**SCHOOL OF
CIVIL ENGINEERING
INDIANA
DEPARTMENT OF HIGHWAYS**

JOINT HIGHWAY RESEARCH PROJECT

FHWA/IN/JHRP-87/9 -1

Final Report

**DEVELOPMENT OF AN OVERLAY DESIGN
PROCEDURE FOR FLEXIBLE PAVEMENTS
IN INDIANA**

**Jay K. Lindly
Thomas D. White**

PURDUE UNIVERSITY

JOINT HIGHWAY RESEARCH PROJECT

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IN INDIANA

Final Report

TO: H. L. Michael, Director
Joint Highway Research Project

FROM: Thomas D. White, Research Engineer
Joint Highway Research Project

October 21, 1987

Project: C-36-55G

File: 2-12-7

Attached is the Final Report on the HPR Part II study titled, "Development of an Overlay Design Procedure for Flexible Pavements in Indiana." This study presents the results of a study that evaluated nondestructive testing equipment and utilized data collected from the existing highway system to develop a proposed overlay design procedure for flexible pavements.

The overlay design procedure involves conducting a parallel analysis to determine overlay thickness required for added structural capacity or to provide functional mitigation of distress.

This report is forwarded to IDOH and FHWA in fulfillment of the objectives of the study.

Sincerely yours,

Thomas D. White
Research Engineer

TDW/rrp

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<p>16. Abstract A Procedure for designing the thickness of asphaltic concrete overlays of flexible pavements was developed at Purdue University in response to a request from the Indiana Department of Highways (IDOH). The research included testing on 30 flexible pavement test sections. Two approaches to the problem were taken: an empirical approach which calculates the overlay thickness required to provide functional performance (ride quality and resistance to distress) over the life of the pavement, and a structural overlay method which calculates thickness required to prevent structural failure.</p> <p>Flexible overlay design Method 2 of the 1986 AASHTO Guide for the Design of Pavement Structures was selected for structural capacity design. Method 2 uses NDT deflection data input to calculate overlay thickness. A negative value for overlay thickness indicates that sufficient structural capacity is present without adding an overlay.</p> <p>The functional performance approach used Indiana flexible pavement historical data to produce a regression equation relating overlay thickness to traffic, design life of the overlay, pavement condition at the end of the design life, and estimated subgrade CBR. Various NDT deflection measurements, climate zone data, and pavement layer thickness variables were included in a variety of empirical analyses, but they were not significant in the analyses.</p> <p>Simultaneous use of the two design methods was recommended to IDOH. If values from both methods are positive, the larger value governs the design. If the structural value is negative, a thickness equal to the functional performance design may be milled and recycled back to the pavement.</p>			
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DEVELOPMENT OF AN OVERLAY DESIGN PROCEDURE FOR FLEXIBLE PAVEMENTS IN INDIANA
FINAL REPORT

by

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and the

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The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

Purdue University
West Lafayette, Indiana

October 21, 1987

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ABSTRACT

Lindly, Jay K. Ph.D., Purdue University, August 1987. Development of an Overlay Design Procedure for Flexible Pavements in Indiana. Major Professor: Dr. Thomas D. White.

A procedure for designing the thickness of asphaltic concrete overlays of flexible pavements was developed at Purdue University in response to a request from the Indiana Department of Highways (IDOH). The research included testing on 30 flexible pavement test sections. Two approaches to the problem were taken: an empirical approach which calculates the overlay thickness required to provide functional performance (ride quality and resistance to distress) over the life of the pavement, and a structural overlay method which calculates the overlay thickness required to prevent structural failure.

Flexible overlay design Method 2 of the 1986 AASHTO Guide for the Design of Pavement Structures was selected for structural capacity design. Method 2 uses NDT deflection data input to calculate overlay thickness. A negative value for overlay thickness indicates that sufficient structural capacity is present without adding an overlay.

The functional performance approach used Indiana flexible pavement historical data to produce a regression equation relating overlay thickness to traffic, design life of the overlay, pavement condition at the end of the design life, and estimated subgrade CBR. Various NDT deflection measurements, climate zone data, and pavement layer thickness variables were included in a variety of empirical analyses, but they were not significant in the analyses.

Simultaneous use of the two design methods was recommended to IDOH. If values from both methods are positive, the larger value governs the design. If the structural value is negative, a thickness equal to the functional performance design may be milled and recycled back to the pavement. Milling and recycling recommendations for variations on the above situations were also given.

CHAPTER 1. INTRODUCTION

A survey of Federal-Aid Primary (FAP) roads in Indiana was conducted in 1985 as part of an HRP Part II study titled "Development of an Overlay Design Procedure for Pavements in Indiana". As a result of this survey, approximately 3180 lane-miles of flexible pavement (containing no portland cement concrete) were identified. That mileage is contained in 431 pavements of varying cross-sections whose lengths may range from under one-quarter mile to over 10 miles. In many cases these 431 sections have been overlaid several times. For example, almost 75 percent of the sections have been overlaid at least three times since initial construction and over 25 percent have been overlaid five or more times.

Flexible pavement overlay frequency is expected to remain high. The Indiana Department of Highways (IDOH) is currently using a 10-year design life in their overlay thickness calculations. At that expected life, over 300 lane-miles per year of FAP flexible pavements can be expected to be overlaid.

Currently, the IDOH is using an overlay thickness

design based on the AASHTO Interim Guide for the Design of Flexible Pavement Structures (1). A typical overlay design involves calculating several overlay thicknesses which vary depending on the magnitude of the layer coefficient assigned to the pavement layers. One recent design example provided possible overlay thicknesses ranging from 0.5 inches to 4.25 inches; the designer was required to choose the value within that range which he found appropriate.

Due to the frequency and expense of overlays and the lack of precision in its current overlay design method, IDOH funded the following reported research.

OVERVIEW OF RESEARCH

The first step in this research was to develop an inventory of all the flexible pavement sections in the FAP road system. The FAP system contains about 55% of the pavements maintained by the IDOH, including state roads, U.S. highways, and Interstates. During the inventory, the following data were stored in a computer data base for each flexible pavement section: pavement cross-section, traffic, climate zone, and overlay age. Other data such as subgrade type and layer strength data would have been excellent additions to the data base, but they were not readily obtainable at that time.

In the next step, statistical design of experiment techniques were used to select thirty, 1250 ft. long pavement test sections which were representative of the flexible pavement sections throughout the state. Each pavement section was surveyed for pavement distresses and tested with four types of non-destructive test (NDT) equipment:

- 1) Dynaflect. A Dynaflect and technician was made available to the research team by the IDOH Research & Training Center (R&T).
- 2) Road Rater 400 (RR400). A RR400 and a technician were made available by the Kentucky Transportation Research Center.
- 3) Road Rater 2000 (RR2000). A RR2000 and a technician were made available from the Kentucky Department of Transportation.
- 4) Dynatest Falling Weight Deflectometer (FWD). An FWD device was obtained on loan from the U.S. Army Corps of Engineers Waterways Experiment Station.

NDT testing was conducted twice in 1986 -- once in the spring and once in the summer/fall -- so that seasonal differences in NDT results could be analyzed. Each 1250' long test section was tested in at least six locations within its length. Five-day temperature history and

pavement surface temperature during testing was obtained for all NDT testing. In addition, cores and subgrade samples were collected from all sections and tested.

The accumulated data were analyzed both by empirical and structural capacity methods. In the empirical method, statistical analysis was applied to the data to determine "what worked", and under what conditions. In the structural capacity method, the NDT data were analyzed using the flexible pavement overlay design procedure in the 1986 AASHTO Guide for Design of Pavement Structures (1).

ORGANIZATION OF THESIS

The research described in this thesis represents one-half of an overall research effort to produce new overlay thickness design techniques for both flexible and rigid pavements in Indiana. As a consequence, much of the project planning and data gathering aspects of the two areas of the research were concurrent. The common aspects of the two research areas are described in detail in Appendix A (2), which is a previously unpublished memo by N.D. Pumphrey, Jr. and J.K. Lindly describing in detail the FAP data base development, design of experiment and field testing. Although these subjects are also treated in the main body of this thesis, they are covered in less detail. Thus, if more detail is desired, Appendix A should be consulted.

CHAPTER 2. REVIEW OF LITERATURE

Much has been written about using deflections obtained with non-destructive test (NDT) devices to design the thickness of asphaltic concrete overlays. In NDT testing, a load is applied to the surface of a pavement, and the resulting surface deflections are measured at the load and for several feet away from the load. As described by Moore, Hanson, and Hall (3) and by Smith and Lytton (4), the load can be applied to the pavement in a variety of ways:

1. Through a static loading device such as the LaCroix Deflectograph.
2. Through a steady state dynamic loading device such as the Dynaflect or Road Rater.
3. Through an impulse (impact) loading device such as the Falling Weight Deflectometer (FWD).

The same authors add that wave propagation NDT devices have also been built but are not used routinely.

Thollen (5) compares the routinely used test devices

in terms of their abilities to transmit a load to the pavement which most resembles a moving wheel load. He found that the FWD's are superior in this respect. As a group the FWD's are also capable of supplying heavy loads (in the 9-kip range) which best resemble the load transmitted by a standard 18-kip axle load.

The major types of NDT devices have been ranked by Lytton, Roberts, and Stoffels (6) for their "total utility for project-level use" and for their "total utility for network-level use". Two FWD's were at the top of both lists. However, all four devices used in the current research project -- the Dynatest FWD, the Dynaflect, the Road Rater 400, and the Road Rater 2000 -- were all ranked among the top six devices in both rankings.

There are two main methods of interpreting NDT deflection results to design overlay thicknesses: empirical methods and analytical (mechanistic) methods.

EMPIRICAL METHODS

Finn and Monismith (7) describe and review several empirical methods for designing asphalt overlays using NDT deflections such as the Asphalt Institute Method (8), the Transport and Road Research Laboratory (TRRL) method, and the State of California (Caltrans) method. Each of these methods use years of deflection data to determine

empirical relationships between NDT deflection and the amount of future traffic that the pavement can sustain before failure. If field data shows that a pavement's deflection is so large that it will not be able to accommodate the projected future traffic, then an overlay is required.

Figures 2.1 and 2.2 are used to demonstrate the Asphalt Institute overlay design Method. Figure 2.1 relates remaining life in 18-kip ESAL to rebound deflections using the Benkelman Beam. After consulting Figure 2.1, if an overlay is required, Figure 2.2 is used to calculate the asphalt overlay thickness that must be added to achieve a reduction in deflection. The curves in Figure 2.2 were developed using elastic-layer theory. The California Method and the TRRL Method use charts similar the Asphalt Institute which are based on experience, not elastic-layer theory.

ANALYTICALLY-BASED METHODS

Analytically-based analysis methods use NDT deflection measurements to estimate (back calculate) the moduli of elasticity of the pavement layers. In this approach, the methods employ a computer based layered-elastic analysis procedure such as Bisar (10). The computer programs perform iterative calculations to match computed surface

Figure 2.1 Asphalt Institute Remaining Life.

Figure IV-6—Asphalt concrete overlay thickness required to reduce pavement deflections from a measured to a design deflection value (rebound test)

Figure 2.2 Asphalt Institute Required Overlay.

deflections with NDT surface deflections measured in the field. In general, they all work in the same way:

1. Pavement layer types and thicknesses are entered
2. Magnitude and contact area of applied field load is entered
3. Surface deflections measured in field are entered
4. Initial values of moduli of elasticity are assumed
5. Poissons ratio for the layers are assumed
6. Theoretical surface deflections are calculated using input parameters and equations of mechanics
7. Differences between field deflection measurements and theoretical deflections are calculated
8. If differences are small, print moduli values and quit. If not, adjust moduli and return to step 6.

After the moduli of elasticity of the layers are estimated, the remaining pavement fatigue life is estimated from an empirical fatigue relationship. The fatigue relationship usually relates radial tensile strain at the bottom of the existing asphalt layer to the number of 18-kip ESAL at failure. Remaining life is calculated as the number of 18-kip ESAL at failure minus the number of 18-kip

ESAL that the road has already experienced. If the predicted future traffic exceeds estimated remaining life, an overlay is required. The overlay thickness is the asphalt thickness required to lower the radial tensile strain to a level which will not produce fatigue failure under the predicted future traffic. Thus, to perform these calculations, past fatigue history and predicted future traffic of the pavement are important parameters.

Rutting failure is considered in addition to fatigue failure in many overlay design methods. An empirical relationship between the number of 18-kip ESAL which will cause unacceptable rutting and stresses and strains in the pavement layers is established. Remaining pavement life before rutting and any required overlay thickness to prevent rutting are calculated by methods analagous to the fatigue failure calculations. The larger of the rutting and fatigue overlays is then selected as the design overlay.

Two layered-elastic analytical methods are the FHWA-Austin Research Engineers (POD) Method (11,12) and the FHWA-Resource International, Inc. (OAF) Method (13). Both methods use the ELSYM5 program to compute elastic moduli. However, they differ in their approach to remaining life calculation. OAF defies convention and assumes that previous fatigue history of a pavement pavement has no bearing on remaining life. OAF calculates remaining life

with the following equation:

$$N_f = 7.56 \times 10^{-12} (1/\epsilon)^{4.68} \quad (2.1)$$

where N_f is remaining life

ϵ is horizontal tensile strain at the bottom of the existing asphalt layer.

OAF does not include a rutting criteria "primarily because rutting of overlaid pavements is most often associated with unstable paving mixes."

POD employs the conventional approach to remaining life calculations as described earlier. The following fatigue relationship is used:

$$N = 9.73 \times 10^{-15} (1/\epsilon_t)^{5.16} \quad (2.2)$$

where N is the number of allowable
18-kip single axle load applications

ϵ_t is the horizontal tensile strain
at the bottom of the existing asphalt layer

A regression equation based on results from the AASHO Road Test has been developed for rutting:

$$N = f(R, \sigma's, \epsilon's) \pm E \quad (2.3)$$

where: N = the number of applications of the design load

R = the allowable rut depth for design

$\sigma's$ = stresses in the pavement layers

$\epsilon's$ = strains in the pavement layers

E = error term

However, the equation "is only valid for analyzing overlays

greater than three inches" because the elastic layer computer program used in the analysis does not calculate reliable stress and strain values for thin surface layers.

In addition to layered-elastic analysis, finite element analysis methods have been used by Hoffman and Thompson (15) to back-calculate moduli of elasticity from NDT deflection basins. However, iterative use of a finite element analysis results in excessive computer time and associated expense. Alternatively regression equations were developed by Hoffmann and Thompson to approximate the results that would be obtained using an iterative process. Unfortunately, because the properties of the base course were not varied in this analysis, the results are valid only for pavements which have base courses similar to that used in the original analysis.

Objections to Analytically-Based Methods

Though analytically-based methods -- in particular, the layered-elastic methods -- are being increasingly recommended, they rely on a variety of assumptions which receive criticism. In general, each pavement layer is considered to be linear-elastic, homogeneous, and isotropic; infinite in lateral extent; and the subgrade is assumed to be semi-infinite in depth. Smith, Darter, and Lytton (17) and Uddin, Meyer, and Hudson (16) list some of the

criticisms of layered-elastic methods:

1. The possibility of non uniqueness of in situ moduli (in a multi-layered pavement, several combinations of moduli can yield similar deflection basins.)
2. There can be difficulty in determining the in-place moduli of granular subgrades.
3. There can be difficulty in determining the in-place moduli of thin asphalt surfaces.
4. Most mechanistic procedures rely on empirical relationships between theoretical strain or stress and a failure criteria.

DESIGN DEFLECTIONS

Results of deflection tests will vary throughout a pavement section. If there are significant variations in deflections, the pavement should be divided into separate analysis units. In an extreme case, each analysis unit may require a different thickness of overlay. Part III of the 1986 AASHTO Guide (1) recommends that the "cumulative difference" approach be used to distinguish breakpoints between analysis units.

Within each analysis unit, there will still be variation of deflection measurements. The deflection that is

selected to be representative of that analysis unit is termed the design deflection. A design deflection is obtained by specifying the percentage of deflection readings inside that analysis unit which are smaller than the design deflection. The 80th to 90th percentile is usually chosen, e.g., the Caltrans method specifies the 80th percentile, the Shell (18) method specifies the 85th percentile, and the Kentucky method (19) specifies the 90th percentile.

TEMPERATURE AND SEASONAL CORRECTIONS

Temperature has a significant effect on asphaltic cement and therefore on asphaltic concrete mixture stiffness. Deflections on flexible pavements cannot be compared unless they are adjusted to a common temperature. For this project, a procedure for temperature corrections was provided by Gupta (20). The procedure involves determining a mean asphalt pavement temperature using the method by Southgate (21). Required inputs to this method are asphalt surface temperature, 5-day temperature history, time of day of the test, and geographical location of the test section. Using the calculated mean pavement temperature factor for each section, the appropriate temperature correction factors can be taken from Appendix L of the 1986 AASHTO Guide (1).

Although pavement structural capacity is lowest during spring thaw, the period of time in which these conditions exist is short. Therefore, NDT deflections from tests conducted during the longer summer/fall seasons are often corrected to give the deflection that would be expected during the critical spring thaw period. Gupta (20) also developed seasonal corrections for deflection as part of this research project. A regression analysis was performed on deflections from the same pavement sections taken during the spring and summer periods of 1986. His work is an extension and improvement on the work begun by Metwali (22) and Mohan (23).

MODULUS CORRECTION FACTORS

Temperature adjustment factors are not applied to the input deflection values when layered-elastic theory is used to back calculate modulus of elasticity values of the asphaltic concrete portion of a pavement (7). Instead, correction factors are applied to the estimated modulus. Appendix L of the 1986 AASHTO Guide (1) supplies recommended temperature adjustment factors for asphaltic concrete modulus.

CLIMATE ZONES

Yoder et al. (24,25) established two climatic zones in Indiana -- north and south. The boundaries of the climate

zones were based on the work of van Til et al. (26). They have subsequently been used in two further studies examining pavement maintenance (27,28).

SERVICEABILITY INDEX AND CONDITION INDEX

Present serviceability index (PSI) and pavement condition index (PCI) are measures of pavement serviceability performance and condition, respectively. In Indiana, PSI are obtained yearly by the Indiana Department of Highways (IDOH). Harness et al. (29) present an account of the methods of data acquisition and treatment used to arrive at the PSI values. PSI is measured on a scale of from 0 to 5. Any value above 4 indicates that the pavement retains excellent serviceability; a value below 2.5 indicates that the pavement's serviceability is low.

