	OuterWheelPath	397.7	5.0	37.9	420.9
23	3/19/2008	Inside	OuterWheelPath	394.3	4.0	39.4	422.1
24	3/19/2008	Inside	OuterWheelPath	386.2	5.3	30.3	440.0
25	3/19/2008	Inside	OuterWheelPath	384.8	7.1	28.2	444.3
26	3/19/2008	Inside	OuterWheelPath	636.3	7.2	29.5	299.7
27	3/19/2008	Inside	OuterWheelPath	374.8	5.0	34.3	444.9
28	3/19/2008	Inside	OuterWheelPath	400.0	5.9	34.8	422.5
29	3/19/2008	Inside	OuterWheelPath	424.7	4.8	35.0	403.1
30	3/19/2008	Inside	OuterWheelPath	363.4	3.8	36.3	453.2
31	3/19/2008	Inside	OuterWheelPath	340.1	5.3	33.6	480.6
32	3/19/2008	Outside	Midlane	409.1	4.4	25.9	427.2
33	3/19/2008	Outside	Midlane	474.0	4.8	28.6	377.6
34	3/19/2008	Outside	Midlane	367.5	4.6	26.9	462.5
35	3/19/2008	Outside	Midlane	376.5	4.5	24.3	458.4
36	3/19/2008	Outside	Midlane	378.8	4.9	24.2	456.5
37	3/19/2008	Outside	Midlane	434.7	4.7	26.6	406.6
38	3/19/2008	Outside	Midlane	346.4	4.2	29.0	480.7

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	3/19/2008	Outside	Midlane	395.1	4.6	27.6	436.2
40	3/19/2008	Outside	Midlane	349.2	4.1	30.4	475.5
41	3/19/2008	Outside	Midlane	324.9	4.1	29.6	504.1
42	5/8/2009	Outside	OuterWheelPath	376.7	5.4	14.5	481.8
43	5/8/2009	Outside	Midlane	381.5	4.2	13.4	480.8
44	5/8/2009	Outside	Midlane	301.1	3.4	13.3	577.8
45	3/17/2010	Outside	OuterWheelPath	758.2	2.3	14.2	280.9
46	3/17/2010	Outside	OuterWheelPath	649.3	2.3	13.9	317.4
47	3/17/2010	Outside	OuterWheelPath	813.5	2.3	17.5	260.7
48	4/6/2010	Inside	Midlane	1118.3	3.0	16.2	205.3
49	4/6/2010	Inside	Midlane	1290.3	2.6	18.5	181.4
50	4/6/2010	Inside	Midlane	1683.4	2.9	17.8	148.2
51	4/6/2010	Inside	Midlane	1500.5	2.9	19.3	160.8
52	4/6/2010	Inside	Midlane	783.9	2.7	15.8	271.0
53	4/6/2010	Inside	OuterWheelPath	1201.2	3.3	17.1	193.2
54	4/6/2010	Inside	OuterWheelPath	1217.6	2.7	18.3	190.0
55	4/6/2010	Inside	OuterWheelPath	1547.5	3.4	17.1	158.8
56	4/6/2010	Inside	OuterWheelPath	1505.2	3.2	18.8	160.8
57	4/6/2010	Inside	OuterWheelPath	783.1	3.1	16.0	270.8
58	4/6/2010	Outside	OuterWheelPath	1393.7	2.9	16.8	172.5
59	4/6/2010	Outside	OuterWheelPath	1139.4	2.6	17.1	201.3
60	4/6/2010	Outside	OuterWheelPath	1764.6	2.7	19.9	141.4
61	4/6/2010	Outside	OuterWheelPath	1374.1	2.8	17.8	173.5
62	4/6/2010	Outside	OuterWheelPath	1544.6	2.5	19.2	157.3
63	4/6/2010	Outside	Midlane	1294.2	2.9	16.7	182.8
64	4/6/2010	Outside	Midlane	1395.4	2.6	18.1	171.1
65	4/6/2010	Outside	Midlane	1682.5	2.9	17.6	148.5
66	4/6/2010	Outside	Midlane	1318.0	2.9	18.2	178.8
67	4/6/2010	Outside	Midlane	1294.5	2.5	19.0	180.5
68	9/20/2010	Outside	OuterWheelPath	1196.2	4.9	19.9	191.0
69	9/20/2010	Outside	OuterWheelPath	1033.7	4.6	20.3	213.5
70	9/20/2010	Outside	OuterWheelPath	1533.3	5.1	22.5	155.8
71	9/20/2010	Outside	OuterWheelPath	1221.1	4.5	21.4	186.7
72	9/20/2010	Outside	OuterWheelPath	1252.9	4.1	20.9	183.4
73	9/20/2010	Outside	Midlane	1051.0	5.0	18.9	212.2
74	9/20/2010	Outside	Midlane	1181.0	4.6	20.2	192.7
75	9/20/2010	Outside	Midlane	1487.8	5.3	20.3	161.0
76	9/20/2010	Outside	Midlane	1170.3	4.6	21.5	192.8
77	9/20/2010	Outside	Midlane	1136.2	3.8	21.6	197.2
78	9/20/2010	Inside	OuterWheelPath	967.9	4.3	20.1	224.8
79	9/20/2010	Inside	OuterWheelPath	947.5	3.9	21.4	227.2
80	9/20/2010	Inside	OuterWheelPath	1354.1	4.3	19.4	174.0
81	9/20/2010	Inside	OuterWheelPath	1205.6	4.5	22.5	187.6

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	9/20/2010	Inside	OuterWheelPath	642.7	3.8	18.4	311.3
83	9/20/2010	Inside	Midlane	909.5	3.9	18.6	237.7
84	9/20/2010	Inside	Midlane	1056.7	3.8	21.5	208.7
85	9/20/2010	Inside	Midlane	1369.3	3.5	20.3	171.7
86	9/20/2010	Inside	Midlane	1210.7	4.1	22.6	186.9
87	9/20/2010	Inside	Midlane	664.5	3.6	18.4	303.4
88	5/13/2011	Inside	OuterWheelPath	862.9	2.8	15.1	252.7
89	5/13/2011	Inside	OuterWheelPath	979.8	2.7	16.3	227.3
90	5/13/2011	Inside	OuterWheelPath	809.5	2.6	15.9	264.1
91	5/13/2011	Inside	OuterWheelPath	839.9	2.8	15.2	257.8
92	5/13/2011	Inside	OuterWheelPath	1072.5	2.7	15.4	213.1
93	5/13/2011	Inside	OuterWheelPath	1580.5	3.3	16.5	156.8
94	5/13/2011	Inside	OuterWheelPath	1024.8	2.9	16.9	218.8
95	5/13/2011	Inside	OuterWheelPath	953.8	2.7	16.2	232.2
96	5/13/2011	Inside	OuterWheelPath	472.3	3.0	13.8	406.4
97	5/13/2011	Inside	OuterWheelPath	824.7	2.9	16.0	260.2
98	5/13/2011	Inside	Midlane	746.1	2.7	14.2	284.5
99	5/13/2011	Inside	Midlane	739.8	2.7	15.7	283.6
100	5/13/2011	Inside	Midlane	821.8	2.8	15.9	261.1
101	5/13/2011	Inside	Midlane	803.4	2.9	15.3	266.7
102	5/13/2011	Inside	Midlane	1139.3	2.3	16.8	201.7
103	5/13/2011	Inside	Midlane	1402.3	3.5	16.6	171.9
104	5/13/2011	Inside	Midlane	928.5	2.9	16.7	236.4
105	5/13/2011	Inside	Midlane	858.4	2.7	15.9	252.4
106	5/13/2011	Inside	Midlane	490.2	2.7	13.9	394.6
107	5/13/2011	Inside	Midlane	807.9	3.2	16.1	264.2

Modulus 6.0 0utput For Cell 34 in Temperature Range 15 to 20°C (Cell34-temp20.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	4/3/2008	Outside	OuterWheelPath	300.5	2.8	13.7	577.0
2	4/3/2008	Outside	OuterWheelPath	307.9	2.9	15.5	559.5
3	4/3/2008	Outside	OuterWheelPath	236.0	2.7	14.3	692.8
4	4/3/2008	Outside	OuterWheelPath	305.8	3.2	15.3	563.2
5	4/3/2008	Outside	OuterWheelPath	439.2	2.7	15.0	426.4
6	4/3/2008	Outside	OuterWheelPath	346.9	3.3	15.7	509.6
7	4/3/2008	Outside	OuterWheelPath	286.2	2.7	15.3	592.9
8	4/3/2008	Outside	OuterWheelPath	327.4	2.8	15.2	534.6
9	4/3/2008	Outside	OuterWheelPath	278.8	2.5	15.6	603.9
10	4/3/2008	Outside	OuterWheelPath	289.1	2.6	15.9	586.1
11	4/3/2008	Inside	OuterWheelPath	254.4	3.2	15.5	648.6
12	4/3/2008	Inside	OuterWheelPath	290.6	3.0	16.4	582.0
13	4/3/2008	Inside	OuterWheelPath	242.4	2.7	15.6	672.9
14	4/3/2008	Inside	OuterWheelPath	272.5	3.1	15.1	616.6
15	4/3/2008	Inside	OuterWheelPath	366.0	2.2	12.3	500.6
16	4/3/2008	Inside	OuterWheelPath	427.6	3.5	16.0	432.6
17	4/3/2008	Inside	OuterWheelPath	278.1	2.9	15.5	605.4
18	4/3/2008	Inside	OuterWheelPath	264.8	2.7	15.9	627.3
19	4/3/2008	Inside	OuterWheelPath	208.0	2.8	15.9	756.2
20	4/3/2008	Inside	OuterWheelPath	243.6	3.1	15.9	669.1
21	4/3/2008	Outside	Midlane	210.2	2.8	13.1	764.2
22	4/3/2008	Outside	Midlane	231.3	2.8	14.1	704.7
23	4/3/2008	Outside	Midlane	226.1	2.5	13.4	720.7
24	4/3/2008	Outside	Midlane	253.0	3.1	14.3	656.5
25	4/3/2008	Outside	Midlane	300.1	2.8	12.7	581.9
26	4/3/2008	Outside	Midlane	287.9	3.2	14.8	592.0
27	4/3/2008	Outside	Midlane	223.5	2.5	14.7	720.7
28	4/3/2008	Outside	Midlane	239.8	2.6	14.0	685.7
29	4/3/2008	Outside	Midlane	219.1	2.5	15.2	729.5
30	4/3/2008	Outside	Midlane	219.9	2.6	15.0	728.4
31	4/12/2011	Outside	OuterWheelPath	364.2	2.6	12.5	501.7
32	4/12/2011	Outside	OuterWheelPath	319.1	2.7	13.0	553.6
33	4/12/2011	Outside	OuterWheelPath	374.1	2.5	14.5	484.4
34	5/31/2011	Inside	OuterWheelPath	259.4	2.6	13.7	646.6
35	5/31/2011	Inside	OuterWheelPath	286.0	2.9	13.1	602.2
36	5/31/2011	Inside	OuterWheelPath	404.1	2.9	13.4	459.8
37	5/31/2011	Inside	OuterWheelPath	450.4	3.7	14.1	420.7
38	5/31/2011	Inside	OuterWheelPath	360.6	2.9	15.1	496.4

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	5/31/2011	Inside	OuterWheelPath	313.8	2.7	13.8	557.6
40	5/31/2011	Inside	OuterWheelPath	225.4	2.7	12.6	726.8
41	5/31/2011	Inside	OuterWheelPath	286.1	2.7	13.4	600.7
42	5/31/2011	Inside	Midlane	251.9	2.5	11.8	671.1
43	5/31/2011	Inside	Midlane	272.4	2.6	13.2	624.9
44	5/31/2011	Inside	Midlane	289.1	2.9	13.7	594.6
45	5/31/2011	Inside	Midlane	342.1	3.3	13.9	521.2
46	5/31/2011	Inside	Midlane	414.4	2.8	13.4	450.9
47	5/31/2011	Inside	Midlane	479.0	3.7	14.7	399.5
48	5/31/2011	Inside	Midlane	365.2	2.8	15.1	491.5
49	5/31/2011	Inside	Midlane	306.3	2.8	13.7	568.6
50	5/31/2011	Inside	Midlane	232.4	2.4	13.0	707.6
51	5/31/2011	Inside	Midlane	324.5	2.8	14.4	541.1
52	5/31/2011	Outside	Midlane	323.4	3.7	15.0	540.4
53	5/31/2011	Outside	Midlane	427.9	3.2	13.6	439.3
54	5/31/2011	Outside	Midlane	346.3	3.9	14.2	515.3
55	5/31/2011	Outside	Midlane	321.5	2.8	14.4	545.0
56	5/31/2011	Outside	Midlane	314.1	3.4	13.9	556.8
57	5/31/2011	Outside	Midlane	314.5	3.1	14.8	552.9
58	5/31/2011	Outside	Midlane	310.3	2.7	14.4	560.2
59	5/31/2011	Outside	OuterWheelPath	300.4	3.1	12.6	581.9
60	5/31/2011	Outside	OuterWheelPath	289.1	3.2	13.7	594.6
61	5/31/2011	Outside	OuterWheelPath	289.0	2.9	13.7	594.7
62	5/31/2011	Outside	OuterWheelPath	325.8	4.0	15.4	535.9
63	5/31/2011	Outside	OuterWheelPath	427.6	3.2	15.5	434.0
64	5/31/2011	Outside	OuterWheelPath	352.8	3.9	14.6	506.5
65	5/31/2011	Outside	OuterWheelPath	351.7	3.2	15.1	506.1
66	5/31/2011	Outside	OuterWheelPath	356.3	3.9	14.8	502.0
67	5/31/2011	Outside	OuterWheelPath	339.3	3.2	14.8	521.4
68	5/31/2011	Outside	OuterWheelPath	332.7	3.0	14.4	530.8

Modulus 6.0 0utput For Cell 34 in Temperature Range 20 to 25°C (Cell34-temp25.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	7/3/2008	Inside	OuterWheelPath	224.0	3.2	14.3	721.4
2	7/3/2008	Inside	OuterWheelPath	234.4	2.9	15.0	693.3
3	7/3/2008	Inside	OuterWheelPath	199.3	2.7	14.8	787.0
4	7/3/2008	Inside	OuterWheelPath	246.4	3.6	14.8	667.9
5	7/3/2008	Outside	OuterWheelPath	211.8	4.2	16.3	743.8
6	7/3/2008	Outside	OuterWheelPath	224.7	4.5	15.4	714.5
7	4/14/2009	Outside	OuterWheelPath	733.2	3.6	15.3	286.2
8	4/14/2009	Outside	OuterWheelPath	579.4	3.6	15.9	342.2
9	4/14/2009	Outside	OuterWheelPath	1029.0	3.2	18.9	215.7
10	4/14/2009	Outside	OuterWheelPath	692.5	3.7	16.6	296.8
11	4/14/2009	Outside	OuterWheelPath	766.8	3.1	17.2	273.4
12	4/14/2009	Outside	Midlane	614.7	3.2	15.1	328.5
13	4/14/2009	Outside	Midlane	705.1	3.1	16.4	293.0
14	4/14/2009	Outside	Midlane	920.9	3.4	16.3	238.5
15	4/14/2009	Outside	Midlane	685.0	3.2	17.7	297.5
16	4/14/2009	Outside	Midlane	669.4	3.0	18.0	302.3
17	4/14/2009	Inside	Midlane	534.5	3.4	15.9	364.2
18	4/14/2009	Inside	Midlane	586.2	3.3	17.5	336.0
19	4/14/2009	Inside	Midlane	809.9	3.0	15.1	265.4
20	4/14/2009	Inside	Midlane	711.5	3.6	18.6	287.5
21	4/14/2009	Inside	Midlane	400.8	3.3	16.3	454.0
22	4/14/2009	Inside	OuterWheelPath	598.3	3.9	17.6	330.5
23	4/14/2009	Inside	OuterWheelPath	564.0	3.4	18.1	345.0
24	4/14/2009	Inside	OuterWheelPath	777.9	3.5	15.3	273.4
25	4/14/2009	Inside	OuterWheelPath	656.4	4.1	17.6	307.6
26	4/14/2009	Inside	OuterWheelPath	391.2	3.8	16.4	462.3
27	6/16/2009	Inside	OuterWheelPath	538.0	3.8	16.2	361.7
28	6/16/2009	Inside	OuterWheelPath	528.9	3.4	17.3	364.2
29	6/16/2009	Inside	OuterWheelPath	737.0	4.6	15.9	284.0
30	6/16/2009	Inside	OuterWheelPath	652.0	4.2	19.7	305.9
31	6/16/2009	Inside	OuterWheelPath	384.2	3.5	15.4	471.7
32	6/16/2009	Inside	Midlane	455.4	3.7	15.0	414.6
33	6/16/2009	Inside	Midlane	503.4	3.6	17.1	378.8
34	6/16/2009	Inside	Midlane	636.9	4.0	15.8	318.2
35	6/16/2009	Inside	Midlane	597.0	3.9	18.9	328.8
36	6/16/2009	Inside	Midlane	368.4	3.1	15.0	488.6
37	6/16/2009	Outside	OuterWheelPath	536.0	4.6	15.5	364.3
38	6/16/2009	Outside	OuterWheelPath	459.1	4.6	16.3	408.7

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	6/16/2009	Outside	OuterWheelPath	697.2	5.2	19.1	291.3
40	6/16/2009	Outside	OuterWheelPath	537.6	4.5	17.7	358.8
41	6/16/2009	Outside	OuterWheelPath	565.7	3.9	17.1	346.1
42	6/16/2009	Outside	Midlane	459.5	4.1	15.0	411.8
43	6/16/2009	Outside	Midlane	511.6	4.1	16.3	375.9
44	6/16/2009	Outside	Midlane	651.9	5.4	16.7	310.8
45	6/16/2009	Outside	Midlane	528.9	4.3	17.9	363.0
46	6/16/2009	Outside	Midlane	509.0	3.8	17.0	375.8
47	8/3/2009	Inside	OuterWheelPath	256.9	4.9	15.9	642.1
48	8/3/2009	Inside	OuterWheelPath	279.1	4.8	17.1	598.0
49	8/3/2009	Inside	OuterWheelPath	237.8	4.5	16.6	678.9
50	8/3/2009	Inside	OuterWheelPath	257.7	5.1	16.2	639.4
51	8/3/2009	Inside	OuterWheelPath	363.9	6.5	15.4	492.0
52	8/3/2009	Inside	OuterWheelPath	370.3	6.5	17.1	480.5
53	8/3/2009	Inside	OuterWheelPath	289.6	4.9	18.2	577.7
54	8/3/2009	Inside	OuterWheelPath	270.4	4.4	17.1	612.8
55	8/3/2009	Inside	OuterWheelPath	211.3	4.0	14.9	751.7
56	8/3/2009	Inside	OuterWheelPath	239.2	4.0	15.3	681.2
57	6/3/2010	Inside	OuterWheelPath	481.6	3.6	15.3	396.3
58	6/3/2010	Inside	OuterWheelPath	443.7	3.3	15.8	420.9
59	6/3/2010	Inside	OuterWheelPath	660.6	4.7	15.9	309.1
60	6/3/2010	Inside	OuterWheelPath	615.2	4.0	18.3	322.2
61	6/3/2010	Inside	OuterWheelPath	330.7	3.3	14.3	533.6
62	6/3/2010	Inside	Midlane	402.6	2.4	13.5	460.8
63	6/3/2010	Inside	Midlane	455.1	2.9	15.1	414.6
64	6/3/2010	Inside	Midlane	629.7	3.6	15.9	320.8
65	6/3/2010	Inside	Midlane	524.6	3.3	17.0	367.1
66	6/3/2010	Inside	Midlane	307.9	2.8	13.7	566.3
67	6/3/2010	Outside	Midlane	409.4	4.1	14.4	452.0
68	6/3/2010	Outside	Midlane	457.9	3.8	15.4	411.8
69	6/3/2010	Outside	Midlane	599.0	4.5	15.7	333.9
70	6/3/2010	Outside	Midlane	467.0	3.7	16.5	402.9
71	6/3/2010	Outside	Midlane	423.2	3.4	15.8	436.6
72	6/3/2010	Outside	OuterWheelPath	453.2	4.5	14.3	418.1
73	6/3/2010	Outside	OuterWheelPath	411.2	4.0	15.2	448.1
74	6/3/2010	Outside	OuterWheelPath	631.7	4.6	17.0	318.0
75	6/3/2010	Outside	OuterWheelPath	459.4	4.0	16.4	408.3
76	6/3/2010	Outside	OuterWheelPath	475.8	3.7	16.3	397.6
77	7/28/2010	Inside	Midlane	553.1	3.1	15.4	355.8
78	7/28/2010	Inside	Midlane	635.0	3.7	18.3	314.4
79	7/28/2010	Inside	Midlane	761.9	4.6	17.7	274.0
80	7/28/2010	Inside	Midlane	909.7	6.4	18.7	237.6
81	7/28/2010	Inside	Midlane	440.2	3.3	15.9	423.3

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	7/28/2010	Inside	OuterWheelPath	612.5	4.0	16.9	325.8
83	7/28/2010	Inside	OuterWheelPath	611.0	3.6	18.4	323.8
84	7/28/2010	Inside	OuterWheelPath	823.5	5.3	17.8	257.8
85	7/28/2010	Inside	OuterWheelPath	739.2	4.6	20.7	276.2
86	7/28/2010	Inside	OuterWheelPath	450.4	3.6	16.2	415.1
87	7/28/2010	Outside	OuterWheelPath	680.8	5.1	17.1	299.9
88	7/28/2010	Outside	OuterWheelPath	583.5	4.2	17.4	337.3
89	7/28/2010	Outside	OuterWheelPath	855.3	5.2	19.9	247.7
90	7/28/2010	Outside	OuterWheelPath	694.3	4.4	18.4	293.3
91	7/28/2010	Outside	OuterWheelPath	725.7	4.0	18.4	283.4
92	7/28/2010	Outside	Midlane	617.4	4.3	16.7	324.2
93	7/28/2010	Outside	Midlane	643.0	4.3	17.6	312.6
94	7/28/2010	Outside	Midlane	796.0	5.9	17.5	265.1
95	7/28/2010	Outside	Midlane	685.8	4.3	19.0	295.2
96	7/28/2010	Outside	Midlane	665.3	3.9	18.4	303.1
97	9/27/2010	Outside	OuterWheelPath	501.1	6.0	17.0	380.4
98	9/27/2010	Outside	OuterWheelPath	439.5	5.6	17.6	419.6
99	9/27/2010	Outside	OuterWheelPath	689.2	6.6	18.6	294.6
100	9/27/2010	Outside	OuterWheelPath	490.5	5.6	18.8	383.0
101	9/27/2010	Outside	OuterWheelPath	464.2	5.0	18.3	400.7
102	9/27/2010	Outside	Midlane	414.2	5.7	16.6	441.8
103	9/27/2010	Outside	Midlane	430.4	5.6	17.1	427.7
104	9/27/2010	Outside	Midlane	576.4	6.7	17.4	340.6
105	9/27/2010	Outside	Midlane	462.4	5.2	18.1	402.4
106	9/27/2010	Outside	Midlane	415.7	4.6	18.3	436.4
107	9/27/2010	Inside	Midlane	373.6	3.8	15.0	483.3
108	9/27/2010	Inside	Midlane	404.5	3.7	17.0	449.0
109	9/27/2010	Inside	Midlane	564.0	3.5	15.9	349.4
110	9/27/2010	Inside	Midlane	456.9	4.1	18.0	406.3
111	9/27/2010	Inside	OuterWheelPath	379.2	3.8	16.2	474.2
112	9/27/2010	Inside	OuterWheelPath	345.5	3.6	16.7	508.1
113	9/27/2010	Inside	OuterWheelPath	543.2	4.7	15.4	360.8
114	9/27/2010	Inside	OuterWheelPath	476.4	4.1	18.3	392.8
115	9/27/2010	Inside	OuterWheelPath	284.8	3.6	16.0	592.5
116	9/27/2010	Inside	OuterWheelPath	294.7	3.6	15.4	579.2
117	4/12/2011	Outside	OuterWheelPath	516.3	2.6	14.8	376.7
118	4/12/2011	Outside	OuterWheelPath	352.8	2.6	14.2	507.9
119	4/12/2011	Outside	Midlane	265.6	2.3	11.9	643.6
120	4/12/2011	Outside	Midlane	293.2	2.3	12.6	592.9
121	4/12/2011	Outside	Midlane	402.2	2.2	12.5	464.6
122	4/12/2011	Outside	Midlane	264.5	2.3	13.0	640.2
123	4/12/2011	Outside	Midlane	257.0	1.9	11.4	663.0
124	4/12/2011	Outside	Midlane	278.3	2.3	13.4	613.7
125	4/12/2011	Inside	Midlane	285.2	2.7	12.8	604.8
126	4/12/2011	Inside	Midlane	290.0	2.7	13.6	593.6
127	4/12/2011	Inside	Midlane	436.2	2.2	13.8	432.2

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
128	4/12/2011	Inside	Midlane	368.8	2.8	14.6	489.4
129	4/12/2011	Inside	Midlane	226.9	2.6	12.9	721.4
130	4/12/2011	Inside	OuterWheelPath	328.6	2.9	14.0	537.3
131	4/12/2011	Inside	OuterWheelPath	284.0	2.7	14.2	600.7
132	4/12/2011	Inside	OuterWheelPath	446.9	3.0	13.3	425.6
133	4/12/2011	Inside	OuterWheelPath	401.8	2.9	15.0	456.8
134	4/12/2011	Inside	OuterWheelPath	242.5	2.8	13.7	681.2
135	5/31/2011	Inside	OuterWheelPath	259.4	2.7	12.4	652.9
136	5/31/2011	Inside	OuterWheelPath	292.0	2.7	13.6	590.4
137	5/31/2011	Outside	Midlane	265.7	3.0	12.4	640.9
138	5/31/2011	Outside	Midlane	285.2	2.9	12.9	604.4
139	5/31/2011	Outside	Midlane	290.2	2.8	12.9	596.3
140	9/7/2011	Outside	OuterWheelPath	325.9	3.1	15.3	536.1
141	9/7/2011	Inside	Midlane	247.9	3.7	14.2	667.4
142	9/7/2011	Inside	Midlane	266.2	3.5	15.4	626.7
143	9/7/2011	Inside	Midlane	278.8	3.8	16.4	600.9
144	9/7/2011	Inside	Midlane	307.4	4.6	16.5	556.9
145	9/7/2011	Inside	Midlane	346.8	4.6	15.2	511.3
146	9/7/2011	Inside	Midlane	416.9	6.3	17.1	438.4