Pavement condition index (PCI) is a pavement condition evaluation system developed by the US Army Corps of Engineers (30). A pavement's PCI value reflects the type, severity, and extent of distress present on a pavement surface. It measures such distresses as polishing, rutting, and a variety of crack types. PCI is measured on a scale of from 0 to 100. For each distress severity and extent, a deduct value is subtracted from 100. A PCI value of 100 indicates a roadway in excellent condition; a value of 25 indicates a roadway in poor condition.

ESTIMATING CBR VALUES

The California Bearing Ratio (CBR) of a subgrade is a relative measure of the ability of that subgrade to sustain load. Methods are available for estimating a CBR value of a soil. Black has put forward techniques for estimating the CBR of cohesive (31) and cohesionless soils (32). Black's approach uses data from common laboratory tests such as the liquid limit and plastic limit tests to estimate CBR. However, the charts used in his method are limited.

The Portland Cement Association has published a chart which may be used to estimate CBR (33). In the chart, the AASHTO soil classification and Unified soil classification categories have been scaled to CBR as well as to other soil strength indices. The chart is shown in Figure 2.3.

EQUIVALENT THICKNESS

In some instances, it may be useful to characterize the combination of the asphaltic concrete and the base and/or subbase of a flexible pavement into one "equivalent thickness" of asphaltic concrete. To do so, one must assume equivalent values (in terms of inches of asphaltic concrete) for an inch thickness of base or subbase. AASHTO has published equivalencies (34). Gomez and Thompson (35) have compiled a list of studies which indicates that the

(1) For the basic idea, see O. J. Porter, "Foundations for Flexible Pavements," Highway Research Board Proceedings of the Twenty-second Annual Meeting, 1942, Vol. 22, pages 100-138.

(2) ASTM Designation D2487.

(3) "Classification of Highway Subgrade Materials," Highway Research Board Proceedings of the Twenty-fifth Annual Meeting, 1945, Vol. 25, pages 378-392.

(4) Airport Paving, U.S. Department of Commerce, Federal Aviation Agency, May 1948, pages 11-18. Estimated using values given in FAA Design Manual for Airport Pavements (Formerly used FAA Classification: Unified Classification now used).

(5) C. E. Warrens, "Correlation Between R Value and k Value," unpublished report, Portland Cement Association, Rocky Mountain-Northwest Region, October 1971 (best-fit correlation with correction for saturation).

(6) See T. A. Middlebrooks and G. E. Bertram, "Soil Tests for Design of Runway Pavements," Highway Research Board Proceedings of the Twenty-second Annual Meeting, 1942, Vol. 22, page 152.

(7) See item (6), page 184.

Figure 2.3 PCA Soils Chart.

following set of equivalencies is more accurate: 1"
asphaltic concrete equals 2" base which equals 3" subbase.

CHAPTER 3. DATA

A significant volume of data was collected and developed as part of this research, and that data is presented in Appendix C. Not all of the data has been utilized, and the objective of this chapter is to present and discuss the data that was ultimately used in the analysis.

In addition to the data presented in Appendix C, Appendix B describes the locations of the 30 pavement sections tested during the research. First, a written description of each section is given. Second each section is located on individual maps of the six highway districts in Indiana.

Appendix A presents much more detailed accounts of the methods of experiment design and data collection than are given in this chapter. For instance, it presents detailed information on statistical methods used to select the 30 design sections as well as on the individual NDT devices. A list of the topics covered in Appendix A follows:

1. The process of building a data base for all flexible pavement sections in the Indiana Federal-Aid Primary (FAP) road system. The data base includes AADT,

percent trucks, and pavement cross-section data

2. Climate zones in Indiana
3. Establishing the statistical design of experiment
4. The process of selecting flexible pavement test sections
5. Field NDT testing
6. NDT devices
7. Pavement cores and soil borings
8. Pavement serviceability (PSI) and pavement condition (PCI) data
9. Independent deflection measurements

Only a brief discussion of these topics will be presented in this chapter.

DATA BASE PREPARATION

Paper records from the Planning Division of the IDOH were used to obtain data on each of the 431 distinct flexible pavement sections in the FAP highway system in Indiana. The data was used to quantify the variation in the flexible pavement system so that a statistical design for experiment could be formulated. The information about each section

was also useful in the selection of the 30 test sections, as each section was required to fulfill different requirements as to layer thicknesses, climate zone location, etc. Five types of data was included in the data base:

1. Layer thicknesses
2. Current overlay ages
3. Layer material types
4. Traffic -- including AADT and percent trucks
5. Climate zone -- North or South

Other data such as subgrade type and pavement condition index would have made valuable additions to the data base, but they were unavailable at that time. These important data were obtained for the 30 test sections later in the research and used in the data analysis.

For ease of retrieval and manipulation, the five types of data which were obtained were stored in computer files with the aid of a data base manager software package (36).

DESIGN OF EXPERIMENT

Statistical design of experiment methods were used to select a set of flexible pavement test sections which were representative of the FAP system and which when tested

would provide a maximum amount of useful data with a given amount of money and testing time consumed. The first part of the process was to assemble a list of the pavement characteristics which were most likely to affect overlay performance. The list follows:

1. Overlay thickness
2. Thickness of asphalt beneath the most recent overlay: hereafter called "base asphalt" thickness
3. Traffic. Trucks per day was selected as the traffic statistic with the most impact on overlay performance.
4. Climate zone location.

A design of experiment was formulated to test for the variability of those four characteristics.

The first step in designing an experiment is to establish the reference space for each of the variables. In this research, two climate zones were identified in the state (Figure 3.1). In each climate zone, a three-factor, three-level composite design was developed which contained low, medium, and high levels of all three factors. The composite design required 15 test sections in each climate zone, for a total of 30 test sections.

Figure 3.1 Indiana Climate Zones.

As mentioned previously, the original data base was used to identify the 30 pavement sections which satisfied the design of experiment requirements. The search of the data base was greatly facilitated by use of the data base manager software.

DATA FROM TEST SECTIONS

The design of experiment was completed in late 1985. Subsequently, plans were made to test the 30 selected flexible pavement sections. Traffic control was provided by IDOH District Offices during field testing. In addition, the Districts obtained pavement core samples from each test section. The IDOH Division of Materials and Tests agreed to take subgrade samples from each of the test sections. Roughness data and the Dynaflect NDT device and operator were obtained from the IDOH Research & Training Center (R&T).

Field testing involved conducting load-deflection tests with four different NDT test devices in both a spring and a summer/fall test period and performing condition surveys on each pavement test section.

Layer Thicknesses

The IDOH Division of Materials and Tests cored each of the 30 test sections at the third points. From these two

cores, asphalt layer thicknesses and subbase layer thicknesses were determined. (Note: in this research, the term "subbase" describes all aggregate between the bituminous layer and the subgrade. Generally, such aggregate is composed of base and, sometimes, subbase layers. However, field investigations for this research were unable to distinguish base and subbase layers, and the aggregate recovered was not of the quality generally associated with base materials. Thus, all aggregate was termed "subbase".) These thickness data are included with other information presented in Table 3.1:

1. Thickness of the most recent overlay
2. Thickness of the "base asphalt", the asphalt which underlies the most recent overlay
3. Subbase thickness
4. Pavement equivalent thickness. As described in Chapter 2, the equivalent thicknesses is calculated as the base asphalt thickness plus one-third the subbase thickness.
5. Distance from pavement surface to the subgrade or total thickness above the subgrade.

Table 3.1 Asphalt Test Section Layer Thicknesses.

Sect. No.	Overlay Thick. (in.)	Base Asphalt Thick. (in.)	Subbase Thick. (in.)	Equiv. Thick. (in.)	Distance to Subgrade (in.)
L-10	1.3	4.6	7.2	7.0	11.8
L-11	1.5	6.4	5.2	8.1	11.6
L-12	2.2	9.8	13.8	14.4	23.6
L-13	3.2	9.5	25.2	17.9	34.7
L-14	1.0	10.6	6.6	12.8	17.2
L-15	2.3	5.8	4.4	7.3	10.2
L-16	1.8	5.3	6.1	7.3	11.4
L-17	1.1	5.5	0.0	5.5	5.5
F-13	1.9	5.6	15.6	10.8	21.2
F-14	0.8	9.5	19.2	15.9	28.7
F-15	1.6	7.1	13.0	11.4	20.1
F-16	3.1	3.3	12.0	7.3	15.3
F-17	2.7	12.8	0.0	12.8	12.8
F-18	2.5	11.0	2.4	11.8	13.4
F-19	1.6	7.5	6.0	9.5	13.5
S-08	2.1	12.1	13.2	16.5	25.3
S-09	1.4	8.5	17.5	14.3	26.0
S-10	1.6	10.0	14.4	14.8	24.4
S-11	3.0	4.0	6.0	6.0	10.0
S-12	2.4	10.8	7.6	13.3	18.4
S-13	1.0	6.5	5.0	8.2	11.5
S-14	2.0	9.0	13.0	13.3	22.0
S-15	1.9	8.6	6.0	10.6	14.6
S-16	1.8	6.2	8.6	9.1	14.8
V-06	1.1	5.0	13.1	9.4	18.1
V-07	2.8	8.4	4.8	10.0	13.2
V-08	1.9	11.2	5.0	12.9	16.2
V-09	3.0	13.0	0.0	13.0	13.0
V-10	2.8	13.4	0.0	13.4	13.4
C-08	2.0	13.5	14.4	18.3	27.9

Serviceability Index and Condition Index

Two measures of pavement condition are its serviceability index and pavement condition index. The serviceability index (in units of PSI) was provided by the IDOH R&T from yearly pavement roughness surveys. In that survey, a regression equation is applied to roughness as measured by the Cox PCA roadmeter to arrive at PSI values. The roughness value is essentially a measure of the number and size of bumps experienced by an automobile passenger traveling over a length of road. The pavement condition index (PCI) was measured by the NDT crew during the summer/fall test period. As previously discussed in Chapter 2, PCI measures type, severity, and extent of pavement surface distresses such as rutting, polishing, various types of cracking, etc.

The roughness test data is automatically recorded by a test vehicle moving over the pavement at 50 mph, while the condition survey data is obtained by men on foot who may cover as little as 150 lineal feet of pavement in one-half hour. Thus, the PCI gives a more detailed, and thus perhaps better, description of the condition of the pavement.

PSI and PCI values for the test sections are presented in Table 3.2, and complete condition survey forms for each of the 30 test sections are presented in Appendix D. PCI

Table 3.2 Road Condition Data.

Sect. No.	PSI	PCI	PCI Minus: Edge Cracks, Edge Drop, Bleeding, Polishing	PCI Minus: Edge Cracks, Edge Drop, Bleeding, Polishing, Rutting
L-10	2.2	34	43	77
L-11	2.4	--	--	--
L-12	3.3	89	97	97
L-13	2.6	--	--	--
L-14	2.7	52	55	69
L-15	2.3	67	69	69
L-16	2.3	38	43	67
L-17	3.0	84	88	88
F-13	2.5	64	65	77
F-14	3.5	68	81	81
F-15	2.9	--	--	--
F-16	2.6	39	37	77
F-17	2.8	80	80	80
F-18	3.0	44	47	63
F-19	3.1	--	--	--
S-08	5.0	90	100	100
S-09	3.6	60	71	71
S-10	2.95	70	70	84
S-11	3.2	80	80	80
S-12	3.55	91	94	94
S-13	3.0	68	68	82
S-14	3.4	38	38	57
S-15	3.2	78	82	82
S-16	2.4	70	73	84
V-06	2.9	57	58	70
V-07	2.65	52	52	81
V-08	3.2	77	83	83
V-09	3.2	58	60	85
V-10	3.15	59	59	100
C-08	3.6	94	94	94

and PSI both gives measures of pavement condition, but they do not measure the same physical phenomena to arrive at their respective values. The last two columns of Table 3.2 present PCI values which do not include deductions for distresses that may not be recorded by the Cox PCA roadmeter. These values will be used in a later analysis to attempt to find a correlation between PSI and PCI.

In Table 3.2, PCI values for four of the test sections are missing. This is because surface treatments had been recently applied to those four pavements, covering the distresses which would have been recorded in the pavement condition survey.

Alligator Cracking

The PCI survey measures alligator cracking, which is a distress indicator of structural failure in flexible pavements. Only one test section exhibited more than isolated alligator cracking: 8.3 percent of the pavement surface area of section S-14 exhibits medium severity alligator cracking.

Subgrade Investigations

The IDOH Division of Materials and Tests obtained one sample of subgrade material in each of the 1250-foot long test sections. After coring through the asphalt layers and

the the subbase, four feet of 3-inch diameter shelby tube was pushed. The subgrade samples were tested by AASHTO standards for liquid limit, plastic limit, density, moisture content, and particle size distribution. From this data, the subgrades were classified by the AASHTO and Unified soil classification systems.

Provisions were not made in the current research for in-place CBR tests or further laboratory studies of the subgrade soils. However, at least a good estimate of the subgrade strength was desired for the analysis. An estimate of CBR was made by using the AASHTO classification, Unified classification, and plasticity index (PI) of the soils. For each subgrade, CBR ranges for the two classifications were read from Figure 2.3. A CBR was selected that fell within both ranges. When two or more soils shared the same classifications, the soil with the lower PI was assigned the higher CBR.

For example, the subgrades for sections F-15, F-16, and F-17 are all A-6 and CL. The PI's are 13.2, 15.2, and 19.7, respectively. CBR ranges from Figure 2.3 for A-6 and CL are 1-13 and 5-15, respectively. Thus, the assigned CBR's must lie between 5 and 13. CBR values of 11 were selected for F-15 and F-16 because their PI values are similar. F-17 was assigned a CBR of 10 due to its relatively higher PI. The test results, soils classifications,

and final estimates of CBR value are given in Table 3.3.

Traffic

The IDOH Division of Planning provided two-way average annual daily traffic (AADT) data for each of the 30 test sections. From Sharaf's work (27), the percentage of the AADT which was composed of trucks of more than two axles was obtained. These two values were multiplied together to arrive at values for trucks per day.

The most recent overlay age of the 30 sections was defined as 1986 minus the year in which the most recent overlay was constructed. A value for "total trucks" was calculated which multiplied trucks per day by 365 and then by the age of the overlay in years, then divided by 365,000. The division by 365,000 was included so that the "total trucks" values would be in the same order of magnitude as the other input values such as layer thicknesses, CBR, etc. which was important later during regression analysis.

Traffic values for each test section are included in Table 3.4.

NDT Deflections

Though four NDT devices were used in the pavement field testing, only 2 (the FWD and the Dynaflect) were

Table 3.3 Subgrade Data.

Sect. No.	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	AASHTO Classification	UNIFIED Classification	Estimated CBR
L-10	29.0	19.6	9.4	A-4	SC	14
L-11	-	-	Not Plastic	Peat	Peat	3
L-12	21.7	14.9	6.8	A-4	SC	20
L-13	20.0	13.6	6.4	A-2-4	SM-SC	28
L-14	29.7	13.3	16.4	A-6	SC	12
L-15	-	-	Not Plastic	A-3	SP	18
L-16	-	-	Not Plastic	A-2-4	SM	37
L-17	-	-	Not Plastic	A-2-4	SM	37
F-13	-	-	Not Plastic	A-2-4	SM	38
F-14	42.3	20.3	22.0	A-7-6	CL	9
F-15	32.4	19.2	13.2	A-6	CL	11
F-16	30.7	15.6	15.2	A-6	CL	11
F-17	37.7	18.0	19.7	A-6	CL	10
F-18	17.1	12.7	4.5	A-4	CL-ML	13
F-19	53.2	26.0	27.2	A-7-6	CH	5
S-08	39.9	17.9	22.0	A-6	CL	9
S-09	38.2	17.2	21.0	A-6	CL	12
S-10	46.3	19.3	27.0	A-7-6	CL	7
S-11	58.6	20.0	38.6	A-7-6	CH	5
S-12	31.7	20.8	10.9	A-6	CL	12
S-13	31.0	19.5	11.5	A-2-6	SC	18
S-14	41.3	19.2	22.1	A-7-6	CL	9
S-15	23.7	16.2	7.5	A-4	CL	12
S-16	29.4	14.8	14.6	A-6	CL	10
V-06	35.8	19.1	16.7	A-6	CL	10
V-07	23.8	15.6	8.2	A-4	SC	16
V-08	54.5	24.1	30.4	A-7-6	CH	5
V-09	41.5	19.9	21.6	A-7-6	CL	9
V-10	23.6	15.0	8.6	A-4	CL	12
C-08	40.8	17.8	23.0	A-7-6	CL	9

Table 3.4 Traffic Data.

Sect. No.	AADT	Per- cent Trucks	Trucks Per Day	Over- lay Age (yr.)	Total Trucks
					$\frac{\text{Trk(Age)(365)}{\text{Day}}}{365,000}$
L-10	2490	16.0	398	13	18.87
L-11	2770	16.0	443	13	21.02
L-12	10060	13.0	1962	1	7.15
L-13	2510	23.0	577	6	12.63
L-14	3430	20.0	686	4	10.00
L-15	1190	16.5	196	6	4.31
L-16	4110	21.0	863	17	53.66
L-17	3200	21.0	672	3	7.37
F-13	1750	25.0	438	15	23.98
F-14	6000	27.5	1650	5	30.11
F-15	7430	27.5	2043	10	74.57
F-16	2196	25.0	549	22	44.09
F-17	8900	27.5	2448	8	71.47
F-18	9510	22.0	2013	11	80.81
F-19	2560	27.5	704	8	20.55
S-08	4100	8.0	328	1	1.20
S-09	2280	10.0	228	10	8.32
S-10	2800	12.5	350	7	8.94
S-11	4080	10.0	420	8	12.26
S-12	5420	11.5	623	6	13.65
S-13	7830	8.0	626	10	22.85
S-14	2190	8.0	175	8	5.11
S-15	910	11.5	105	7	2.70
S-16	1610	11.0	177	9	5.80
V-06	5800	19.5	1131	7	28.91
V-07	10200	19.5	1989	13	94.53
V-08	1850	11.5	213	13	10.11
V-09	7910	37.0	2927	11	117.53
V-10	7870	32.0	2755	10	100.56
C-08	6040	17.0	1027	4	15.00

considered in the data analysis. The Road Rater 400 data and the Road Rater 2000 data were both eliminated from consideration because of incomplete data sets. The Road Raters had been fitted with a new data collection system only one day before the spring test period began and did not function properly, resulting in garbled data records. Because the data was collected on tape, the garbled data was not discovered until after spring testing was complete and the data had been transferred onto paper for analysis. This problem was corrected before the summer/fall test period.

The garbled data appeared extensively throughout the spring data of which an example may be found in Appendix C. In the first test section, C8, under the Road Rater 400 heading, the last 4 values on the first line of data are the deflection readings at 0', 1', 2', and 3' away from the load. These deflection values should decrease because the pavement deflection decreases with distance from the applied load. Instead, the values follow no pattern and cannot be used in analysis.