Modulus 6.0 0utput For Cell 34 in Temperature Range 25 to 30°C (Cell34-temp30.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	10/3/2007	Outside	OuterWheelPath	188.7	5.6	19.3	800.2
2	10/3/2007	Outside	OuterWheelPath	207.0	5.2	21.1	738.4
3	10/3/2007	Outside	OuterWheelPath	188.3	5.4	21.0	794.9
4	10/3/2007	Outside	OuterWheelPath	210.0	5.3	18.8	738.5
5	10/3/2007	Outside	OuterWheelPath	220.4	5.3	16.5	720.4
6	10/3/2007	Outside	OuterWheelPath	270.2	5.8	19.4	605.7
7	10/3/2007	Outside	OuterWheelPath	188.7	4.6	21.2	792.9
8	10/3/2007	Outside	OuterWheelPath	171.0	4.5	19.6	862.3
9	10/3/2007	Outside	OuterWheelPath	151.3	5.1	18.6	952.8
10	10/3/2007	Outside	OuterWheelPath	185.0	4.6	19.6	811.3
11	10/4/2007	Outside	Midlane	203.9	5.1	18.4	757.1
12	10/4/2007	Outside	Midlane	206.0	5.2	20.4	743.6
13	10/4/2007	Outside	Midlane	197.0	5.4	20.9	768.0
14	10/4/2007	Outside	Midlane	218.8	5.1	19.6	712.5
15	10/4/2007	Outside	Midlane	224.1	3.8	15.9	713.8
16	10/4/2007	Outside	Midlane	252.1	5.9	19.6	638.5
17	10/4/2007	Outside	Midlane	199.0	4.8	21.0	761.7
18	10/4/2007	Outside	Midlane	184.7	4.2	19.2	814.0
19	10/4/2007	Outside	Midlane	151.0	4.4	18.7	953.7
20	10/4/2007	Outside	Midlane	174.1	4.4	19.4	851.2
21	10/4/2007	Inside	OuterWheelPath	204.8	7.1	19.2	751.4
22	10/4/2007	Inside	OuterWheelPath	187.0	6.2	21.5	797.4
23	10/4/2007	Inside	OuterWheelPath	178.0	5.7	19.9	834.7
24	10/4/2007	Inside	OuterWheelPath	226.9	6.7	20.4	690.0
25	10/4/2007	Inside	OuterWheelPath	261.5	5.8	20.4	618.3
26	10/4/2007	Inside	OuterWheelPath	210.8	6.6	20.3	730.8
27	10/4/2007	Inside	OuterWheelPath	177.9	5.7	20.0	834.6
28	10/4/2007	Inside	OuterWheelPath	178.8	5.4	19.6	833.0
29	10/4/2007	Inside	OuterWheelPath	192.4	4.8	19.8	786.3
30	10/4/2007	Inside	OuterWheelPath	207.8	4.7	19.7	741.1
31	5/22/2008	Inside	OuterWheelPath	197.1	3.7	14.7	794.3
32	5/22/2008	Inside	OuterWheelPath	195.2	3.6	15.3	797.2
33	5/22/2008	Inside	OuterWheelPath	183.0	3.2	15.1	839.1
34	5/22/2008	Inside	OuterWheelPath	215.3	3.9	14.9	740.9
35	5/22/2008	Inside	OuterWheelPath	255.8	4.0	13.3	655.5
36	5/22/2008	Inside	OuterWheelPath	227.2	4.9	15.2	709.3
37	5/22/2008	Inside	OuterWheelPath	190.9	3.7	16.2	806.6
38	5/22/2008	Inside	OuterWheelPath	188.2	3.5	15.7	818.0

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	5/22/2008	Inside	OuterWheelPath	159.6	3.6	14.5	936.5
40	5/22/2008	Inside	OuterWheelPath	165.4	3.6	14.9	908.6
41	7/3/2008	Inside	OuterWheelPath	377.0	4.0	14.5	481.5
42	7/3/2008	Inside	OuterWheelPath	385.3	4.0	15.9	469.2
43	7/3/2008	Inside	OuterWheelPath	241.2	3.1	16.2	673.0
44	7/3/2008	Inside	OuterWheelPath	225.0	2.8	15.2	714.7
45	7/3/2008	Inside	OuterWheelPath	177.8	2.7	13.0	870.6
46	7/3/2008	Inside	OuterWheelPath	185.0	2.5	13.1	843.6
47	7/3/2008	Outside	OuterWheelPath	220.4	4.8	13.7	733.5
48	7/3/2008	Outside	OuterWheelPath	217.4	4.4	15.5	732.5
49	7/3/2008	Outside	OuterWheelPath	207.3	4.3	15.1	761.9
50	7/3/2008	Outside	OuterWheelPath	270.3	6.2	16.8	614.1
51	7/3/2008	Outside	OuterWheelPath	324.8	5.9	16.3	534.3
52	7/3/2008	Outside	OuterWheelPath	250.1	5.8	16.2	654.4
53	7/3/2008	Outside	OuterWheelPath	217.3	3.6	15.2	734.2
54	7/3/2008	Outside	OuterWheelPath	219.5	3.4	14.4	732.3
55	7/3/2008	Outside	Midlane	154.9	4.6	13.1	967.9
56	7/3/2008	Outside	Midlane	173.5	4.2	13.7	882.8
57	7/3/2008	Outside	Midlane	171.0	4.2	14.2	889.6
58	7/3/2008	Outside	Midlane	198.7	5.8	15.3	786.3
59	7/3/2008	Outside	Midlane	201.4	6.0	13.9	785.4
60	7/3/2008	Outside	Midlane	211.2	5.3	15.3	750.1
61	7/3/2008	Outside	Midlane	183.0	3.7	15.2	838.6
62	7/3/2008	Outside	Midlane	169.0	3.9	13.4	902.8
63	7/3/2008	Outside	Midlane	195.3	2.6	14.3	802.1
64	7/3/2008	Outside	Midlane	174.6	2.9	12.9	883.6
65	8/18/2008	Outside	OuterWheelPath	362.5	6.5	17.1	488.5
66	8/18/2008	Outside	OuterWheelPath	335.0	6.0	18.7	514.7
67	8/18/2008	Outside	OuterWheelPath	326.5	5.5	17.9	527.3
68	8/18/2008	Outside	OuterWheelPath	374.0	8.0	19.8	470.1
69	8/18/2008	Outside	OuterWheelPath	404.2	8.5	19.1	444.2
70	8/18/2008	Outside	OuterWheelPath	434.4	7.6	19.6	419.0
71	8/18/2008	Outside	OuterWheelPath	335.3	6.1	19.1	513.3
72	8/18/2008	Outside	OuterWheelPath	322.6	6.2	17.6	533.1
73	8/18/2008	Outside	OuterWheelPath	378.9	3.4	14.9	478.4
74	8/18/2008	Outside	OuterWheelPath	366.8	3.2	14.4	492.1
75	9/8/2009	Inside	OuterWheelPath	342.6	4.9	15.0	516.8
76	9/8/2009	Inside	OuterWheelPath	368.7	4.8	15.7	486.1
77	9/8/2009	Inside	OuterWheelPath	293.3	4.5	15.4	581.3
78	9/8/2009	Inside	OuterWheelPath	344.6	5.3	15.0	514.5
79	9/8/2009	Inside	OuterWheelPath	493.5	6.4	15.1	389.4
80	9/8/2009	Inside	OuterWheelPath	469.5	6.9	16.2	401.9
81	9/8/2009	Inside	OuterWheelPath	378.7	5.3	16.9	472.7

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	9/8/2009	Inside	OuterWheelPath	358.7	4.9	16.5	494.2
83	9/8/2009	Inside	OuterWheelPath	263.7	4.2	13.9	637.6
84	9/8/2009	Inside	OuterWheelPath	283.4	4.2	14.3	601.3
85	9/8/2009	Inside	Midlane	286.3	4.1	13.1	601.7
86	9/8/2009	Inside	Midlane	270.0	4.0	13.9	626.0
87	9/8/2009	Inside	Midlane	304.2	4.2	14.6	568.1
88	9/8/2009	Inside	Midlane	315.1	5.0	14.7	552.5
89	9/8/2009	Inside	Midlane	369.8	4.8	14.0	490.4
90	9/8/2009	Inside	Midlane	411.7	6.3	15.7	446.3
91	9/8/2009	Inside	Midlane	298.3	4.7	15.8	572.4
92	9/8/2009	Inside	Midlane	311.8	4.5	15.1	555.5
93	9/8/2009	Inside	Midlane	242.0	3.9	13.2	684.8
94	9/8/2009	Inside	Midlane	282.8	4.2	13.7	604.8
95	9/8/2009	Outside	Midlane	274.9	5.9	14.5	614.8
96	9/8/2009	Outside	Midlane	280.0	6.1	15.3	603.0
97	9/8/2009	Outside	Midlane	286.1	6.1	15.3	593.0
98	9/8/2009	Outside	Midlane	305.0	7.5	16.5	560.3
99	9/8/2009	Outside	Midlane	348.9	7.6	15.8	507.0
100	9/8/2009	Outside	Midlane	334.1	7.6	16.5	522.1
101	9/8/2009	Outside	Midlane	288.4	5.9	16.5	585.1
102	9/8/2009	Outside	Midlane	302.8	5.4	14.8	569.4
103	9/8/2009	Outside	Midlane	276.4	5.4	15.3	609.1
104	9/8/2009	Outside	Midlane	278.6	5.3	15.0	606.5
105	9/8/2009	Outside	OuterWheelPath	324.8	6.2	14.5	540.4
106	9/8/2009	Outside	OuterWheelPath	278.4	6.6	16.2	602.3
107	9/8/2009	Outside	OuterWheelPath	269.4	6.5	15.7	619.7
108	9/8/2009	Outside	OuterWheelPath	328.6	8.4	17.1	527.0
109	9/8/2009	Outside	OuterWheelPath	385.2	8.0	17.3	465.5
110	9/8/2009	Outside	OuterWheelPath	336.8	8.1	17.1	517.1
111	9/8/2009	Outside	OuterWheelPath	308.0	6.2	17.1	554.1
112	9/8/2009	Outside	OuterWheelPath	322.1	6.8	16.5	537.1
113	9/8/2009	Outside	OuterWheelPath	284.8	6.1	16.1	592.2
114	9/8/2009	Outside	OuterWheelPath	288.4	5.8	15.8	587.5
115	10/8/2010	Outside	OuterWheelPath	446.0	6.1	17.7	414.7
116	10/8/2010	Outside	OuterWheelPath	407.7	6.4	18.6	442.4
117	10/8/2010	Outside	OuterWheelPath	391.9	5.8	18.2	457.1
118	10/8/2010	Outside	OuterWheelPath	475.8	7.7	19.7	390.3
119	10/8/2010	Outside	OuterWheelPath	468.7	7.8	19.7	394.9
120	10/8/2010	Outside	OuterWheelPath	486.2	7.6	19.4	384.4
121	10/8/2010	Outside	OuterWheelPath	415.6	5.9	19.4	434.1
122	10/8/2010	Outside	OuterWheelPath	466.7	6.2	19.0	397.6
123	10/8/2010	Outside	OuterWheelPath	434.6	5.0	19.3	419.5
124	10/8/2010	Outside	OuterWheelPath	412.5	5.0	19.1	437.2
125	6/29/2011	Inside	OuterWheelPath	241.9	3.2	13.6	683.0
126	6/29/2011	Inside	OuterWheelPath	279.6	3.0	14.3	607.6
127	6/29/2011	Inside	OuterWheelPath	220.0	2.8	14.3	731.5

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
128	6/29/2011	Inside	OuterWheelPath	239.1	3.4	13.6	689.2
129	6/29/2011	Inside	OuterWheelPath	346.5	4.1	13.2	518.7
130	6/29/2011	Inside	OuterWheelPath	344.5	4.2	14.0	518.0
131	6/29/2011	Inside	OuterWheelPath	247.6	3.1	14.9	664.9
132	6/29/2011	Inside	OuterWheelPath	243.7	2.9	14.3	675.8
133	6/29/2011	Inside	OuterWheelPath	193.2	2.8	13.0	816.4
134	6/29/2011	Inside	Midlane	301.2	2.9	13.0	578.9
135	9/7/2011	Outside	OuterWheelPath	323.4	4.5	15.5	538.7
136	9/7/2011	Outside	OuterWheelPath	312.2	3.8	16.2	551.2
137	9/7/2011	Outside	OuterWheelPath	275.0	3.7	16.3	607.7
138	9/7/2011	Outside	OuterWheelPath	355.0	6.1	19.1	491.1
139	9/7/2011	Outside	OuterWheelPath	420.2	5.8	18.7	431.9
140	9/7/2011	Outside	OuterWheelPath	360.1	5.5	17.1	491.0
141	9/7/2011	Outside	OuterWheelPath	322.2	3.7	17.4	534.2
142	9/7/2011	Outside	OuterWheelPath	356.4	4.3	16.6	496.3
143	9/7/2011	Outside	OuterWheelPath	337.0	3.1	16.4	518.9
144	9/7/2011	Inside	Midlane	350.9	4.2	18.4	497.4
145	9/7/2011	Inside	Midlane	323.4	3.9	17.0	533.9
146	9/7/2011	Inside	Midlane	226.1	3.7	14.6	714.8
147	9/7/2011	Inside	Midlane	276.9	3.8	15.3	608.2
148	9/7/2011	Inside	OuterWheelPath	305.5	4.7	16.6	559.2
149	9/7/2011	Inside	OuterWheelPath	317.0	4.5	17.6	540.4
150	9/7/2011	Inside	OuterWheelPath	443.7	5.6	16.6	418.9
151	9/7/2011	Inside	OuterWheelPath	350.1	4.2	18.8	497.2
152	9/7/2011	Inside	OuterWheelPath	307.6	4.0	17.4	553.7
153	9/7/2011	Inside	OuterWheelPath	242.4	4.0	15.1	675.1
154	9/7/2011	Inside	OuterWheelPath	265.3	4.1	16.0	626.0

Modulus 6.0 0utput For Cell 34 in Temperature Range 30 to 35°C (Cell34-temp35.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	7/7/2008	Inside	Midlane	200.9	2.7	11.3	802.9
2	7/7/2008	Inside	Midlane	218.3	2.3	12.0	748.5
3	7/7/2008	Inside	Midlane	191.1	2.3	12.3	827.8
4	7/7/2008	Inside	Midlane	216.1	3.2	13.1	748.0
5	7/7/2008	Inside	Midlane	243.8	3.2	12.5	684.5
6	7/7/2008	Inside	Midlane	290.8	3.8	13.6	592.3
7	7/7/2008	Inside	Midlane	198.3	2.7	13.4	797.8
8	7/7/2008	Inside	Midlane	193.2	2.3	11.9	823.4
9	7/7/2008	Inside	Midlane	158.9	2.1	10.6	968.7
10	7/7/2008	Inside	Midlane	187.3	2.1	10.1	857.0
11	7/15/2008	Outside	OuterWheelPath	264.2	5.0	14.5	634.0
12	7/15/2008	Outside	OuterWheelPath	255.7	4.7	16.0	644.1
13	7/15/2008	Outside	OuterWheelPath	246.9	4.5	15.5	663.8
14	7/15/2008	Outside	OuterWheelPath	315.1	6.6	17.1	544.4
15	7/15/2008	Outside	OuterWheelPath	390.9	6.0	17.2	460.5
16	7/15/2008	Outside	OuterWheelPath	325.0	5.9	17.0	531.8
17	7/15/2008	Outside	OuterWheelPath	260.6	4.4	17.1	630.6
18	7/15/2008	Outside	OuterWheelPath	262.7	4.8	15.9	631.1
19	7/15/2008	Outside	OuterWheelPath	247.9	3.7	15.4	662.2
20	7/15/2008	Outside	OuterWheelPath	247.2	3.5	14.2	668.9
21	7/21/2008	Outside	OuterWheelPath	191.7	5.6	13.6	817.8
22	7/21/2008	Outside	OuterWheelPath	184.6	4.9	14.5	836.8
23	7/21/2008	Outside	OuterWheelPath	186.0	4.8	14.1	834.2
24	7/21/2008	Outside	OuterWheelPath	225.8	7.1	15.5	711.3
25	7/21/2008	Outside	OuterWheelPath	258.9	7.0	15.2	641.1
26	7/21/2008	Outside	OuterWheelPath	212.0	6.9	15.4	747.4
27	7/21/2008	Outside	OuterWheelPath	190.1	4.6	15.0	815.3
28	7/21/2008	Outside	OuterWheelPath	188.6	5.1	14.5	823.0
29	7/21/2008	Outside	OuterWheelPath	188.3	3.9	13.9	827.4
30	7/21/2008	Outside	OuterWheelPath	183.7	3.7	12.6	851.5
31	7/21/2008	Outside	Midlane	165.0	4.7	12.7	924.5
32	7/21/2008	Outside	Midlane	175.3	4.2	13.4	877.6
33	7/21/2008	Outside	Midlane	169.4	4.4	13.3	901.8
34	7/21/2008	Outside	Midlane	194.7	6.3	14.9	800.9
35	7/21/2008	Outside	Midlane	193.0	6.9	13.6	813.5
36	7/21/2008	Outside	Midlane	172.0	6.0	15.1	880.4
37	7/21/2008	Outside	Midlane	166.9	4.3	14.5	904.7
38	7/21/2008	Outside	Midlane	159.6	4.2	13.2	945.1

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	7/21/2008	Outside	Midlane	176.0	2.9	12.4	881.5
40	7/21/2008	Outside	Midlane	179.8	2.9	11.6	872.7
41	7/22/2008	Inside	Midlane	158.4	3.1	11.1	966.8
42	7/22/2008	Inside	Midlane	193.7	2.4	10.7	830.3
43	7/22/2008	Inside	Midlane	169.7	2.8	12.4	906.8
44	7/22/2008	Inside	Midlane	182.7	3.9	12.8	853.8
45	7/22/2008	Inside	Midlane	176.2	3.9	12.3	881.4
46	7/22/2008	Inside	Midlane	206.0	5.0	13.7	772.9
47	7/22/2008	Inside	Midlane	169.0	3.1	13.6	901.5
48	7/22/2008	Inside	Midlane	161.4	2.8	12.0	945.6
49	7/22/2008	Inside	Midlane	145.9	2.5	11.4	1027.6
50	7/22/2008	Inside	Midlane	159.3	2.8	11.3	960.9
51	7/22/2008	Inside	OuterWheelPath	199.1	3.6	13.7	793.6
52	7/22/2008	Inside	OuterWheelPath	215.3	3.6	14.1	744.9
53	7/22/2008	Inside	OuterWheelPath	187.7	3.0	13.6	831.2
54	7/22/2008	Inside	OuterWheelPath	222.9	4.1	14.4	723.6
55	7/22/2008	Inside	OuterWheelPath	317.6	4.9	14.0	551.7
56	7/22/2008	Inside	OuterWheelPath	281.3	5.0	14.8	602.8
57	7/22/2008	Inside	OuterWheelPath	204.1	3.5	15.3	770.2
58	7/22/2008	Inside	OuterWheelPath	195.6	2.9	14.2	801.7
59	7/22/2008	Inside	OuterWheelPath	164.4	3.0	12.0	932.3
60	7/22/2008	Inside	OuterWheelPath	156.6	2.8	12.1	967.2
61	8/18/2008	Inside	OuterWheelPath	276.2	3.9	16.4	605.3
62	8/18/2008	Inside	OuterWheelPath	299.9	3.8	17.4	564.7
63	8/18/2008	Inside	OuterWheelPath	258.6	3.7	17.0	634.7
64	8/18/2008	Inside	OuterWheelPath	310.1	4.7	17.4	550.3
65	8/18/2008	Inside	OuterWheelPath	417.9	5.4	17.1	437.5
66	8/18/2008	Inside	OuterWheelPath	407.5	6.2	18.2	443.5
67	8/18/2008	Inside	OuterWheelPath	304.1	4.1	18.7	554.8
68	8/18/2008	Inside	OuterWheelPath	291.6	3.4	17.2	577.7
69	8/18/2008	Inside	OuterWheelPath	204.0	3.3	14.4	775.0
70	8/18/2008	Inside	OuterWheelPath	221.6	3.3	14.8	725.0
71	7/21/2009	Outside	OuterWheelPath	275.8	5.4	15.2	610.5
72	7/21/2009	Outside	OuterWheelPath	224.5	5.4	16.1	711.9
73	7/21/2009	Outside	OuterWheelPath	330.5	6.5	18.1	521.8
74	7/21/2009	Outside	OuterWheelPath	249.8	5.5	17.5	650.2
75	7/21/2009	Outside	OuterWheelPath	251.2	5.0	16.5	651.1
76	7/21/2009	Outside	Midlane	239.6	4.9	14.7	682.9
77	7/21/2009	Outside	Midlane	239.6	5.1	15.8	678.2
78	7/21/2009	Outside	Midlane	305.1	6.8	16.2	561.1
79	7/21/2009	Outside	Midlane	245.7	5.1	17.0	660.4
80	7/21/2009	Outside	Midlane	232.1	4.5	16.4	692.6
81	7/21/2009	Inside	Midlane	252.3	3.8	13.9	659.7

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	7/21/2009	Inside	Midlane	257.7	4.2	16.5	638.3
83	7/21/2009	Inside	Midlane	339.1	4.3	15.3	519.9
84	7/21/2009	Inside	Midlane	315.9	4.3	17.9	540.9
85	7/21/2009	Inside	Midlane	216.1	3.5	14.1	742.7
86	7/21/2009	Inside	OuterWheelPath	264.5	4.0	15.6	629.0
87	7/21/2009	Inside	OuterWheelPath	257.6	3.8	17.1	636.3
88	7/21/2009	Inside	OuterWheelPath	407.8	5.1	15.7	449.6
89	7/21/2009	Inside	OuterWheelPath	321.8	4.4	18.9	530.4
90	7/21/2009	Inside	OuterWheelPath	219.8	3.9	15.0	728.6
91	6/29/2011	Inside	Midlane	261.0	3.1	13.5	644.5
92	9/7/2011	Inside	OuterWheelPath	262.2	4.1	17.9	624.9
93	9/7/2011	Inside	OuterWheelPath	306.3	5.0	17.1	556.5
94	9/7/2011	Inside	OuterWheelPath	402.1	6.4	17.5	449.8

Modulus 6.0 0utput For Cell 34 in Temperature Range 35 to 40°C (Cell34-temp40.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	7/15/2008	Outside	Midlane	184.4	4.7	13.8	841.5
2	7/15/2008	Outside	Midlane	173.3	4.4	14.3	879.9
3	7/15/2008	Outside	Midlane	184.3	4.5	14.6	837.3
4	7/15/2008	Outside	Midlane	205.3	6.6	16.0	763.4
5	7/15/2008	Outside	Midlane	221.1	6.9	14.6	727.2
6	7/15/2008	Outside	Midlane	194.7	6.1	15.8	796.3
7	7/15/2008	Outside	Midlane	179.7	4.1	15.7	847.8
8	7/15/2008	Outside	Midlane	172.4	4.4	14.3	883.4
9	7/15/2008	Outside	Midlane	195.2	2.9	14.1	803.6
10	7/15/2008	Outside	Midlane	189.0	2.8	12.8	831.7
11	9/14/2009	Outside	OuterWheelPath	264.8	6.8	16.4	625.4
12	9/14/2009	Outside	OuterWheelPath	240.2	6.0	17.6	669.8
13	9/14/2009	Outside	OuterWheelPath	299.4	8.1	19.3	559.8
14	9/14/2009	Outside	OuterWheelPath	261.2	6.4	19.3	622.1
15	9/14/2009	Outside	OuterWheelPath	259.7	5.6	17.7	630.2
16	9/14/2009	Outside	Midlane	238.2	5.8	15.8	681.2
17	9/14/2009	Outside	Midlane	243.5	5.9	17.0	665.0
18	9/14/2009	Outside	Midlane	315.7	7.7	17.2	543.3
19	9/14/2009	Outside	Midlane	254.1	5.8	18.8	637.2
20	9/14/2009	Outside	Midlane	240.1	5.1	17.6	670.0
21	9/14/2009	Inside	Midlane	262.9	4.2	15.5	632.3
22	9/14/2009	Inside	Midlane	262.5	4.4	17.9	624.3
23	9/14/2009	Inside	Midlane	318.9	5.0	15.8	543.5
24	9/14/2009	Inside	Midlane	303.9	4.9	19.5	552.8
25	9/14/2009	Inside	Midlane	236.0	3.9	16.3	684.1
26	9/14/2009	Inside	OuterWheelPath	279.9	5.0	17.2	596.3
27	9/14/2009	Inside	OuterWheelPath	282.4	4.2	18.9	586.9
28	9/14/2009	Inside	OuterWheelPath	461.1	6.4	16.8	406.2
29	9/14/2009	Inside	OuterWheelPath	321.9	4.7	19.9	527.7
30	9/14/2009	Inside	OuterWheelPath	243.3	4.1	16.4	667.7