The Road Rater 2000 data set was also incomplete for the summer/fall testing period due to its availability for only one-half the test period. Thus, instead of having four complete sets of data -- spring data and summer/fall data for each of two different Road Raters -- only the summer/fall test period for the Road Rater 400 is complete.

The deflection data directly beneath the NDT load is presented in Table 3.5. The deflection values are corrected as described in Chapter 2 to a standard 70 degrees F, and represent the 85th percentile of six deflection readings taken per test section. The six test sites per section were located 120'-180' apart within the 1250'-long test sections. Deflections were measured in the right wheel path of the outside lane. Tables 3.6 and 3.7 present uncorrected deflection data from sensors which are farthest from the applied load for the Dynaflect and FWD, respectively.

Table 3.5 Temperature Corrected Sensor 0 Deflections.

Sect. No.	Spring Dynalect	Summer Dynalect	Spring FWD per 1000#	Summer FWD per 1000#
L-10	2.05	1.23	4.44	3.49
L-11	5.05	3.10	6.39	5.74
L-12	0.84	0.59	1.36	1.29
L-13	0.85	0.64	1.34	1.43
L-14	1.24	0.78	2.04	1.93
L-15	2.22	1.22	4.50	3.05
L-16	1.72	1.12	3.91	3.29
L-17	1.10	0.70	2.20	1.89
F-13	1.27	0.84	3.20	2.73
F-14	1.11	0.75	2.10	1.72
F-15	1.15	0.83	2.18	1.71
F-16	1.31	0.83	3.26	2.48
F-17	0.63	0.50	0.80	0.79
F-18	0.56	0.44	0.73	0.82
F-19	1.24	0.74	2.69	2.01
S-08	0.66	0.58	1.28	1.14
S-09	1.07	0.60	1.74	1.59
S-10	0.90	0.78	1.63	2.27
S-11	0.55	0.32	0.51	0.56
S-12	0.78	0.48	1.25	1.12
S-13	1.23	0.73	2.29	1.95
S-14	1.20	0.94	2.16	2.29
S-15	1.27	0.72	2.76	2.06
S-16	1.26	0.83	2.27	2.19
V-06	1.08	0.59	1.67	1.68
V-07	1.12	0.90	1.18	2.11
V-08	1.41	1.08	2.38	2.19
V-09	0.52	0.42	0.55	0.83
V-10	0.58	0.43	0.47	0.78
C-08	0.76	0.62	1.01	1.25

Table 3.6 Dynaflect Deflections (mils)
4 ft. from Load.

Sect. No.	Spring	Summer/Fall
L-10	0.4546	0.2927
L-11	1.7839	1.6360
L-12	0.2774	0.2518
L-13	0.2153	0.1537
L-14	0.2991	0.2385
L-15	0.4018	0.2917
L-16	0.2683	0.2050
L-17	0.1893	0.1465
F-13	0.1690	0.1490
F-14	0.2850	0.2490
F-15	0.2660	0.2310
F-16	0.1772	0.1405
F-17	0.2509	0.2081
F-18	0.1802	0.1305
F-19	0.2736	0.2375
S-08	0.2166	0.2070
S-09	0.1838	0.1478
S-10	0.1374	0.1208
S-11	0.1987	0.1714
S-12	0.2132	0.1853
S-13	0.2039	0.1693
S-14	0.2259	0.1961
S-15	0.2854	0.1915
S-16	0.2589	0.2191
V-06	0.1663	0.1679
V-07	0.2703	0.2603
V-08	0.3912	0.3265
V-09	0.2178	0.1686
V-10	0.3087	0.3002
C-08	0.1701	0.1446

Table 3.7 FWD Deflections (mils/K-1b)
7 ft. from Load.

Sect. No.	Spring	Summer/Fall
L-10	0.223	0.180
L-11	0.176	0.482
L-12	0.147	0.153
L-13	0.131	0.103
L-14	0.210	0.137
L-15	0.241	0.204
L-16	0.182	0.167
L-17	0.101	0.109
F-13	--	0.136
F-14	0.149	0.151
F-15	0.159	0.150
F-16	0.099	0.092
F-17	0.099	0.141
F-18	0.079	0.076
F-19	0.139	0.156
S-08	0.152	0.151
S-09	--	0.132
S-10	--	0.140
S-11	--	0.103
S-12	0.086	0.161
S-13	--	0.142
S-14	--	0.156
S-15	0.166	0.170
S-16	--	0.151
V-06	0.076	0.187
V-07	0.131	0.176
V-08	0.091	0.138
V-09	0.100	0.093
V-10	0.108	0.101
C-08	--	0.116

-- measurements not taken

CHAPTER 4. EMPIRICAL DATA ANALYSIS

In this chapter, statistical analysis techniques will be used to obtain a regression relationship between most recent overlay thickness (the dependent variable) and a variety of independent variables for the 30 flexible pavement test sections studied. Such a regression relationship (equation) can be used to predict required thickness for future overlays for pavements similar to the 30 test sections. The chapter also contains tests of the regression equation to ensure that it is suitable.

Independent variables addressed in the analysis include climate zone, "base asphalt" thickness (the thickness of asphalt beneath the most recent overlay), and traffic, which are factors on which the design of experiment is based. The independent variables also included the following factors for which data was collected but which were not used to design the experiment or as a basis to select the test sections (called "covariates"):

1. Most recent overlay age (years)
2. Subbase thickness (in.)

3. Equivalent asphalt thickness of base asphalt and sub-base (in.)
4. Total pavement thickness (from top of pavement to the subgrade) (in.)
5. Estimated CBR (%)
6. Maximum deflection reading (from "sensor 0" directly under the load) for both spring and summer/fall (mils)
7. Present Serviceability Index (PSI)
8. Pavement Condition Index (PCI)
9. Dynaflect deflections 4' from load (mils)

These data have been presented in Chapter 3. There may be other variables that may also have an effect on overlay performance.

TEST FOR NORMALITY OF DATA

The first step in the statistical analysis procedure was to check that the dependent variable is normally distributed. If the dependent variable is not normally distributed, then the data must be transformed in a way that results in a normal distribution. The overlay data distribution was checked using the Shapiro-Wilk test and the

hypothesis of normality was accepted at the $\alpha = 0.05$ level.

MODEL SELECTION AND ANALYSIS OF VARIANCE

In order to find out which of the independent variables would be helpful in the prediction equation, analysis of variance was conducted on a variety of models using the general linear model (PROC GLM) portion of the Statistical Analysis System (SAS) (37) statistics computer package. The analysis of variance models were composed of various combinations of the independent variables, two-factor, first-order interactions, and squared terms. Climate zone was the only indicator variable: the North climate zone was assigned a value of one and South was assigned a value of zero. In each model, independent variables were included to represent pavement thickness, overlay age, traffic, climate zone, subgrade strength, and pavement condition (either PSI or PCI). In some models, a variable from the NDT deflection testing was added, making a total of seven variables.

Including six variables resulted in a model with a total of 26 terms when squared terms and interactions were added. Seven variables resulted in a model with 34 terms. However, there were only 30 observations for pavement thickness (30 test sections). Guidelines suggest that five degrees of freedom are desired in the error term. As a

result, there were too many terms to be considered in the model at one time. Thus, models with a limited number of terms were considered at one time. In the first run, Type III sum of squares were evaluated. Terms which were insignificant at the 0.25 level were discarded and replaced with remaining terms prior to re-analysis. This procedure was repeated until all terms had been tested for significance. The significant terms were then used in the subsequent statistical analysis.

Table 4.1 lists the independent variables for the analysis of variance models which were ultimately investigated.

STEPWISE REGRESSION

The significant terms from each of the analysis of variance models were separately entered in a stepwise regression procedure using the SAS package. The "maxr" option of the stepwise procedure was specified. In this procedure, the analysis first produces a regression equation containing the single term which, along with a y-intercept value, gives the maximum r-squared value possible. The second output gives an equation including the two terms (plus a y-intercept) which provide the highest r-squared value. Next, the analysis gives the best three-term model, etc., until the supply of terms input to the model

Table 4.1 Models Used in Analysis.

Variable Set No.	Dependent Variable	Independent Variables Used in the Model				
1	Olay	CBR	Tottrk	Totthk	Age	PCI Clim
2	Olay	CBR	Tottrk	Totthk	Age	PSI Clim
3	Olay	CBR	Tottrk	Totthk	Age	PCI Clim Sen0Spr
4	Olay	CBR	Tottrk	Totthk	Age	PSI Clim Sen0Sum
5	Olay	CBR	Tottrk	Depth	Age	PCI Clim
6	Olay	Sen4Sum	Tottrk	Totthk	Age	PCI Clim
7	Olay	Sen4Spr	Tottrk	Totthk	Age	PCI Clim

Olay : Most Recent Overlay Thickness (in.)

CBR : Estimated California Bearing Ratio of Subgrade

Tottrk: Total Trucks = $\frac{(\text{Trucks/Day})(365)(\text{Age})}{365,000}$ (365)

Totthk: Equiv. Pavement Thickness = Asphalt Thickness + $\frac{\text{Subbase Thickness}}{3}$ (in.)

Age : Age of Most Recent Overlay (yrs.)

PCI : Pavement Condition Index

PSI : Present Serviceability Index

Clim : Climate Zone (South=0; North=1)

Sen0Spr: Spring Dynaflect Deflection Reading Directly Under Load (mils)

Sen0Sum: Summer Dynaflect Deflection Reading Directly Under Load (mils)

Sen4Spr: Spring Dynaflect Deflection Reading 4 Feet From Load (mils)

Sen4Sum: Summer Dynaflect Deflection Reading 4 Feet From Load (mils)

has been exhausted. Thus, if 14 terms were found to be significant in the previous analysis of variance procedure, 14 different regression equations will be produced.

From each variable set, the following method was used to select promising equations:

1. All terms in the regression equation must be significant at the 0.1 level.
2. The coefficient of determination (R-squared) value must indicate that the model is a good fit, and the adjusted R-squared value must also be high.
3. Residuals of the regression equation must be normally distributed as measured by the Shapiro-Wilk test.
4. The number of terms in the regression equation must be 10 or less.
5. Mallow's C_p must approach the number of terms in the regression equation.

Several regression equations were promising. In each case, the promising equations included the independent variables listed in variable set one. The equations are listed in Table 4.2. Though these equations possess high R-squared values, each contains nine or ten terms in the equation in addition to the y-intercept term. This was

Table 4.2 Promising Regression Equations.

Name	Regression Equation	R ²	Adjusted R ²
A	$\begin{aligned} \text{OLAY} = & -2.77 + 0.0016 \text{ TOTTRK}^2 + 0.0022 \text{ AGE}^2 \\ & + 0.0009 \text{ PCI}^2 - 0.0049 \text{ CBR}^2 \\ & + 0.0055 \text{ CBR*AGE} - 0.0070 \text{ TOTTHK*PCI} \\ & + 0.1293 \text{ CBR*CLIM} - 0.1002 \text{ TOTTHK*CLIM} \\ & + 0.4814 \text{ TOTTHK} \end{aligned}$	0.85	0.76
B	$\begin{aligned} \text{OLAY} = & -3.42 - 3.2714 \text{ CLIM} + 0.5247 \text{ TOTTHK} \\ & + 0.0050 \text{ TOTTRK*AGE} + 0.0032 \text{ CBR*AGE} \\ & - 0.0078 \text{ TOTTHK*PCI} + 0.2350 \text{ CBR*CLIM} \\ & - 0.0088 \text{ CBR}^2 + 0.0010 \text{ PCI}^2 \\ & + 0.0751 \text{ AGE*CLIM} + 0.1188 \text{ CBR} \end{aligned}$	0.91	0.85
C	$\begin{aligned} \text{OLAY} = & -7.73 + 43.77 \text{ CBR} + 0.0506 \text{ TOTTRK} \\ & - 1.7819 \text{ CBR*TOTTHK} + 0.8051 \text{ TOTTHK} \\ & + 0.4869 \text{ AGE} - 2.0890 \text{ CBR*AGE} \\ & - 0.1148 \text{ PCI} - 0.6390 \text{ CLIM} \\ & - 0.0073 \text{ TOTTHK*PCI} + 0.0018 \text{ PCI}^2 \end{aligned}$	0.85	0.75

felt to be an excessive number of terms to explain a set of observations numbering only 25 or 30.

The equations were checked using sensitivity tests which start with an overlay thickness calculation for a pavement. One design parameter is changed, leaving all other parameters constant, and a new overlay thickness is calculated. The two thicknesses are compared to ensure that the design equation has reacted reasonably to the change in the parameter. For example, if CBR is selected for change, an increase in CBR with all other parameters remaining constant should result in a thinner required overlay because the pavement now rests on a stronger foundation.

Table 4.3 presents the sensitivity analysis for Equation A from table 4.2, which is typical of the sensitivity analyses of the three equations. Examination of the analyses resulted in four findings:

1. Unreasonable overlay thicknesses are calculated. In case 2 of Table 4.3, two negative overlays are calculated although no negative overlays are found in the research data.
2. Varying equivalent thickness (TOTTHK) values always result in unreasonable changes in required overlay thickness.

Table 4.3 Sensitivity Checks of Equation A.

Case #1		Case #2	
CBR=8%	Trk/Day=2900	CBR=12%	Trk/Day=200
PCI=35	Age=10 years	PCI=35	Age=10 years
	Totthk=13"		Totthk=8"
Predicted Thick. 2.85"		Predicted Thick. 0.42"	
<u>Sensitivity</u>	<u>New Thickness</u>	<u>Sensitivity</u>	<u>New Thickness</u>
Trk/Day=2200	2.27	Trk/Day=400	0.44
Trk/Day=1600	1.91	Trk/Day=700	0.49
Trk/Day=1000	1.66	CBR= 5	0.61
CBR=14	3.31	CBR= 8	0.59
CBR=20	3.42	CBR=17	-0.01
CBR=30	2.82	CBR=30	-2.28
Totthk=9	2.31	Totthk=7	0.18
Totthk=12	2.72	Totthk=11	1.13
Totthk=17	3.39	Totthk=15	2.07
Clim=0	3.12	Clim=1	1.17
Age=13	4.07	Age=13	0.77
Age=15	5.04	Age=15	1.03
Age=18	6.73	Age=18	1.45
PCI=50	2.65	PCI=50	0.74
PCI=65	2.86	PCI=65	1.48

Case #3	
CBR=12%	Trk/Day=800
PCI=35	Age=10 years
	Totthk=13"
Predicted Thick. 1.94"	
<u>Sensitivity</u>	<u>New Thickness</u>
Trk/Day= 200	1.49
Trk/Day= 500	2.17
Trk/Day=1500	1.57
Trk/Day=2000	1.85
CBR= 7	1.88
CBR=20	2.20
CBR=30	2.49
Totthk=6	0.99
Totthk=9	1.40
Totthk=16	2.35
Clim=0	1.70
Age=13	2.36
Age=15	2.67
Age=18	3.19
PCI=50	1.74
PCI=65	1.95

3. Varying climate zone (CLIM) produces inconsistent results. In table 4.3, the South climate zone (CLIM=0) overlay thickness is greater than the North climate zone thickness in Case 1 but lower in Cases 2 and 3.
4. Varying other variables (CBR and PCI in Cases 1 and 3 in table 4.3) sometimes produced unreasonable changes in overlay thickness. However, when this occurs, an interaction of that variable with either climate zone or equivalent thickness which causes the unreasonable response is always present in the regression equation. In Table 4.3, note the positive regression coefficient for the CBR*CLIM interaction and the negative regression coefficient for the TOTTH*PCI interaction.

Due to the findings listed above, the regression equations in Table 4.2 were rejected, and a stepwise (maxr) regression procedure with independent variables overlay age, total trucks, PCI, and CBR (omitting equivalent thickness and climate zone) was initiated. The procedure produced only two regression equations which fulfilled the requirements listed above:

$$\begin{aligned} \text{olay} = & 0.7014 + 0.00153(\text{tottrk})^2 \\ & + 0.00326 (\text{age})^2 + 0.00016(\text{pci})^2 \end{aligned} \quad (4.1)$$

and

$$\text{olay} = 0.7592 + 0.00145(\text{tottrk})^2 + 0.00379(\text{age})^2 + 0.000162(\text{pci})^2 - (0.000429)(\text{cbr})^2 \quad (4.2)$$

where:

olay = calculated thickness of required, new overlay in
inches

tottrk = (trucks/day)(365)(age) / 365,000

age = design life of new overlay (years)

pci = desired PCI value at the end of the design life of
the new overlay

cbr = estimated subgrade CBR.

The R-squared and adjusted R-squared values for (4.1) are 0.54 and 0.47, respectively. The corresponding values for (4.2) are 0.60 and 0.52. Equation (4.2) was selected for further analysis.

Figure 4.1 shows how closely (4.2) estimated the actual overlay values measured from core samples.

A sensitivity test was performed with (4.2), and the results are presented in Table 4.4. The results show that varying any independent variable in the regression equation produces the expected change in the direction of the overlay thickness. For example, in Case #1, when trucks per day is varied from 2200 to 1600, a decrease in required

Figure 4.1 Actual vs. Predicted Overlay Thickness.

Table 4.4 Sensitivity Checks of Equation (4.2).

Case #1		Case #2	
CBR=8%	Trk/Day=2900	CBR=12%	Trk/Day=200
PCI=35	Age=10 years	PCI=35	Age=10 years
Predicted Thick. 2.53"		Predicted Thick. 1.28"	
<u>Sensitivity</u>	<u>New Thickness</u>	<u>Sensitivity</u>	<u>New Thickness</u>
Trk/Day=2200	2.01	Trk/Day=400	1.30
Trk/Day=1600	1.68	Trk/Day=700	1.35
Trk/Day=1000	1.45	CBR= 2	1.34
CBR= 2	2.55	CBR= 8	1.31
CBR=20	2.38	CBR=20	1.17
CBR=40	1.87	CBR=40	0.65
Age=13	3.63	Age=13	1.55
Age=15	4.52	Age=15	1.76
Age=20	7.32	Age=20	2.43
PCI=50	2.73	PCI=50	1.49
PCI=65	3.01	PCI=65	1.76

Case #3	
CBR=12%	Trk/Day=800
PCI=35	Age=10 years
Predicted Thick. 1.37"	
<u>Sensitivity</u>	<u>New Thickness</u>
Trk/Day= 200	1.28
Trk/Day= 500	1.31
Trk/Day=1500	1.61
Trk/Day=2000	1.85
CBR= 2	1.43
CBR=20	1.26
CBR=40	0.74
Age=13	1.69
Age=15	1.96
Age=20	2.78
PCI=50	1.57
PCI=65	1.85

overlay thickness is expected, and the thickness does indeed decrease from 2.01 inches to 1.68 inches. These results provide a confirmation that (4.2) is a reliable regression equation. Several predicted thickness values in Case 1 exceed the typical Indiana maximum overlay thickness of three inches; these values will be addressed later in this chapter.