Modulus 6.0 0utput For Cell 35 in Temperature Range 0 to 5°C (Cell35-temp5.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	11/9/2007	Inside	Midlane	935.1	6.6	22.9	228.0
2	11/9/2007	Inside	Midlane	1238.8	8.0	24.1	182.5
3	11/9/2007	Inside	Midlane	988.1	7.3	23.0	218.4
4	11/9/2007	Inside	Midlane	1488.5	7.4	22.3	159.5
5	11/9/2007	Inside	Midlane	867.5	5.9	21.5	243.1
6	11/9/2007	Inside	Midlane	1169.7	6.7	23.8	191.0
7	11/9/2007	Inside	Midlane	1077.8	6.1	21.1	205.9
8	4/28/2008	Outside	OuterWheelPath	671.4	3.6	16.7	303.8
9	4/28/2008	Outside	OuterWheelPath	1021.3	3.5	18.6	217.3
10	4/28/2008	Outside	OuterWheelPath	698.7	4.0	16.6	294.8
11	4/28/2008	Outside	OuterWheelPath	1011.4	3.8	17.3	220.5
12	4/28/2008	Outside	OuterWheelPath	685.6	3.0	17.6	297.4
13	4/28/2008	Outside	OuterWheelPath	992.0	3.6	18.2	222.7
14	4/28/2008	Outside	OuterWheelPath	1040.3	2.9	17.9	215.0
15	4/28/2008	Outside	OuterWheelPath	1100.1	3.1	18.1	205.7
16	4/28/2008	Outside	OuterWheelPath	1143.3	3.3	18.7	199.0
17	4/28/2008	Outside	OuterWheelPath	1068.1	3.7	17.2	211.5
18	4/7/2009	Outside	OuterWheelPath	697.4	2.9	14.9	298.3
19	4/7/2009	Outside	OuterWheelPath	945.8	3.3	15.7	234.5
20	4/7/2009	Outside	OuterWheelPath	686.0	3.5	14.7	302.5
21	4/7/2009	Outside	OuterWheelPath	845.4	3.3	15.1	256.7
22	4/7/2009	Outside	OuterWheelPath	665.6	2.8	15.1	308.9
23	4/7/2009	Outside	OuterWheelPath	741.1	3.3	15.1	284.2
24	4/7/2009	Outside	OuterWheelPath	797.9	2.9	14.9	268.8
25	4/7/2009	Outside	OuterWheelPath	905.1	3.0	15.8	242.4
26	4/7/2009	Outside	OuterWheelPath	987.4	3.0	16.4	225.8
27	4/7/2009	Outside	OuterWheelPath	1063.0	3.0	16.1	213.7
28	11/17/2009	Outside	OuterWheelPath	1438.1	5.6	23.2	163.2
29	3/19/2010	Outside	OuterWheelPath	1028.5	2.1	15.2	220.4
30	3/19/2010	Outside	OuterWheelPath	1036.5	2.1	15.1	219.2
31	3/19/2010	Outside	OuterWheelPath	1345.1	2.0	17.4	176.7
32	3/19/2010	Outside	OuterWheelPath	1038.4	2.4	15.1	218.9
33	3/19/2010	Outside	OuterWheelPath	1306.3	2.0	16.0	182.3
34	3/19/2010	Outside	OuterWheelPath	1178.4	2.1	15.9	197.5
35	3/19/2010	Outside	OuterWheelPath	1599.3	1.8	17.4	154.6
36	3/19/2010	Outside	OuterWheelPath	1676.9	2.2	16.6	149.7
37	3/19/2010	Outside	OuterWheelPath	1768.8	1.8	18.1	142.4
38	2/16/2011	Outside	OuterWheelPath	1712.4	15.8	68.4	128.4

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	2/16/2011	Outside	OuterWheelPath	1559.2	12.3	57.3	140.4
40	2/16/2011	Outside	OuterWheelPath	2052.3	17.5	61.4	112.8
41	2/16/2011	Outside	OuterWheelPath	2097.8	10.2	59.9	111.1
42	2/16/2011	Outside	OuterWheelPath	2242.6	23.4	68.4	104.2
43	2/16/2011	Outside	Midlane	1383.5	16.6	63.1	152.6
44	2/16/2011	Outside	Midlane	1653.4	9.7	57.2	134.2
45	2/16/2011	Outside	Midlane	1833.9	10.7	64.1	122.5
46	2/16/2011	Outside	Midlane	2280.9	16.8	69.2	102.7
47	2/16/2011	Outside	OuterWheelPath	1904.7	30.0	70.6	117.9
48	2/16/2011	Outside	OuterWheelPath	1832.7	25.9	61.1	123.2
49	2/16/2011	Outside	OuterWheelPath	1821.3	23.3	64.8	123.0
50	2/16/2011	Outside	OuterWheelPath	1540.9	16.3	60.2	141.0
51	2/16/2011	Outside	OuterWheelPath	2114.8	13.7	64.5	109.7
52	2/16/2011	Inside	Midlane	1391.0	16.8	60.3	152.7
53	2/16/2011	Inside	Midlane	1729.2	27.6	60.5	128.9
54	2/16/2011	Inside	Midlane	2076.1	15.3	58.8	112.2
55	2/16/2011	Inside	Midlane	1321.7	21.0	63.1	158.1
56	2/16/2011	Inside	Midlane	2267.1	14.5	67.0	103.5

Modulus 6.0 0utput For Cell 35 in Temperature Range 5 to 10°C (Cell35-temp10.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	11/9/2007	Inside	Midlane	1177.5	5.7	21.8	191.7
2	11/9/2007	Inside	Midlane	1226.9	5.6	20.9	186.4
3	11/9/2007	Inside	Midlane	1197.5	6.2	21.2	189.7
4	11/9/2007	Outside	Midlane	657.2	6.6	23.8	298.5
5	11/9/2007	Outside	Midlane	1050.1	7.4	25.5	206.3
6	11/9/2007	Outside	Midlane	883.4	7.1	24.0	237.2
7	11/9/2007	Outside	Midlane	1027.3	8.1	23.9	211.1
8	11/9/2007	Outside	Midlane	950.0	4.8	24.2	224.0
9	11/9/2007	Outside	Midlane	866.9	6.3	24.0	240.7
10	11/9/2007	Outside	Midlane	726.0	5.0	21.7	278.8
11	11/9/2007	Outside	Midlane	1062.4	5.6	23.0	206.5
12	11/9/2007	Outside	Midlane	981.3	5.2	22.1	220.4
13	11/9/2007	Outside	Midlane	809.3	5.1	20.3	258.0
14	3/23/2009	Outside	OuterWheelPath	831.5	2.5	24.9	247.7
15	3/23/2009	Outside	OuterWheelPath	837.6	2.7	24.6	246.6
16	3/23/2009	Outside	OuterWheelPath	917.6	2.2	21.8	232.5
17	3/23/2009	Outside	OuterWheelPath	1151.3	2.2	22.3	194.6
18	3/23/2009	Outside	OuterWheelPath	1239.1	2.4	24.5	182.2
19	3/23/2009	Outside	Midlane	845.3	2.4	24.0	245.4
20	3/23/2009	Outside	Midlane	1015.6	2.5	22.9	213.9
21	3/23/2009	Outside	Midlane	901.4	2.1	20.5	237.1
22	3/23/2009	Outside	Midlane	1221.3	2.2	22.3	185.9
23	3/23/2009	Outside	Midlane	1235.3	2.3	23.4	183.4
24	3/23/2009	Inside	OuterWheelPath	942.9	3.0	25.7	224.0
25	3/23/2009	Inside	OuterWheelPath	1281.0	3.4	25.2	177.1
26	3/23/2009	Inside	OuterWheelPath	1164.1	2.8	28.0	188.7
27	3/23/2009	Inside	OuterWheelPath	1082.8	2.8	25.2	201.7
28	3/23/2009	Inside	OuterWheelPath	1301.7	3.0	29.3	172.3
29	3/23/2009	Inside	Midlane	845.9	2.8	24.1	245.2
30	3/23/2009	Inside	Midlane	1219.3	3.2	25.7	183.6
31	3/23/2009	Inside	Midlane	1394.8	2.5	25.2	165.8
32	3/23/2009	Inside	Midlane	919.6	2.6	21.7	232.2
33	3/23/2009	Inside	Midlane	1391.2	2.3	22.9	167.7
34	4/7/2009	Outside	Midlane	335.9	3.0	13.4	530.5
35	4/7/2009	Outside	Midlane	478.4	3.0	15.1	398.8
36	4/7/2009	Outside	Midlane	414.1	2.9	13.6	450.5
37	4/7/2009	Outside	Midlane	526.8	2.8	13.7	373.7
38	4/7/2009	Outside	Midlane	318.8	2.7	12.8	554.9

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	4/7/2009	Outside	Midlane	448.1	2.8	14.1	422.4
40	4/7/2009	Outside	Midlane	416.6	2.5	14.0	447.2
41	4/7/2009	Outside	Midlane	432.3	2.2	13.9	434.9
42	4/7/2009	Outside	Midlane	474.5	2.4	14.2	403.8
43	4/7/2009	Outside	Midlane	465.9	2.4	13.9	410.4
44	4/7/2009	Inside	Midlane	306.4	3.2	13.5	569.2
45	4/7/2009	Inside	Midlane	471.5	3.6	15.4	402.6
46	4/7/2009	Inside	Midlane	402.4	3.7	14.1	459.0
47	4/7/2009	Inside	Midlane	437.2	3.6	14.4	429.6
48	4/7/2009	Inside	Midlane	435.8	2.3	14.7	429.8
49	4/7/2009	Inside	Midlane	428.4	3.3	14.7	435.6
50	4/7/2009	Inside	Midlane	357.4	3.0	13.9	503.9
51	4/7/2009	Inside	Midlane	464.5	3.0	14.7	409.1
52	4/7/2009	Inside	Midlane	471.7	2.6	13.8	406.8
53	4/7/2009	Inside	Midlane	422.7	2.6	13.4	444.1
54	4/7/2009	Inside	OuterWheelPath	376.9	3.2	14.5	481.6
55	4/7/2009	Inside	OuterWheelPath	448.1	3.9	15.5	418.5
56	4/7/2009	Inside	OuterWheelPath	403.6	3.7	14.3	457.4
57	4/7/2009	Inside	OuterWheelPath	488.9	4.0	15.1	392.2
58	4/7/2009	Inside	OuterWheelPath	424.3	2.8	14.8	438.5
59	4/7/2009	Inside	OuterWheelPath	562.0	3.4	15.3	351.7
60	4/7/2009	Inside	OuterWheelPath	453.4	3.1	15.1	415.8
61	4/7/2009	Inside	OuterWheelPath	549.1	3.2	16.0	356.5
62	4/7/2009	Inside	OuterWheelPath	502.0	3.2	15.6	383.0
63	4/7/2009	Inside	OuterWheelPath	420.6	3.1	14.5	442.4
64	10/26/2009	Outside	OuterWheelPath	1225.5	5.5	22.8	185.0
65	10/26/2009	Outside	OuterWheelPath	1182.8	6.8	22.5	190.4
66	10/26/2009	Outside	OuterWheelPath	1253.9	5.4	22.1	182.3
67	10/26/2009	Outside	OuterWheelPath	1568.7	5.1	21.4	153.8
68	10/26/2009	Outside	OuterWheelPath	1802.2	5.1	21.6	138.0
69	10/26/2009	Outside	Midlane	1167.5	6.2	22.7	192.2
70	10/26/2009	Outside	Midlane	1304.2	7.0	22.8	176.3
71	10/26/2009	Outside	Midlane	1122.3	6.0	20.4	200.2
72	10/26/2009	Outside	Midlane	1565.9	5.2	21.4	154.0
73	10/26/2009	Outside	Midlane	1764.8	4.9	21.0	140.6
74	10/26/2009	Inside	OuterWheelPath	1213.9	5.8	22.7	186.5
75	10/26/2009	Inside	OuterWheelPath	1390.9	7.0	22.5	168.0
76	10/26/2009	Inside	OuterWheelPath	1686.6	4.3	24.6	143.4
77	10/26/2009	Inside	OuterWheelPath	1499.8	4.8	21.8	158.9
78	10/26/2009	Inside	OuterWheelPath	1765.6	5.3	22.1	139.9
79	10/26/2009	Inside	Midlane	1204.5	5.9	22.5	187.8
80	10/26/2009	Inside	Midlane	1613.2	7.1	22.9	149.5
81	10/26/2009	Inside	Midlane	1834.8	4.6	22.8	135.4

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	10/26/2009	Inside	Midlane	1251.1	5.2	20.0	184.4
83	10/26/2009	Inside	Midlane	1778.9	4.3	21.0	139.8
84	11/17/2009	Inside	OuterWheelPath	1466.7	5.9	22.6	161.1
85	11/17/2009	Inside	OuterWheelPath	1686.2	7.4	22.5	144.7
86	11/17/2009	Inside	OuterWheelPath	2138.5	3.9	24.8	119.3
87	11/17/2009	Inside	OuterWheelPath	1647.2	5.6	21.3	148.2
88	11/17/2009	Inside	OuterWheelPath	1993.4	6.0	22.4	127.2
89	11/17/2009	Inside	Midlane	1386.8	6.2	22.0	168.7
90	11/17/2009	Inside	Midlane	1987.6	7.6	22.9	127.2
91	11/17/2009	Inside	Midlane	2190.6	5.7	22.8	118.0
92	11/17/2009	Inside	Midlane	1522.2	4.9	20.3	158.2
93	11/17/2009	Inside	Midlane	2150.2	4.5	21.5	120.4
94	11/17/2009	Outside	OuterWheelPath	1361.8	7.3	22.7	170.6
95	11/17/2009	Outside	OuterWheelPath	1339.5	6.4	21.6	173.6
96	11/17/2009	Outside	OuterWheelPath	1708.8	6.0	20.8	144.3
97	11/17/2009	Outside	OuterWheelPath	2031.0	5.5	21.2	126.0
98	11/17/2009	Outside	Midlane	1374.1	6.3	22.9	169.3
99	11/17/2009	Outside	Midlane	1559.9	6.9	23.0	153.4
100	11/17/2009	Outside	Midlane	1474.7	5.4	22.3	160.7
101	11/17/2009	Outside	Midlane	1856.2	5.5	22.0	134.6
102	11/17/2009	Outside	Midlane	2066.8	5.5	22.0	123.9
103	3/17/2010	Outside	OuterWheelPath	651.4	2.0	15.6	313.1
104	3/17/2010	Outside	OuterWheelPath	682.8	2.2	16.3	300.6
105	3/17/2010	Inside	OuterWheelPath	694.2	2.9	16.0	297.3
106	3/17/2010	Inside	OuterWheelPath	733.5	3.2	15.5	285.8
107	3/17/2010	Inside	OuterWheelPath	866.3	2.3	16.6	249.6
108	3/17/2010	Inside	OuterWheelPath	866.3	2.8	16.2	250.2
109	3/17/2010	Inside	OuterWheelPath	978.2	2.8	17.0	226.7
110	3/17/2010	Inside	OuterWheelPath	847.3	2.6	16.3	254.4
111	3/17/2010	Inside	OuterWheelPath	856.9	2.4	15.8	252.9
112	3/17/2010	Inside	OuterWheelPath	1062.6	2.0	15.8	214.1
113	3/17/2010	Inside	OuterWheelPath	1061.2	2.8	16.8	213.1
114	3/17/2010	Inside	OuterWheelPath	547.3	2.9	14.5	360.8
115	3/17/2010	Inside	Midlane	618.8	2.0	15.1	326.8
116	3/17/2010	Inside	Midlane	699.2	2.5	14.4	298.7
117	3/17/2010	Inside	Midlane	662.8	2.1	14.3	311.5
118	3/17/2010	Inside	Midlane	838.8	2.0	15.8	257.1
119	3/17/2010	Inside	Midlane	1009.8	2.1	17.8	220.2
120	11/16/2010	Outside	OuterWheelPath	1334.3	5.9	22.5	173.5
121	11/16/2010	Outside	OuterWheelPath	1293.4	6.4	22.0	178.1
122	11/16/2010	Outside	OuterWheelPath	1427.5	5.3	21.8	165.1
123	11/16/2010	Outside	OuterWheelPath	1857.6	4.7	21.8	134.7
124	11/16/2010	Outside	OuterWheelPath	2169.9	4.8	21.9	119.4
125	11/16/2010	Outside	Midlane	1278.5	6.0	22.3	179.5
126	11/16/2010	Outside	Midlane	1381.3	6.9	22.2	169.1
127	11/16/2010	Outside	Midlane	1210.7	5.5	20.2	189.0

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
128	11/16/2010	Outside	Midlane	1746.4	5.1	21.1	141.7
129	11/16/2010	Outside	Midlane	1854.7	5.7	19.7	136.2
130	11/16/2010	Inside	Midlane	1305.8	5.5	21.7	177.0
131	11/16/2010	Inside	Midlane	1795.8	6.7	22.3	138.0
132	11/16/2010	Inside	Midlane	1946.2	4.5	22.9	129.3
133	11/16/2010	Inside	Midlane	1437.6	4.6	20.7	165.1
134	11/16/2010	Inside	Midlane	1981.5	4.2	20.7	128.8
135	11/16/2010	Inside	OuterWheelPath	1253.3	5.3	21.9	182.6
136	11/16/2010	Inside	OuterWheelPath	1493.8	6.3	21.8	159.4
137	11/16/2010	Inside	OuterWheelPath	1419.3	5.0	21.8	165.9
138	11/16/2010	Inside	OuterWheelPath	1571.4	4.5	21.0	153.9
139	11/16/2010	Inside	OuterWheelPath	1821.0	5.0	21.9	136.7

Modulus 6.0 0utput For Cell 35 in Temperature Range 10 to 15°C (Cell35-temp15.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	3/19/2008	Outside	OuterWheelPath	467.6	3.7	33.9	375.3
2	3/19/2008	Outside	OuterWheelPath	610.4	4.0	30.8	308.2
3	3/19/2008	Outside	OuterWheelPath	390.2	3.9	31.0	435.5
4	3/19/2008	Outside	OuterWheelPath	622.1	4.1	29.1	305.4
5	3/19/2008	Outside	OuterWheelPath	549.5	3.9	31.4	333.7
6	3/19/2008	Outside	OuterWheelPath	574.7	4.7	30.9	322.8
7	3/19/2008	Outside	OuterWheelPath	612.6	4.0	31.6	306.6
8	3/19/2008	Outside	OuterWheelPath	704.3	3.7	31.5	275.3
9	3/19/2008	Outside	OuterWheelPath	647.1	4.2	32.5	293.1
10	3/19/2008	Outside	OuterWheelPath	779.9	4.6	31.0	254.8
11	3/19/2008	Inside	Midlane	341.6	4.4	34.2	478.2
12	3/19/2008	Inside	Midlane	552.9	5.3	31.7	331.8
13	3/19/2008	Inside	Midlane	398.2	5.4	31.0	428.7
14	3/19/2008	Inside	Midlane	577.0	5.1	31.5	321.2
15	3/19/2008	Inside	Midlane	447.9	4.5	32.9	389.2
16	3/19/2008	Inside	Midlane	410.6	5.5	30.7	419.1
17	3/19/2008	Inside	Midlane	321.7	4.8	30.5	506.5
18	3/19/2008	Inside	Midlane	515.3	4.7	33.6	348.4
19	3/19/2008	Inside	Midlane	492.3	3.9	29.8	365.2
20	3/19/2008	Inside	Midlane	396.8	4.2	29.4	432.1
21	3/19/2008	Inside	OuterWheelPath	298.0	5.3	39.0	524.7
22	3/19/2008	Inside	OuterWheelPath	347.8	6.0	34.7	470.9
23	3/19/2008	Inside	OuterWheelPath	320.6	5.6	35.7	500.2
24	3/19/2008	Inside	OuterWheelPath	425.8	5.8	35.8	401.4
25	3/19/2008	Inside	OuterWheelPath	241.1	5.3	47.2	606.9
26	3/19/2008	Inside	OuterWheelPath	473.0	5.8	33.4	372.5
27	3/19/2008	Inside	OuterWheelPath	349.7	5.7	34.2	469.6
28	3/19/2008	Inside	OuterWheelPath	488.0	5.7	38.0	359.1
29	3/19/2008	Inside	OuterWheelPath	401.5	4.9	40.6	415.0
30	3/19/2008	Inside	OuterWheelPath	336.9	5.0	37.5	479.0
31	3/19/2008	Outside	Midlane	268.3	3.7	30.4	583.1
32	3/19/2008	Outside	Midlane	402.9	4.4	30.0	426.2
33	3/19/2008	Outside	Midlane	297.1	3.8	30.4	538.8
34	3/19/2008	Outside	Midlane	433.6	3.9	26.5	407.5
35	3/19/2008	Outside	Midlane	256.8	3.3	26.1	612.2
36	3/19/2008	Outside	Midlane	339.2	3.8	26.4	493.0
37	3/19/2008	Outside	Midlane	339.7	3.9	27.6	490.3
38	3/19/2008	Outside	Midlane	367.6	4.2	28.3	460.2

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	3/19/2008	Outside	Midlane	416.6	4.2	30.7	414.4
40	3/19/2008	Outside	Midlane	410.9	4.0	26.8	424.4
41	4/3/2008	Outside	OuterWheelPath	210.0	2.3	13.0	765.4
42	4/3/2008	Outside	OuterWheelPath	280.0	2.8	13.8	609.1
43	4/3/2008	Outside	OuterWheelPath	239.3	2.4	14.1	686.4
44	4/3/2008	Outside	OuterWheelPath	288.0	2.3	14.3	593.9
45	4/3/2008	Outside	OuterWheelPath	290.4	2.6	14.9	587.7
46	6/30/2009	Outside	OuterWheelPath	234.7	4.1	17.1	683.8
47	6/30/2009	Outside	OuterWheelPath	255.0	5.1	17.5	639.9
48	6/30/2009	Outside	OuterWheelPath	232.1	5.4	17.3	689.0
49	6/30/2009	Outside	OuterWheelPath	278.0	6.1	16.6	601.6
50	6/30/2009	Outside	OuterWheelPath	215.9	4.3	17.1	729.5
51	6/30/2009	Outside	OuterWheelPath	276.8	6.1	17.0	602.2
52	6/30/2009	Outside	OuterWheelPath	265.6	4.8	15.0	629.4
53	6/30/2009	Outside	OuterWheelPath	290.3	5.0	15.3	586.4
54	6/30/2009	Outside	OuterWheelPath	268.7	5.1	14.4	626.2
55	6/30/2009	Outside	Midlane	204.7	4.9	17.2	759.8
56	6/30/2009	Outside	Midlane	244.6	5.0	17.4	661.2
57	6/30/2009	Outside	Midlane	280.3	4.8	16.0	599.9
58	6/30/2009	Outside	Midlane	196.2	3.8	16.0	790.6
59	6/30/2009	Outside	Midlane	269.9	5.4	16.8	614.8
60	6/30/2009	Outside	Midlane	272.7	3.9	14.9	617.0
61	6/30/2009	Outside	Midlane	264.6	4.2	14.3	634.1
62	6/30/2009	Outside	Midlane	271.9	4.1	14.5	620.1
63	6/30/2009	Outside	Midlane	259.7	4.4	14.1	644.2
64	3/17/2010	Outside	OuterWheelPath	413.2	2.3	13.6	451.3
65	3/17/2010	Outside	OuterWheelPath	450.2	2.3	14.0	421.1
66	3/17/2010	Outside	OuterWheelPath	447.9	2.3	13.4	424.6
67	4/6/2010	Outside	OuterWheelPath	989.7	2.9	18.2	223.1
68	4/6/2010	Outside	OuterWheelPath	988.5	3.2	17.3	224.5
69	4/6/2010	Outside	OuterWheelPath	1070.7	2.8	18.2	210.0
70	4/6/2010	Outside	OuterWheelPath	1282.8	2.7	18.0	182.7
71	4/6/2010	Outside	OuterWheelPath	1500.3	2.8	18.4	161.5
72	4/6/2010	Outside	Midlane	945.0	3.0	17.3	232.4
73	4/6/2010	Outside	Midlane	1132.3	3.1	18.2	201.1
74	4/6/2010	Outside	Midlane	957.4	3.0	16.6	231.0
75	4/6/2010	Outside	Midlane	1266.8	2.7	17.5	185.0
76	4/6/2010	Outside	Midlane	1525.7	2.7	18.5	159.4
77	4/6/2010	Inside	OuterWheelPath	1053.4	3.4	18.5	212.3
78	4/6/2010	Inside	OuterWheelPath	1210.6	3.8	18.9	190.2
79	4/6/2010	Inside	OuterWheelPath	1395.0	2.8	20.5	169.1
80	4/6/2010	Inside	OuterWheelPath	1244.9	3.1	18.4	186.6
81	4/6/2010	Inside	OuterWheelPath	1420.2	3.1	19.1	167.9

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	4/6/2010	Inside	Midlane	996.0	3.2	17.8	222.5
83	4/6/2010	Inside	Midlane	1339.0	3.9	18.9	175.9
84	4/6/2010	Inside	Midlane	1490.6	2.9	19.5	161.4
85	4/6/2010	Inside	Midlane	1089.1	3.0	17.5	208.0
86	4/6/2010	Inside	Midlane	1453.8	2.6	17.6	166.2
87	9/20/2010	Outside	OuterWheelPath	824.3	4.7	23.3	251.0
88	9/20/2010	Outside	OuterWheelPath	851.1	5.3	22.5	245.7
89	9/20/2010	Outside	OuterWheelPath	822.2	4.2	22.0	252.9
90	9/20/2010	Outside	OuterWheelPath	1049.3	4.3	20.8	210.5
91	9/20/2010	Outside	OuterWheelPath	1225.2	4.5	21.1	186.5
92	9/20/2010	Outside	Midlane	781.2	5.2	23.0	262.0
93	9/20/2010	Outside	Midlane	881.8	5.7	23.3	238.2
94	9/20/2010	Outside	Midlane	742.1	4.4	20.6	275.5
95	9/20/2010	Outside	Midlane	1096.4	3.9	21.3	203.0
96	9/20/2010	Outside	Midlane	1207.5	4.2	20.8	188.8
97	9/20/2010	Inside	OuterWheelPath	812.4	4.9	23.6	253.5
98	9/20/2010	Inside	OuterWheelPath	915.6	5.7	23.4	231.3
99	9/20/2010	Inside	OuterWheelPath	1041.5	3.7	24.7	208.2
100	9/20/2010	Inside	OuterWheelPath	1012.8	4.2	21.5	215.7
101	9/20/2010	Inside	OuterWheelPath	1105.5	4.6	22.2	200.9
102	9/20/2010	Inside	Midlane	814.6	4.7	22.7	253.9
103	9/20/2010	Inside	Midlane	1084.3	5.7	23.8	202.6
104	9/20/2010	Inside	Midlane	1083.1	3.7	22.7	203.7
105	9/20/2010	Inside	Midlane	923.2	4.0	20.7	232.6
106	9/20/2010	Inside	Midlane	1140.4	3.5	20.3	197.9
107	4/11/2011	Outside	OuterWheelPath	1095.8	2.3	16.4	208.3
108	4/11/2011	Outside	OuterWheelPath	1092.2	2.3	15.9	209.5
109	4/11/2011	Outside	OuterWheelPath	1131.4	2.3	15.8	204.0
110	4/11/2011	Outside	OuterWheelPath	1389.6	2.3	15.9	173.9
111	4/11/2011	Outside	OuterWheelPath	1343.7	3.5	13.4	181.4
112	4/11/2011	Outside	Midlane	1041.3	2.3	16.4	216.7
113	4/11/2011	Outside	Midlane	1211.8	2.5	16.4	192.7
114	4/11/2011	Outside	Midlane	1088.1	2.3	15.4	210.7
115	4/11/2011	Outside	Midlane	1408.9	2.4	16.3	171.6
116	4/11/2011	Outside	Midlane	1497.8	2.3	16.2	163.8
117	4/11/2011	Inside	OuterWheelPath	1156.8	3.0	18.1	197.9
118	4/11/2011	Inside	OuterWheelPath	1292.3	3.6	17.4	182.3
119	4/11/2011	Inside	OuterWheelPath	1574.6	2.3	19.8	154.5
120	4/11/2011	Inside	OuterWheelPath	1309.3	3.0	17.2	180.7
121	4/11/2011	Inside	OuterWheelPath	1570.4	2.9	18.1	156.2
122	4/11/2011	Inside	Midlane	1084.7	3.1	17.2	209.0
123	4/11/2011	Inside	Midlane	1505.6	3.9	18.0	161.4
124	4/11/2011	Inside	Midlane	1786.3	2.5	19.0	140.7
125	4/11/2011	Inside	Midlane	1208.6	2.9	17.0	192.4
126	4/11/2011	Inside	Midlane	1690.7	2.5	17.4	148.1