INDEPENDENT CHECK

As an independent check, four flexible pavement sections that were not used in the previous analysis were evaluated using (4.2). IDOH paper records were used to obtain traffic data, PCI, and overlay age for the sections. CBR was estimated based on typical soil distributions throughout the state and the proximity of the section to test sections of known subgrade type used in this study. PCI data was unavailable, so PCI was estimated from PSI. To obtain a correlation between PSI and PCI, three regression analyses were performed: the models use PSI from Table 3.2 as the dependent variable and the linear and squared terms of PCI and the two adjusted PCI's from Table 3.2 as the independent variables. The results were poor, with the R-squared of the best correlation being 0.47 and residuals (differences between actual and predicted PSI values) of up to 1.0. Due to the poor results, a rough correlation presented in Table 4.5 was developed based on a

Table 4.5 PSI vs. PCI.

PSI	PCI
2.5	35
2.6	40
2.7	45
2.8	50
2.9	55
3.0	60
3.1	62
3.3	66
3.5	70
4.0	90
5.0	90+

Table 4.6 Independent Check of Design Equation.

No.	Trucks/ day	Age (yrs)	PCI	Est. CBR(%)	Actual O'lay (in)	Predicted O'lay (in)
1	220	8	64	12	1.7	1.6
2	790	10	64	12	1.7	1.8
3	430	10	55	10	1.0	1.6
4	2700	16	50	9	3.0	4.8

Note:

For the overlay thickness design equation, trucks/day are converted to tottrk by multiplying trucks/day by overlay age in years and by 365 days/year, then dividing the result by 365,000.

Site Locations:

- No. 1: SR 135; Washington Co.; From Salem N. to the Jackson Co. line.
- No. 2: SR 64; Gibson Co.; From Ill. state line, 4.32 mi. E.
- No. 3: US 61; Warrick Co.; From N. city limits of Boonville to I-64.
- No. 4: SR 1; Allen Co.; From 3.74 mi. N. of Allen-Wells Co. line, N. to Fort Wayne.

common sense evaluation of the values in Table 3.2 and is used in the analysis.

The independent check results are presented in Table 4.6. Actual overlays and predicted overlays using (4.2) correlate well in Numbers 1, 2, and 3. However, in Number 4, predicted overlay is thicker than the actual overlay. In fact, 4.8 inches is thicker than almost any overlay in the state. Case 1 in Table 4.4 also lists three excessively thick overlays. These examples all have high traffic and high 'age' values, and they illustrate that values of trucks/day and overlay age which combine to exceed the maximum total truck study value of 32.2 (Table 3.4) may predict overlay thicknesses above the typical Indiana maximum of three inches. (For example, total trucks for Number 4 equals 43.2).

However, three inch maximum overlay is a limiting value for this empirical research and will be incorporated into the empirical design approach. Thus, (4.2) should be used to predict overlay thickness for total truck values under 32.2, and maximum overlay must be approximately three inches.

OVERLAY THICKNESS CALCULATIONS

Equation (4.2) was used to calculate overlay thicknesses for the 10 out of 30 pavement test sections

with PSI less than 2.7 (sections at or near minimum acceptable serviceability). The calculations were based on a 10-year design life, a terminal PCI of 35 (the equivalent of a PSI of 2.5), estimated CBR values from Table 3.3, and initial truck traffic data from Table 3.4 with a two percent per year traffic growth factor. The results presented in Table 4.7 reflect expected overlay thicknesses for the input conditions. Sections F13 and V7 represent the extremes of the thickness calculations. The F13 value is less than one inch due largely to the effect of the extremely high CBR. The 2.2 inch value for V7 reflects the effect higher traffic has on equation (4.2).

RELIABILITY

The regression equation (4.2) predicts the mean of the distribution of overlay thickness. Most individual outcomes deviate from the mean, and the "reliability" concept accounts for the deviation. Reliability refers to the probability that the predicted overlay will be successful in providing acceptable service through the overlay design life. A 95% reliability indicates that, on the average, 95 times in 100 the predicted overlay will be successful. Equation (4.2) provides a 50% reliability.

Through the determination of confidence intervals, the SAS computer output for equation (4.2) provides the 95%

Table 4.7 Empirical Equation Overlay
Thickness Results.

Section Number	Empirical Equation Overlay (in.)	Trucks/ Day	Estimated CBR
L-10	1.3	398	14
L-11	1.4	443	3
L-13	1.0	577	28
L-14	1.3	686	12
L-15	1.2	196	18
L-16	1.1	863	37
F-13	0.8	438	38
F-16	1.5	549	11
S-16	1.3	177	10
V-07	2.2	1989	16

reliability overlay thickness value for each of the test sections. Each value is approximately 0.9 inches thicker than the mean value calculated by (4.2), and that value must be added to any predicted thickness from (4.2) to achieve 95% reliability. Similarly, other thickness increments were calculated to reach other reliability levels, and the results are presented in Table 4.8.

Table 4.8 Thickness Increments to Reach Reliabilities.

Reliability (%)	Thickness (in.)
95	0.9
90	0.7
85	0.6
75	0.4

Use of the thickness increments in Table 4.8 would produce some overlay thicknesses which have not been verified through previous service in Indiana. For example, consider a high-traffic pavement for which equation (4.2) calculates on overlay thickness of 2.9 inches. To reach 95% reliability, 0.9 inches of overlay must be added to the 2.9 inches. The 3.8 inch total exceeds the typical maximum overlay thickness of 3.0 inches. Because the reliability-based design concept as represented by the values in Table

4.8 is untested in Indiana, its adoption cannot be recommended at this time. However, the concept is one which deserves significant further attention.

SUMMARY

Equation (4.2) is selected for empirical design:

$$\begin{aligned} o_{lay} = & 0.7592 + 0.00145(tottrk)^2 + 0.00379(age)^2 \\ & + 0.000162(pci)^2 - 0.000429(cbr)^2 \end{aligned} \quad (4.2)$$

where:

o_{lay} = calculated thickness of required, new
overlay in inches

$tottrk$ = (trucks/day)(365)(age)/365,000

age = design life of new overlay (years)

pci = desired PCI value at the end of the design
life of the new overlay

cbr = estimated subgrade CBR

Equation (4.2) has been verified for the following range of design values:

1. Anticipated overlay age: 5-20 years
2. Anticipated daily trucks: 50-3000
3. Total trucks: less than 32.2. Note: total trucks is defined as (trucks/day) (overlay age) (365)/365,000. If total trucks exceeds 32.2, the

calculated overlay value may exceed the thickest overlay typically found on Indiana pavements: 3.0 inches. If so, 3.0 inches should be specified.

4. PCI: PCI is normally specified as 35, which approximates to a PSI value of 2.5.

5. CBR: 0-40%.

If a reliability-based design is desired, Table 4.8 presents thickness values which may be added to overlay thicknesses determined from equation (4.2) to attain given reliabilities.

CHAPTER 5. STRUCTURAL ANALYSIS METHOD

This chapter describes the structural capacity overlay thickness design used in the research and presents and discusses results of structural overlay calculations for pavement test sections.

1986 AASHTO GUIDE

The structural overlay design method from the 1986 AASHTO Guide (1) was utilized, which employs the following equation as the basis for calculations:

$$SN_{OL} = SN_Y - SN_{XEFF} (F_{RL}) \quad (5.1)$$

where:

SN_{OL} is the structural capacity of the overlay which must be added.

SN_Y is the total structural capacity required to support the overlay traffic over existing subgrade conditions.

SN_{XEFF} is the effective structural capacity of the existing pavement immediately prior to overlay.

F_{RL} is the remaining life factor which accounts for damage to the existing pavement as well as the desired degree of damage to the overlay at the end of the overlay traffic.

The 1986 AASHTO Guide presents two methods for solving equation (5.1). Both methods are based on NDT pavement deflections and are designed to calculate identical overlay thicknesses.

Method 1

Method 1 relies on pavement layer modulus values back-calculated from NDT deflections, from which effective structural layer coefficients are read from charts. SN_{EFF} is calculated using the layer coefficients and layer thicknesses, then SN_Y and F_{RL} are found using nomographs and figures presented in the 1986 Guide. However, the 1986 AASHTO Guide does not specify a method for determining back-calculated layer moduli.

For this research, two back-calculation methods were used to estimate layer modulus values. FWD deflection data from 30 flexible test sections tested during both the spring and summer/fall test periods were used as input to the computer program BISDEF. BISDEF is a program developed by the US Army Corps of Engineers which uses

BISAR (11) as the base program for back-calculating elastic modulus values. BISDEF includes limits on the modulus values. When a limit is reached, the modulus is fixed at that limit value. Modulus ranges for pavement layer materials follow:

1. Asphaltic concrete: 200,000 to 1,000,000 psi
2. Granular base and subbase: 15,000 to 150,000 psi
3. Subgrade: 1,000 to 50,000 psi

An alternate, unpublished back-calculation program written by a Purdue University Transportation Engineering graduate student was also evaluated. It also uses BISAR to compute surface deflections; however, the elastic modulus values are not constrained.

Tables 5.1 and 5.2 list the output elastic moduli values for the spring and summer/fall NDT testing periods, respectively. In both tables, the subgrade modulus value for a given section is almost always larger than the value for the subbase. These results cannot be accepted because they imply that the subgrade has higher structural capacity than the subbase.

The elastic modulus values for asphaltic concrete shown in Tables 5.1 and 5.2 are not temperature-corrected. Tables 5.3 and 5.4 show the modulus values corrected to a

Table 5.1 Back-Calculated E Values from Spring Testing (ksi).

Sec. No.	<u>Bisdef</u>			<u>Alternate Method</u>		
	Asphalt	Sub base	Sub grade	Asphalt	Sub base	Sub grade
C 8	396	5.0	35.4	-	-	-
F 13	200	5.0	16.1	151	7.4	20.7
F 14	203	7.2	14.9	218	7.4	24.4
F 15	352	5.0	13.5	381	4.2	23.2
F 16	265	5.0	9.4	364	3.1	16.9
F 17	522	N/A	14.8	518	N/A	20.0
F 18	1000	5.0	16.9	-	-	-
F 19	200	5.0	10.8	181	4.0	15.9
L 10	255	5.5	9.1	291	4.8	12.8
L 11	200	5.0	3.7	232	1.0	6.2
L 12	415	14.2	14.9	464	8.8	25.8
L 13	293	9.5	18.4	301	10.3	31.6
L 14	200	5.0	12.0	225	1.7	27.7
L 15	200	5.0	8.9	199	1.2	17.0
L 16	275	5.0	8.6	279	5.2	11.8
L 17	421	N/A	15.4	431	N/A	18.2
S 8	269	5.0	17.2	295	2.6	59.1
S 9	481	9.2	14.5	477	11.4	21.5
S 10	236	6.8	20.8	242	7.4	32.4
S 11	1000	150	29.2	680	15784	30.1
S 12	277	13.2	14.9	278	15.5	20.9
S 13	217	17.1	13.8	258	13.7	18.4
S 14	200	5.0	15.4	202	3.3	35.6
S 15	200	5.0	9.0	187	1.6	18.4
S 16	248	7.5	13.2	248	9.7	17.7
V 6	791	35.5	11.6	773	67.6	17.2
V 7	1000	5.0	12.5	-	-	-
V 8	200	5.0	10.1	179	1.1	27.1
V 9	669	N/A	21.8	649	N/A	29.7
V 10	1000	N/A	17.3	976	N/A	25.1

Dashes indicate computer program did not close to an acceptable solution.

Table 5.2 Back Calculated E Values from
Summer/Fall Testing (ksi).

Sec. No.	<u>Bisdef</u>			<u>Alternate Method</u>		
	Asphalt	Sub base	Sub grade	Asphalt	Sub base	Sub grade
C 8	200	5.0	26.9	-	-	-
F 13	200	6.1	16.2	166	9.0	21.5
F 14	224	10.1	13.8	234	12.9	20.5
F 15	404	6.7	15.9	431	5.8	25.0
F 16	394	5.0	13.4	409	5.9	18.5
F 17	486	N/A	14.8	483	N/A	20.0
F 18	380	5.0	20.2	499	0.5	153
F 19	203	8.2	11.5	201	10.4	15.3
L 10	227	6.1	10.0	236	6.4	13.3
L 11	200	5.0	3.0	160	1.2	4.9
L 12	240	14.2	15.0	248	18.4	22.0
L 13	208	10.8	17.5	213	13.2	28.2
L 14	200	5.0	12.1	181	1.7	30.0
L 15	200	5.0	10.4	145	1.9	17.2
L 16	200	5.0	9.4	162	5.9	12.6
L 17	257	N/A	17.2	271	N/A	20.1
S 8	261	5.0	20.0	287	2.7	76.6
S 9	241	12.7	13.4	224	24.5	19.0
S 10	200	5.0	15.9	117	4.6	29.8
S 11	200	150	27.2	267	13565	27.1
S 12	201	18.0	15.9	207	19.3	23.0
S 13	207	8.8	13.6	192	17.1	17.3
S 14	200	5.0	11.7	135	3.0	27.9
S 15	200	5.0	11.5	153	3.5	18.2
S 16	200	6.3	14.1	146	23.6	16.1
V 6	649	24.4	10.8	281	124	14.5
V 7	200	5.0	8.2	-	-	-
V 8	200	5.0	9.9	58.9	3319	12.6
V 9	1000	N/A	27.2	1096	N/A	36.3
V 10	1000	N/A	25.7	1897	N/A	29.5

Dashes indicate computer program did
not close to an acceptable solution.

standard 70 degrees F by the method presented in Appendix L of the 1986 AASHTO Guide, which allows the values to be compared on an equal basis. In over 50 percent of the cases, the elastic modulus values calculated from spring and summer/fall test results differ from each other by more than 50 percent. These results are also unacceptable because they indicate great changes in the asphalt layer moduli over periods of only a few months.

The results in Tables 5.3 and 5.4 may also be compared with typical values for the elastic modulus of asphaltic concrete at 70 degrees F. The Asphalt Institute (38) reports an average modulus value of about 450,000 psi at 70 degrees F. In general, the values in Tables 5.3 and 5.4 are significantly less than that value, although they range from under 100,000 to over 1,000,000 psi.

Use of method 1 was discontinued due to the lack of direction in the 1986 AASHTO Guide and problems with the back-calculated modulus results described in the previous three paragraphs.

Method 2

Method 2 requires only two NDT deflections for analysis: temperature-corrected deflection directly under load and un-corrected deflection seven feet from load. The seven foot deflection is used in the following equation to

Table 5.3 Temperature Corrected Moduli From BISDEF (ksi).

Sec. No.	Spring		Summer	
	Correction Factor	Corrected Modulus	Correction Factor	Corrected Modulus
L-10	0.53	135	1.21	275
L-11	0.47	94-	1.32	264-
L-12	0.44	183	1.32	317
L-13	0.75	220	1.21	252
L-14	0.80	160-	1.31	262-
L-15	0.44	88-	1.40	280-
L-16	0.50	138	1.50	300
L-17	0.50	211	1.00	257
F-13	0.93	186-	1.31	262-
F-14	0.86	175	1.23	276
F-15	0.63	222	0.91	368
F-16	1.10	292	1.23	485
F-17	0.84	438	0.93	452
F-18	0.75	750+	1.32	502
F-19	0.90	180-	1.61	327
S-08	0.93	250	1.70	444
S-09	0.39	188	1.79	431
S-10	0.64	151	1.78	356-
S-11	0.70	700+	2.02	404-
S-12	0.87	241	2.50	503
S-13	0.70	152	3.40	704
S-14	0.71	142-	3.05	610-
S-15	0.71	142-	2.86	572-
S-16	0.91	226	2.50	500-
V-06	0.56	443	1.61	1045
V-07	0.53	530+	1.50	300-
V-08	0.58	116-	1.79	358-
V-09	0.89	595	0.36	360-
V-10	1.20	1200+	0.33	330+
C-08	0.41	162	2.35	470-

- Reached lower limit in BISDEF

+ Reached upper limit in BISDEF

Table 5.4 Temperature Corrected Moduli From Alternate Method (ksi).

Sec. No.	Spring		Summer	
	Correction Factor	Corrected Modulus	Correction Factor	Corrected Modulus
L-10	0.53	154	1.21	286
L-11	0.47	109	1.32	211
L-12	0.44	204	1.32	327
L-13	0.75	226	1.21	258
L-14	0.80	180	1.31	237
L-15	0.44	88	1.40	203
L-16	0.50	140	1.50	243
L-17	0.50	216	1.00	271
F-13	0.93	140	1.31	217
F-14	0.86	187	1.23	288
F-15	0.63	240	0.91	392
F-16	1.10	400	1.23	503
F-17	0.84	435	0.93	449
F-18	0.75	-	1.32	659
F-19	0.90	163	1.61	324
S-08	0.93	274	1.70	488
S-09	0.39	186	1.79	401
S-10	0.64	155	1.78	208
S-11	0.70	476	2.02	539
S-12	0.87	242	2.50	518
S-13	0.70	181	3.40	653
S-14	0.71	143	3.05	412
S-15	0.71	133	2.86	438
S-16	0.91	226	2.50	365
V-06	0.56	433	1.61	452
V-07	0.53	-	1.50	-
V-08	0.58	104	1.79	105
V-09	0.89	578	0.36	395
V-10	1.20	1171	0.33	626
C-08	0.41	-	2.35	-

- Computer program did not close to an acceptable solution.

calculate the subgrade modulus (M) which reflects that particular test date:

$$M = P(S_F) / D_R(R) \quad (5.2)$$

where: P is the NDT load in pounds

S_F is the subgrade modulus prediction factor
given in AASHTO

D_R is the measured NDT deflection at a radial
distance R (84 inches) from the center of load.

The temperature-corrected deflection directly under load is then used to solve for SN_{XEFF} using an equation of the following form given in Appendix PP of the 1986 AASHTO Guide (given here as Appendix F):

$$d = F(p, ht, ac, sn, ers, urs) \quad (5.3)$$

where: d is temperature-corrected deflection directly

under load (in.)

p is NDT load (lbs.)

ht is thickness of pavement system above the roadbed
soil (in.)

ac is radius of the NDT loading plate (in.)

sn is effective structural number (termed SN_{XEFF}
in equation (5.1))

ers is resilient modulus of roadbed soil (termed M
in equation (5.2))

urs is Poisson's Ratio of roadbed soil

Equation (5.3) is an equation based on elastic layer theory which examines the pavement cross-section as two layers -- pavement and subgrade. SN_{XEFF} can be calculated because the subgrade modulus is already known from (5.2). SN_Y and F_{RL} are found as in Method 1, and SN_{OL} is then calculated. (A detailed description of Method 2 is found in Appendix E including a Fortran program for solving (5.3).)

A decision was made to utilize Method 2 to finish this research because the method appears to be complete. However, additional verification is required before Method 2 can be utilized with confidence.

Effective Subgrade Modulus

The effective subgrade resilient modulus (M_R) is defined as the composite modulus for all the seasons of the year, as opposed to the M of equation (5.2) which is the modulus only at a particular NDT test date. M_R is used in the nomograph solution of SN_Y . The 1986 AASHTO Guide calculates M_R using the chart presented in Figure 5.1, which requires values of M from four seasons -- spring thaw, spring/fall wet, summer, and winter. The first three values come from NDT deflections recorded in those seasons used in equation (5.2), and the winter value is estimated at 20,000 - 50,000 psi, depending upon the values from the other seasons.

Month	Roadbed Soil Modulus, M_R (psi)	Relative Damage, u_f
Jan.	28000	.006
	28000	.006
Feb.	28000	.006
	28000	.006
Mar.	20900	.012
	20900	.012
Apr.	20900	.012
	21000	.012
May	21000	.012
	21000	.012
June	22000	.010
	22000	.010
July	22000	.010
	22000	.010
Aug.	22000	.010
	22000	.010
Sept.	22000	.010
	22000	.010
Oct.	21000	.012
	21000	.012
Nov.	21000	.012
	21000	.012
Dec.	24000	.008
	28000	.006
Summation: $\Sigma u_f =$		0.238

$$\text{Average: } \bar{u}_f = \frac{\Sigma u_f}{n} = \underline{0.0099}$$

$$\text{Effective Roadbed Soil Resilient Modulus, } M_R \text{ (psi)} = \underline{22,000} \quad (\text{corresponds to } \bar{u}_f)$$

Figure 5.1 M_R Calculation Form.

M_R calculations were performed on the test section subgrades using the FWD values from spring thaw and summer/fall testing. The spring/fall wet period modulus values were interpolated, and winter values were estimated as 20,000 - 50,000 psi. Figure 5.1 contains an example M_R calculation for section F15, and complete results are presented in Table 5.5. Note that only 15 test sections are represented. All of the test sections from Vincennes District and sections L11 and S12 were eliminated because results indicated that "spring thaw" deflection testing was performed before the subgrade had completely thawed. Eight other sections were eliminated due to lack of spring thaw deflection measurements seven feet from load.

Only the FWD could be used in the M_R analysis. It is the only NDT device used in the research equipped with a circular load plate required for calculations using equation (5.3).

The 1986 AASHTO Guide states that spring thaw moduli will be significantly lower than summer moduli. Results in Table 5.5 indicate that this may not be true in Indiana, with most spring and summer modulus values reasonably close to one another and six of fifteen spring values higher than summer values.

In many situations, only summer NDT deflections will

Table 5.5 Subgrade Moduli for Test Sections (ksi).

Sect. No.	M (Spring)	M (Summer)	M _R	M _R Minus M (Spring)	M _R Minus M (Summer)
No.	Spring	Fall		Spring	Summer
F-14	22.3	22.0	23.0	0.7	1.0
F-15	20.9	22.1	22.0	1.1	-0.1
F-16	33.5	36.1	34.0	0.5	-2.1
F-17	33.5	23.6	26.0	-7.5	2.4
F-18	43.6	45.3	45.0	1.4	-0.3
F-19	23.0	20.5	22.0	-1.0	1.5
L-10	15.3	19.0	18.5	3.2	-0.5
L-12	23.2	22.3	23.0	-0.2	0.7
L-13	26.1	33.2	30.0	3.9	-3.2
L-14	16.3	24.9	19.5	3.2	-5.4
L-15	14.7	17.3	16.0	1.3	-1.3
L-16	19.4	21.2	22.0	2.6	0.8
L-17	35.0	32.4	37.0	2.0	4.6
S-08	21.1	22.0	21.0	-0.1	-1.0
S-15	20.0	19.5	20.0	0.0	0.5
			avg.	0.74	-0.16
			σ	2.69	2.36

be available for overlay calculations. The final column in Table 5.5 shows that in that case, summer modulus values may be used as a reasonable estimate of M_R .

Table 3.5 shows that spring deflections directly under load are significantly higher than corresponding summer deflections. If spring and summer subgrade modulus values are similar in Indiana, what accounts for the higher spring deflections? It is hypothesized that Indiana spring and summer subgrade values are similar because winter frost only penetrates into the subbase, not into the subgrade, due to climate conditions or the black body effect of the asphalt surface. Thus, the subgrade may not become saturated during spring thaw while the subbase does, making the subbase the pavement layer contributing to higher spring deflections, not the subgrade. Further study is indicated to test this hypothesis.

OVERLAY THICKNESS CALCULATIONS

AASHTO Guide Method 2 was used to calculate structural overlay thickness for the 10 out of 30 pavement test sections with $PSI < 2.7$ (sections at or near required rehabilitation). The calculations were based on the following input values:

1. Reliability that design life will be met or exceeded:
0.85 (per range provided by 1986 AASHTO Guide).

2. Standard deviation: 0.35 (per AASHTO Guide example calculations).
3. Asphalt layer coefficient: 0.34 (per IDOH)
4. Subbase layer coefficient: 0.14 (per IDOH)
5. M_R from Table 5.5, or, if not listed in Table 5.5, summer/fall subgrade resilient modulus was used.
6. Design life: 10 years (per IDOH)
7. Initial PSI: 4.5
8. Terminal PSI: 2.5
9. Traffic: 1986 base traffic with a two percent per year traffic growth factor.

Overlay calculation results are presented in Table 5.6, which shows that five out of the ten test sections (those with negative overlays) do not require additional structural overlay during the next ten years. These results are quite reasonable for the traffic levels and present asphalt thicknesses considered. Two sections (L13 and L14) already have quite thick asphalt layers but only carry average traffic. The other three sections (F13, F16, S16) have average existing asphalt thicknesses but carry low traffic. Results for four of the sections (L14, F13,

Table 5.6 AASHTO Overlay Thickness Results.

Section Number	AASHTO Overlay (in.)	Trucks/Day	Current Total Asph. Thickness (in.)
L-10	1.6	398	5.9
L-11	5.3	443	7.9
L-13	-11.5	577	12.7
L-14	-0.2	686	11.6
L-15	1.3	196	8.1
L-16	2.1	863	7.1
F-13	-1.1	438	7.5
F-16	-0.0	549	6.4
S-16	-0.6	177	8.0
V-07	1.4	1989	11.2

F16, S16) indicate that modest reductions in asphalt thickness (0 inches to 1.2 inches) would be acceptable, suggesting that increase in pavement asphalt thickness over time has been greater than required for structural capacity. The calculation for L13 indicates that 11.5 inches of the existing 12.7 inches of asphalt could be removed. Such action should not be taken, and that value is unacceptable. However, Tables 3.1 and 3.3 show that the L13 pavement cross section is 12.7 inches of asphalt above 25 inches of subbase over a sandy subgrade (estimated CBR of 28). The asphalt thickness build-up over time on such a strong foundation does appear excessive for the relatively low traffic volume, but removal of 11.5 inches of asphalt is not indicated.

Four of the other five results in Table 5.6 indicate that moderate (1.3 inch to 2.1 inch) structural overlays are required for future traffic. The value for the fifth remaining section (L11) specifies a 5.3 inch structural overlay. Indiana experience has shown that a three inch maximum overlay is usually appropriate, so 5.3 inches is probably excessive. However, the AASHTO calculation for L11 was greatly affected by an unusual circumstance: a peat subgrade (Table 3.3). In this situation, if L11 has been performing satisfactorily with thinner previous overlays and if no alligator cracking is present, the 5.3 inch

value should be discounted and replaced by a value less than three inches.

The two sections of uncommon cross-section (L13 and L11) which produced extreme overlay values demonstrate that engineering judgment and knowledge of local conditions must be used with the 1986 AASHTO Guide procedure when selecting overlay thicknesses for unusual situations.

SUMMARY

The 1986 AASHTO Guide Method 2 was selected for calculating structural overlay thickness. Method 2 uses two NDT deflections: temperature-corrected deflection directly under load and un-corrected deflection seven feet from load.

Method 2 uses the effective subgrade resilient modulus, M_R , as calculated from deflection data from four different seasons. In Indiana, if only the summer subgrade resilient modulus is known, it may be used in place of M_R . Test data indicates that seasonal change in subbase modulus be examined in future research.

Results of AASHTO Method 2 structural overlay calculations on ten pavement sections provided generally good results, though results for two pavements with unusual cross-sections required the use of engineering judgment.

CHAPTER 6. DESIGN METHOD COMPARISON AND DISCUSSION

Two methods were used in this research to determine overlay thickness requirements. One is an empirical method which results in an overlay thickness to resist surface distress (roughness) and provide rider comfort during the overlay design life. The second method is a structural overlay design method from the 1986 AASHTO Guide (1) which determines overlay thickness required to prevent structural failure during the overlay design life. AASHTO calculates a negative thickness if excess structural capacity is present.

COMPARISON

Table 6.1 compares the results of the two methods for ten pavement test sections of $PSI < 2.7$. The AASHTO method indicates that 5 of the 10 pavement sections require no structural overlay to meet projected future traffic. AASHTO calculates moderate structural overlay requirements for the other sections (with the exception of L11, the section with peat subgrade discussed in Chapter 5).

The empirical calculation always adds overlay thickness. Table 6.1 presents overlay thickness values between

Table 6.1 AASHTO vs. Empirical Equation
Overlay Thickness Results.

Section Number	AASHTO Overlay (in.)	Empirical Equation Overlay (in.)	Trucks/ Day	Current Total Asph. Thickness (in.)
L-10	1.6	1.3	398	5.9
L-11	5.3	1.4	443	7.9
L-13	-11.5	1.0	577	12.7
L-14	-0.2	1.3	686	11.6
L-15	1.3	1.2	196	8.1
L-16	2.1	1.1	863	7.1
F-13	-1.1	0.8	438	7.5
F-16	-0.0	1.5	549	6.4
S-16	-0.6	1.3	177	8.0
V-07	1.4	2.2	1989	11.2

0.8 inches and 2.2 inches, which are within the range of overlays studied in this research.

It is not possible to directly compare results from the current IDOH structural overlay design procedure with results of the empirical and AASHTO calculations because the IDOH procedure produces three potential overlay thicknesses based on varying the percentage of remaining structural capacity assigned to the existing pavement layers in the procedure -- 70%, 80%, 100%. The designer must then choose the overlay thickness he judges most appropriate. For example, for section Sl6, the three potential overlay thicknesses generated are -2.9 inches, -3.6 inches, and -5.2 inches. Although the IDOH procedure results agree with the AASHTO result that the pavement does not require additional thickness, the wide range in values provides little help to the designer in accurately assessing structural capacity. This situation holds true in any calculation using the IDOH method. For that reason, IDOH calculations are not included in Table 6.1.

DISCUSSION

The empirical equation calculates an overlay thickness which provides adequate functional performance (ride quality and resistance to roughness) during the overlay design life. When pavement rehabilitation is needed, additional

overlay is always added. This practice of adding overlays for functional, not structural purposes appears to have produced excess structural capacity in a significant proportion of flexible primary highway system pavements in Indiana. Three findings support this statement:

1. Only one instance of significant alligator cracking (indicating structural failure) was observed in 30 test sections (see "Alligator Cracking", Chapter 3).
2. Pavement cores from many of the 30 test sections showed thick pavements associated with relatively low traffic (see Tables 3.1 and 3.4).
3. AASHTO overlay calculations in Table 6.1 indicate that five of the ten test sections have excess structural capacity.

Use of the functional and structural design methods together will produce a more effective and economical overlay design procedure than that currently used. The functional method calculates the thickness of newly-laid overlay required for rider satisfaction. The AASHTO method calculates required additional structural capacity. If both values are positive, the larger value can be used for the overlay. If the structural value is negative, a thickness equal to the functional overlay may be milled and

recycled back to the pavement as a new surface (satisfying functional performance requirements).

Milling and recycling may also be performed if the required structural overlay is positive but smaller than the functional overlay. In this case, the milled thickness is limited to the functional thickness minus the structural thickness, and an overlay must be added equal to the functional thickness.

It may also be acceptable to mill a thickness greater than the functional overlay before recycling if significant excess structural capacity exists. In this case, the recycle thickness need only be the functional thickness. Engineering judgment should be used when setting the depth of the milling operation.

Under no circumstances should a pavement requiring rehabilitation be milled without a subsequent overlay or seal. This action will expose a cracked surface to the elements and traffic. Such a pavement will deteriorate rapidly.

CHAPTER 7. CONCLUSIONS AND RECOMMENDATIONS

This research has resulted in an overlay design procedure which addresses both structural performance and functional performance (resistance to surface distress). When flexible pavements are identified for overlay, two calculations should be performed:

1. For functional performance, use equation 4.2 as described in Appendix D:

$$\text{olay} = 0.7592 + 0.00145 (\text{tottrk})^2 + 0.00379 (\text{age})^2 + 0.000162 (\text{pci})^2 - 0.000429 (\text{cbr})^2 \quad (4.2)$$

where:

olay = calculated thickness of required, new overlay
(inches)

tottrk = (trucks/day)(365)(age)/365,000

age = design life of new overlay (years)

pci = desired PCI value at the end of the design life
of the new overlay (usually 35)

cbr = estimated subgrade CBR

2. For structural capacity, use 1986 AASHTO Guide

Overlay Method 2, a method which calculates overlay thickness based on NDT deflection measurements. A falling weight deflectometer (FWD) NDT device should be used to perform the NDT testing for two reasons: a) AASHTO calculations require NDT load to be applied through a circular loading plate, and b) An FWD load most closely resembles a moving truck load in both load magnitude and load duration.

Both calculations should be considered in overlay thickness selection:

1. If both values are positive, the larger may be specified as the design thickness.
2. If the structural value is negative, a thickness equal to the functional overlay may be milled and an overlay applied or the milled material recycled back to the pavement.
3. Increased milling may be considered if significant excess structural capacity exists. In this case, an overlay equal to the functional requirement thickness should be applied to the pavement and may include recycling.
4. Milling may also be performed if the required structural overlay is positive but smaller than the

functional overlay. The milled thickness will be limited to the functional thickness minus the structural thickness, and an overlay equal to the functional thickness must be added.

During the course of the project, three areas were identified for further research:

1. A need exists to develop a reliable computer program to back-calculate pavement layer elastic moduli from NDT deflections.
2. Due to the significance of subgrade characteristics, better and more detailed assessments of subgrade strength are required.
3. An investigation to determine the effect of subbase layers weakened by spring thaw moisture saturation on pavement structural capacity must be undertaken.

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APPENDICES

APPENDIX A - DATA BASE, EXPERIMENT DESIGN AND FIELD TESTING

The Indiana Department of Highways (IDOH), through the Joint Highway Research Project (JHRP) at Purdue University, initiated a project to develop overlay design procedures for jointed reinforced concrete (JRC), continuously-reinforced concrete (CRC), and flexible pavements. The results of this study are expected to fill the IDOH's need for a standardized, practical overlay design procedure.

To collect the necessary data for developing the overlay design procedure an extensive field testing and evaluation program was planned based on statistical design of experiment concepts. A statistically based design of experiment greatly reduces the number of pavements that need to be tested while maintaining the significance of the results. Part of the testing and evaluation program involved use of several non-destructive testing (NDT) devices. The NDT devices utilized were the Dynaflect, falling-weight deflectometer (FWD), and two model of the Road Rater (RR) devices (RR400 and RR2000).

NDT testing of each pavement section selected to satisfy the design of experiment was conducted twice in 1986: once during the spring thaw when the pavement subgrade is at its weakest and once in the summer/fall. During both test periods, the 4 NDT devices tested the pavement within approximately forty minutes of each other so that results from the 4 devices could be compared on an equal basis.

Other data gathered for each pavement test section included:

1. Surface roughness
2. Distress type, extent and severity
3. Layer thickness
4. Layer age
5. Subgrade classification and estimated strength
6. Traffic
7. Climatic data

This appendix outlines the steps that were taken to design the experiment, select the test sections, and obtain the NDT results and other data for each test section.

SCOPE OF EXPERIMENT

The road and highway system in Indiana consists of

91,500+ miles of public streets and highways (1). Of this mileage, approximately 11,350 miles are maintained by the IDOH and sustain almost 60% of the vehicle miles traveled. Because of the large number of sample test sections that would be required to analyze the entire state system, it was decided to include only those highways on the Federal-aid Interstate (FAI) and Federal-aid Primary (FAP) systems. Thus, the total pavement population to be analyzed was reduced to approximately 6,200 miles of the most highly traveled highways in Indiana.

In a general review of the highway system inventory, four broad types of pavements can be identified.

1. Flexible pavements
2. Jointed reinforced concrete pavements (JRCP)
3. Continuously reinforced concrete pavements (CRCP)
4. Jointed plain concrete pavements (JPCP).

Since initial construction, most of the pavements have been overlaid one or more times with 1" to 5" of asphalt per overlay.

After studying the inventory, consideration of JPC pavements was discontinued due to the limited number of these types of pavements in the highway system. Ultimately, the overlay research focused on the following pavement types:

1. Overlaid flexible pavements
2. JRC pavements with and without overlays
3. CRC pavements with and without overlays.

DATA REQUIREMENTS

After determining the highway population to be considered in the analysis, attention was turned to the factors which most affect overlay performance. Initially, a list of possible factors was compiled. In compiling this list, particular attention was given to a similar list included in the preliminary experimental design plan for the long-term pavement performance (LTPP) area of the Strategic Highway Research Program (SHRP) (2). The general list of factors considered for both flexible and rigid pavements follows:

- 1.. Layer thicknesses
2. Layer ages
3. Layer types
4. Traffic
5. Climate
6. Pavement roughness
7. Subgrade type
8. Pavement distress
9. Layer strength.