Modulus 6.0 0utput For Cell 35 in Temperature Range 15 to 20°C (Cell35-temp20.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	4/3/2008	Outside	OuterWheelPath	288.4	2.4	14.9	590.9
2	4/3/2008	Outside	OuterWheelPath	214.3	2.7	14.4	746.0
3	4/3/2008	Outside	OuterWheelPath	206.7	2.1	14.8	765.1
4	4/3/2008	Outside	OuterWheelPath	263.2	2.8	14.5	635.9
5	4/3/2008	Outside	OuterWheelPath	287.4	2.7	14.5	594.0
6	4/3/2008	Inside	OuterWheelPath	231.0	3.1	16.2	695.9
7	4/3/2008	Inside	OuterWheelPath	274.3	3.9	16.8	607.1
8	4/3/2008	Inside	OuterWheelPath	225.2	3.5	15.2	714.2
9	4/3/2008	Inside	OuterWheelPath	309.8	3.7	16.3	554.2
10	4/3/2008	Inside	OuterWheelPath	235.8	2.7	15.9	686.2
11	4/3/2008	Inside	OuterWheelPath	340.6	3.1	16.0	515.9
12	4/3/2008	Inside	OuterWheelPath	274.6	3.0	16.2	608.8
13	4/3/2008	Inside	OuterWheelPath	317.7	3.0	17.2	540.7
14	4/3/2008	Inside	OuterWheelPath	290.6	3.1	16.7	580.9
15	4/3/2008	Inside	OuterWheelPath	257.9	3.0	16.2	639.1
16	4/3/2008	Outside	Midlane	170.4	2.3	13.0	899.7
17	4/3/2008	Outside	Midlane	174.1	2.0	12.7	886.9
18	4/3/2008	Outside	Midlane	224.0	2.7	14.4	720.9
19	4/3/2008	Outside	Midlane	179.8	2.6	13.3	861.2
20	4/3/2008	Outside	Midlane	261.1	2.4	12.8	647.6
21	4/3/2008	Outside	Midlane	155.6	2.0	12.8	966.7
22	4/3/2008	Outside	Midlane	207.0	2.7	13.7	770.0
23	4/3/2008	Outside	Midlane	210.7	2.2	13.6	760.1
24	4/3/2008	Outside	Midlane	216.9	2.4	14.0	741.1
25	4/3/2008	Outside	Midlane	237.8	2.5	14.0	690.2
26	4/3/2008	Outside	Midlane	230.6	2.5	13.5	709.3
27	5/6/2009	Outside	OuterWheelPath	181.0	4.5	13.9	853.1
28	5/6/2009	Outside	OuterWheelPath	218.4	5.1	13.5	739.8
29	5/6/2009	Outside	OuterWheelPath	175.0	3.6	13.9	875.7
30	5/6/2009	Outside	OuterWheelPath	220.9	4.8	13.8	731.7
31	5/6/2009	Outside	OuterWheelPath	203.3	3.9	12.4	788.4
32	5/6/2009	Outside	OuterWheelPath	204.8	4.1	12.7	782.1
33	5/6/2009	Outside	OuterWheelPath	235.8	4.4	13.5	697.2
34	5/6/2009	Outside	OuterWheelPath	231.0	4.6	12.9	711.5
35	5/6/2009	Outside	Midlane	184.4	3.8	13.9	840.9
36	5/6/2009	Inside	Midlane	190.4	4.3	14.9	814.8
37	5/6/2009	Inside	Midlane	245.4	5.1	16.1	664.5
38	5/6/2009	Inside	Midlane	214.4	5.0	15.0	742.8

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	5/6/2009	Inside	Midlane	219.4	5.0	14.7	731.1
40	5/6/2009	Inside	Midlane	198.7	3.5	13.6	795.4
41	5/6/2009	Inside	Midlane	222.7	4.9	14.8	722.2
42	5/6/2009	Inside	Midlane	211.4	3.9	13.2	760.3
43	5/6/2009	Inside	Midlane	236.6	3.9	13.2	696.9
44	5/6/2009	Inside	Midlane	237.7	3.5	12.3	699.1
45	5/6/2009	Inside	OuterWheelPath	252.9	4.5	15.8	650.4
46	5/6/2009	Inside	OuterWheelPath	296.8	5.6	16.4	572.5
47	5/6/2009	Inside	OuterWheelPath	284.6	5.1	15.4	595.1
48	5/6/2009	Inside	OuterWheelPath	318.4	5.4	15.8	544.2
49	5/6/2009	Inside	OuterWheelPath	253.3	4.1	15.1	652.5
50	5/6/2009	Inside	OuterWheelPath	386.4	4.9	15.9	468.2
51	5/6/2009	Inside	OuterWheelPath	324.3	4.2	14.3	541.7
52	5/6/2009	Inside	OuterWheelPath	340.2	4.3	14.5	521.3
53	5/6/2009	Inside	OuterWheelPath	318.6	4.4	14.7	547.8
54	5/6/2009	Inside	OuterWheelPath	310.4	4.2	14.3	560.4
55	6/30/2009	Outside	OuterWheelPath	267.5	4.9	14.6	627.5
56	6/30/2009	Outside	Midlane	257.6	5.2	18.0	633.1
57	6/3/2010	Outside	OuterWheelPath	467.0	3.8	17.8	399.9
58	6/3/2010	Outside	OuterWheelPath	512.1	4.1	17.0	374.1
59	6/3/2010	Outside	OuterWheelPath	491.7	3.7	17.9	384.1
60	6/3/2010	Outside	OuterWheelPath	600.1	3.9	16.6	331.6
61	6/3/2010	Outside	OuterWheelPath	643.8	4.1	16.7	313.9
62	6/3/2010	Outside	Midlane	428.0	4.0	17.6	428.3
63	6/3/2010	Outside	Midlane	474.3	4.5	17.7	395.4
64	6/3/2010	Outside	Midlane	398.7	3.6	16.0	456.7
65	6/3/2010	Outside	Midlane	520.3	3.5	16.0	371.7
66	6/3/2010	Outside	Midlane	574.5	3.6	16.1	344.0
67	6/3/2010	Inside	Midlane	433.8	4.0	17.9	423.2
68	6/3/2010	Inside	Midlane	553.8	4.9	19.3	347.8
69	6/3/2010	Inside	Midlane	534.4	3.3	18.5	359.0
70	6/3/2010	Inside	Midlane	559.1	2.8	14.8	354.2
71	9/17/2010	Outside	OuterWheelPath	432.0	5.7	21.8	416.5
72	9/17/2010	Outside	OuterWheelPath	457.3	6.2	20.6	400.8
73	9/17/2010	Outside	OuterWheelPath	438.8	4.8	19.9	415.2
74	9/17/2010	Outside	OuterWheelPath	530.1	5.2	18.5	361.2
75	9/17/2010	Outside	OuterWheelPath	633.9	5.3	18.2	315.0
76	10/18/2010	Outside	OuterWheelPath	616.0	5.0	22.2	315.9
77	10/18/2010	Outside	OuterWheelPath	595.2	5.4	20.6	326.8
78	10/18/2010	Outside	OuterWheelPath	627.2	4.6	20.6	313.8
79	10/18/2010	Outside	OuterWheelPath	781.5	4.4	19.3	266.4
80	10/18/2010	Outside	OuterWheelPath	906.0	4.4	19.8	237.0
81	10/18/2010	Outside	Midlane	560.5	6.1	21.5	340.9

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	10/18/2010	Outside	Midlane	636.8	6.6	22.1	308.1
83	10/18/2010	Outside	Midlane	576.4	5.7	20.1	335.8
84	10/18/2010	Outside	Midlane	781.6	4.5	20.0	265.4
85	10/18/2010	Outside	Midlane	860.8	4.9	19.6	246.8
86	10/18/2010	Inside	Midlane	588.8	5.9	21.5	328.2
87	10/18/2010	Inside	Midlane	768.1	7.0	22.4	266.1
88	10/18/2010	Inside	Midlane	788.2	5.1	21.4	262.0
89	10/18/2010	Inside	Midlane	669.6	4.9	19.2	300.4
90	10/18/2010	Inside	Midlane	828.4	4.0	19.3	254.6
91	10/18/2010	Inside	OuterWheelPath	694.7	5.6	22.7	287.2
92	10/18/2010	Inside	OuterWheelPath	778.7	6.5	22.4	263.3
93	10/18/2010	Inside	OuterWheelPath	698.8	5.4	22.6	286.1
94	10/18/2010	Inside	OuterWheelPath	839.4	5.1	20.6	250.5
95	10/18/2010	Inside	OuterWheelPath	870.3	5.3	21.0	243.1
96	5/4/2011	Outside	OuterWheelPath	308.9	3.3	16.0	556.4
97	5/4/2011	Outside	OuterWheelPath	359.9	3.5	16.8	492.0
98	5/4/2011	Outside	OuterWheelPath	289.2	3.6	15.4	587.7
99	5/4/2011	Outside	OuterWheelPath	374.0	3.7	15.3	482.0
100	5/4/2011	Outside	OuterWheelPath	272.8	2.9	15.8	613.4
101	5/4/2011	Outside	OuterWheelPath	330.2	3.6	15.5	530.1
102	5/4/2011	Outside	OuterWheelPath	352.8	3.0	15.0	505.2
103	5/4/2011	Outside	OuterWheelPath	375.9	2.8	15.1	480.7
104	5/4/2011	Outside	OuterWheelPath	377.2	3.0	14.9	480.0
105	5/4/2011	Outside	OuterWheelPath	434.2	2.9	15.0	430.2
106	5/4/2011	Outside	Midlane	256.3	3.2	15.1	646.5
107	5/4/2011	Outside	Midlane	358.0	3.3	16.8	494.0
108	5/4/2011	Outside	Midlane	270.5	3.0	15.0	620.5
109	5/4/2011	Outside	Midlane	382.2	2.6	14.8	475.5
110	5/4/2011	Outside	Midlane	227.2	2.5	13.9	715.5
111	5/4/2011	Outside	Midlane	308.5	3.1	14.7	561.6
112	5/4/2011	Outside	Midlane	342.5	2.6	14.5	518.6
113	5/4/2011	Outside	Midlane	362.2	2.6	14.8	495.7
114	5/4/2011	Outside	Midlane	345.1	2.5	14.5	515.6
115	5/4/2011	Outside	Midlane	378.3	2.4	13.9	482.2
116	5/4/2011	Inside	Midlane	320.5	4.1	16.4	539.5
117	5/4/2011	Inside	Midlane	582.7	4.2	18.9	335.0
118	5/4/2011	Inside	Midlane	412.6	4.6	16.8	442.6
119	5/4/2011	Inside	Midlane	446.9	4.3	16.7	416.4
120	5/4/2011	Inside	Midlane	410.3	2.8	16.8	444.6
121	5/4/2011	Inside	Midlane	388.9	3.7	16.7	463.6
122	5/4/2011	Inside	Midlane	360.4	3.3	15.4	495.7
123	5/4/2011	Inside	Midlane	451.9	3.1	15.8	415.0
124	5/4/2011	Inside	Midlane	393.3	2.9	14.6	465.7
125	5/4/2011	Inside	Midlane	381.7	3.0	14.5	476.9
126	5/4/2011	Inside	OuterWheelPath	397.9	3.7	17.4	453.7
127	5/4/2011	Inside	OuterWheelPath	483.3	4.3	18.6	387.8

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
128	5/4/2011	Inside	OuterWheelPath	421.7	4.3	16.9	435.0
129	5/4/2011	Inside	OuterWheelPath	511.8	4.3	17.4	373.4
130	5/4/2011	Inside	OuterWheelPath	431.5	3.0	17.9	424.9
131	5/4/2011	Inside	OuterWheelPath	598.1	3.8	18.4	329.2
132	5/4/2011	Inside	OuterWheelPath	488.1	3.5	16.9	388.4
133	5/4/2011	Inside	OuterWheelPath	583.4	3.1	17.7	336.8
134	5/4/2011	Inside	OuterWheelPath	466.6	3.7	16.6	402.9
135	5/4/2011	Inside	OuterWheelPath	433.4	3.4	16.0	428.1
136	5/31/2011	Inside	OuterWheelPath	296.9	3.9	15.7	574.8
137	5/31/2011	Inside	OuterWheelPath	337.3	3.8	16.1	519.5
138	5/31/2011	Inside	OuterWheelPath	378.1	3.8	15.9	476.1
139	5/31/2011	Inside	OuterWheelPath	339.9	3.3	14.4	522.0
140	5/31/2011	Inside	OuterWheelPath	355.1	2.7	14.5	504.3

Modulus 6.0 0utput For Cell 35in Temperature Range 20 to 25°C (Cell35-temp25.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	7/3/2008	Outside	OuterWheelPath	210.4	3.8	18.5	738.5
2	7/3/2008	Outside	OuterWheelPath	250.5	4.9	18.7	644.6
3	7/3/2008	Outside	OuterWheelPath	218.8	4.4	18.4	716.9
4	7/3/2008	Outside	OuterWheelPath	294.7	5.6	17.8	571.1
5	7/3/2008	Outside	OuterWheelPath	316.3	4.7	17.6	541.3
6	7/3/2008	Outside	OuterWheelPath	210.7	3.8	15.7	749.6
7	7/3/2008	Outside	OuterWheelPath	224.3	4.0	14.7	718.7
8	7/3/2008	Outside	OuterWheelPath	214.7	4.3	14.9	742.5
9	7/3/2008	Outside	OuterWheelPath	233.3	4.1	14.5	698.1
10	4/14/2009	Outside	OuterWheelPath	410.0	3.0	15.8	447.5
11	4/14/2009	Outside	OuterWheelPath	411.3	3.6	15.6	446.9
12	4/14/2009	Outside	OuterWheelPath	416.9	2.8	16.2	440.7
13	4/14/2009	Outside	OuterWheelPath	519.9	3.0	15.5	373.0
14	4/14/2009	Outside	OuterWheelPath	624.9	3.0	16.0	322.5
15	4/14/2009	Outside	Midlane	385.7	3.1	16.0	468.6
16	4/14/2009	Outside	Midlane	429.0	3.3	16.0	431.5
17	4/14/2009	Outside	Midlane	367.3	2.9	15.0	489.7
18	4/14/2009	Outside	Midlane	499.9	2.8	15.7	384.1
19	4/14/2009	Outside	Midlane	563.8	2.6	16.2	348.8
20	4/14/2009	Inside	Midlane	408.6	3.7	17.0	445.5
21	4/14/2009	Inside	Midlane	554.3	4.3	18.0	349.9
22	4/14/2009	Inside	Midlane	566.6	3.0	17.6	344.7
23	4/14/2009	Inside	Midlane	453.6	3.4	16.7	411.6
24	4/14/2009	Inside	Midlane	597.5	2.8	17.0	332.0
25	4/14/2009	Inside	OuterWheelPath	459.6	4.1	17.9	404.7
26	4/14/2009	Inside	OuterWheelPath	497.5	4.4	17.6	381.2
27	4/14/2009	Inside	OuterWheelPath	529.1	3.4	18.2	362.3
28	4/14/2009	Inside	OuterWheelPath	564.2	3.8	17.6	345.9
29	4/14/2009	Inside	OuterWheelPath	608.5	3.9	18.4	324.8
30	5/6/2009	Outside	OuterWheelPath	174.8	3.7	14.1	875.2
31	5/6/2009	Outside	OuterWheelPath	203.3	4.2	14.3	777.6
32	6/16/2009	Outside	OuterWheelPath	377.9	4.3	19.1	467.9
33	6/16/2009	Outside	OuterWheelPath	381.7	5.1	19.0	464.6
34	6/16/2009	Outside	OuterWheelPath	369.5	3.9	18.8	476.9
35	6/16/2009	Outside	OuterWheelPath	447.5	4.1	16.5	416.4
36	6/16/2009	Outside	OuterWheelPath	515.0	4.2	16.9	372.6
37	6/16/2009	Outside	Midlane	384.2	4.7	18.7	462.9
38	6/16/2009	Outside	Midlane	399.6	5.1	18.9	448.6

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	6/16/2009	Outside	Midlane	324.9	3.9	17.3	531.1
40	6/16/2009	Outside	Midlane	447.8	3.8	16.6	415.9
41	6/16/2009	Outside	Midlane	497.7	3.6	16.3	384.0
42	6/16/2009	Inside	OuterWheelPath	421.9	4.8	21.2	425.4
43	6/16/2009	Inside	OuterWheelPath	465.1	5.4	20.8	395.2
44	6/16/2009	Inside	OuterWheelPath	458.4	4.1	21.1	399.1
45	6/16/2009	Inside	OuterWheelPath	515.7	4.1	18.2	369.6
46	6/16/2009	Inside	OuterWheelPath	508.2	4.3	18.8	372.6
47	6/16/2009	Inside	Midlane	362.3	5.1	19.3	483.0
48	6/16/2009	Inside	Midlane	434.1	5.7	19.8	418.8
49	6/16/2009	Inside	Midlane	422.3	3.8	18.4	430.9
50	6/16/2009	Inside	Midlane	396.2	4.0	16.7	457.0
51	8/3/2009	Inside	OuterWheelPath	267.2	5.2	20.1	608.9
52	8/3/2009	Inside	OuterWheelPath	300.6	6.3	21.6	552.0
53	8/3/2009	Inside	OuterWheelPath	281.0	6.3	20.5	584.5
54	8/3/2009	Inside	OuterWheelPath	294.0	6.7	20.7	563.9
55	8/3/2009	Inside	OuterWheelPath	219.3	4.9	20.3	708.8
56	8/3/2009	Inside	OuterWheelPath	354.2	6.5	20.1	489.6
57	8/3/2009	Inside	OuterWheelPath	320.0	5.2	17.5	536.7
58	8/3/2009	Inside	OuterWheelPath	302.2	5.3	17.1	562.3
59	8/3/2009	Inside	OuterWheelPath	294.7	5.6	17.6	571.8
60	8/3/2009	Inside	OuterWheelPath	274.4	5.5	17.2	605.6
61	6/3/2010	Inside	Midlane	485.6	3.4	16.2	391.6
62	6/3/2010	Inside	OuterWheelPath	435.0	4.2	19.1	419.6
63	6/3/2010	Inside	OuterWheelPath	503.1	4.8	19.1	375.0
64	6/3/2010	Inside	OuterWheelPath	512.3	3.4	19.9	368.3
65	6/3/2010	Inside	OuterWheelPath	546.9	3.9	16.7	356.1
66	6/3/2010	Inside	OuterWheelPath	577.0	3.8	17.1	340.9
67	7/28/2010	Outside	OuterWheelPath	497.4	4.3	22.3	372.6
68	7/28/2010	Outside	OuterWheelPath	512.0	5.2	20.9	366.7
69	7/28/2010	Outside	OuterWheelPath	482.7	3.9	20.6	384.3
70	7/28/2010	Outside	OuterWheelPath	591.2	4.3	18.8	331.4
71	7/28/2010	Outside	OuterWheelPath	651.8	4.2	18.3	308.1
72	7/28/2010	Outside	Midlane	462.4	4.7	20.8	397.0
73	7/28/2010	Outside	Midlane	510.3	5.1	21.1	367.3
74	7/28/2010	Outside	Midlane	421.9	3.9	18.5	431.0
75	7/28/2010	Outside	Midlane	609.2	4.0	18.2	324.9
76	7/28/2010	Outside	Midlane	643.9	3.8	17.9	311.7
77	7/28/2010	Inside	OuterWheelPath	565.5	5.3	23.6	335.6
78	7/28/2010	Inside	OuterWheelPath	602.1	6.4	22.4	321.3
79	7/28/2010	Inside	OuterWheelPath	648.8	4.2	23.5	301.8
80	7/28/2010	Inside	OuterWheelPath	686.7	4.8	19.8	293.7
81	7/28/2010	Inside	OuterWheelPath	694.4	4.9	20.0	290.9

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	7/28/2010	Inside	Midlane	519.1	5.0	21.5	361.8
83	7/28/2010	Inside	Midlane	648.4	6.1	22.8	302.9
84	7/28/2010	Inside	Midlane	617.0	4.0	20.7	317.7
85	7/28/2010	Inside	Midlane	564.4	4.3	18.4	344.3
86	7/28/2010	Inside	Midlane	655.6	3.4	17.4	308.3
87	9/27/2010	Outside	OuterWheelPath	321.7	4.6	19.6	528.7
88	9/27/2010	Outside	OuterWheelPath	348.6	6.4	20.3	495.2
89	9/27/2010	Outside	OuterWheelPath	326.5	5.0	18.9	524.5
90	9/27/2010	Outside	OuterWheelPath	442.0	5.1	17.9	417.1
91	9/27/2010	Outside	OuterWheelPath	476.5	5.4	18.2	392.9
92	9/27/2010	Outside	Midlane	324.3	5.4	20.3	523.6
93	9/27/2010	Outside	Midlane	364.5	6.0	20.4	478.1
94	9/27/2010	Outside	Midlane	295.0	4.7	18.0	570.1
95	9/27/2010	Outside	Midlane	455.9	4.4	17.6	407.9
96	9/27/2010	Outside	Midlane	482.2	4.7	17.4	391.0
97	9/27/2010	Inside	Midlane	319.5	4.5	19.1	532.9
98	9/27/2010	Inside	Midlane	388.9	5.6	19.2	457.4
99	9/27/2010	Inside	Midlane	378.8	3.7	17.9	470.0
100	9/27/2010	Inside	Midlane	370.7	4.1	16.3	482.3
101	9/27/2010	Inside	Midlane	468.9	3.3	16.1	402.6
102	9/27/2010	Inside	OuterWheelPath	357.4	4.4	19.9	486.6
103	9/27/2010	Inside	OuterWheelPath	410.3	5.2	19.9	437.3
104	9/27/2010	Inside	OuterWheelPath	387.1	3.4	20.7	455.7
105	9/27/2010	Inside	OuterWheelPath	441.0	4.1	18.3	416.9
106	9/27/2010	Inside	OuterWheelPath	460.1	4.2	18.1	403.9
107	5/31/2011	Outside	OuterWheelPath	208.6	3.2	16.5	751.8
108	5/31/2011	Outside	OuterWheelPath	257.4	3.8	17.2	636.3
109	5/31/2011	Outside	OuterWheelPath	207.6	3.7	16.1	756.4
110	5/31/2011	Outside	OuterWheelPath	251.4	4.0	15.4	655.0
111	5/31/2011	Outside	OuterWheelPath	178.3	2.9	16.0	851.4
112	5/31/2011	Outside	OuterWheelPath	227.2	3.9	15.7	707.1
113	5/31/2011	Outside	OuterWheelPath	232.4	3.3	14.4	700.6
114	5/31/2011	Outside	OuterWheelPath	244.8	3.3	14.0	674.9
115	5/31/2011	Outside	OuterWheelPath	253.0	3.4	14.3	656.5
116	5/31/2011	Outside	OuterWheelPath	272.7	3.5	14.0	620.8
117	5/31/2011	Outside	Midlane	209.7	3.2	16.4	749.2
118	5/31/2011	Outside	Midlane	276.1	3.8	17.3	602.4
119	5/31/2011	Outside	Midlane	208.4	3.7	15.8	755.5
120	5/31/2011	Outside	Midlane	276.7	3.3	14.7	610.9
121	5/31/2011	Outside	Midlane	163.5	2.8	14.9	916.8
122	5/31/2011	Outside	Midlane	238.1	3.9	15.7	681.9
123	5/31/2011	Outside	Midlane	237.3	3.2	14.4	689.4
124	5/31/2011	Outside	Midlane	253.2	3.1	14.1	657.0
125	5/31/2011	Outside	Midlane	250.7	2.9	13.7	663.9
126	5/31/2011	Outside	Midlane	243.9	3.0	13.1	681.2
127	5/31/2011	Inside	OuterWheelPath	251.9	3.3	16.2	650.8

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
128	5/31/2011	Inside	OuterWheelPath	313.9	4.1	17.1	546.0
129	5/31/2011	Inside	OuterWheelPath	290.2	2.6	16.3	582.9
130	5/31/2011	Inside	OuterWheelPath	300.3	3.2	13.7	577.3
131	5/31/2011	Inside	OuterWheelPath	288.6	3.0	13.6	595.8
132	5/31/2011	Inside	Midlane	239.7	3.6	14.9	681.8
133	5/31/2011	Inside	Midlane	342.7	3.9	16.5	511.9
134	5/31/2011	Inside	Midlane	312.5	4.0	15.6	552.8
135	5/31/2011	Inside	Midlane	304.5	3.8	14.7	567.3
136	5/31/2011	Inside	Midlane	288.4	2.6	15.0	590.5
137	5/31/2011	Inside	Midlane	323.3	3.7	15.3	539.5
138	5/31/2011	Inside	Midlane	270.6	3.2	13.6	626.3
139	5/31/2011	Inside	Midlane	293.1	2.6	13.1	590.9
140	5/31/2011	Inside	Midlane	291.2	2.4	12.0	598.9
141	5/31/2011	Inside	Midlane	281.4	2.4	12.2	614.0
142	9/7/2011	Inside	Midlane	244.3	5.0	21.8	647.5
143	9/7/2011	Inside	Midlane	311.7	6.0	22.5	534.6
144	9/7/2011	Inside	Midlane	324.0	5.9	22.2	519.5
145	9/7/2011	Inside	Midlane	315.1	6.2	20.8	534.2
146	9/7/2011	Inside	Midlane	288.8	3.8	19.9	573.9
147	9/7/2011	Inside	Midlane	312.6	6.0	21.0	537.0
148	9/7/2011	Inside	Midlane	275.8	4.5	17.4	602.5
149	9/7/2011	Inside	Midlane	313.8	3.6	16.1	549.4
150	9/7/2011	Inside	Midlane	279.4	3.6	15.0	605.2
151	9/7/2011	Inside	Midlane	326.7	3.6	15.1	535.8

Modulus 6.0 0utput For Cell 35 in Temperature Range 25 to 30°C (Cell35-temp30.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	10/3/2007	Outside	OuterWheelPath	201.5	6.5	24.0	744.6
2	10/3/2007	Outside	OuterWheelPath	234.7	7.2	24.5	660.4
3	10/3/2007	Outside	OuterWheelPath	201.8	6.8	23.1	746.5
4	10/3/2007	Outside	OuterWheelPath	217.5	7.1	23.1	704.5
5	10/3/2007	Outside	OuterWheelPath	182.5	4.4	22.7	808.3
6	10/3/2007	Outside	OuterWheelPath	259.7	5.6	23.1	614.1
7	10/3/2007	Outside	OuterWheelPath	249.4	4.8	20.6	640.7
8	10/3/2007	Outside	OuterWheelPath	249.0	4.8	20.3	642.5
9	10/3/2007	Outside	OuterWheelPath	237.7	4.9	20.5	665.3
10	10/3/2007	Outside	OuterWheelPath	218.5	4.9	19.2	714.7
11	10/4/2007	Outside	Midlane	203.2	6.2	23.6	741.0
12	10/4/2007	Outside	Midlane	313.3	6.2	25.5	526.0
13	10/4/2007	Outside	Midlane	237.2	6.0	23.0	659.0
14	10/4/2007	Outside	Midlane	260.3	6.2	23.3	612.5
15	10/4/2007	Outside	Midlane	210.6	3.5	21.1	728.6
16	10/4/2007	Outside	Midlane	244.5	5.3	22.4	645.4
17	10/4/2007	Outside	Midlane	205.7	4.7	19.5	747.7
18	10/4/2007	Outside	Midlane	258.5	4.5	20.0	625.0
19	10/4/2007	Outside	Midlane	252.1	4.1	18.6	641.8
20	10/4/2007	Outside	Midlane	258.1	3.9	18.0	632.2
21	10/4/2007	Inside	OuterWheelPath	157.7	5.9	22.7	905.0
22	10/4/2007	Inside	OuterWheelPath	177.5	6.8	22.6	826.2
23	10/4/2007	Inside	OuterWheelPath	136.5	6.2	22.4	1013.4
24	10/4/2007	Inside	OuterWheelPath	197.8	6.9	21.8	762.5
25	10/4/2007	Inside	OuterWheelPath	123.1	4.5	21.0	1104.6
26	10/4/2007	Inside	OuterWheelPath	219.2	6.1	21.6	704.8
27	10/4/2007	Inside	OuterWheelPath	165.8	5.2	19.3	884.4
28	10/4/2007	Inside	OuterWheelPath	176.9	5.2	18.4	845.1
29	10/4/2007	Inside	OuterWheelPath	193.0	4.9	18.8	788.3
30	10/4/2007	Inside	OuterWheelPath	237.8	5.3	18.9	670.4
31	5/22/2008	Inside	OuterWheelPath	181.9	4.3	18.0	828.8
32	5/22/2008	Inside	OuterWheelPath	198.1	5.2	18.8	772.6
33	5/22/2008	Inside	OuterWheelPath	200.8	4.7	18.1	767.3
34	5/22/2008	Inside	OuterWheelPath	202.0	5.0	18.3	763.0
35	5/22/2008	Inside	OuterWheelPath	166.1	3.6	17.7	890.7
36	5/22/2008	Inside	OuterWheelPath	252.7	4.7	17.6	644.0
37	5/22/2008	Inside	OuterWheelPath	226.0	3.9	16.2	707.8
38	5/22/2008	Inside	OuterWheelPath	216.1	3.6	15.9	734.1

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	5/22/2008	Inside	OuterWheelPath	220.6	3.8	16.6	719.5
40	5/22/2008	Inside	OuterWheelPath	209.0	3.7	15.6	754.7
41	7/3/2008	Outside	OuterWheelPath	163.7	3.6	17.6	901.2
42	7/3/2008	Outside	OuterWheelPath	164.1	3.2	16.8	903.6
43	7/3/2008	Outside	Midlane	142.2	4.2	17.4	1006.1
44	7/3/2008	Outside	Midlane	144.1	3.7	16.5	1001.0
45	7/3/2008	Outside	Midlane	184.2	5.0	18.7	817.8
46	7/3/2008	Outside	Midlane	160.8	4.7	17.7	913.3
47	7/3/2008	Outside	Midlane	201.9	4.3	16.4	771.5
48	7/3/2008	Outside	Midlane	119.4	4.0	15.0	1168.5
49	7/3/2008	Outside	Midlane	191.8	5.2	16.7	801.3
50	7/3/2008	Outside	Midlane	179.8	3.5	14.3	855.2
51	7/3/2008	Outside	Midlane	201.9	3.5	12.9	789.6
52	7/3/2008	Outside	Midlane	174.2	3.6	13.8	879.4
53	7/3/2008	Outside	Midlane	180.7	3.5	13.2	858.5
54	7/3/2008	Inside	Midlane	140.7	3.6	17.8	1012.2
55	7/3/2008	Inside	Midlane	177.1	4.4	20.0	837.5
56	7/3/2008	Inside	Midlane	166.7	4.4	18.9	882.5
57	7/3/2008	Inside	Midlane	168.0	4.5	17.9	881.9
58	7/3/2008	Inside	Midlane	152.9	2.7	17.0	953.3
59	7/3/2008	Inside	Midlane	156.0	2.6	16.2	943.0
60	7/3/2008	Inside	Midlane	221.9	4.6	18.7	708.0
61	7/22/2008	Inside	Midlane	217.6	5.0	19.3	716.6
62	7/22/2008	Inside	Midlane	193.7	5.0	17.8	790.3
63	8/18/2008	Outside	OuterWheelPath	316.0	5.2	23.5	526.7
64	8/18/2008	Outside	OuterWheelPath	384.2	6.0	23.8	452.2
65	8/18/2008	Outside	OuterWheelPath	296.9	6.4	22.6	554.9
66	8/18/2008	Outside	OuterWheelPath	407.4	7.1	21.6	436.2
67	8/18/2008	Outside	OuterWheelPath	276.4	4.9	21.8	588.5
68	8/18/2008	Outside	OuterWheelPath	342.2	7.5	22.0	498.4
69	8/18/2008	Outside	OuterWheelPath	331.8	4.9	19.1	517.5
70	8/18/2008	Outside	OuterWheelPath	368.9	4.8	18.6	478.0
71	8/18/2008	Outside	OuterWheelPath	342.3	5.3	18.4	507.0
72	8/18/2008	Outside	OuterWheelPath	397.4	5.0	17.9	452.9
73	6/16/2009	Inside	Midlane	458.7	3.3	15.7	410.5
74	9/8/2009	Inside	OuterWheelPath	326.0	5.5	19.8	522.8
75	9/8/2009	Inside	OuterWheelPath	394.2	6.4	20.6	449.6
76	9/8/2009	Inside	OuterWheelPath	373.5	6.2	19.4	471.5
77	9/8/2009	Inside	OuterWheelPath	381.0	6.7	19.7	463.6
78	9/8/2009	Inside	OuterWheelPath	310.6	4.8	19.2	544.4
79	9/8/2009	Inside	OuterWheelPath	491.2	6.3	20.0	380.3
80	9/8/2009	Inside	OuterWheelPath	415.3	5.2	17.0	439.9
81	9/8/2009	Inside	OuterWheelPath	420.1	4.9	17.3	435.3

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	9/8/2009	Inside	OuterWheelPath	385.6	5.0	17.7	464.1
83	9/8/2009	Inside	Midlane	263.3	5.2	17.9	622.8
84	9/8/2009	Inside	Midlane	316.9	6.4	19.8	534.4
85	9/8/2009	Inside	Midlane	284.0	6.4	18.8	584.6
86	9/8/2009	Inside	Midlane	305.6	6.4	18.2	554.1
87	9/8/2009	Inside	Midlane	262.4	4.2	16.8	628.3
88	9/8/2009	Inside	Midlane	320.9	6.4	18.8	531.9
89	9/8/2009	Inside	Midlane	292.4	4.6	15.5	582.4
90	9/8/2009	Inside	Midlane	334.5	4.1	15.2	525.8
91	9/8/2009	Inside	Midlane	289.9	4.0	14.2	591.3
92	9/8/2009	Inside	Midlane	273.3	4.1	14.1	619.3
93	9/8/2009	Outside	Midlane	245.6	5.3	17.7	658.0
94	9/8/2009	Outside	Midlane	295.9	6.4	19.4	564.6
95	9/8/2009	Outside	Midlane	251.4	6.3	18.6	643.1
96	9/8/2009	Outside	Midlane	331.3	5.8	17.2	523.4
97	9/8/2009	Outside	Midlane	197.1	4.8	16.6	785.0
98	9/8/2009	Outside	Midlane	311.3	6.5	18.2	546.2
99	9/8/2009	Outside	Midlane	301.9	4.6	15.8	567.1
100	9/8/2009	Outside	Midlane	306.1	4.8	15.5	562.1
101	9/8/2009	Outside	Midlane	290.0	4.9	15.7	585.4
102	9/8/2009	Outside	Midlane	298.7	4.8	15.2	573.9
103	9/8/2009	Outside	OuterWheelPath	227.4	5.1	18.4	695.8
104	9/8/2009	Outside	OuterWheelPath	295.0	6.6	19.6	565.4
105	9/8/2009	Outside	OuterWheelPath	256.3	6.5	19.3	631.3
106	9/8/2009	Outside	OuterWheelPath	318.2	7.2	18.3	536.8
107	9/8/2009	Outside	OuterWheelPath	219.2	4.8	18.1	717.0
108	9/8/2009	Outside	OuterWheelPath	312.3	7.2	18.5	544.0
109	9/8/2009	Outside	OuterWheelPath	283.0	5.5	16.2	594.7
110	9/8/2009	Outside	OuterWheelPath	305.0	5.5	16.2	561.2
111	9/8/2009	Outside	OuterWheelPath	323.8	5.2	15.7	537.5
112	9/8/2009	Outside	OuterWheelPath	327.4	6.0	16.0	531.9
113	10/8/2010	Outside	OuterWheelPath	347.7	5.0	22.1	492.1
114	10/8/2010	Outside	OuterWheelPath	415.2	6.6	22.0	429.1
115	10/8/2010	Outside	OuterWheelPath	331.8	6.5	21.2	512.3
116	10/8/2010	Outside	OuterWheelPath	418.6	6.8	20.5	429.4
117	10/8/2010	Outside	OuterWheelPath	307.1	4.7	20.5	545.7
118	10/8/2010	Outside	OuterWheelPath	404.5	5.9	20.9	440.1
119	10/8/2010	Outside	OuterWheelPath	404.5	5.1	19.0	444.2
120	10/8/2010	Outside	OuterWheelPath	423.2	5.5	18.9	429.1
121	10/8/2010	Outside	OuterWheelPath	410.0	5.5	19.4	438.6
122	10/8/2010	Outside	OuterWheelPath	434.7	5.6	18.6	420.9
123	6/29/2011	Inside	OuterWheelPath	242.7	3.3	17.4	665.2
124	6/29/2011	Inside	OuterWheelPath	282.4	4.0	18.5	588.1
125	6/29/2011	Inside	OuterWheelPath	258.3	4.0	17.3	634.2
126	6/29/2011	Inside	OuterWheelPath	278.5	3.9	17.5	597.7
127	6/29/2011	Inside	OuterWheelPath	229.0	2.6	17.7	694.6

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
128	6/29/2011	Inside	OuterWheelPath	366.3	3.9	18.5	480.8
129	6/29/2011	Inside	OuterWheelPath	321.2	3.2	15.9	540.2
130	6/29/2011	Inside	OuterWheelPath	296.9	2.8	15.1	577.0
131	6/29/2011	Inside	OuterWheelPath	282.1	3.1	15.5	598.8
132	6/29/2011	Inside	OuterWheelPath	277.2	2.9	14.7	610.1
133	6/29/2011	Inside	Midlane	243.1	3.8	17.7	663.2
134	6/29/2011	Inside	Midlane	250.9	3.6	17.2	649.0
135	9/7/2011	Outside	OuterWheelPath	255.2	4.4	21.0	628.3
136	9/7/2011	Outside	OuterWheelPath	322.8	5.5	21.2	523.3
137	9/7/2011	Outside	OuterWheelPath	247.5	3.7	21.1	643.0
138	9/7/2011	Outside	OuterWheelPath	308.6	5.1	21.0	542.3
139	9/7/2011	Outside	OuterWheelPath	299.0	3.5	18.1	563.8
140	9/7/2011	Outside	OuterWheelPath	327.1	3.6	16.5	530.7
141	9/7/2011	Outside	OuterWheelPath	336.7	3.6	17.3	516.6
142	9/7/2011	Outside	OuterWheelPath	357.9	3.9	16.5	495.0
143	9/7/2011	Inside	OuterWheelPath	315.7	5.0	24.1	525.8
144	9/7/2011	Inside	OuterWheelPath	357.0	6.1	24.4	477.5
145	9/7/2011	Inside	OuterWheelPath	326.9	5.8	23.0	514.1
146	9/7/2011	Inside	OuterWheelPath	385.9	6.0	23.2	451.8
147	9/7/2011	Inside	OuterWheelPath	305.2	4.0	23.0	542.2
148	9/7/2011	Inside	OuterWheelPath	437.3	5.7	23.0	410.5
149	9/7/2011	Inside	OuterWheelPath	395.3	4.6	20.1	449.7
150	9/7/2011	Inside	OuterWheelPath	354.7	4.1	18.9	491.9
151	9/7/2011	Inside	OuterWheelPath	331.7	4.6	18.7	518.7
152	9/7/2011	Inside	OuterWheelPath	336.8	4.5	18.4	513.4
153	9/7/2011	Outside	Midlane	225.9	4.1	21.9	687.7
154	9/7/2011	Outside	Midlane	278.2	5.2	22.6	583.5
155	9/7/2011	Outside	Midlane	250.5	4.9	21.9	634.8
156	9/7/2011	Outside	Midlane	294.4	4.8	19.7	566.0
157	9/7/2011	Outside	Midlane	199.1	3.7	20.0	765.0
158	9/7/2011	Outside	Midlane	301.4	5.4	21.1	552.1
159	9/7/2011	Outside	Midlane	295.2	3.6	17.6	571.0
160	9/7/2011	Outside	Midlane	288.7	3.6	16.2	585.6
161	9/7/2011	Outside	Midlane	288.9	3.7	16.1	585.7
162	9/7/2011	Outside	Midlane	299.9	3.5	15.8	570.0

Modulus 6.0 0utput For Cell 35 in Temperature Range 30 to 35°C (Cell35-temp35.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	7/7/2008	Inside	Midlane	186.6	3.1	16.6	819.0
2	7/7/2008	Inside	Midlane	241.5	4.0	18.1	665.2
3	7/7/2008	Inside	Midlane	219.2	4.0	17.0	721.4
4	7/7/2008	Inside	Midlane	237.6	4.2	16.5	679.7
5	7/7/2008	Inside	Midlane	182.4	2.8	15.5	839.1
6	7/7/2008	Inside	Midlane	253.8	4.2	17.0	644.0
7	7/7/2008	Inside	Midlane	198.9	3.2	13.3	796.5
8	7/7/2008	Inside	Midlane	209.4	2.4	11.7	775.0
9	7/7/2008	Inside	Midlane	224.0	2.4	11.3	738.1
10	7/7/2008	Inside	Midlane	220.3	2.3	10.9	750.2
11	7/15/2008	Outside	OuterWheelPath	227.9	4.1	19.8	689.7
12	7/15/2008	Outside	OuterWheelPath	275.0	5.4	19.8	596.4
13	7/15/2008	Outside	OuterWheelPath	247.0	5.0	20.2	646.8
14	7/15/2008	Outside	OuterWheelPath	312.3	5.8	18.5	544.0
15	7/15/2008	Outside	OuterWheelPath	190.1	3.8	18.8	797.6
16	7/15/2008	Outside	OuterWheelPath	289.1	5.9	18.9	576.3
17	7/15/2008	Outside	OuterWheelPath	254.7	4.1	16.0	646.0
18	7/15/2008	Outside	OuterWheelPath	249.8	4.4	15.1	659.5
19	7/15/2008	Outside	OuterWheelPath	250.2	4.4	15.8	655.8
20	7/15/2008	Outside	OuterWheelPath	275.7	4.3	15.1	611.0
21	7/15/2008	Outside	Midlane	212.5	4.2	19.8	728.1
22	7/15/2008	Outside	Midlane	227.4	5.5	20.1	689.9
23	7/15/2008	Outside	Midlane	223.2	4.9	19.2	703.0
24	7/15/2008	Outside	Midlane	260.1	5.0	17.2	631.2
25	7/15/2008	Outside	Midlane	147.7	4.2	14.8	992.5
26	7/15/2008	Outside	Midlane	248.0	5.8	18.4	650.6
27	7/15/2008	Outside	Midlane	225.5	3.8	15.4	712.5
28	7/15/2008	Outside	Midlane	218.7	3.8	13.4	739.5
29	7/15/2008	Outside	Midlane	200.7	3.9	14.4	784.9
30	7/15/2008	Outside	Midlane	201.1	4.0	13.5	788.6
31	7/21/2008	Outside	OuterWheelPath	183.0	4.3	18.3	823.6
32	7/21/2008	Outside	OuterWheelPath	191.6	5.8	18.0	796.1
33	7/21/2008	Outside	OuterWheelPath	178.4	5.2	17.8	842.3
34	7/21/2008	Outside	OuterWheelPath	223.9	6.2	16.9	710.0
35	7/21/2008	Outside	OuterWheelPath	202.9	5.8	15.6	772.2
36	7/21/2008	Outside	OuterWheelPath	171.4	3.3	17.1	872.2
37	7/21/2008	Outside	OuterWheelPath	222.1	5.7	17.0	714.1
38	7/21/2008	Outside	OuterWheelPath	188.1	4.1	14.7	823.6

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
39	7/21/2008	Outside	OuterWheelPath	197.0	4.2	13.6	800.7
40	7/21/2008	Outside	OuterWheelPath	190.4	4.6	14.3	818.1
41	7/21/2008	Outside	OuterWheelPath	202.3	4.9	13.7	783.8
42	7/21/2008	Outside	Midlane	163.6	4.6	16.4	907.9
43	7/21/2008	Outside	Midlane	205.9	5.4	17.6	754.6
44	7/21/2008	Outside	Midlane	169.4	5.0	16.9	881.1
45	7/21/2008	Outside	Midlane	199.8	4.8	15.4	782.5
46	7/21/2008	Outside	Midlane	156.1	3.5	15.6	946.0
47	7/21/2008	Outside	Midlane	220.7	5.4	16.5	719.7
48	7/21/2008	Outside	Midlane	171.5	3.9	13.3	893.3
49	7/21/2008	Outside	Midlane	178.7	3.9	12.1	873.3
50	7/21/2008	Outside	Midlane	166.7	3.9	12.5	918.6
51	7/21/2008	Outside	Midlane	170.4	3.8	12.1	906.0
52	7/22/2008	Inside	Midlane	184.9	5.4	17.3	821.5
53	7/22/2008	Inside	Midlane	157.0	3.5	15.7	941.2
54	7/22/2008	Inside	Midlane	200.5	5.7	17.8	769.5
55	7/22/2008	Inside	Midlane	178.6	3.9	13.9	862.0
56	7/22/2008	Inside	Midlane	174.7	3.7	13.5	879.3
57	7/22/2008	Inside	Midlane	178.7	3.0	12.7	869.2
58	7/22/2008	Inside	Midlane	176.5	3.1	12.4	879.6
59	7/22/2008	Inside	Midlane	164.3	3.2	11.4	937.4
60	7/22/2008	Inside	OuterWheelPath	220.1	4.3	18.9	711.7
61	7/22/2008	Inside	OuterWheelPath	249.0	5.6	19.4	645.3
62	7/22/2008	Inside	OuterWheelPath	233.3	5.0	18.8	680.7
63	7/22/2008	Inside	OuterWheelPath	239.7	5.7	18.9	666.3
64	7/22/2008	Inside	OuterWheelPath	206.6	3.8	18.5	749.0
65	7/22/2008	Inside	OuterWheelPath	278.9	5.7	18.3	594.4
66	7/22/2008	Inside	OuterWheelPath	264.0	4.4	15.3	631.1
67	7/22/2008	Inside	OuterWheelPath	241.3	3.8	14.4	680.6
68	7/22/2008	Inside	OuterWheelPath	252.5	4.1	15.3	653.2
69	7/22/2008	Inside	OuterWheelPath	241.0	3.8	14.8	679.4
70	7/22/2008	Inside	OuterWheelPath	208.2	4.0	14.1	764.4
71	8/18/2008	Inside	OuterWheelPath	318.6	5.5	23.9	522.5
72	8/18/2008	Inside	OuterWheelPath	377.2	6.8	24.5	457.4
73	8/18/2008	Inside	OuterWheelPath	357.9	6.1	23.3	478.7
74	8/18/2008	Inside	OuterWheelPath	324.4	5.7	22.0	519.4
75	8/18/2008	Inside	OuterWheelPath	381.0	6.9	23.1	456.5
76	8/18/2008	Inside	OuterWheelPath	349.8	4.6	24.5	484.9
77	8/18/2008	Inside	OuterWheelPath	452.2	7.2	23.6	399.0
78	8/18/2008	Inside	OuterWheelPath	327.1	5.4	19.6	521.9
79	8/18/2008	Inside	OuterWheelPath	364.8	4.7	18.6	482.1
80	8/18/2008	Inside	OuterWheelPath	295.9	4.5	18.4	567.5
81	8/18/2008	Inside	OuterWheelPath	299.9	4.1	17.3	565.0

No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
82	7/21/2009	Outside	OuterWheelPath	203.7	4.7	20.4	750.1
83	7/21/2009	Outside	OuterWheelPath	214.3	6.0	20.4	721.2
84	7/21/2009	Outside	OuterWheelPath	188.0	4.4	18.8	804.5
85	7/21/2009	Outside	OuterWheelPath	243.1	5.2	16.9	666.2
86	7/21/2009	Outside	OuterWheelPath	235.9	5.4	16.6	683.1
87	7/21/2009	Outside	Midlane	203.4	5.2	19.6	753.9
88	7/21/2009	Outside	Midlane	224.1	5.4	19.9	698.4
89	7/21/2009	Outside	Midlane	171.3	4.0	17.1	872.6
90	7/21/2009	Outside	Midlane	226.1	4.6	16.4	706.7
91	7/21/2009	Outside	Midlane	234.9	4.5	15.5	689.9
92	7/21/2009	Inside	Midlane	230.6	5.5	20.3	681.8
93	7/21/2009	Inside	Midlane	231.7	6.1	20.9	677.4
94	7/21/2009	Inside	Midlane	226.5	4.1	18.6	697.2
95	7/21/2009	Inside	Midlane	247.0	4.5	16.6	659.2
96	7/21/2009	Inside	Midlane	237.0	3.9	14.6	689.2
97	7/21/2009	Inside	OuterWheelPath	283.5	4.8	21.7	577.3
98	7/21/2009	Inside	OuterWheelPath	291.2	5.5	21.4	566.2
99	7/21/2009	Inside	OuterWheelPath	248.1	4.3	20.7	643.0
100	7/21/2009	Inside	OuterWheelPath	303.1	4.6	18.1	557.9
101	6/29/2011	Inside	Midlane	174.0	3.3	16.2	866.6
102	6/29/2011	Inside	Midlane	216.4	4.0	15.9	733.3
103	6/29/2011	Inside	Midlane	220.3	3.1	14.5	729.8
104	9/7/2011	Outside	OuterWheelPath	243.9	4.0	22.2	647.2
105	9/7/2011	Outside	OuterWheelPath	271.6	5.0	21.1	598.4

Modulus 6.0 0utput For Cell 35 in Temperature Range 35 to 40°C (Cell35-temp40.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	9/14/2009	Outside	OuterWheelPath	208.6	5.5	21.8	731.7
2	9/14/2009	Outside	OuterWheelPath	227.8	6.7	21.9	683.2
3	9/14/2009	Outside	OuterWheelPath	205.8	5.1	20.6	743.5
4	9/14/2009	Outside	OuterWheelPath	243.5	5.6	18.0	661.3
5	9/14/2009	Outside	OuterWheelPath	242.0	6.1	17.7	665.6
6	9/14/2009	Outside	Midlane	219.5	5.8	21.3	705.0
7	9/14/2009	Outside	Midlane	233.0	6.0	21.7	672.0
8	9/14/2009	Outside	Midlane	171.7	5.0	19.3	860.8
9	9/14/2009	Outside	Midlane	248.9	5.0	18.0	650.2
10	9/14/2009	Outside	Midlane	245.5	4.9	17.2	660.1
11	9/14/2009	Inside	Midlane	208.6	6.3	21.6	732.4
12	9/14/2009	Inside	Midlane	250.0	7.2	22.0	635.5
13	9/14/2009	Inside	Midlane	229.4	4.8	19.6	686.9
14	9/14/2009	Inside	Midlane	244.2	5.1	17.8	660.6
15	9/14/2009	Inside	Midlane	254.2	4.3	16.3	645.9
16	9/14/2009	Inside	OuterWheelPath	291.4	6.1	22.5	563.2
17	9/14/2009	Inside	OuterWheelPath	315.4	7.4	22.2	530.4
18	9/14/2009	Inside	OuterWheelPath	268.4	5.4	21.7	602.3
19	9/14/2009	Inside	OuterWheelPath	372.9	5.4	19.6	471.6
20	9/14/2009	Inside	OuterWheelPath	339.1	5.3	19.6	507.6