SYSTEM INVENTORY AND DATA BASE CONSTRUCTION

To obtain values for the pavement characteristics listed above, the Planning Division of the IDOH was consulted. The Planning Division maintains a set of paper files called Road Life Records which contains basic construction and major maintenance data for every state-maintained highway in Indiana. For each county in the state, Road Life Records contains a line-drawing of each highway along with data cards describing construction dates, construction materials, and layer thicknesses, plus information on pavement widenings, overlays, etc. Eight man-months of effort were required to convert information about the FAI and FAP systems in the Road Life Records to a computer data base. Information concerning 1747 different pavement sections was recorded. These sections range in length from several one-hundredths of a mile to 20 or 30 miles. Two additional man-months were spent entering the data for the 1747 different pavement sections into a data base resident on an IBM XT personal computer. The data was entered using a data base management software package (6) for ease of data retrieval and manipulation. Approximately 500,000 bytes of memory were required for the data base.

The Planning Division also maintains traffic data (3). In each year of a three-year cycle, annual average daily traffic (AADT) data are recorded for a different one-third

of Indiana highways. Seasonal and yearly adjustment factors are applied to this data, but no adjustment is made to account for vehicles of more than two axles.

Number of trucks per day is the crucial traffic parameter for this study. To obtain trucks/day for each section of highway, Sharaf's (4) values for percentage of total traffic which is truck traffic were multiplied by total AADT to obtain trucks/day values for each highway section.

Sharaf reported percent truck data for the thirty-one and seventeen truck count station locations on the federal-aid rural primary and the rural and urban interstate highway systems, respectively. From the truck data collected at these stations, the percent trucks was determined. This percentage is assumed to be constant for the highway system within a given county. Percent trucks for counties which did not contain count station were assumed based on counted values in adjacent counties and on counties with similar population characteristics. Figures A1 and A2 show actual values and assumed values (in parenthesis) for the rural primary and interstate systems.

Work by Colucci-Rios and Yoder (5) was used to divide the state into two major climate zones. Factors such as annual snowfall and rainfall amounts, Thornthwaite Moisture

Figure A1 Percent Trucks -- Rural Primary Roads.

Figure A2 Percent Trucks -- Rural and Urban Interstate.

Index, and freezing indexes were considered when establishing this dividing line between the two zones. Figure A3 shows the general climatic boundary location. In general, the boundary begins just northwest of Kentland at the Illinois/Indiana state line and proceeds as a straight line east-southeasterly to just south of Logansport, then to just north of Marion, and ending northeast of Trinity at the Ohio/Indiana state line.

Most highways in Indiana were constructed before adequate or easily-accessible records were kept concerning subgrade soil type. Lacking this information, subgrade type was not considered during data base development. Pavement distress and layer strength data were also unavailable. These data were gathered later for the pavement test sections selected.

STATISTICAL EXPERIMENT DESIGN

The primary advantage of using a statistical experiment design is that it allows one to obtain desired information about a population with relatively few samples from that population. A savings in time and finances and an increase in efficiency of the data collection procedure results when a proper experiment design is conducted.

Figure A3 North and South Climate Zones.

When an experiment is designed (in this case, when the pavement test sections are selected), the size of the experiment depends upon the number of design factors considered in the experiment, the number of levels used within each factor, and the number of repeats desired. In this study, the list of factors includes layer thicknesses, traffic, and climate zone.

Levels refer to the number of levels within each factor which will be considered. For example, if AADT is chosen as a design factor, two levels of traffic would be "low" and "high". If three levels are considered, they would be the low, medium, and high levels of AADT. As either number of test factors or number of levels increases, the size of the experiment increases.

If test sections are selected based upon three of their characteristics (factors) and if each factor has two levels, the number of sections selected for a full design is 2^3 or 8. If four factors at three levels are used, 3^4 or 81 sections must be selected. In this type of experimental design, called a complete factorial, all levels of each factor are represented with all levels of each other factor.

If only two levels per factor are chosen, only linear relationships can be calculated during analysis of test

data. If three levels per factor are used, curved relationships can be determined. Three levels per factor were selected so that curvature could be detected in a relationship, if present.

Because the state was broken into two climate zones, a total of six different experiments were to be designed: an experiment in each climate zone for JRCP, for CRCP, and for flexible pavements.

Another consideration was that the first field test series was to be performed during the spring thaw period when excess water can be present beneath the pavement, resulting in the pavement's weakest condition. It was estimated that only a total of 65-70 sections could be tested during this month-long period. Thus, while three levels of each factor must be considered, only 10-12 test sites could be selected for each of the six experiments. Thus, only two factors could be used if complete factorial experiments were to be conducted. ($3^2 = 9$, which is acceptable. $3^3 = 27$, which is too high.)

The list of potential factors was scrutinized. Despite the fact that the resulting number of test sections would be too high in a complete factorial design, it was decided that three factors were required for each experiment. For flexible pavements, the following factors were chosen:

1. Traffic
2. Thickness of most recent overlay
3. Total asphalt thickness beneath most recent overlay.

For both JRCP and CRCP, the following three factors were chosen:

1. Traffic
2. Ratio of overlay thickness to total pavement thickness
3. PC concrete thickness.

Once the factors were selected, the levels of each factor for the experiment could be established. The previously-referenced data base management software was used to compile data for the plots in Figures A4-A12 for flexible, JRC, and CRC pavements. Using the information presented on these plots, the total range of each factor could be determined. Then, within the total range, values for high, medium, and low levels for that factor could be set. For example, in Figure A5, the thickness of most recent overlay of flexible pavements ranged from 0.75" to 4.75". However, almost all of the overlays were from 0.75" to 3.25" thick. This smaller range was used to set the levels of most recent asphalt overlay thickness because an insufficient number of the thicker overlay pavement was available for testing.

Figure A4 Flexible Pavements -- Truck Traffic Distribution.

Figure A5 Flexible Pavements -- Asphalt Overlay Thickness Distribution.

Figure A6 Flexible Pavements -- Asphalt Base Thickness Distribution.

Figure A7 CRC Pavements -- Truck Traffic Distribution.

Figure A8 CRC Pavements -- Concrete Thickness Distribution.

Figure A9 CRC Pavements -- Ratio of Newest Overlay Thickness to Total Pavement Thickness Distribution.

Figure A10 JRC Pavements -- Truck Traffic Distribution.

Figure All JRC Pavements -- Edge Concrete Thickness.

Figure A12 JRC Pavements -- Ratio of Newest Overlay Distribution.

In a similar manner, levels were set for the other factors considered in the experiment. The list of factor levels is shown in Table A1. The selection of three factors meant that a complete factorial experiment could not be run, because 162 test sections would be required for 6 of the 3^3 designs. Instead, composite designs (7) for each of the six experiments were selected. This type of design is a compromise. Although not as much information is obtained as in a complete factorial design, significantly fewer test section are required to gain that information. Unlike a complete factorial design, in a composite design not all levels of each factor are represented with all levels of each other factor.

Figure A13 illustrates the differences between a factorial design using three factors at three levels and a composite design for three factors at three levels for test pavement selection. In both Figures A13a and A13b, the x, y, and z axes represent the three factors. The circles each represent a different selected test section. Thus, in Figure A13a, (the complete factorial) test section #1 has factor x at a high level, factor y at a medium level, and factor z at a low level. Figure A13b represents the composite design. As may be noted, many of the mid-level test sections are missing, which means that this design does not provide as much information as the complete

Table A1 Experiment Factor Levels.

<u>Pavement Type</u>	<u>Factor</u>	<u>Low Level</u>	<u>Mid Level</u>	<u>High Level</u>
Flexible	Trucks per day	300	1450	2600
Flexible	Overlay thickness	1 in.	2 in.	3 in.
Flexible	Asphalt beneath overlay	3 in.	8 in.	13 in.
JCRP	Trucks per day	1075	3750	6425
JCRP	Ratio of most recent overlay thickness to total pvt. thickness	0.030	0.175	0.320
JCRP	PCC thickness	7.5 in.	8.5 in.	9.5 in.

a) factorial design — 27 test sections b) composite design — 15 test sections

Figure A13 Factorial Design vs. Composite Design.

design. (In technical terms, it provides fewer error degrees of freedom.) In the composite design, the number of test sections (n) may be determined by

$$n = 2^k + 2k + 1 \quad (1)$$

where k is the number of factors to be considered (3 in this case). Equation 1 gives the number of test sections if no factor combination is to be tested twice (repeated). The basis for the design is the 2^k factorial. The 2^3 pavement sections are at the 6 corners of the cube in Figure A13b, and they are called factorial points. However, because only two levels of each factor are included in a 2^k design, only linear effects of these factors may be determined when regression is employed. Thus, to investigate curvature in a regression relationship, more levels of each factor must be obtained. In this case, $2k + 1 = 7$ additional points are included to allow curvature determination -- one combination is at the center level of all three factors, and six combinations are "star", or extreme, points that are located on lines which radiate from the center point through the midpoints of each of the six faces of the cube. The distance from the center point to each of these points is fixed so that the orthogonal nature of the design is maintained.

Therefore, in the proposed design, 15 test sections are required for each of the 6 experiments, for a total of

90 test sections -- a more reasonable number of sections to test in the allotted time and a considerable reduction from the 162 sections required by the 3^3 factorial design.

Thus far in the experiment design, no factor level combination was repeated (replicated). Ninety sections were considered the maximum for the testing time and financial constraints. However, some replication was still considered to be necessary. Thus, 3 of the 6 star points were eliminated from the design and were replaced by 3 replicates. Two of the eliminated star points were used to replicate two of the factorial points, and one was used to replicate a star point. During data analysis, these replicates will allow estimation of whether a first order (linear) polynomial is a complete fit or whether a second order (quadratic) should be applied. This estimation technique is called a lack-of-fit analysis.

Technical Discussion of Composite Design

What is the premise which allows one to reduce the number of test sections in the experiment by using the composite design? Although the detailed mathematical analysis is not required by the engineer using this technique, it is helpful to have a basic understanding of the underlying concepts before using the procedure.

The basic regression equation for the composite design when $k=3$ (15 factor level combinations) is

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_{12} X_1 X_2 + \beta_{13} X_1 X_3 + \beta_{23} X_2 X_3 + \beta_{11} X_1^2 + \beta_{22} X_2^2 + \beta_{33} X_3^2 + \epsilon \quad (2)$$

where $X_{1,2,3}$ are factor values, the betas (β s) are least square regression coefficients, and y is the dependent variable (deflection, roughness, or any other measured result). The error term has 5 degrees of freedom because the number of observations in the experiment (15) minus the number of beta terms (10) equals 5. (Note that the three factor interaction, $X_1 X_2 X_3$, and the two-factor, second-order interactions (e.g., $X_1^2 X_2$) are considered zero and are left out of equation 2 as is often the case.) By comparison, a three-leveled factorial design will have 17 degrees of freedom in the error term if all two-factor, second order interactions and three-factor interactions are considered zero. The additional degrees of freedom would allow more confidence in the analysis but would require greater investment of time and finances because now $3^3 = 27$ factor level combinations must be tested instead of merely 15. The 5 degrees of freedom provided by the composite design are considered adequate for this analysis.

Detailed discussion of orthogonal polynomials and their advantages may be obtained from textbooks on statistical experimental design and response surface

methodology (7,8).

TEST SECTION SELECTION

As stated previously, three equally-spaced levels were chosen for each factor. Subsequently, test sections were to be selected which satisfy the 15 combinations of these factor levels used in the composite design. In reality, even though there were 1,747 pavement sections to choose from, no section satisfies a factor combination exactly, and, in some cases, the closest fit was not as good as the researchers would have desired. Thus, during test section selection, sections were chosen whose factor values fell as close as possible to the desired factor levels.

Using the data base manager software, the computer was queried to supply pavement sections which complied with the requirements for each of the 15 different test sections in each of the six experimental designs. From one to perhaps 20 or 30 candidates were found for each description. These sections were plotted in 15 different colors on six separate maps. Final selection of test sections was based upon two criteria:

1. Sections in the extreme north or extreme south climate zones were favored which would tend to bring out the effects of the climate zone factor.

2. Sections were selected that were relatively close together which would minimize travel time between sites during field testing.

Unfortunately, there is not sufficient variation in CRCP in Indiana to fill out the desired experimental design. For example, low, medium, and high levels of traffic are desired. However, the CRC pavements were constructed for use as high-volume roads. Consequently test sections are not available in the low-volume categories. A similar situation occurs for the other factors as well. Overall, only 13 different CRCP sections were found in the state and were included in the test program. A general regression analysis will be performed to determine if the various factors have an effect on the pavement test (independent) variables.

Overall, thirty flexible test sections (15 in the north climate zone; 15 in the south climate zone), 30 JRCP sections, and 13 CRCP sections were selected for a total of 73 test sections.

In subsequent visits to the offices of each of the six highway districts in Indiana, the selected test sections were compared to lists of projected major maintenance projects for 1986. If a test section was scheduled to be overlaid in 1986, an alternate pavement section was

selected. During these visits, arrangements were made to core the test sections to verify construction and maintenance records in the data base.

In addition, each test section was visited. Inside each test section (which could be as long as several miles) the beginning and end of a 1250' final test section were marked. Markings consisted of yellow arrows painted on the centerline for 2-lane pavements; for multi-lane pavements, the yellow arrows were painted just off the pavement on the right shoulder. The 1250' sections were chosen to be representative of the entire section, to avoid obstructions such as bridges, culverts, and railroad beds, and to provide sufficient sight distance for safety during testing.

FIELD NDT TESTING

For any one pavement test section, tests were conducted on the same day at the same time with four NDT test devices in the following order: Dynaflect, Road Rater Model 400 (RR400), Road Rater Model 2000 (RR2000), and Dynatest FWD Model AE1030. Testing was usually accomplished within a 40-minute period. If mechanical or electronic troubles were encountered, the test period stretched to as long as 1.5 hours. During the spring test

period, pavement surface temperature was measured twice at each section with an infrared temperature sensor (Omega Engineering, Inc., Model OS 600). During the summer/fall test period, readings were taken three times at each section.

Due to mechanical breakdowns, some pavements were not tested on the same day by all test devices. For a summary of the test schedule, see Tables A2 and A3.

Six sites were tested with each device within each 1250' test section. The sites were normally 120' to 180' apart and were located in the outside wheel path of the outside lane. On rigid or composite pavement sections, the distance from the nearest joint or crack was noted.

The spring series of test results were obtained during a five-week period in the early spring (3/17/86 - 4/25/86) when pavement deflections tend to peak due to pavement layer and subgrade thaw. Climatological data (9) from the National Oceanic and Atmospheric Administration (NOAA) indicated that the southern portion of Indiana begins spring thaw approximately two weeks before northern Indiana. Therefore, testing began in the south climate zone after spring thaw was well underway and moved north. Yellow x's were painted on the six test sites within each section so that the same sites would be tested during the

Table A2 Spring Deflection Testing Equipment Usage.

	<u>Ft. Wayne</u>	<u>LaPorte</u>	<u>Green- field</u>	<u>Crawfords- ville</u>	<u>Seymour</u>	<u>Vincennes</u>
All Equip.	⁺ 1,2,5,6,9, 10,12,13,14,15, 16,17,18,19	3,4,5,6,7 8,9,10,11, 12,15,17	1,3	1,2,3,4	3,9,11	--
Dynalect, RR400,2000	7,8,11	--	--	--	6,7,8, 12,15	1,2,3, 5,6
Dynalect, RR2000,FWD	--	--	--	--	10,13,14	--
Dynalect, RR400,FWD	3	1,2,13, 14,16	2	5,6,7,8	1,2,4, 5,16 [*]	--
FWD, RR400,2000	--	--	--	--	--	4,8
Dynalect, RR400	--	--	--	--	--	7
Dynalect, RR2000	4	--	--	--	--	--
FWD,RR400	--	--	--	--	--	9,10
Dynalect	--	--	--	--	--	4,8,9,10
FWD	4,7,8,11	--	--	--	6,7,8, 12,15	1,2,3 5,6,7

⁺FWD used only in right wheelpath, not midlane^{*}FWD completed first three sites only

Table A3 Summer/Fall Deflection Testing Equipment Usage.

	<u>Pt. Wayne</u>	<u>LaPorte</u>	<u>Green- field</u>	<u>Crawfords- ville</u>	<u>Seymour</u>	<u>Vincennes</u>
All Equip.	--	--	--	1, 3, 4, 5, 8	1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16	1, 2, 3, 4, 5, 6, 7, 8
Dynalect, RR400, FWD	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	--	--	--	--
Dynalect, RR400, 2000	--	--	1, 2, 3	--	--	9, 10
Dynalect, RR2000, FWD	--	--	--	--	7, 8	--
Dynalect, RR400	--	--	--	2, 6, 7	17	--
FWD	--	--	1, 2, 3	2, 6, 7	17	9, 10

* Only three sites tested. These were all that could be found after overlay.

summer/fall test period.

The bulk of the summer/fall test period was completed from 8/5/86 to 9/5/86. However, due to equipment breakdowns, some devices had to go back at a later date to test pavements that had already been tested by the other devices. Testing with the RR400 and the Dynaflect was conducted in this manner on 10/30/86, and the FWD on 11/17/86, 11/18/86, and 11/24/86.

In addition, the RR2000 was only made available for the first two weeks of the test period in the summer/fall test period. During that time, only test sections in the south climate zone were tested.

TEST DEVICES

The Dynaflect (Figure A14) is also a steady state deflection device with only one dynamic force and one frequency for the dynamic force. Thus, all deflection readings throughout the test sequence reflect a 2000-lb static weight and a 1000-lb peak-to-peak dynamic load applied at 8 Hz. Deflections were recorded at the center of the load and at 1', 2', 3', and 4' from the center.

The RR400 (Figure A15) is a steady state dynamic device which applies an initial static load of 1800-lb and

Figure A14 The Dynaflect.

Figure A15 The Road Rater 400.

a peak-to-peak dynamic load which can vary from 500-lb to 2800-lb with a frequency that can be varied from 5 Hz to 70 Hz. For this research project, sites 1 to 5 were tested at 25 Hz at each of 3 different dynamic loads: 600-lb, 1200-lb, and 1800-lb. Deflection readings were recorded for each of the three dynamic load levels at each site. At site 6, the 600, 1200, and 1800-lb loads were each tested at 15 Hz, at 25 Hz, and at 35 Hz. Velocity sensors measured deflection for each loading at each frequency. The sensors are located at the center of the load and at 1', 2', and 3' from the center.

The RR2000 (Figure A16) is a larger version of the RR400, with a static load of 3800-lb and a wider range of dynamic loads. On sites 1-5 of each test section, peak-to-peak dynamic forces of 600, 1200, 1800, 2400, and 3600-lb were each applied to the pavement at 25 Hz, and deflection readings were taken for each force. On site 6, a frequency sweep was conducted: readings were taken for each of the dynamic loadings at 15 Hz, at 25 Hz, and at 35 Hz. The velocity sensors for the RR2000 are also located directly under the load and 1', 2', and 3' from the load.