Modulus 6.0 0utput For Cell 79 For April and May 2009 (Cell79-final.asc) With Strain Calculation by Thompson Formula							
No	Date	Lane	Position	HMA layer Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Strain in micro-inches
1	4/8/2009	Inside	OuterWheelPath	805.9	3.9	14.4	267.6
2	4/8/2009	Inside	OuterWheelPath	529.1	2.6	12.1	376.9
3	4/8/2009	Inside	OuterWheelPath	772.6	3.5	12.0	281.4
4	4/8/2009	Inside	OuterWheelPath	821.5	2.7	12.3	267.7
5	4/8/2009	Inside	OuterWheelPath	522.6	2.8	12.4	379.7
6	4/8/2009	Inside	OuterWheelPath	614.3	3.1	11.2	338.3
7	4/8/2009	Inside	OuterWheelPath	712.8	2.6	12.8	297.7
8	4/8/2009	Inside	Midlane	1060.4	10.6	13.3	218.1
9	4/8/2009	Inside	Midlane	897.6	4.6	11.7	251.2
10	4/8/2009	Inside	Midlane	613.5	7.3	12.2	335.9
11	4/8/2009	Inside	Midlane	964.5	5.1	12.7	235.7
12	4/8/2009	Inside	Midlane	844.9	4.9	12.9	260.8
13	4/8/2009	Inside	Midlane	872.0	3.3	12.0	256.3
14	4/8/2009	Inside	Midlane	1162.2	6.3	13.0	203.6
15	4/13/2009	Inside	OuterWheelPath	767.0	3.7	14.1	278.6
16	4/13/2009	Inside	OuterWheelPath	836.1	4.1	14.0	260.8
17	4/13/2009	Inside	OuterWheelPath	1205.6	4.2	14.0	196.5
18	4/13/2009	Inside	Midlane	1111.2	11.5	13.7	209.7
19	4/13/2009	Inside	Midlane	1371.9	6.7	15.2	176.4
20	4/13/2009	Inside	Midlane	1789.8	10.4	14.2	144.5
21	4/14/2009	Inside	OuterWheelPath	871.8	3.0	14.7	251.3
22	4/14/2009	Inside	OuterWheelPath	924.6	4.1	14.3	240.8
23	4/14/2009	Inside	OuterWheelPath	1333.8	4.5	14.2	181.4
24	4/14/2009	Inside	Midlane	1239.8	10.7	13.8	192.5
25	4/14/2009	Inside	Midlane	1388.8	7.3	15.1	174.8
26	4/14/2009	Inside	Midlane	1993.7	9.0	14.5	132.7
27	5/7/2009	Inside	OuterWheelPath	253.0	10.5	13.4	660.7
28	5/7/2009	Inside	OuterWheelPath	240.3	4.6	10.1	706.6
29	5/7/2009	Inside	OuterWheelPath	263.4	4.4	11.2	651.6
30	5/7/2009	Inside	OuterWheelPath	584.1	5.4	10.8	353.0
31	5/7/2009	Inside	OuterWheelPath	257.9	3.4	10.2	668.4
32	5/7/2009	Inside	OuterWheelPath	364.4	5.9	9.5	515.0
33	5/7/2009	Inside	OuterWheelPath	373.1	5.6	9.3	506.7
34	5/7/2009	Inside	Midlane	434.3	33.9	12.7	437.1
35	5/7/2009	Inside	Midlane	497.5	7.1	9.7	403.9
36	5/7/2009	Inside	Midlane	265.8	19.7	11.0	648.2
37	5/7/2009	Inside	Midlane	975.6	10.8	12.2	234.6
38	5/7/2009	Inside	Midlane	653.1	7.5	11.4	322.1

APPENDIX C

PAVEMENT TEMPERATURE CORRECTION & MODULUS CORRECTION

Cell 33 Selected Drops								
No	Date	Surf Temp in °C	HMA Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	T(1-day) in°C	Time	Predicted Pavement Temp in °C
1	4/7/2009	26.89	370.0	2.8	16.8	1	13.53	19.21
2	4/7/2009	26.44	495.1	2.9	17.4	1	13.55	18.92
3	4/7/2009	26.44	470.8	2.7	17.4	1	13.58	18.93
4	4/7/2009	26.67	540.0	2.8	18.5	1	13.60	19.10
5	4/7/2009	26.72	515.5	2.8	19.1	1	13.62	19.15
6	4/7/2009	26.50	487.8	2.6	19.0	1	13.65	19.01
7	4/7/2009	26.56	366.7	2.7	21.1	1	13.68	19.07
8	4/7/2009	25.83	537.8	2.8	21.7	1	13.70	18.59
9	4/7/2009	25.89	545.3	2.7	23.5	1	13.72	18.64
10	4/7/2009	26.28	477.1	3	21.3	1	13.75	18.92

Cell 34 Selected Drops								
No	Date	Surf Temp in °C	HMA Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	T(1-day) in°C	Time	Predicted Pavement Temp in °C
1	4/7/2009	26.61	443.6	3.2	14.8	1	16.60	20.84
2	4/7/2009	26.89	477.3	3.2	15.2	1	16.62	21.05
3	4/7/2009	26.89	393.8	3.0	14.7	1	16.64	21.06
4	4/7/2009	26.50	440.9	3.3	14.2	1	16.66	20.78
5	4/7/2009	26.28	591.9	2.8	12.4	1	16.68	20.63
6	4/7/2009	26.22	731.2	4.1	14.7	1	16.70	20.60
7	4/7/2009	26.61	533.9	3.4	14.5	1	16.71	20.89
8	4/7/2009	26.67	480.1	3.1	15.3	1	16.73	20.93
9	4/7/2009	26.61	307.2	3.1	13.6	1	16.75	20.90
10	4/7/2009	26.89	447.7	3.2	14.9	1	16.77	21.11
11	4/14/2009	25.67	598.3	3.9	17.6	8.82	11.43	19.56
12	4/14/2009	26.11	564.0	3.4	18.1	8.82	11.44	19.86
13	4/14/2009	26.28	777.9	3.5	15.3	8.82	11.45	19.97
14	4/14/2009	26.28	656.4	4.1	17.6	8.82	11.46	19.98
15	4/14/2009	26.56	391.2	3.8	16.4	8.82	11.47	20.16
16	5/8/2009	27.61	392.3	4.0	13.3	16.38	13.72	24.18
17	5/8/2009	27.67	440.7	3.9	14.0	16.38	13.74	24.23
18	5/8/2009	27.17	364.7	3.6	13.5	16.38	13.77	23.90
19	5/8/2009	27.50	399.4	4.1	13.0	16.38	13.79	24.15
20	5/8/2009	27.67	542.0	4.4	12.9	16.38	13.81	24.28
21	5/8/2009	27.50	614.3	4.9	14.4	16.38	13.83	24.17
22	5/8/2009	27.33	467.1	4.0	14.7	16.38	13.85	24.07
23	5/8/2009	27.17	429.3	3.9	14.0	16.38	13.87	23.97
24	5/8/2009	27.06	300.5	3.6	13.0	16.38	13.89	23.91
25	5/8/2009	26.50	378.6	3.8	13.8	16.38	13.92	23.54

Cell -35 Selected Drops								
No	Date	Surf Temp in °C	HMA Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	T(1-day) in°C	Time	Predicted Pavement Temp in °C
1	4/7/2009	27.83	376.9	3.2	14.5	1.0	16.39	21.62
2	4/7/2009	27.17	448.1	3.9	15.5	1.0	16.41	21.15
3	4/7/2009	27.28	403.6	3.7	14.3	1.0	16.43	21.24
4	4/7/2009	27.00	488.9	4.0	15.1	1.0	16.45	21.05
5	4/7/2009	26.67	424.3	2.8	14.8	1.0	16.47	20.81
6	4/7/2009	27.28	562.0	3.4	15.3	1.0	16.49	21.27
7	4/7/2009	27.39	453.4	3.1	15.1	1.0	16.51	21.36
8	4/7/2009	27.11	549.1	3.2	16.0	1.0	16.53	21.16
9	4/7/2009	26.56	502.0	3.2	15.6	1.0	16.55	20.77
10	4/7/2009	26.61	420.6	3.1	14.5	1.0	16.57	20.82
11	4/14/2009	26.94	459.6	4.1	17.9	8.8	11.75	20.52
12	4/14/2009	27.56	497.5	4.4	17.6	8.8	11.76	20.93
13	4/14/2009	26.33	529.1	3.4	18.2	8.8	11.78	20.13
14	4/14/2009	27.83	564.2	3.8	17.6	8.8	11.79	21.13
15	4/14/2009	27.50	608.5	3.9	18.4	8.8	11.80	20.91
16	5/6/2009	32.72	252.9	4.5	15.8	16.6	16.75	29.77
17	5/6/2009	32.83	296.8	5.6	16.4	16.6	16.77	29.85
18	5/6/2009	32.83	284.6	5.1	15.4	16.6	16.79	29.86
19	5/6/2009	32.72	318.4	5.4	15.8	16.6	16.81	29.79
20	5/6/2009	32.00	253.3	4.1	15.1	16.6	16.83	29.28
21	5/6/2009	32.89	386.4	4.9	15.9	16.6	16.84	29.93
22	5/6/2009	32.44	324.3	4.2	14.3	16.6	16.86	29.61
23	5/6/2009	32.00	340.2	4.3	14.5	16.6	16.88	29.30
24	5/6/2009	32.00	318.6	4.4	14.7	16.6	16.90	29.31
25	5/6/2009	31.61	310.4	4.2	14.3	16.6	16.93	29.04

Cell79 Selected Drops								
No	Date	Surf Temp in °C	HMA Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	T(1-day) in°C	Time	Predicted Pavement Temp in °C
1	4/8/2009	22.06	805.9	3.9	14.4	2.53	12.70	15.89
2	4/8/2009	23.00	529.1	2.6	12.1	2.53	12.72	16.54
3	4/8/2009	23.06	772.6	3.5	12.0	2.53	12.78	16.60
4	4/8/2009	22.83	821.5	2.7	12.3	2.53	12.82	16.47
5	4/8/2009	22.89	522.6	2.8	12.4	2.53	12.84	16.52
6	4/8/2009	23.06	614.3	3.1	11.2	2.53	12.86	16.64
7	4/8/2009	20.33	712.8	2.6	12.8	2.53	12.90	14.82
8	4/13/2009	8.22	767.0	3.7	14.1	7.64	6.02	7.59
9	4/13/2009	8.11	836.1	4.1	14.0	7.64	6.04	7.52
10	4/13/2009	8.11	1205.6	4.2	14.0	7.64	6.06	7.52
11	4/14/2009	6.39	871.8	3.0	14.7	8.82	6.93	6.74
12	4/14/2009	6.28	924.6	4.1	14.3	8.82	6.94	6.67
13	4/14/2009	6.28	1333.8	4.5	14.2	8.82	6.95	6.67
14	5/7/2009	36.00	253.0	10.5	13.4	17.20	15.17	31.32
15	5/7/2009	37.39	240.3	4.6	10.1	17.20	15.20	32.33
16	5/7/2009	38.61	263.4	4.4	11.2	17.20	15.23	33.21
17	5/7/2009	38.78	584.1	5.4	10.8	17.20	15.26	33.36
18	5/7/2009	37.28	257.9	3.4	10.2	17.20	15.29	32.31
19	5/7/2009	35.67	364.4	5.9	9.5	17.20	15.32	31.18
20	5/7/2009	35.00	373.1	5.6	9.3	17.20	15.34	30.72

Calculation of Refernce Temperature and Corrected Modulus								
No	Cell	Date	Surface Temp in °C	Time	T (1-day) in°C	Predicted Reference Temp in °C	Avg Modulus in ksi	Corrected Modulus in ksi
1	33	4/3/2009	22.33	11.67	0.96	15.21	482.3	624.8
2	34	4/3/2009	18.38	11.67	0.96	12.59	508.5	931.1
3	34	4/28/2009	32.05	13.12	6.67	24.08	508.5	424.6
4	35	4/3/2009	22.75	12.55	0.96	15.84	399.6	697.7
5	35	4/28/2009	32.44	13.13	6.67	24.36	399.6	401.5
6	79	4/6/2009	22.05	12.62	2.28	15.77	561.7	698.0
7	79	4/28/2009	26.04	10.92	6.67	19.05	561.7	555.5

APPENDIX D

EVERSTRESS RESULTS FOR CELLS 33, 34, 35 AND 79

Front Wheel Configuration-(Files FRONT-1.OUT to FRONT-7.OUT)						Evaluation point (0,0)		
File No	Cell	Date	HMA Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	Exx in micro-strain	Eyy in micro-strain	Szz in psi
1	33	4/3/2009	624.8	2.8	19.6	382.1	382.1	-4.6
2	34	4/3/2009	931.1	3.4	15.3	270.2	270.2	-4.0
3	34	4/28/2009	424.6	4.0	13.7	497.9	497.9	-5.4
4	35	4/3/2009	697.7	3.6	16.0	338.8	338.8	-4.6
5	35	4/28/2009	401.5	4.7	15.2	502.5	502.5	-5.8
6	79	4/6/2009	698.0	3.5	13.3	332.3	332.3	-5.7
7	79	4/28/2009	555.5	5.7	10.6	377.4	377.4	-6.5

Rear Wheel Configuration- Files REAR-1.out to REAR-7.OUT													
File No	Cell	(0,0)			(6.63,0)			(0,24)			(6.63,24)		
		Exx	Eyy	Szz	Exx	Eyy	Szz	Exx	Eyy	Szz	Exx	Eyy	Szz
1	33	84	-156	-3	69	-143	-3	91	349	-6	266	372	-5
2	34	74	-108	-3	61	-98	-3	79	247	-5	194	262	-5
3	34	80	-184	-3	64	-167	-3	73	446	-7	337	483	-6
4	35	76	-135	-3	62	-123	-3	80	309	-6	237	329	-5
5	35	70	-177	-3	56	-160	-2	56	446	-7	336	487	-6
6	79	70	-129	-3	57	-117	-3	72	302	-7	231	323	-6
7	79	65	-131	-2	54	-119	-2	56	335	-7	258	365	-7

Everstress Results(Files FORM-1.OUT to FORM-7.OUT) and Marshall Thompson Formula For all Cells						Strain in Microinches		Value Increase in %
File No	Cell	Date	HMA Modulus in ksi	Base Modulus in ksi	Subgrade Modulus in ksi	From Thompson Formula	From Everstress Analysis	
1	33	4/7/2009	624.75	2.78	19.58	316.33	464.89	31.96
2	34	4/7/2009	931.10	3.40	15.28	237.94	332.46	28.43
3	34	4/7/2009	424.63	4.00	13.66	441.68	591.59	25.34
4	35	4/7/2009	697.68	3.55	16.00	296.17	411.71	28.06
5	35	4/7/2009	401.54	4.67	15.22	456.40	591.27	22.81
6	79	4/7/2009	697.96	3.45	13.27	301.50	401.92	24.99
7	79	4/7/2009	555.53	5.68	10.64	367.55	447.96	17.95

APPENDIX E

PEAK-PICK RESULTS AND THE CORRECTED MEASURED VALUES

CELL 33-PICKED VALUES OF FRONT WHEEL SCENARIO-4/3/2009 (FILES ResultsPP_Cell33_4-3-09_01.txt to ResultsPP_Cell33_4-3-09_18.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	268.0	202.1	313.2	151.1	287.9	303.9	-5.0	-6.1	-6.7
2	161.8	118.3	187.5	146.7	236.8	262.4	-4.8	-5.7	-6.8
3	138.9	90.2	142.0	123.7	200.5	223.5	-4.5	-5.1	-5.4
4	237.2	194.6	290.3	137.6	276.4	258.6	-5.0	-5.8	-5.9
5	69.8	79.5	89.9	-2.6	-3.2	-3.8			
6	22.8	36.5	40.2	111.8	138.1	160.5	-3.9	-4.6	-5.3
7	209.3	134.8	193.7	116.6	246.2	249.1	-4.3	-4.6	-5.3
8	188.3	117.0	181.5	118.8	243.3	238.8	-4.0	-4.8	-5.8
9	176.8	92.7	171.3	113.5	234.2	230.2	-3.9	-4.9	-5.6
10	217.8	155.1	216.5	119.7	251.5	259.0	-4.4	-4.9	-5.8
11	31.3	57.3	62.4	89.9	178.7	200.7	-4.1	-4.6	-5.4
12	195.8	121.3	198.7	117.3	245.2	237.4	-4.0	-4.9	-5.6
13	102.8	124.0	142.8	100.5	198.9	232.9	-4.7	-4.6	-5.2
14	27.1	28.2	47.2	79.4	131.2	130.2	-3.2	-3.7	-4.2
15	140.4	72.8	154.4	122.0	233.9	224.3	-4.0	-5.2	-5.6
16	141.9	127.6	179.5	123.3	256.0	265.0	-4.4	-5.2	-5.9
17	224.6	150.2	245.6	138.1	276.4	257.3	-4.5	-5.8	-5.9
18	101.0	78.1	130.2	126.7	233.7	228.0	-4.1	-5.4	-6.2

CELL 33-CORRECTED VALUES OF FRONT WHEEL SCENARIO-4/3/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	272.3	204.6	283.8	156.8	254.4	265.8	-5.0	-6.1	-6.7
2	164.5	119.8	169.9	152.2	209.2	229.5	-4.8	-5.7	-6.8
3	141.1	91.3	128.6	128.4	177.2	195.5	-4.5	-5.1	-5.4
4	241.1	197.0	263.1	142.8	244.2	226.2	-5.0	-5.8	-5.9
5	71.0	80.5	81.4	-2.7	-2.9	-3.4			
6	23.2	36.9	36.4	116.0	122.0	140.4	-3.9	-4.6	-5.3
7	212.8	136.5	175.5	121.0	217.5	217.9	-4.3	-4.6	-5.3
8	191.4	118.5	164.5	123.3	215.0	208.9	-4.0	-4.8	-5.8
9	179.7	93.9	155.2	117.8	207.0	201.3	-3.9	-4.9	-5.6
10	221.4	157.0	196.2	124.2	222.2	226.6	-4.4	-4.9	-5.8
11	31.8	58.1	56.6	93.3	157.9	175.6	-4.1	-4.6	-5.4
12	199.0	122.8	18	121.7	216.7	207.7	-4.0	-4.9	-5.6
13	104.5	125.6	129.3	104.3	175.7	203.7	-4.7	-4.6	-5.2
14	27.5	28.5	42.8	82.4	115.9	113.9	-3.2	-3.7	-4.2
15	142.7	73.7	139.9	126.6	206.7	196.2	-4.0	-5.2	-5.6
16	144.2	129.2	162.6	128.0	226.2	231.8	-4.4	-5.2	-5.9
17	228.3	152.1	222.5	143.3	244.2	225.0	-4.5	-5.8	-5.9
18	102.6	79.1	118.0	131.5	206.5	199.4	-4.1	-5.4	-6.2

CELL 33- PICKED VALUES OF REAR WHEEEL 1 SCENARIO-4/3/2009 (FILES ResultsPP_Cell33_4-3-09_01.txt to ResultsPP_Cell33_4-3-09_18.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	74.9	107.5	132.2	129.2	251.5	259.9	-5.3	-5.7	-6.7
2	192.7	124.0	188.4	126.9	242.0	259.7	-4.7	-5.4	-6.2
3	174.9	102.4	157.2	121.9	230.3	246.3	-4.9	-4.6	-5.2
4	121.7	139.7	176.8	126.3	254.6	253.4	-5.3	-5.5	-5.8
5	76.4	92.8	115.2	-2.9	-3.3	-4.0			
6	93.3	42.6	79.6	105.3	175.8	193.0	-4.3	-4.4	-4.9
7	71.7	122.6	96.5	111.6	210.5	237.3	-5.2	-5.4	-6.3
8	94.4	131.5	177.2	113.4	210.5	231.8	-5.1	-5.5	-6.0
9	137.2	138.5	146.2	111.4	210.4	232.9	-5.1	-5.4	-5.8
10	53.7	86.3	24.4	118.1	196.9	226.9	-5.4	-5.7	-6.3
11	123.0	117.6	138.1	118.3	213.3	222.4	-5.7	-5.7	-6.1
12	89.6	101.0	166.8	115.3	213.3	242.8	-5.2	-5.3	-5.9
13	52.5	87.8	101.0	117.8	199.2	239.4	-5.5	-5.6	-6.4
14	96.7	46.7	65.1	91.6	157.0	162.7	-4.0	-4.3	-4.8
15	191.9	109.6	170.2	113.7	224.4	247.3	-5.0	-5.1	-5.9
16	54.7	80.8	72.5	121.0	201.1	224.8	-5.9	-5.6	-6.4
17	123.3	111.4	137.1	123.7	232.9	263.2	-5.0	-5.4	-6.6
18	157.1	113.8	146.0	113.6	223.1	261.2	-5.0	-5.3	-6.1

CELL 33-CORRECTED VALUES OF REAR WHEEEL 1 SCENARIO-4/3/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	76.1	108.9	119.8	134.1	222.2	227.4	-5.3	-5.7	-6.7
2	195.9	125.6	170.7	131.7	213.8	227.1	-4.7	-5.4	-6.2
3	177.8	103.7	142.4	126.5	203.5	215.4	-4.9	-4.6	-5.2
4	123.7	141.4	160.2	131.1	225.0	221.7	-5.3	-5.5	-5.8
5	77.7	94.0	104.3	-3.0	-2.9	-3.5			
6	94.8	43.1	72.1	109.3	155.3	168.8	-4.3	-4.4	-4.9
7	72.9	124.1	87.4	115.8	186.0	207.5	-5.2	-5.4	-6.3
8	96.0	133.2	160.6	117.7	186.0	202.8	-5.1	-5.5	-6.0
9	139.4	140.2	132.4	115.6	185.9	203.7	-5.1	-5.4	-5.8
10	54.5	87.4	22.1	122.5	174.0	198.5	-5.4	-5.7	-6.3
11	125.0	119.1	125.2	122.7	188.5	194.5	-5.7	-5.7	-6.1
12	91.1	102.3	151.1	119.7	188.5	212.4	-5.2	-5.3	-5.9
13	53.4	88.9	91.5	122.2	176.1	209.4	-5.5	-5.6	-6.4
14	98.3	47.2	59.0	95.0	138.8	142.3	-4.0	-4.3	-4.8
15	195.0	110.9	154.2	118.0	198.3	216.3	-5.0	-5.1	-5.9
16	55.6	81.8	65.7	125.6	177.7	196.6	-5.9	-5.6	-6.4
17	125.3	112.8	124.2	128.4	205.8	230.2	-5.0	-5.4	-6.6
18	159.7	115.2	132.3	117.9	197.2	228.5	-5.0	-5.3	-6.1

CELL 33- PICKED VALUES OF REAR WHEEL 2 SCENARIO-4/3/2009 (FILES ResultsPP_Cell33_4-3-09_01.txt to ResultsPP_Cell33_4-3-09_18.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	34.9	82.6	87.5	-68.9	-69.3	-120.1	-3.1	-2.5	-2.8
2	67.5	82.0	98.8	-65.6	-69.5	-109.0	-2.7	-2.2	-2.6
3	63.9	63.1	85.8	-59.3	-57.3	-87.3	-2.6	-2.2	-2.3
4	25.8	98.8	111.9	-65.5	-58.8	-109.4	-2.9	-2.6	-2.8
5	-37.8	-40.7	-58.3	-1.7	-1.3	-1.4			
6	36.8	28.4	41.4	-58.4	-55.5	-83.2	-2.4	-1.9	-2.0
7	-0.8	15.4	71.2	-55.8	-59.5	-101.9	-3.2	-2.8	-3.1
8	45.6	19.2	24.9	-54.3	-60.1	-100.7	-3.1	-2.6	-2.9
9	66.5	19.3	96.3	-51.9	-57.5	-100.2	-3.1	-2.6	-2.8
10	26.2	72.0	7.4	-55.6	-67.0	-109.9	-3.2	-2.7	-2.8
11	48.4	15.3	86.6	-57.4	-66.2	-114.4	-3.4	-2.6	-2.8
12	40.8	77.5	19.3	-55.5	-65.0	-105.8	-3.0	-2.5	-2.7
13	25.8	67.5	77.8	-58.4	-70.8	-117.5	-3.2	-2.6	-2.9
14	35.2	3.4	2.5	-43.4	-47.7	-80.3	-2.4	-2.0	-2.2
15	85.5	72.8	103.4	-53.9	-65.0	-111.9	-2.7	-2.3	-2.7
16	10.6	1.6	97.3	-58.3	-71.2	-126.0	-3.4	-2.5	-2.8
17	60.3	83.4	92.6	-60.0	-74.0	-123.6	-2.7	-2.4	-3.0
18	53.8	76.1	76.2	-56.7	-70.7	-118.5	-2.6	-2.3	-2.7

CELL 33- CORRECTED VALUES OF REAR WHEEL 2 SCENARIO-4/3/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	35.5	83.6	79.3	-71.5	-61.3	-105.1	-3.1	-2.5	-2.8
2	68.6	83.1	89.6	-68.1	-61.4	-95.4	-2.7	-2.2	-2.6
3	64.9	63.9	77.8	-61.6	-50.6	-76.4	-2.6	-2.2	-2.3
4	26.2	10	101.3	-68.0	-51.9	-95.7	-2.9	-2.6	-2.8
5	-38.5	-41.2	-52.8	-1.8	-1.1	-1.2			
6	37.4	28.8	37.5	-60.6	-49.0	-72.8	-2.4	-1.9	-2.0
7	-0.8	15.6	64.5	-57.9	-52.6	-89.1	-3.2	-2.8	-3.1
8	46.4	19.4	22.6	-56.4	-53.1	-88.1	-3.1	-2.6	-2.9
9	67.6	19.5	87.2	-53.9	-50.8	-87.6	-3.1	-2.6	-2.8
10	26.6	72.9	6.7	-57.7	-59.2	-96.1	-3.2	-2.7	-2.8
11	49.2	15.5	78.5	-59.6	-58.5	-100.1	-3.4	-2.6	-2.8
12	41.5	78.5	17.5	-57.6	-57.4	-92.6	-3.0	-2.5	-2.7
13	26.2	68.3	70.5	-60.6	-62.5	-102.8	-3.2	-2.6	-2.9
14	35.7	3.5	2.3	-45.0	-42.1	-70.3	-2.4	-2.0	-2.2
15	86.9	73.7	93.7	-55.9	-57.4	-97.9	-2.7	-2.3	-2.7
16	10.8	1.6	88.2	-60.5	-62.9	-110.2	-3.4	-2.5	-2.8
17	61.3	84.5	83.9	-62.3	-65.4	-108.2	-2.7	-2.4	-3.0
18	54.7	77.1	69.1	-58.8	-62.5	-103.6	-2.6	-2.3	-2.7

CELL 34- PICKED VALUES OF FRONT WHEEL SCENARIO-4/3/2009 (FILES ResultsPP_Cell34_4-3-09_01.txt to ResultsPP_Cell34_4-3-09_18.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	23.1			69.2	106.4	98.9	-3.3	-1.9	-3.1
2	285.7	263.1	290.6	133.4	276.4	295.7	-4.7	-3.1	-4.6
3	338.1	325.8	383.1	136.2	293.9	326.3	-4.7	-3.4	-4.7
4				88.7	136.9	146.7	-3.1	-2.0	-3.1
5	329.6	353.3	379.3	150.9	283.3	333.0	-4.6	-3.7	-4.9
6	95.3	75.3	71.1	115.8	187.8	197.9	-4.9	-3.4	-4.6
7	37.4	31.2	42.1	72.2	135.2	145.5		-2.7	-4.2
8	108.4	86.4	79.6	67.7	170.6	176.1		-2.0	-3.6
9	205.1	171.2	171.9	79.9	199.8	222.8		-2.2	-3.7
10	229.7	197.4	215.7	80.4	207.0	236.2		-2.1	-3.8
11	273.2	243.5	268.2	81.8	217.0	241.8	-4.3	-2.1	-4.0
12			294.0	94.2	231.6	251.1	-4.8	-2.6	-4.4
13	268.1			90.6	230.5	256.6		-2.7	-4.4
14	108.2	122.6	155.3	91.5	194.3	220.3		-3.0	-4.7
15	115.3	121.4	143.8	91.1	182.9	203.6	-4.6	-2.8	-4.5
16				97.6	229.5	258.7	-5.0	-2.7	-4.7
17									
18									

CELL 34- CORRECTED VALUES OF FRONT WHEEL SCENARIO-4/3/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	20.1			62.0	89.6	82.7	-3.3	-1.9	-3.1
2	247.9	233.9	247.8	119.6	232.7	247.4	-4.7	-3.1	-4.6
3	293.4	289.6	326.7	122.1	247.4	273.0	-4.7	-3.4	-4.7
4				79.6	115.3	122.7	-3.1	-2.0	-3.1
5	286.0	314.1	323.5	135.3	238.5	278.6	-4.6	-3.7	-4.9
6	82.7	66.9	60.6	103.8	158.2	165.5	-4.9	-3.4	-4.6
7	32.4	27.7	35.9	64.8	113.8	121.8		-2.7	-4.2
8	94.1	76.8	67.9	60.7	143.7	147.4		-2.0	-3.6
9	178.0	152.2	146.6	71.6	168.3	186.4		-2.2	-3.7
10	199.4	175.5	183.9	72.1	174.3	197.6		-2.1	-3.8
11	237.1	216.5	228.7	73.4	182.7	202.3	-4.3	-2.1	-4.0
12			250.8	84.5	195.0	210.1	-4.8	-2.6	-4.4
13	232.7			81.2	194.1	214.7		-2.7	-4.4
14	93.9	109.0	132.5	82.0	163.6	184.4		-3.0	-4.7
15	100.1	108.0	122.6	81.7	154.0	170.3	-4.6	-2.8	-4.5
16				87.5	193.2	216.5	-5.0	-2.7	-4.7
17									
18									

CELL 34- PICKED VALUES OF REAR WHEEL 1 SCENARIO-4/3/2009 (FILES ResultsPP_Cell34_4-3-09_01.txt to ResultsPP_Cell34_4-3-09_18.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	23.5			79.2	138.9	154.8	-3.7	-2.3	-3.4
2	170.5	168.7	207.1	124.1	255.1	300.1	-5.1	-3.5	-4.5
3	170.4	189.8	205.1	125.2	258.0	284.5	-4.9	-3.5	-4.8
4				91.6	193.6	213.6	-3.4	-2.2	-3.3
5	113.0	139.5	148.8	135.5	253.2	267.0	-5.4	-3.6	-4.8
6	226.8	206.3	212.0	108.3	232.0	264.7	-5.4	-3.3	-4.4
7	169.5	154.9	146.8	75.8	185.6	239.3		-3.0	-4.3
8	190.2	165.8	167.4	69.1	177.4	227.0		-2.2	-3.6
9	205.6	184.3	194.7	75.1	190.2	233.4		-2.4	-3.8
10	168.4	158.7	170.7	76.5	181.9	238.3		-2.5	-4.0
11	139.6	149.9	168.5	77.9	184.4	215.2	-5.2	-2.6	-4.2
12			90.2	77.3	171.8	217.6	-5.8	-2.8	-4.4
13	77.5			80.5	171.0	231.1		-2.8	-4.5
14	67.9	61.9	61.6	85.7	196.2	258.5		-3.0	-4.6
15	75.9	72.7	69.4	81.1	195.9	246.0	-5.8	-3.1	-4.5
16				85.0	175.9	241.5	-6.0	-2.9	-4.5
17									
18									

CELL 34- CORRECTED VALUES OF REAR WHEEL 1 SCENARIO-4/3/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	20.4			71.1	116.9	129.5	-3.7	-2.3	-3.4
2	148.0	149.9	176.6	111.2	214.8	251.0	-5.1	-3.5	-4.5
3	147.9	168.7	174.9	112.3	217.2	238.1	-4.9	-3.5	-4.8
4				82.1	163.0	178.7	-3.4	-2.2	-3.3
5	98.0	124.0	126.9	121.5	213.1	223.4	-5.4	-3.6	-4.8
6	196.8	183.4	180.8	97.1	195.3	221.5	-5.4	-3.3	-4.4
7	147.1	137.7	125.2	68.0	156.2	200.2		-3.0	-4.3
8	165.0	147.4	142.8	62.0	149.4	19		-2.2	-3.6
9	178.4	163.8	166.0	67.3	160.1	195.3		-2.4	-3.8
10	146.1	141.1	145.5	68.6	153.2	199.4		-2.5	-4.0
11	121.1	133.3	143.7	69.8	155.3	180.1	-5.2	-2.6	-4.2
12			76.9	69.3	144.6	182.1	-5.8	-2.8	-4.4
13	67.3			72.2	143.9	193.4		-2.8	-4.5
14	58.9	55.0	52.5	76.9	165.2	216.3		-3.0	-4.6
15	65.8	64.6	59.2	72.7	165.0	205.9	-5.8	-3.1	-4.5
16				76.2	148.1	202.1	-6.0	-2.9	-4.5
17									
18									

CELL 34- PICKED VALUES OF REAR WHEEL 2 SCENARIO-4/3/2009 (FILES ResultsPP_Cell34_4-3-09_01.txt to ResultsPP_Cell34_4-3-09_18.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	22.6			-52.4	-64.6	-70.2	-2.2	-1.5	-2.2
2	69.9	61.8	72.1	-85.1	-91.0	-94.4	-3.0	-2.4	-3.0
3	82.9	82.9	87.5	-94.3	-100.4	-109.4	-2.8	-2.3	-3.0
4	19.9			-70.3	-79.7	-86.4	-2.0	-1.5	-2.2
5	65.3	20.4	21.2	-90.3	-96.1	-116.3	-3.0	-2.5	-3.2
6	83.3	73.7	74.7	-86.2	-93.8	-97.8	-2.8	-2.1	-2.9
7	67.9	60.1	60.9	-58.9	-76.9	-92.6		-2.2	-3.3
8	74.3	63.3	62.6	-55.4	-69.6	-83.5		-1.7	-2.8
9	92.1	74.2	81.2	-59.8	-72.5	-95.4		-1.8	-3.0
10	69.4	60.5	67.8	-61.1	-75.7	-92.2		-1.9	-3.1
11	66.2	6.9	9.7	-62.0	-75.0	-96.7	-3.3	-1.9	-3.1
12			-1.2	-62.7	-79.6	-101.5	-3.6	-2.1	-3.2
13	19.9			-67.6	-89.7	-108.8		-2.1	-3.3
14	25.9	24.0	22.7	-74.2	-94.2	-115.5		-2.1	-3.2
15	31.9	3	28.2	-71.9	-88.1	-110.4	-3.4	-2.2	-3.2
16				-67.8	-90.9	-112.6	-3.4	-2.2	-3.3
17									
18									

CELL 34-CORRECTED VALUES OF REAR WHEEL 2 SCENARIO-4/3/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	19.6			-47.0	-54.4	-58.7	-2.2	-1.5	-2.2
2	60.7	55.0	61.5	-76.3	-76.6	-79.0	-3.0	-2.4	-3.0
3	71.9	73.7	74.6	-84.6	-84.6	-91.5	-2.8	-2.3	-3.0
4	17.3			-63.1	-67.1	-72.3	-2.0	-1.5	-2.2
5	56.7	18.2	18.0	-81.0	-80.9	-97.3	-3.0	-2.5	-3.2
6	72.3	65.5	63.7	-77.3	-79.0	-81.8	-2.8	-2.1	-2.9
7	58.9	53.4	52.0	-52.8	-64.8	-77.4		-2.2	-3.3
8	64.5	56.2	53.3	-49.6	-58.6	-69.8		-1.7	-2.8
9	79.9	66.0	69.3	-53.6	-61.1	-79.8		-1.8	-3.0
10	60.2	53.8	57.8	-54.8	-63.8	-77.2		-1.9	-3.1
11	57.5	6.1	8.2	-55.6	-63.2	-80.9	-3.3	-1.9	-3.1
12			-1.0	-56.3	-67.0	-84.9	-3.6	-2.1	-3.2
13	17.3			-60.6	-75.6	-91.0		-2.1	-3.3
14	22.5	21.4	19.3	-66.6	-79.3	-96.6		-2.1	-3.2
15	27.7	26.7	24.0	-64.5	-74.2	-92.4	-3.4	-2.2	-3.2
16				-60.8	-76.5	-94.2	-3.4	-2.2	-3.3
17									
18									

CELL 34- PICKED VALUES OF FRONT WHEEL SCENARIO-4/28/2009 (FILES ResultsPP_Cell34_4-28-09_01.txt to ResultsPP_Cell34_4-28-09_17.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	-1.3	-1.4	-1.3			-1.1	-0.6	-0.6	-0.7
2				-104.0	-124.0	-139.2		-4.9	-4.3
3	63.2			-78.3	-97.3	-97.9		-2.7	-4.1
4	-370.8			-141.1	-310.4	-358.0		-5.0	-6.0
5									
6		2.2							
7	-22.1	-36.4	-47.9	-133.6	-151.3	-131.0	-8.6	-3.1	-5.1
8									
9			-103.3	-146.4	-261.0	-317.1		-4.9	-5.6
10	-88.5	-85.7	-104.9	-71.1	-91.2	-76.4		-2.3	-3.7
11				-143.6	-312.2	-386.0		-4.7	-5.5
12				-79.7	-91.7	-97.4		-3.9	-3.8
13		-64.7		-156.8	-309.4	-361.8		-5.3	-5.8
14				-166.4	-311.3	-397.6		-6.0	-6.6
15	-512.4	-530.3	-658.7	-236.0	-42	-502.0		-3.9	-6.2
16			-41.4	-180.8	-308.3	-367.3		-5.6	-6.2
17				-124.2	-180.6	-174.7		-2.1	-3.8

CELL 34- CORRECTED VALUES OF FRONT WHEEL SCENARIO-4/28/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	-1.1	-1.3	-1.1			-1.0	-0.6	-0.6	-0.7
2				-93.3	-104.4	-116.5		-4.9	-4.3
3	54.9			-70.2	-81.9	-81.9		-2.7	-4.1
4	-321.8			-126.6	-261.3	-299.6		-5.0	-6.0
5									
6		2.0							
7	-19.1	-32.4	-40.8	-119.8	-127.4	-109.6	-8.6	-3.1	-5.1
8									
9			-88.1	-131.3	-219.8	-265.4		-4.9	-5.6
10	-76.8	-76.2	-89.5	-63.7	-76.8	-63.9		-2.3	-3.7
11				-128.8	-262.9	-323.0		-4.7	-5.5
12				-71.5	-77.2	-81.5		-3.9	-3.8
13		-57.5		-140.6	-260.6	-302.8		-5.3	-5.8
14				-149.3	-262.1	-332.7		-6.0	-6.6
15	-444.7	-471.5	-561.9	-211.7	-353.6	-420.1		-3.9	-6.2
16			-35.3	-162.1	-259.6	-307.4		-5.6	-6.2
17				-111.4	-152.0	-146.2		-2.1	-3.8

CELL 34- PICKED VALUES OF REAR WHEEL 1 SCENARIO-4/28/2009 (FILES ResultsPP_Cell34_4-28-09_01.txt to ResultsPP_Cell34_4-28-09_17.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	-1.0	-0.9	-1.1			-1.0	-0.6	-0.6	-0.7
2				-145.3	-32	-304.7		-5.9	-6.1
3	62.9			-119.0	-152.9	-156.7		-3.1	-4.4
4	-68.1			-180.6	-268.2	-313.2		-5.2	-6.3
5									
6		2.4							
7	-57.6	-63.6	-133.0	-139.9	-197.2	-223.7	-6.4	-3.2	-5.3
8									
9			-345.1	-181.0	-294.0	-359.1		-5.9	-7.2
10	-102.3	-107.4	-116.9	-79.0	-104.5	-140.7		-2.4	-4.1
11				-164.4	-269.4	-382.1		-5.2	-6.7
12				-147.3	-293.8	-410.9		-6.1	-6.3
13		-104.9		-198.9	-339.0	-403.6		-5.5	-7.7
14				-235.1	-362.9	-389.2		-6.1	-8.7
15	-154.6	-132.1	-190.6	-283.0	-39	-441.6		-5.8	-7.5
16			-141.4	-198.2	-344.7	-429.9		-6.4	-7.7
17				-132.1	-269.9	-334.1		-2.9	-4.4

CELL 34-CORRECTED VALUES OF REAR WHEEL 1 SCENARIO-4/28/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	-0.8	-0.8	-1.0			-0.8	-0.6	-0.6	-0.7
2				-130.3	-269.5	-254.9		-5.9	-6.1
3	54.6			-106.7	-128.7	-131.1		-3.1	-4.4
4	-59.1			-162.0	-225.9	-262.1		-5.2	-6.3
5									
6		2.1							
7	-5	-56.6	-113.5	-125.5	-166.1	-187.2	-6.4	-3.2	-5.3
8									
9			-294.4	-162.3	-247.6	-300.5		-5.9	-7.2
10	-88.8	-95.5	-99.7	-70.8	-88.0	-117.8		-2.4	-4.1
11				-147.5	-226.8	-319.7		-5.2	-6.7
12				-132.1	-247.4	-343.9		-6.1	-6.3
13		-93.2		-178.4	-285.5	-337.7		-5.5	-7.7
14				-210.9	-305.6	-325.7		-6.1	-8.7
15	-134.2	-117.5	-162.5	-253.8	-328.4	-369.5		-5.8	-7.5
16			-120.6	-177.7	-290.2	-359.7		-6.4	-7.7
17				-118.5	-227.2	-279.5		-2.9	-4.4

CELL 34-PICKED VALUES OF REAR WHEEL 2 SCENARIO-4/28/2009 (FILES ResultsPP_Cell34_4-28-09_01.txt to ResultsPP_Cell34_4-28-09_17.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	0.1	0.4	0.1			0.1	-0.6	-0.6	-0.7
2				90.2	77.9	106.1		-3.0	-2.3
3	58.0			51.8	59.8	74.4		-1.0	-1.7
4				90.2	107.4	125.7		-2.4	-2.5
5									
6		1.2							
7	5.7	16.9	-17.9	101.5	87.9	102.8	-1.5	-0.8	-1.5
8									
9			-112.0	109.2	118.0	152.6		-1.7	-2.5
10	-10.8	9.0	30.3	56.4	55.6	75.8		-0.7	-1.6
11				102.3	118.8	149.3		-1.6	-2.2
12				107.5	110.6	129.3		-1.7	-2.0
13		-103.4		138.5	132.4	185.9		-1.5	-2.6
14				155.5	134.5	162.7		-1.7	-2.6
15	-45.4	-21.0	-24.9	172.2	176.0	210.1		-1.2	-2.0
16			50.9	155.9	153.1	192.6		-1.6	-2.4
17				106.1	107.8	132.3		-0.7	-1.5

CELL 34-CORRECTED VALUES OF REAR WHEEL 2 SCENARIO-4/28/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	0.1	0.3	0.1			0.1	-0.6	-0.6	-0.7
2				80.9	65.6	88.8		-3.0	-2.3
3	50.4			46.4	50.4	62.3		-1.0	-1.7
4				80.9	90.4	105.2		-2.4	-2.5
5									
6		1.0							
7	5.0	15.0	-15.3	91.0	74.0	86.0	-1.5	-0.8	-1.5
8									
9			-95.6	97.9	99.4	127.7		-1.7	-2.5
10	-9.4	8.0	25.8	50.6	46.9	63.5		-0.7	-1.6
11				91.7	10	124.9		-1.6	-2.2
12				96.4	93.1	108.2		-1.7	-2.0
13		-92.0		124.2	111.5	155.6		-1.5	-2.6
14				139.4	113.2	136.1		-1.7	-2.6
15	-39.4	-18.6	-21.3	154.4	148.2	175.8		-1.2	-2.0
16			43.4	139.8	128.9	161.2		-1.6	-2.4
17				95.1	90.7	110.7		-0.7	-1.5

CELL 35- PICKED VALUES OF FRONT WHEEL SCENARIO-4/3/2009 (FILES ResultsPP_Cell35_4-3-09_01.txt to ResultsPP_Cell34_4-3-09_17.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	36.9			228.6	243.0	284.5	-5.4	-4.6	-3.7
2	244.7	27		278.2	319.0	315.4	-5.7	-5.9	-4.6
3	60.1	56.0		216.0	245.4	268.7	-5.4	-4.4	-3.5
4	49.6	34.4		177.7	193.6	215.9	-5.0	-3.7	-2.8
5	-64.7			136.6	140.7	157.6	-4.8		-2.1
6		4.1		142.5	153.6	170.7	-3.9	-2.9	-2.5
7	136.6	191.3		230.6	305.1	308.8	-4.6	-4.3	-4.0
8	50.4	67.8		194.8	233.5	249.4	-4.5	-3.8	-3.5
9	58.4	76.9		197.2	242.5	264.1	-4.4	-3.8	-3.5
10	59.0	72.3		192.1	237.6	248.3	-4.4	-3.7	-3.4
11		38.8		168.5	197.6	224.3	-4.1	-3.4	-3.0
12	59.5	87.2		208.0	262.2	275.4	-4.8	-3.8	-3.8
13	215.6	257.2		270.6	353.6	327.4	-4.4	-4.8	-4.9
14	66.3	84.9		212.9	258.0	280.1	-2.4	-4.1	-3.8
15	178.0	241.6		253.0	331.1	321.9	-5.1	-5.1	-4.4
16	120.2	186.4		237.6	314.5	316.5	-4.5	-4.5	-4.1
17	92.1	141.5		235.8	301.3	306.0	-5.1	-4.3	-4.1

CELL 35- CORRECTED VALUES OF FRONT WHEEL SCENARIO-4/3/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	31.5			200.7	191.9	236.7	-5.4	-4.6	-3.7
2	208.4	235.8		244.2	252.0	262.4	-5.7	-5.9	-4.6
3	51.2	48.9		189.6	193.8	223.6	-5.4	-4.4	-3.5
4	42.2	30.1		156.0	152.9	179.6	-5.0	-3.7	-2.8
5	-55.1			119.9	111.1	131.1	-4.8		-2.1
6		3.6		125.1	121.3	142.0	-3.9	-2.9	-2.5
7	116.3	167.0		202.5	241.0	256.9	-4.6	-4.3	-4.0
8	42.9	59.2		171.0	184.4	207.5	-4.5	-3.8	-3.5
9	49.8	67.2		173.1	191.5	219.7	-4.4	-3.8	-3.5
10	50.2	63.1		168.6	187.7	206.6	-4.4	-3.7	-3.4
11		33.9		147.9	156.0	186.6	-4.1	-3.4	-3.0
12	50.6	76.1		182.6	207.1	229.2	-4.8	-3.8	-3.8
13	183.6	224.6		237.5	279.3	272.4	-4.4	-4.8	-4.9
14	56.5	74.1		186.9	203.8	233.1	-2.4	-4.1	-3.8
15	151.6	211.0		222.1	261.5	267.8	-5.1	-5.1	-4.4
16	102.4	162.8		208.5	248.4	263.3	-4.5	-4.5	-4.1
17	78.4	123.5		207.0	238.0	254.6	-5.1	-4.3	-4.1

CELL 35- PICKED VALUES OF REAR WHEEL 1 SCENARIO-4/3/2009 (FILES ResultsPP_Cell35_4-3-09_01.txt to ResultsPP_Cell34_4-3-09_17.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	120.8			212.3	276.0	315.6	-5.5	-4.3	-3.7
2	183.6	229.3		253.4	319.8	331.2	-6.3	-5.1	-4.3
3	147.9	175.4		233.9	32	328.5	-5.6	-4.4	-3.8
4	54.2	62.4		209.2	271.8	308.0	-5.2	-3.6	-3.2
5	-39.1			173.0	210.7	245.2	-5.0		-2.6
6		39.3		158.0	203.7	214.1	-4.6	-3.5	-2.8
7	163.4	220.5		234.9	312.8	309.3	-5.4	-5.2	-4.5
8	108.1	147.3		208.0	268.8	288.7	-5.2	-4.4	-3.7
9	123.5	167.1		218.7	290.6	296.6	-5.1	-4.5	-4.0
10	117.6	159.7		205.9	284.8	290.3	-5.2	-4.5	-3.6
11		93.7		20	263.9	280.8	-5.0	-4.1	-3.5
12	126.2	172.9		232.4	304.9	311.7	-5.6	-4.8	-4.2
13	88.7	129.9		253.4	306.1	305.6	-5.2	-5.7	-5.5
14	135.3	180.1		227.8	298.0	313.8	-3.2	-4.7	-4.0
15	155.6	222.6		240.3	305.3	313.1	-5.6	-5.4	-4.5
16	138.7	216.9		251.4	327.7	335.9	-5.3	-5.2	-4.6
17	148.0	21		247.6	319.6	315.0	-5.6	-5.2	-4.3

CELL 35- CORRECTED VALUES OF REAR WHEEL 1 SCENARIO-4/3/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	102.9			186.4	218.0	262.6	-5.5	-4.3	-3.7
2	156.3	200.2		222.5	252.6	275.5	-6.3	-5.1	-4.3
3	126.0	153.2		205.4	252.7	273.3	-5.6	-4.4	-3.8
4	46.2	54.5		183.7	214.7	256.2	-5.2	-3.6	-3.2
5	-33.3			151.9	166.4	204.0	-5.0		-2.6
6		34.3		138.7	160.9	178.1	-4.6	-3.5	-2.8
7	139.2	192.5		206.2	247.0	257.4	-5.4	-5.2	-4.5
8	92.1	128.6		182.6	212.3	240.2	-5.2	-4.4	-3.7
9	105.2	145.9		192.0	229.5	246.8	-5.1	-4.5	-4.0
10	100.2	139.5		180.8	225.0	241.5	-5.2	-4.5	-3.6
11		81.8		175.6	208.5	233.6	-5.0	-4.1	-3.5
12	107.4	151.0		204.0	240.8	259.3	-5.6	-4.8	-4.2
13	75.5	113.4		222.4	241.7	254.2	-5.2	-5.7	-5.5
14	115.2	157.2		199.9	235.4	261.1	-3.2	-4.7	-4.0
15	132.5	194.4		210.9	241.1	260.5	-5.6	-5.4	-4.5
16	118.1	189.4		220.7	258.9	279.4	-5.3	-5.2	-4.6
17	126.1	183.3		217.4	252.5	262.1	-5.6	-5.2	-4.3

CELL 35- PICKED VALUES OF REAR WHEEL 2 SCENARIO-4/3/2009 (FILES ResultsPP_Cell35_4-3-09_01.txt to ResultsPP_Cell34_4-3-09_17.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	18.6			-101.8	-8	-92.3	-3.6	-2.4	-1.8
2	78.7	72.1		-118.0	-82.2	-98.8	-4.0	-2.6	-2.0
3	68.3	58.0		-119.0	-80.7	-104.0	-3.7	-2.2	-1.9
4	60.9	11.1		-11	-80.2	-95.1	-3.2	-1.8	-1.4
5	14.9			-99.6	-76.3	-86.1	-3.1		-1.1
6		-5.4		-76.8	-57.4	-70.8	-3.6	-2.1	-1.7
7	94.8	104.1		-104.6	-65.5	-87.9	-4.0	-3.0	-2.8
8	51.7	51.4		-91.8	-69.6	-86.0	-3.9	-2.5	-2.2
9	62.4	61.3		-98.7	-70.3	-87.1	-3.8	-2.6	-2.3
10	59.9	59.5		-99.4	-69.6	-88.5	-3.9	-2.4	-2.2
11		35.4		-91.9	-68.2	-79.5	-3.8	-2.3	-2.1
12	57.5	58.3		-101.8	-71.4	-90.6	-4.1	-2.6	-2.4
13	60.9	54.1		-122.0	-83.3	-103.4	-3.4	-3.1	-3.1
14	66.8	61.7		-104.4	-74.6	-91.9	-1.6	-2.6	-2.2
15	85.0	92.8		-113.6	-80.7	-104.6	-3.9	-2.8	-2.5
16	62.5	84.4		-116.3	-80.1	-97.3	-3.6	-2.8	-2.6
17	68.1	69.8		-112.0	-77.8	-100.9	-3.9	-2.7	-2.4

CELL 35- CORRECTED VALUES OF REAR WHEEL 2 SCENARIO-4/3/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	15.9			-89.3	-63.2	-76.8	-3.6	-2.4	-1.8
2	67.0	62.9		-103.6	-64.9	-82.2	-4.0	-2.6	-2.0
3	58.2	50.6		-104.5	-63.7	-86.5	-3.7	-2.2	-1.9
4	51.9	9.7		-96.6	-63.4	-79.1	-3.2	-1.8	-1.4
5	12.7			-87.5	-60.2	-71.6	-3.1		-1.1
6		-4.7		-67.4	-45.3	-58.9	-3.6	-2.1	-1.7
7	80.7	90.9		-91.8	-51.7	-73.2	-4.0	-3.0	-2.8
8	44.0	44.8		-80.6	-55.0	-71.6	-3.9	-2.5	-2.2
9	53.1	53.5		-86.7	-55.5	-72.4	-3.8	-2.6	-2.3
10	51.0	52.0		-87.2	-55.0	-73.6	-3.9	-2.4	-2.2
11		30.9		-80.7	-53.9	-66.1	-3.8	-2.3	-2.1
12	49.0	50.9		-89.4	-56.4	-75.4	-4.1	-2.6	-2.4
13	51.9	47.2		-107.1	-65.8	-86.0	-3.4	-3.1	-3.1
14	56.9	53.9		-91.7	-59.0	-76.4	-1.6	-2.6	-2.2
15	72.4	81.0		-99.7	-63.8	-87.0	-3.9	-2.8	-2.5
16	53.2	73.7		-102.1	-63.3	-81.0	-3.6	-2.8	-2.6
17	58.0	60.9		-98.3	-61.5	-84.0	-3.9	-2.7	-2.4