The Dynatest FWD Model AE1030 (Figure A17) is an impulse load NDT device. In this research project, the load was dropped from four different heights, imparting impact loads of approximately 3000-lb, 6500-lb, 10000-lb,

Figure A16 The Road Rater 2000.

Figure A17 The Dynatest FWD Model AE1030.

and 14000-lb. Deflection sensors are located at the point of load and at two offset distances. The sensor at the load is fixed while the other two are moveable. On sites 1-4 of each test section, the 6500 and 14000-lb dynamic loads were each applied twice, with the movable sensors set at 1' and 3' from the load for the first drop and at 2' and 4' for the second drop. At the fifth site, the 6500 and 14000-lb loads were each applied three times, with the deflection sensors moved to 5' and 7' for the third drop. Finally, at site 6, each of the four dynamic loads was applied twice, first with the sensors at 1' and 3', then with the sensors at 2' and 4'.

PAVEMENT CORES AND SOIL BORINGS

Two pavement cores and one set of two shelly tube samples were taken for each of the test sections. The IDOH district offices obtained 6-inch diameter pavement cores at approximately the one-third points of the test sections. The actual pavement layer thicknesses from these two cores were averaged, and the results were assumed to be the thicknesses of the pavement layers throughout each test section. These insitu layer thicknesses replaced the values for thickness found in Road Life Records and were used in the subsequent statistical analysis.

Because the subgrade is a controlling factor for pavement behavior and performance, it was deemed necessary to obtain information on the subgrade soil. The IDOH Materials and Tests Division obtained shelby tube samples at each test section. Although sampling at several locations throughout each test section was desirable, time and personnel constraints dictated one boring per section. In Fort Wayne, LaPorte, Greenfield, and Vincennes Districts, a new pavement core was drilled (in addition to the two which had previously been taken) and four feet of 3-inch diameter shelby tube was pushed into the subgrade. In the remaining two districts, Seymour and Crawfordsville, the tubes were pushed in existing core holes after the filler material was removed. Boring logs included descriptions and thicknesses of the pavement materials, the granular layers below the asphalt or concrete, and the subgrade soil. The top two feet of the subgrade sample was tested for density, moisture content, gradation, and Atterberg limits. This information was used to classify the soil and to estimate its in-place strength. The estimated subgrade strength was then incorporated into the statistical analysis for overlay design.

CONDITION SURVEYS

During summer/fall field testing, condition surveys were performed on each individual pavement test section. These surveys determine the extent and severity of pavement surface distresses such as rutting, polishing, various types of cracking, etc. The PAVER (10) condition survey method was adopted for this research. PAVER deducts values for each distress depending on the extent and severity from an initial score of 100 and calls the result the Pavement Condition Index (PCI). Thus, a pavement with a PCI of 90 is in excellent condition, while one with a PCI of 24 is in very poor condition.

Example survey forms for concrete-surfaced and for asphalt-surfaced pavements are given in Figure A18 and Figure A19. The forms list all the distresses to be recorded.

Each pavement test section is approximately 1250' long. Within each section, six test sites are located 120'-180' apart. A condition survey of 120'-180' requires up to one-half hour, which consumes most of the time required to complete NDT testing. Thus, for each of the 73 test sections, one of the intervals between test sites was randomly selected to be surveyed.

Two adjustments were made in the PAVER survey method. First, only one pavement lane was surveyed, not the entire

SLAB SIZE 15 x 20

Distress Types				
21. Blow-Up	31. Polished			
Buckling/Shattering	Aggregate			
22. Corner Break	32. Popouts			
23. Divided Slab	33. Pumping			
24. Durability ("D")	34. Punctuair			
Cracking	35. Railroad			
25. Faulting	Crossing			
26. Joint Seal Damage	36. Sealing /Map			
27. Lane/Shoulder Drop Off	Cracking/Crazing			
28. Linear Cracking	37. Shrinkage Cracks			
29. Patching, Large &	38. Spalling, Corner			
Util Cuts	39. Spalling, J			
30. Patching, Small	Joint			

DIST. TYPE	SEV.	NO. ** SLABS	% SLABS	DEDUCT VALUE
26*	M	1	5	2
22	L	1	5	2
22	M	1	5	2
29	L	1	5	3
29	M	2	10	2
38	L	2	10	
DEDUCT TOTAL				8 = 2
CORRECTED DEDUCT. VALUE (CDV)				24
PCI = 100 - CDV =				76
* RATING =				VERY GOOD

* Total Number of Sigsps Containing Each Distress of Same Severity

Figure A18 Condition Survey Form for Concrete.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH MOTORPOOL RD.SECTION 1DATE 10/2/79SAMPLE UNIT 1SURVEYED BY SKAREA OF SAMPLE 2500

Distress Types					SKETCH:	
1. Alligator Cracking	*10. Long & Trans Cracking					
2. Bleeding	11. Patching & Util Cut Patching					
3. Block Cracking	12. Polished Aggregate					
*4. Bumps and Sags	*13. Potholes					
5. Corrugation	14. Railroad Crossing					
6. Depression	15. Rutting					
*7. Edge Cracking	16. Shoving					
*8. Jt Reflection Cracking	17. Sloppage Cracking					
*9. Lane/Slidr Drop Off	18. Swell					
	19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
	101	11	15	16		
	10L	1 x 6L	2 x 25L	6 x 4L		
	5	2 x 2M				
	5L					
	5M					
	10L					
	5M					
TOTAL SEVERITY	L	40	1	50	24	
	M	10	16			
	L					
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = <u>67</u> RATING = <u>GOOD</u>		
1	0.24	L	4			
1	0.6	M	17			
6	0.26	L	4			
10	1.60		4			
10	0.1	M	3			
15	2.0	L	13			
DEDUCT TOTAL		Σ = 2	45			
CORRECTED DEDUCT VALUE (CDV)			33			

* All Distresses Are Measured in Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured in Linear Ft; Distress 13 is Measured in Number of Potholes.

Figure A19 Condition Survey Form for Asphalt.

pavement surface. Thus, to be consistent, longitudinal cracking between the lane to be surveyed and the adjoining lane in asphalt pavements was always included among the distresses noted. Secondly, PAVER does not include a specific method for evaluating CRC pavements. Pavements with CRC surfaces were evaluated as JRC pavements with imaginary, perfect, transverse joints at 20' intervals.

PAVEMENT ROUGHNESS DATA

Pavement roughness data for 1986 was obtained from the IDOH Division of Research & Training (R&T) (11). R&T tests pavements with one Cox Model B, PCA roadmeter and one Cox Model E, PCA roadmeter. The basic pavement roughness test result is the roughness number (RN) which gives a measure of the size and number of bumps experienced by an automobile passenger traveling over a length of road. The RN is translated into a Present Serviceability Index (PSI) value through regression equations developed by R&T (12).

The range of PSI values is from 0 to 5, with 5 being a perfect pavement and 0 an exceedingly poor one. However, when using the R&T regression equations, PSI's of greater than 5 may be calculated. When this occurs, the PSI value is reported as 5.

For some test sections, 1985 roughness data (PSI values) is used in place of 1986 data. This substitution occurred for one of two reasons:

1. Although all Indiana highways are tested annually, some portions of pavement are missed. If this occurred for one of the test sections, 1985 data was used.
2. If a test section was chip sealed in 1986 after NDT testing but before roughness was measured, the 1986 roughness data is not compatible with the NDT data. In this case, 1985 data is used.

CHECKING DEFLECTION READINGS

A device and procedure was utilized to check the deflection measured by the sensors used with the four NDT devices. Four direct current linear variable differential transformers (LVDT's) were mounted on an 8-foot long wooden beam similar to that used by Baladi (13). This "reference beam" is shown in Figure A20. The LVDT's were carefully calibrated in the laboratory. In operation, the LVDT's were located adjacent to the deflection sensors for the NDT devices, a test load was applied, and the readings from the two sets of sensors were recorded and compared.

The LVDT's gaging range was ± 0.25 inches; with a

Figure A20 The Reference Beam Fitted With LVDT's.

sensitivity of 41.1 volts/inch. Leads from the LVDT's ran to a 12-channel light beam oscillograph recorder with a maximum sensitivity of 0.05 volts/inch. The oscillograph recorded the displacements on light-sensitive paper. Once mounted, the accuracy of the LVDT's was confirmed by comparing their output against a micrometer caliper of 0.0005 inch accuracy.

In tests of all four NDT devices on both asphalt and concrete pavements conducted at the IDOH Research & Training Center in W. Lafayette, Indiana, the reference beam was positioned as shown in Figure A21. The beam was supported on a 4-inch diameter section of pipe which was placed 6-7 feet away from the NDT loading point (this distance kept the support of the beam out of the deflection basin of the load). The beam was leveled by raising or lowering a jack which was placed under the end of the beam. After being leveled, the beam was locked in position by placing a weight on the beam above the jack.

Extendable screwjacks were placed between the tip of the LVDT probe and the pavement surface. The probe tip matched an indentation in the top of the screw jack. A zero was obtained for each LVDT by adjusting the height of the screwjacks.

During project planning, it was hoped that the LVDT's

Figure A21 Checking FWD Against Reference Beam.

on the beam could be simultaneously positioned next to the sensors on the NDT devices. In practice, the NDT devices geometries did not allow this. Thus, in the field, every individual NDT sensor except at the point of load was tested separately after re-positioning the #1 beam LVDT as close as possible to an NDT sensor and at an equal distance from the load center.

Field tests were performed during one day of the spring test period. On that day, the following tests were completed:

1. The FWD was tested only on flexible pavement.
2. The RR2000 was only tested on flexible pavement.
3. The RR400 was only tested on flexible pavement.
4. The Dynaflect was tested on flexible and concrete pavement.

Deflection test results are shown in Tables A4-A6. They indicate that, within a reasonable error, the FWD sensors were providing accurate deflection readings. The results also show that the LVDT readings did not agree with deflection readings of either Road Rater.

Although some pattern in the Road Rater data may be detected, e.g. the similarity in the "% difference" column for sensors two feet and three feet from load for the

Table A4 Spring FWD Check--Asphalt.

<u>Test#</u>	<u>Sensor Loc.</u>	<u>Load(KPa)</u>	FWD	LVDT	<u>% Diff.</u>
			<u>Defl. (mils)</u>	<u>Defl. (mils)</u>	
1	1 ft.	414	7.5	7.3	-2.7
2	1 ft.	414	7.0	6.8	-2.9
3	1 ft.	414	7.0	6.8	-2.9
4	1 ft.	890	16.2	16.4	1.2
5	1 ft.	890	16.2	16.2	0.0
6	1 ft.	890	16.3	16.5	1.2
7	3 ft.	414	-----	VOID	-----
8	3 ft.	414	3.07	2.76	-11.0
9	3 ft.	414	3.03	2.84	-6.7
10	3 ft.	414	3.07	2.84	-8.1
11	3 ft.	890	7.20	7.30	1.4
12	3 ft.	890	7.24	7.06	-2.6
13	3 ft.	890	7.24	7.14	-1.4

Table A5 Spring RR2000 Check--Asphalt.

<u>Test#</u>	<u>Sensor</u>	<u>Loc.</u>	<u>Load(lb)</u>	RR2000	LVDT	<u>% Diff.</u>
				<u>Defl. (mils)</u>	<u>Defl. (mils)</u>	
1	1 ft.		1200	1.04	0.49	-112.0
2	1 ft.		1200	----	VOID	-----
3	1 ft.		1200	1.01	0.50	-102.0
4	1 ft.		2400	2.17	2.17	0.0
5	1 ft.		2400	2.19	2.14	-2.3
6	1 ft.		2400	2.20	2.26	2.7
7	1 ft.		3600	3.45	3.77	8.5
8	1 ft.		3600	3.43	3.65	6.0
9	1 ft.		3600	3.42	3.77	9.3
10	2 ft.		1200	0.70	1.30	46.2
11	2 ft.		1200	0.69	1.38	50.0
12	2 ft.		1200	0.71	1.26	43.7
13	2 ft.		2400	1.48	2.43	39.1
14	2 ft.		2400	1.47	2.43	39.5
15	2 ft.		2400	1.48	2.35	37.0
16	2 ft.		3600	2.26	3.41	33.7
17	2 ft.		3600	2.24	3.41	34.3
18	2 ft.		3600	2.23	3.45	35.4
19	3 ft.		1200	0.41	0.78	47.4
20	3 ft.		1200	0.42	0.78	46.2
21	3 ft.		1200	0.42	0.83	49.4
22	3 ft.		2400	0.88	1.55	43.2
23	3 ft.		2400	0.87	1.55	43.8
24	3 ft.		2400	0.88	1.55	43.2
25	3 ft.		3600	1.37	2.28	39.9
26	3 ft.		3600	1.36	2.28	40.4
27	2 ft.		3600	1.37	2.28	39.9

Table A6 Spring RR400 Check--Asphalt.

Test#	Sensor Loc.	Load(lb)	RR400	LVD	% Diff.
			Defl. (mils)	Defl. (mils)	
1	1 ft.	1200	1.26	1.54	18.2
2	1 ft.	1200	1.26	1.46	13.7
3	1 ft.	1200	1.26	1.46	13.7
4	1 ft.	1800	2.05	2.43	15.6
5	1 ft.	1800	2.04	2.60	21.5
6	1 ft.	1800	----	VOID	-----
7	2 ft.	1200	0.64	1.14	43.8
8	2 ft.	1200	0.63	1.14	44.7
9	2 ft.	1200	0.63	1.14	44.7
10	2 ft.	1800	1.26	1.78	29.2
11	2 ft.	1800	1.20	1.78	32.6
12	2 ft.	1800	1.20	1.82	34.1
13	3 ft.	1200	0.54	0.41	-31.7
14	3 ft.	1200	0.55	0.45	-22.2
15	3 ft.	1200	0.55	0.41	-34.1
16	3 ft.	1800	1.22	1.30	6.2
17	3 ft.	1800	1.25	1.34	6.7
18	3 ft.	1800	1.25	1.38	9.4

RR2000, the general lack of agreement between the LVDT's and the sensors was disturbing.

No data is given for the Dynaflect. During tests, the oscillograph output remained flat, indicating that no deflection was being measured by the beam. Dynaflect loads are small and result in correspondingly small deflections that were on an order of 0.0001 inch. Such small deflections are outside the capability of the LVDT's used on the reference beam.

Due to the problems encountered in the first test session, one day in the summer/fall test period was also set aside for reference beam testing:

1. The RR2000 was tested on both asphalt and concrete pavements.
2. The RR400 was tested on both asphalt and concrete pavements.
3. The FWD was tested on only concrete pavement.

Test results were similar to spring results and are shown in Tables A7-All. Again, the FWD sensors appear to give reasonable agreement with the LVDT's. A consistent, general trend was not identified for the Road Raters when comparing the same device from spring test date to summer test date. However, the summer RR2000 concrete pavement

Table A7 Summer RR2000 Check--Asphalt.

Test#	Sensor Loc.	Load(lb)	RR2000		LVDT		% Diff.
			Defl. (mils)	Defl. (mils)	Defl. (mils)	Defl. (mils)	
1	1 ft.	1800	2.27		2.00*		-13.5
2	1 ft.	1800	2.21		2.34*		5.6
3	1 ft.	1800	2.27		1.27		78.7
4	1 ft.	1800	----		VOID*		----
5	1 ft.	2400	3.07		2.92*		-5.1
6	1 ft.	2400	3.07		2.87		-7.0
7	2 ft.	2400	1.47		2.86		48.6
8	2 ft.	2400	1.49		2.70		44.8
9	2 ft.	3600	2.25		4.26		47.2
10	2 ft.	3600	2.25		4.30*		47.7
11	3 ft.	1800	0.49		0.29*		-69.0
12	3 ft.	1800	0.50		0.44		-13.6
13	3 ft.	2400	0.69		1.22		43.4
14	3 ft.	2400	0.68		1.46		53.4
15	3 ft.	3600	1.05		2.80		61.4
16	3 ft.	3600	1.05		2.77		62.1

* Possible reference beam system malfunction.

Table A8 Summer RR2000 Check--Concrete.

<u>Test#</u>	<u>Sensor Loc.</u>	<u>Load(lb)</u>	RR2000	LVD	<u>% Diff.</u>
			<u>Defl. (mils)</u>	<u>Defl. (mils)</u>	
1	1 ft.	1800	1.32	4.62	71.4
2	1 ft.	1800	1.32	4.62	71.4
3	1 ft.	2400	1.77	7.42	76.1
4	1 ft.	2400	1.78	7.30	75.6
5	2 ft.	1800	1.17	3.77	68.9
6	2 ft.	1800	1.15	3.83	70.0
7	2 ft.	2400	1.55	5.32	70.8
8	2 ft.	2400	1.56	5.47	71.4
9	3 ft.	1800	0.91	3.22	71.7
10	3 ft.	1800	0.92	3.28	71.9
11	3 ft.	2400	1.23	4.27	71.1
12	3 ft.	2400	1.22	4.51	72.9

Table A9 Summer RR400 Check--Asphalt.

<u>Test#</u>	<u>Sensor Loc.</u>	<u>Load(lb)</u>	RR400	LVDT	% <u>Diff.</u>
			<u>Defl. (mils)</u>	<u>Defl. (mils)</u>	
1	1 ft.	1200	1.69	2.31	26.8
2	1 ft.	1200	1.69	2.62	35.5
3	1 ft.	1800	3.83	4.59	16.6
4	1 ft.	1800	3.83	4.68	18.2
5	2 ft.	1200	----	VOID	----
6	2 ft.	1200	1.02	1.82	44.0
7	2 ft.	1800	----	VOID	-----
8	2 ft.	1800	----	VOID	-----
9	3 ft.	1200	0.64	1.31	51.1
10	3 ft.	1200	0.64	1.34	52.2
11	3 ft.	1800	1.32	1.82	27.5
12	3 ft.	1800	1.32	1.82	27.5

Table A10 Summer RR400 Check--Concrete.

<u>Test#</u>	<u>Sensor Loc.</u>	<u>Load(lb)</u>	<u>RR400</u> <u>Defl. (mils)</u>	<u>LVDT</u> <u>Defl. (mils)</u>	<u>% Diff.</u>
1	1 ft.	1200	1.59	2.19	27.4
2	1 ft.	1200	1.59	2.19	27.4
3	1 ft.	1800	----	VOID	----
4	1 ft.	1800	----	VOID	----
5	2 ft.	1200	0.91	1.46	37.6
6	2 ft.	1200	0.91	1.46	37.6
7	2 ft.	1200	0.91	1.34	32.1
8	2 ft.	1800	1.44	3.02	52.3
9	2 ft.	1800	1.44	3.35	57.0
10	3 ft.	1200	0.74	1.58	53.2
11	3 ft.	1200	0.74	1.58	53.2
12	3 ft.	1800	1.93	2.23	13.4
13	3 ft.	1800	1.93	2.23	13.4

Table All Summer FWD Check--Concrete.