CELL 35- PICKED VALUES OF FRONT WHEEL SCENARIO-4/28/2009 (FILES ResultsPP_Cell35_4-28-09_01.txt to ResultsPP_Cell34_4-28-09_17.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	-1.3					-1.3			
2		-325.4		-321.0	-342.7	-360.5			
3	-186.5	-125.9		-277.0	-291.5	-333.0			
4		-25.8		-273.2	-230.5	-220.7			
5				-254.6	-246.8	-262.2			
6	-45.2			-367.0	-368.8	-415.0			
7									
8	-397.8	-464.5		-422.3	-447.3	-506.6			
9		-11							
10		-29.0		-339.1	-359.9	-353.6			
11		-177.2		-324.0	-334.8	-321.5			
12	-188.7	-236.0		-316.1	-403.6	-462.2			
13				-318.1	-273.3	-235.4			
14	-61.9	-86.0		-270.2	-314.4	-333.3			
15		-585.2		-460.9	-512.5	-585.6			
16	-6			-411.8	-465.0	-477.2			
17				-180.5	-187.8	-217.0			

CELL 35-CORRECTED VALUES OF FRONT WHEEL SCENARIO-4/28/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	-1.1					-1.1			
2		-284.2		-281.8	-270.7	-30			
3	-158.9	-11		-243.2	-230.3	-277.1			
4		-22.5		-239.9	-182.1	-183.7			
5				-223.6	-195.0	-218.2			
6	-38.5			-322.2	-291.3	-345.3			
7									
8	-338.8	-405.7		-370.8	-353.4	-421.5			
9		-96.1							
10		-25.4		-297.8	-284.3	-294.2			
11		-154.8		-284.5	-264.5	-267.5			
12	-160.7	-206.1		-277.5	-318.9	-384.6			
13				-279.3	-215.9	-195.9			
14	-52.8	-75.1		-237.2	-248.4	-277.3			
15		-511.1		-404.7	-404.9	-487.3			
16	-51.1			-361.6	-367.4	-397.1			
17				-158.4	-148.4	-180.6			

CELL 35- PICKED VALUES OF REAR WHEEL 1 SCENARIO-4/28/2009 (FILES ResultsPP_Cell35_4-28-09_01.txt to ResultsPP_Cell34_4-28-09_17.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	-1.0					-1.0			
2		-175.4		-340.2	-365.3	-339.0			
3	-248.2	-184.5		-282.6	-328.6	-369.7			
4		-205.4		-317.1	-379.3	-372.1			
5				-241.0	-274.2	-295.7			
6	-96.4			-402.1	-391.7	-367.0			
7									
8	-297.1	-370.5		-418.5	-495.9	-551.5			
9		-87.5							
10		-102.5		-414.8	-400.2	-418.9			
11		-68.6		-404.1	-411.7	-425.7			
12	-253.4	-305.7		-353.5	-471.7	-530.4			
13				-434.9	-471.3	-496.9			
14	-153.1	-161.5		-313.2	-374.7	-394.9			
15		-209.6		-515.0	-537.0	-538.8			
16	-168.2			-468.8	-450.3	-456.4			
17				-252.7	-267.4	-276.5			

CELL 35- CORRECTED VALUES OF REAR WHEEL 1 SCENARIO-4/28/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	-0.8					-0.8			
2		-153.2		-298.7	-288.5	-282.1			
3	-211.4	-161.2		-248.1	-259.6	-307.7			
4		-179.4		-278.4	-299.6	-309.6			
5				-211.6	-216.6	-246.1			
6	-82.1			-353.0	-309.4	-305.4			
7									
8	-253.1	-323.5		-367.5	-391.8	-459.0			
9		-76.4							
10		-89.5		-364.2	-316.2	-348.6			
11		-59.9		-354.8	-325.2	-354.3			
12	-215.8	-267.0		-310.4	-372.7	-441.4			
13				-381.9	-372.4	-413.5			
14	-130.4	-141.0		-275.0	-296.0	-328.6			
15		-183.0		-452.2	-424.3	-448.4			
16	-143.3			-411.6	-355.8	-379.8			
17				-221.8	-211.2	-230.1			

CELL 35- REAR WHEEL 2 SCENARIO-4/28/2009 (FILES ResultsPP_Cell35_4-28-09_01.txt to ResultsPP_Cell34_4-28-09_17.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	0.6					0.3			
2		-31.5		120.6	75.5	107.4			
3	-117.0	-39.4		100.7	70.5	98.7			
4		2.0		159.9	87.4	114.6			
5				105.9	56.8	88.3			
6	98.3			152.2	84.0	121.7			
7									
8	-88.4	-101.5		195.0	129.8	139.7			
9		1.6							
10		32.6		169.2	103.9	142.2			
11		42.8		166.8	98.4	128.8			
12	-53.9	-52.9		147.9	88.5	122.3			
13				181.5	102.2	142.8			
14	-38.6	-32.1		128.9	82.7	113.3			
15		-20.5		226.9	134.5	147.2			
16	161.1			206.6	123.4	173.5			
17				11	70.5	95.6			

CELL 35-CORRECTED VALUES OF REAR WHEEL 2 SCENARIO-4/28/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1	0.5					0.2			
2		-27.5		105.8	59.6	89.3			
3	-99.7	-34.4		88.4	55.7	82.1			
4		1.7		140.4	69.0	95.3			
5				93.0	44.9	73.5			
6	83.7			133.6	66.3	101.2			
7									
8	-75.3	-88.6		171.2	102.5	116.2			
9		1.4							
10		28.5		148.6	82.1	118.4			
11		37.4		146.5	77.7	107.2			
12	-45.9	-46.2		129.8	69.9	101.8			
13				159.4	80.7	118.8			
14	-32.9	-28.0		113.1	65.3	94.2			
15		-17.9		199.1	106.3	122.5			
16	137.2			181.4	97.5	144.4			
17				96.6	55.7	79.5			

CELL 35- PICKED VALUES OF FRONT WHEEL SCENARIO-4/29/2009 (FILES ResultsPP_Cell35_4-29-09_01.txt to ResultsPP_Cell34_4-29-09_12.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1									
2	-103.4	-109.7		-210.8	-241.2	-267.0			
3	-298.9	-328.3		-291.0	-328.0	-354.2			
4	96.6	88.7		-19.7					
5	29.9			-38.5	-33.5	-36.0			
6				-163.7	-176.1	-196.2			
7	51.0	45.1		-47.6	-43.4	-48.8			
8	-141.8	-162.2		-192.0	-242.2	-228.2			
9		-45.9		-130.9	-156.6	-179.2			
10	-9.2			-103.3	-103.7	-120.6			
11				-55.9	-47.8	-58.8			
12	-23.6			-111.6	-124.3	-144.3			

CELL 35- CORRECTED VALUES OF FRONT WHEEL SCENARIO-4/29/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1									
2	-88.1	-95.8		-185.1	-190.6	-222.2			
3	-254.6	-286.7		-255.5	-259.1	-294.7			
4	82.3	77.5		-17.3					
5	25.4			-33.8	-26.5	-3			
6				-143.7	-139.1	-163.3			
7	43.4	39.3		-41.8	-34.3	-40.6			
8	-120.8	-141.7		-168.6	-191.3	-189.9			
9		-40.1		-114.9	-123.7	-149.1			
10	-7.9			-90.7	-81.9	-100.3			
11				-49.1	-37.8	-48.9			
12	-20.1			-97.9	-98.2	-12			

CELL 35- PICKED VALUES OF REAR WHEEL 1 SCENARIO-4/29/2009 (FILES ResultsPP_Cell35_4-29-09_01.txt to ResultsPP_Cell34_4-29-09_12.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1									
2	-152.3	-143.0		-244.5	-279.9	-330.4			
3	-112.0	-189.1		-281.5	-333.9	-325.1			
4	95.2	94.1		-18.8					
5	54.6			-48.0	-34.8	-41.4			
6				-160.8	-210.5	-203.2			
7	93.2	71.4		-49.9	-45.2	-47.4			
8	-82.5	-115.8		-258.5	-277.5	-286.8			
9		-44.8		-157.6	-199.0	-218.4			
10	-8.0			-109.2	-110.1	-101.1			
11				-57.4	-48.7	-46.1			
12	-19.1			-112.1	-124.5	-139.4			

CELL 35-CORRECTED VALUES OF REAR WHEEL 1 SCENARIO-4/29/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1									
2	-129.7	-124.9		-214.6	-221.1	-274.9			
3	-95.4	-165.1		-247.2	-263.8	-270.6			
4	81.0	82.2		-16.5					
5	46.5			-42.1	-27.5	-34.4			
6				-141.2	-166.3	-169.1			
7	79.4	62.3		-43.8	-35.7	-39.4			
8	-70.3	-101.1		-227.0	-219.2	-238.6			
9		-39.2		-138.4	-157.2	-181.7			
10	-6.8			-95.9	-87.0	-84.1			
11				-50.3	-38.5	-38.4			
12	-16.3			-98.4	-98.3	-116.0			

CELL 35- PICKED VALUES OF REAR WHEEL 2 SCENARIO-4/29/2009 (FILES ResultsPP_Cell35_4-29-09_01.txt to ResultsPP_Cell34_4-29-09_12.txt)									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1									
2	-69.0	-64.2		85.4	64.2	71.0			
3	-5.0	-75.1		104.8	62.9	94.4			
4		81.2		17.9					
5	26.5			23.5	24.6	30.8			
6				73.9	46.0	60.3			
7	41.1	51.0		27.2	24.3	27.5			
8	-67.3	-83.4		87.4	56.7	74.0			
9		-26.0		60.7	43.4	53.7			
10	-7.3			43.3	35.0	45.8			
11				25.4	24.1	29.3			
12	23.5			41.5	33.8	46.9			

CELL 35- CORRECTED VALUES OF REAR WHEEL 2 SCENARIO-4/29/2009									
FILE NO	TE201	TE202	TE203	LE201	LE202	LE203	PG201	PG202	PG203
1									
2	-58.8	-56.0		75.0	50.7	59.1			
3	-4.3	-65.6		92.0	49.7	78.5			
4		70.9		15.7					
5	22.5			20.6	19.4	25.6			
6				64.9	36.3	50.2			
7	35.0	44.5		23.8	19.2	22.9			
8	-57.3	-72.8		76.7	44.8	61.5			
9		-22.7		53.3	34.3	44.7			
10	-6.2			38.0	27.7	38.1			
11				22.3	19.0	24.4			
12	2			36.4	26.7	39.0			

CELL 79- PICKED VALUES OF FRONT WHEEL SCENARIO-4/6/2009 (FILES ResultsPP_Cell79_4-6-09_01.txt to ResultsPP_Cell79_4-6-09_16.txt)									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1	117.7	147.0	224.5	69.1			-5.9	-7.5	-7.8
2	169.4	226.6	301.7	282.2	218.9	258.2	-6.0	-7.8	-7.9
3	85.6	109.8	192.0	45.7	136.8	177.5	-5.5	-7.2	-7.6
4	115.7	146.2	234.3	96.1	54.2	45.8	-6.1	-7.9	-7.4
5	63.8	79.4	146.0	22.8	13.3	14.5	-5.0	-6.5	-7.0
6	131.1	162.1	226.8	163.4	143.9	176.2	-4.9	-6.6	-7.1
7	158.5	199.4	247.0	245.2	233.1	277.1	-5.0	-6.4	-6.9
8	148.3	208.4	206.7	163.4	204.0		-4.3	-5.8	-5.8
9	42.3	51.6	50.7	16.7	18.7		-2.1	-2.8	-2.8
10	33.3	38.5	71.8	-35.9		-29.6	-3.2	-4.0	-4.8
11	8	94.0	157.5	31.6	14.7		-4.4	-5.8	-7.2
12	114.7	142.0	213.1		99.8	126.1	-4.8	-6.5	-7.4
13	165.7	208.1	249.0	243.7	236.0	277.4	-4.9	-6.3	-7.5
14	161.2	203.6	243.6	245.5	225.4	269.6	-4.8	-6.5	-7.2
15	57.3	70.7	125.9	11.5			-4.0	-5.4	-7.0
16	47.0	54.4	86.7	-25.8	-14.2		-3.8	-4.6	-6.1

CELL 79- CORRECTED VALUES OF FRONT WHEEL SCENARIO-4/6/2009									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1	105.8	135.1	205.4	67.3			-5.9	-7.5	-7.8
2	152.3	208.2	276.0	274.9	197.0	222.9	-6.0	-7.8	-7.9
3	77.0	100.9	175.7	44.6	123.1	153.2	-5.5	-7.2	-7.6
4	104.0	134.3	214.4	93.7	48.8	39.5	-6.1	-7.9	-7.4
5	57.4	73.0	133.6	22.2	11.9	12.5	-5.0	-6.5	-7.0
6	117.8	149.0	207.5	159.2	129.5	152.1	-4.9	-6.6	-7.1
7	142.5	183.2	226.0	238.9	209.7	239.2	-5.0	-6.4	-6.9
8	133.3	191.5	189.1	159.2	183.6		-4.3	-5.8	-5.8
9	38.0	47.5	46.4	16.3	16.8		-2.1	-2.8	-2.8
10	29.9	35.4	65.7	-35.0		-25.6	-3.2	-4.0	-4.8
11	71.9	86.4	144.1	30.8	13.2		-4.4	-5.8	-7.2
12	103.2	130.5	195.0		89.8	108.9	-4.8	-6.5	-7.4
13	149.0	191.2	227.9	237.5	212.3	239.5	-4.9	-6.3	-7.5
14	144.9	187.1	222.8	239.2	202.8	232.7	-4.8	-6.5	-7.2
15	51.5	65.0	115.2	11.2			-4.0	-5.4	-7.0
16	42.2	5	79.3	-25.2	-12.8		-3.8	-4.6	-6.1

CELL 79- PICKED VALUES OF REAR WHEEL 1 SCENARIO-4/6/2009 (FILES ResultsPP_Cell79_4-6-09_01.txt to ResultsPP_Cell79_4-6-09_16.txt)									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1	180.5	253.5	312.9	226.9			-6.0	-8.0	-8.1
2	196.5	273.2	324.3	241.5	227.2	268.6	-6.4	-7.9	-8.3
3	134.2	184.7	269.3	150.8	130.2	178.0	-5.8	-7.9	-8.0
4	196.9	267.0	338.7	256.3	236.4	286.7	-6.5	-8.3	-8.2
5	102.0	136.4	235.5	72.8	49.3	73.6	-5.2	-7.4	-7.6
6	158.7	216.6	251.0	177.0	189.7	230.4	-5.6	-7.6	-7.4
7	156.0	214.1	239.3	126.5	143.4	159.2	-5.7	-7.7	-7.4
8	148.8	192.4	213.9	60.3	22.1		-5.7	-7.5	-8.0
9	124.8	170.7	155.8	118.6	106.9		-4.0	-5.9	-5.7
10	50.5	64.5	103.9	-48.8		-51.0	-4.2	-5.5	-5.6
11	122.3	157.3	213.8	129.3	130.4		-5.1	-7.2	-7.6
12	157.6	213.5	255.1		195.8	235.6	-5.6	-7.7	-7.5
13	169.3	231.2	251.4	117.7	142.6	154.1	-5.8	-7.8	-7.8
14	169.5	229.3	256.1	127.7	140.9	159.2	-5.9	-7.7	-7.3
15	83.9	112.0	180.4	69.4			-4.7	-6.9	-7.4
16	72.1	87.9	144.1	-32.6	-31.6		-4.6	-6.0	-6.4

CELL 79- CORRECTED VALUES OF REAR WHEEL 1 SCENARIO-4/6/2009									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1	162.2	233.0	286.3	221.0			-6.0	-8.0	-8.1
2	176.6	251.0	296.7	235.3	204.4	231.9	-6.4	-7.9	-8.3
3	120.7	169.7	246.4	146.9	117.1	153.7	-5.8	-7.9	-8.0
4	177.0	245.4	309.9	249.7	212.7	247.5	-6.5	-8.3	-8.2
5	91.7	125.4	215.5	70.9	44.4	63.5	-5.2	-7.4	-7.6
6	142.7	199.1	229.7	172.5	170.6	198.9	-5.6	-7.6	-7.4
7	140.3	196.7	219.0	123.3	129.0	137.4	-5.7	-7.7	-7.4
8	133.8	176.8	195.7	58.7	19.9		-5.7	-7.5	-8.0
9	112.2	156.9	142.6	115.5	96.2		-4.0	-5.9	-5.7
10	45.4	59.3	95.1	-47.5		-44.0	-4.2	-5.5	-5.6
11	109.9	144.6	195.7	126.0	117.4		-5.1	-7.2	-7.6
12	141.7	196.2	233.4		176.1	203.4	-5.6	-7.7	-7.5
13	152.2	212.5	23	114.6	128.3	133.1	-5.8	-7.8	-7.8
14	152.3	210.7	234.3	124.4	126.7	137.5	-5.9	-7.7	-7.3
15	75.4	102.9	165.0	67.6			-4.7	-6.9	-7.4
16	64.8	80.8	131.9	-31.8	-28.4		-4.6	-6.0	-6.4

CELL 79- PICKED VALUES OFREAR WHEEL 2 SCENARIO-4/6/2009 (FILES ResultsPP_Cell79_4-6-09_01.txt to ResultsPP_Cell79_4-6-09_16.txt)									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1	-52.2	-58.6	-90.6	66.4			-2.4	-2.9	-2.7
2	-60.6	-66.0	-102.5	92.1	31.6	43.6	-2.4	-2.9	-2.9
3	-49.2	-58.6	-81.3	39.4	8.5	24.8	-2.2	-2.7	-2.8
4	-46.6	-64.7	-98.4	79.6	40.6	49.7	-2.3	-2.8	-2.6
5	-46.4	-57.0	-75.4	12.9	-9.3	5.4	-2.1	-2.6	-2.4
6	-39.9	-56.6	-76.8	66.9	37.5	49.5	-2.6	-3.1	-2.7
7	-44.9	-62.4	-83.5	63.6	3	37.5	-2.7	-3.0	-2.8
8	-49.8	-69.9	-105.9	-8.6	-20.3		-2.7	-3.0	-3.0
9	-33.0	-51.3	-91.7	2.5	19.2		-1.9	-2.1	-2.2
10	-28.4	-40.6	-50.7	-5.0		-8.1	-2.1	-2.3	-2.2
11	-38.3	-54.6	-69.5	36.4	16.7		-2.4	-2.9	-2.7
12	-41.6	-56.3	-76.3		35.9	45.9	-2.6	-3.0	-2.6
13	-46.6	-63.7	-93.3	54.7	31.9	34.3	-2.7	-3.0	-2.8
14	-48.5	-68.0	-94.0	62.8	27.3	36.3	-2.7	-3.1	-2.7
15	-40.4	-54.9	-66.9	-2.0			-2.3	-2.7	-2.6
16	-33.7	-48.2	-62.3	20.1	7.7		-2.2	-2.5	-2.3

CELL 79- CORRECTED VALUES OF REAR WHEEL 2 SCENARIO-4/6/2009									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1	-46.9	-53.9	-82.9	64.7			-2.4	-2.9	-2.7
2	-54.5	-60.7	-93.8	89.7	28.4	37.6	-2.4	-2.9	-2.9
3	-44.2	-53.8	-74.4	38.4	7.7	21.4	-2.2	-2.7	-2.8
4	-41.8	-59.4	-90.1	77.6	36.5	42.9	-2.3	-2.8	-2.6
5	-41.7	-52.4	-69.0	12.6	-8.4	4.6	-2.1	-2.6	-2.4
6	-35.9	-52.0	-70.3	65.2	33.7	42.8	-2.6	-3.1	-2.7
7	-40.4	-57.3	-76.4	61.9	27.0	32.4	-2.7	-3.0	-2.8
8	-44.8	-64.2	-96.9	-8.4	-18.2		-2.7	-3.0	-3.0
9	-29.7	-47.1	-83.9	2.4	17.3		-1.9	-2.1	-2.2
10	-25.5	-37.3	-46.4	-4.9		-7.0	-2.1	-2.3	-2.2
11	-34.5	-50.2	-63.6	35.5	15.0		-2.4	-2.9	-2.7
12	-37.4	-51.7	-69.8		32.3	39.7	-2.6	-3.0	-2.6
13	-41.8	-58.5	-85.4	53.3	28.7	29.6	-2.7	-3.0	-2.8
14	-43.6	-62.5	-86.0	61.2	24.5	31.3	-2.7	-3.1	-2.7
15	-36.3	-50.5	-61.3	-1.9			-2.3	-2.7	-2.6
16	-30.3	-44.3	-57.0	19.6	6.9		-2.2	-2.5	-2.3

CELL 79- PICKED VALUES OF FRONT WHEEL SCENARIO-4/28/2009 (FILES ResultsPP_Cell79_4-28-09_01.txt to ResultsPP_Cell79_4-28-09_10.txt)									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1		-1.3	-1.3						
2	-219.8	-286.5	-337.2	-364.6	-313.8	-341.8	-6.0	-8.4	-7.9
3	-74.5	-81.3	-147.8	-155.9		-99.0	-5.9	-6.4	-6.0
4	-29.4	-36.0	-71.4	82.1	60.1	71.4	-3.5	-5.2	-8.2
5	-150.2	-178.6	-319.6	-168.8	-112.3	-143.4	-6.8	-9.4	-9.2
6	-39.9	-48.6	-102.1	69.9	49.9	53.5	-5.0	-6.2	-5.8
7									
8									
9				-81.7	-65.2	-77.5			
10									

CELL 79- CORRECTED VALUES OF FRONT WHEEL SCENARIO-4/28/2009									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1		-1.2	-1.2						
2	-197.6	-263.3	-308.6	-355.3	-282.4	-295.1	-6.0	-8.4	-7.9
3	-67.0	-74.7	-135.2	-151.9		-85.5	-5.9	-6.4	-6.0
4	-26.4	-33.1	-65.3	8	54.1	61.7	-3.5	-5.2	-8.2
5	-135.1	-164.1	-292.5	-164.5	-101.1	-123.8	-6.8	-9.4	-9.2
6	-35.9	-44.7	-93.5	68.2	44.9	46.2	-5.0	-6.2	-5.8
7									
8									
9				-79.6	-58.6	-66.9			
10									

CELL 79- PICKED VALUES OF REAR WHEEL 1 SCENARIO-4/28/2009 (FILES ResultsPP_Cell79_4-28-09_01.txt to ResultsPP_Cell79_4-28-09_10.txt)									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1		-1.3	-1.0						
2	-248.7	-316.1	-354.6	-171.1	-188.9	-197.6	-7.0	-8.7	-8.8
3	-178.3	-196.7	-312.6	-111.3		-40.7	-6.6	-8.7	-7.7
4	-58.8	-79.2	-136.7	116.8	81.3	89.7	-4.0	-6.4	-8.5
5	-237.7	-290.3	-427.9	-332.9	-272.9	-287.1	-6.9	-9.9	-9.3
6	-65.2	-87.7	-147.5	136.0	90.8	91.7	-5.7	-8.0	-6.8
7									
8									
9				-60.4	-53.5	-60.1			
10									

CELL 79- CORRECTED VALUES OF REAR WHEEL 1 SCENARIO-4/28/2009									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1		-1.2	-0.9						
2	-223.6	-290.5	-324.5	-166.7	-17	-170.6	-7.0	-8.7	-8.8
3	-160.3	-180.8	-286.1	-108.4		-35.2	-6.6	-8.7	-7.7
4	-52.9	-72.8	-125.1	113.8	73.1	77.5	-4.0	-6.4	-8.5
5	-213.7	-266.8	-391.6	-324.4	-245.6	-247.9	-6.9	-9.9	-9.3
6	-58.6	-80.6	-135.0	132.5	81.7	79.2	-5.7	-8.0	-6.8
7									
8									
9				-58.8	-48.1	-51.9			
10									

CELL 79- PICKED VALUES OF REAR WHEEL 2 SCENARIO-4/28/2009 (FILES ResultsPP_Cell79_4-28-09_01.txt to ResultsPP_Cell79_4-28-09_10.txt)									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1			-0.1						
2	45.7	62.8	89.7	-52.2	-16.5	-21.7	-2.3	-2.9	-3.0
3	51.5	58.8	72.3	-4.6		17.2	-2.2	-2.5	-2.3
4		26.4	46.6	45.6	37.0	35.5	-1.0	-1.8	-2.3
5	77.6	73.3	98.1	-73.4	-19.6	-25.7	-2.0	-2.5	-2.7
6	41.3	39.0	64.3	47.3	40.4	34.5	-1.4	-1.6	-1.9
7									
8									
9				43.8	29.9	64.1			
10									

CELL 79- CORRECTED VALUES OF REAR WHEEL 2 SCENARIO-4/28/2009									
FILE NO	TE001	TE002	TE003	LE001	LE002	LE003	PG001	PG002	PG003
1			-0.1						
2	41.1	57.7	82.0	-50.9	-14.9	-18.7	-2.3	-2.9	-3.0
3	46.3	54.0	66.1	-4.4		14.9	-2.2	-2.5	-2.3
4		24.2	42.7	44.4	33.3	30.7	-1.0	-1.8	-2.3
5	69.8	67.4	89.7	-71.5	-17.6	-22.2	-2.0	-2.5	-2.7
6	37.1	35.9	58.8	46.1	36.3	29.7	-1.4	-1.6	-1.9
7									
8									
9				42.7	26.9	55.3			
10									

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BIOGRAPHICAL INFORMATION

Veni valli Nagarajan is originaly from India. She received her Bachelor of Engineering in Civil Engineering from Anna University, Chennai in May 2010. After her graduation, she immediately pursued her Master of Science at University of Texas at Arlington from August 2010. She was guided in her program by Dr. Romanoschi, her supervising professor. In December 2012 she graduated from University of Texas at Arlington successfully. Her future plan is to work in civil engineering companies to acquire field experience.