<u>Test#</u>	<u>Sensor Loc.</u>	<u>Load(KPa)</u>	FWD	LVDI	<u>% Diff.</u>
			<u>Defl. (mils)</u>	<u>Defl. (mils)</u>	
1	1 ft.	414	3.42	3.25	-5.2
2	1 ft.	414	3.46	3.41	-1.5
3	1 ft.	414	3.50	3.59	2.5
4	1 ft.	890	7.95	8.18	2.8
5	1 ft.	890	7.91	8.18	3.3
6	1 ft.	890	7.91	8.08	2.1
7	3 ft.	414	1.69	1.46	-15.7
8	3 ft.	650	2.83	2.51	-12.7
9	3 ft.	650	2.83	2.55	-10.9
10	3 ft.	650	2.87	2.55	-12.5
11	3 ft.	900	3.90	3.53	-10.6
12	3 ft.	900	3.90	3.50	-11.4
13	3 ft.	900	3.94	3.53	-11.6
14	3 ft.	999	4.37	3.89	-12.3

deflection test data showed consistency.

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APPENDIX B - DESCRIPTION OF FLEXIBLE PAVEMENT TEST SECTIONS

Table B1 Description of Flexible Pavement Test Sections.

<u>Section *</u>	<u>Co.</u>	<u>Route</u>	<u>General Description and Length</u>	<u>Test Section** Description</u>
C-8	67	US 231	From south of I 70 northerly to Jct. US 40 - 2.97 mi.	From county road by power line tower (2.0 mi. south of Jct. US 40 & 1.6 mi. north of Jct. I 70) northerly (NB)
F-13	85	SR 114	From Fulton/Wabash Co. Line easterly 3.04 mi. - 3.04 mi.	From Fulton/Wabash Co. line easterly (in the town of Disko) (EB)
F-14	1	US 27	From Jct. SR 124 to 0.5 mi. south of Decatur C/L - 4.87 mi.	From CR 200N (3.9 mi. south of US 224 and 2.3 mi. north of SR 124) northerly (SB)
F-15	2	US 33	From 1.1 mi. southeast of Whitley/Allen Co. Line southeasterly - 1.29 mi.	From McDuffee Rd. (2.8 mi. south of SR 205) southeasterly (SB)
F-16	92	SR 114	From Wabash/Whitley Co. Line easterly 2.06 mi. - 2.06 mi.	From CR 850W (appr. 1.6 mi. east of Wabash/Whitley Co. Line and 1.6 mi. west of Jct. SR 105) easterly (EB)
F-17	1	US 27	From Adams/Allen Co. Line southerly 5.09 mi. (SOUTHBOUND lanes) - 5.09 mi.	From CR 900N (4.4 mi. south of Adams/Allen Co. Line and 2.65 mi. north of Decatur C/L) southerly in SOUTHBOUND lanes (SB)
F-18	52	US 31	From Miami/Fulton Co. Line southerly - 2.43 mi.	From Miami/Fulton Co. Line and CR 400S (4.8 mi. south of Jct. SR 25) southerly in SOUTHBOUND lanes (SB)
F-19	90	SR 1	From 3.15 mi. north of Jay/Wells Co. Line northerly to Bluffton C/L - 7.72 mi.	From CR 500S (1.0 mi. north of Jct. SR 218) southerly (SB)

Table B1, Continued.

<u>Section</u>	<u>Co.</u>	<u>Route</u>	<u>General Description and Length</u>	<u>Test Section Description</u>
L-10	64	SR 8	From Crooked Creek Bridge to the Porter/LaPorte Co. Line - 2.78 mi.	From 500' east of CR 500E easterly (WB)
L-11	64	SR 8	From one mile east of Kouts to Crooked Creek Bridge - 0.74 mi.	From 1000' west of Crooked Creek Bridge westerly (WB)
L-12	46	US 421	From south Jct. US 6 to north Jct. US 6 - 0.99 mi.	From entrance to Truck Transport and Redi-Mix plant northerly (north boundary is not painted) (NB)
L-13	25	SR 14	From 1.19 mi. west of Akron to 0.67 mi. west of Akron near Fulton/Kosciusko Co. Line - 0.52 mi.	From 0.15 mi. east of CR 1000E (CR 1000E is 1.4 mi. west of Jct. SR 19) easterly (WB)
L-14	66	US 421	From Jct. SR 114 northerly to Jct. SR 14 - 8.45 mi.	From CR 100S (CR 100S is 1.0 mi. south of no. Jct. SR 14) southerly to near the county schools (SB)
L-15	75	SR 10	From Jasper/Starke Co. Line to Jct. US 421 - 2.02 mi.	From 400' west of CR 1100W westerly (WB)
L-16	37	SR 114	From 2.5 mi. east of Newton/Jasper Co. Line easterly - 2.26 mi.	From CR 700W easterly (located near Rensselaer) (EB)
L-17	37	SR 10	From Newton/Jasper Co. Line easterly - 4.02 mi.	From just east of I 65 easterly - apprx. 0.3 mi. (EB)
S-8	31	US 150	From Washington/Harrison Co. Line to 1.0 mi. east of Jct. SR 135 - 3.46 mi.	From Buffalo Trace Park entrance (0.75 mi. east of Jct SR 135) westerly (EB)

Table B1, Continued.

<u>Section</u>	<u>Co.</u>	<u>Route</u>	<u>General Description and Length</u>	<u>Test Section Description</u>
S-9	69	US 421	From Jefferson/Ripley Co. Line to Jct. US 50 - 12.59 mi.	From CR 1050S (0.6 mi. north of Jefferson/Ripley Co. Line) northerly (NB)
S-10	16	SR 46	From Bartholomew/Decatur Co. Line to 0.5 mi. west of Jct. SR 3 - 6.50 mi.	From CR 600W (1.1 mi. west of Jct. SR 3) westerly (WB)
S-11	69	US 50	From east C/L of Versailles easterly 2.35 mi. to near Jct. SR 129 - 2.35 mi.	From 0.7 mi. east of Jct. US 421 easterly to near Versailles State Park entrance (WB)
S-12	10	SR 60	From east C/L of Borden easterly - 1.73 mi.	From 4.8 mi. east of Jct. SR 335 (at Scenic Valley Apts.) easterly (EB)
S-13	3	SR 46	From east C/L of Columbus City easterly to near Jct. SR 9 - 4.81 mi.	From 3.4 mi. west of Jct. SR 9 westerly to near the County Market (WB)
S-14	3	SR 9	From 0.03 mi. south of Shelby/Bartholomew Co. Line to appr. the town of Hope - 2.40 mi.	From 7.4 mi. north of Jct. SR 46 northerly to near CR 900N (NB)
S-15	10	SR 3	From Jct. SR 203 to Clark/Scott Co. Line - 0.72 mi.	From 3.9 mi. south of Jct. SR 356 southerly (between Jct. SR 362 and Jct. SR 203) (SB)
S-16	55	SR 135	From Brown/Morgan Co. Line to south C/L Morgantown - 1.91 mi.	From 0.8 mi. south of the West Jct. SR 252 southerly (skip culvert in the middle) - 0.2 mi. (SB)

Table B1, Continued.

<u>Section</u>	<u>Co.</u>	<u>Route</u>	<u>General Description and Length</u>	<u>Test Section Description</u>
V-6	19	US 231	From Spencer/Dubois Co. Line to so. C/L of Huntingburg - 5.15 mi.	From appr. 3.5 mi. no. of Jct. I 64 northerly to CR 900S (3.75 mi. south of Jct. SR 64 in Huntingburg) (SB)
V-7	19	US 231	From no. Huntingburg C/L northerly - 1.41 miles	From just south of the transmission lines (0.3 mi. no. of Huntingburg C/L) northerly to 0.3 mi. from beginning of the concrete (NB)
V-8	77	SR 154	From appr. 2.2 mi. west of Jct. SR 63 to appr. 3.0 mi. east of Jct. SR 63 (skip area around SR 63 in Graysville) - 4.95 mi.	From 0.75 mi. east of Jct. SR 63 easterly to county road next to white house & barn with tin roof (6.5 mi. west of US 41) (WB)
V-9	87	I 64	From just east of Jct. SR 61 easterly to Warwick/Spencer Co. Line (EASTBOUND LANES) - 14.58 mi.	Between MP 47 & 48 appr. 8 mi. east of Jct. SR 61 in EASTBOUND lanes (EB)
V-10	62	I 64	From Perry/Dubois Co. Line to 0.4 mi. east of Jct. SR 145 (EASTBOUND LANES) - 5.64 mi.	From 0.5 mi. east of Perry/Dubois Co. Line easterly (between MP 67 & 68) in EASTBOUND lanes (EB)

* C = Crawfordsville District, F = Fort Wayne, G = Greenfield,
L = LaPorte, S = Seymour, V = Vincennes

** All test sections are approximately 0.25 mi. long, except where noted. Limits are yellow arrows painted on the pavement. Tests were run in the right wheel path of the outside lane (if more than 2-lane highway). The lane direction for the test is shown in parenthesis (NB = northbound, etc.).

Table B2 County Names and Corresponding Numbers.

<u>County Name</u>	<u>No.</u>	<u>County Name</u>	<u>No.</u>	<u>County Name</u>	<u>No.</u>
Adams	1	Hendricks	32	Pike	63
Allen	2	Henry	33	Porter	64
Bartholomew	3	Howard	34	Posey	65
Benton	4	Huntington	35	Pulaski	66
Blackford	5	Jackson	36	Putnam	67
Boone	6	Jasper	37	Randolph	68
Brown	7	Jay	38	Ripley	69
Carroll	8	Jefferson	39	Rush	70
Cass	9	Jennings	40	St. Joseph	71
Clark	10	Johnson	41	Scott	72
Clay	11	Knox	42	Shelby	73
Clinton	12	Kosciusko	43	Spencer	74
Crawford	13	Lagrange	44	Starke	75
Daviess	14	Lake	45	Steuben	76
Dearborn	15	LaPorte	46	Sullivan	77
Decatur	16	Lawrence	47	Switzerland	78
Dekalb	17	Madison	48	Tippecanoe	79
Delaware	18	Marion	49	Tipton	80
Dubois	19	Marshall	50	Union	81
Elkhart	20	Martin	51	Vanderburgh	82
Fayette	21	Miami	52	Vermillion	83
Floyd	22	Monroe	53	Vigo	84
Fountain	23	Montgomery	54	Wabash	85
Franklin	24	Morgan	55	Warren	86
Fulton	25	Newton	56	Warrick	87
Gibson	26	Noble	57	Washington	88
Grant	27	Ohio	58	Wayne	89
Greene	28	Orange	59	Wells	90
Hamilton	29	Owen	60	White	91
Hancock	30	Parke	61	Whitley	92
Harrison	31	Perry	62		

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Figure B1 Flexible Test Section Locations in
Crawfordsville District.

FORT WAYNE DISTRICT

Figure B2

Flexible Test Section Locations in
Fort Wayne District.

LAPORTE DISTRICT

Figure B3 Flexible Test Section Locations in LaPorte District.

SEYMOUR DISTRICT

Figure B4 Flexible Test Section Locations in Seymour District.

Oct. 1978

Figure B5 Flexible Test Section Locations in Vincennes District.

APPENDIX C - TESTING DATA BASE

A significant amount of data was collected during the 3-year duration of the overlay design study conducted for IDOH. The data base containing this data which follows includes complete information on section location, traffic, cross section, subgrade soil, climate zone, and deflection testing dates, times, temperatures, and values. A great deal of care was taken in organizing the data to facilitate accessing and manipulating the data. Note that the data is essentially free format for maximum flexibility. The complete set is also available on 5-1/4" floppy diskettes from the Transportation Area, School of Civil Engineering, Purdue University, West Lafayette, IN 47907.

Following is an entry-by-entry explanation of each value found in the data set:

Line No. 1 - Location, Traffic, and Climate Zone Data

Test Section Number (Entry 1). The test sections in each IDOH district (C = Crawfordsville, F = Fort Wayne, G = Greenfield, L = LaPorte, S = Seymour, and V = Vincennes) are numbered consecutively in the following order: CRCP,

JRCP, and Asphalt.

County Number (Entry 2). This entry identifies the county in which the test section is located. The 92 counties are numbered consecutively in alphabetical order. Appendix B contains a list of corresponding county names and numbers.

Route Type (Entry 3). The route types (I = Interstate, US = United States, and SR = State Road) correspond to those used in route signing by the State of Indiana.

Route Number (Entry 4). The route numbers correspond to those used in route signing by the State of Indiana.

Average Annual Daily Traffic (AADT) (Entry 5). The IDOH Division of Planning maintains traffic information by highway. Each highway in each county is divided into several sections, and the AADT is determined for each section. The IDOH updates the traffic information for each route every three years.

Percent Trucks (Entry 6). This entry shows the percent of the AADT which is composed of trucks. Percent truck data was obtained from a Ph.D thesis by E.A. Sharaf titled "Analysis of Highway Maintenance Costs" (Purdue University, August 1984). Seventeen interstate and thirty-one primary rural highway counting sites were located in various counties throughout the state. At each of these stations,

periodic traffic counts were made for both trucks and automobiles during several consecutive years. The percent trucks was calculated at each count station. This value was considered representative of all similar highway types throughout the county in which the station was located. In counties which had no count station, percent trucks was extrapolated or interpolated from adjacent counties or from counties with similar traffic and demographic characteristics.

Number of Trucks (Entry 7). This value was obtained by multiplying AADT by percent trucks on each test section.

Climate Zone (Entry 8). The state was divided into two climate zones (N = north and S = south). The dividing line begins near Kentland in the west and extends to near the Jay/Adams county line in the east. Factors included when determining this boundary include temperature, precipitation, and ground moisture.

Line No. 2 - General Pavement Section Data

General Section Description (Entry 1). A pavement section is considered to have the same cross section throughout its length. Sections were identified by construction or maintenance contract number found in Road Life Records, Division of Planning, IDOH. A 1250' test section was

selected within the boundaries of this general section. A list of definitions of the abbreviations used in the descriptions follows:

F. = From	m. = miles
CL = county line	n. = north
C/L = city limit	e. = east
NB = northbound	s. = south
EB = eastbound	w. = west
SB = southbound	se. = southeast
WB = westbound	CR = county road

Length of the General Section (Entry 2). The length is given in miles.

Line No. 3 - Pavement Test Section Data

Test Section Description (Entry 1). The location of each pavement test section is described. Deflection, condition, serviceability, traffic, subgrade, and climate data for this project were collected on each section. Definitions of abbreviations are the same as listed in the General Section Description.

Length of Test Section (Entry 2). The length is given in miles and is approximately 0.25 miles for every test section.

Line No. 4 - Pavement Cross Section Data

Cross Section Type (Entry 1). A number from 1 to 7 is shown.

1 = bituminous pavement

2 = asphalt on JRCP

3 = asphalt on JPCP

4 = asphalt on CRCP

5 = non-overlaid JRCP

6 = non-overlaid JPCP

7 = non-overlaid CRCP

Contract Number (Entry 2). This contract number is the one under which the newest overlay was constructed.

Year Construction Ended (Entry 3). Listed are the last two digits of the year in which the contract for the newest overlay was completed.

Age of Newest Overlay (Entry 4). Testing during this study was conducted in 1986. The overlay age is calculated by subtracting the year construction ended from 1986. If no overlay has been placed on the original pavement, this value is the age of the original pavement.

Latest Overlay Thickness (Entry 5). The thicknesses shown for the newest asphaltic concrete overlay are in inches. If a pavement has not been overlaid, zero is shown.

Ratio of Newest Overlay Thickness to Total Pavement Thickness (Entry 6). Total pavement thickness consists of the sum of all asphaltic thicknesses which have been placed in the test section. Total thickness does not include granular base or subbase. The ratio is zero for all flexible pavements. (This factor was not used in the analysis of data for AC pavements; thus, it was not calculated.)

Thickness of Asphaltic Concrete Base (Entry 7). Asphaltic concrete "base" consists of all AC which is under the newest AC overlay in bituminous pavements. Thicknesses listed are in inches. A value of zero is shown when no (AC) base is present.

Portland Cement Concrete Thickness (Entry 8). For all composite pavements and PC pavements, these thicknesses are shown in inches. A value of zero appears when the pavement cross section is AC.

Subbase Thickness (Entry 9). The thicknesses of subbase under the AC or PCC pavements are given in inches. Zero is shown if the pavement lies directly on the subgrade.

Subbase Type (Entry 10). For subbase type, the following code was used:

G = granular

BS = bituminous stabilized

N = none present

Line No. 5 - Subgrade Data

Three-inch shelly tubes were pushed into the subgrade through a six-inch core holes in each of the pavement test sections. From this sample, sieve analyses, Atterberg limit, dry unit weight, moisture content, and specific gravity tests were conducted to ascertain the following data shown in this line of the data base:

AASHTO Soil Classification (Entry 1).

AASHTO Soil Group Index (Entry 2).

Unified Soil Classification (Entry 3).

Dry Unit Weight (Entry 4).

In-place Moisture Content (Entry 5).

Estimated CBR (%) (Entry 6). See the "Thickness Design for Concrete Highway and Street Pavements", Portland Cement Association, 1984, p. 7. The two soil classifications were used to estimate the CBR values.

Liquid Limit (Entry 7).

Plastic Limit (Entry 8).

Plasticity Index (Entry 9).

Specific Gravity (Entry 10).

Line No. 6 - Condition, Performance,
and Skid Measurements

Condition Rating (Entry 1). Pavement condition was quantified using the pavement maintenance management system (PAVER) developed by M.D. Shahin and S.D. Kohn for the U.S. Army Corps of Engineers and discussed in Technical Report M-294, "Pavement Maintenance Management for Roads and Parking Lots", USACE-CERL, October 1981.

Serviceability Measurement (Entry 2). The IDOH Research and Training Center measures roughness of Indiana highway pavements on a three year cycle using the Portland Cement Association (PCA) Roadmeter. The roughness values obtained are converted to Present Serviceability Index (PSI) using a regression equation relating these roughness values to PSI.

Skid Number (Entry 3). The IDOH Research and Training Center yearly quantifies skid characteristics of Indiana highway pavements using a skid trailer.

Line No. 7 - Number of Days of Testing

Deflection measurement were made during two testing periods - spring and summer/fall. Because of equipment malfunctions, not all test sections were tested by all NDT deflection testing devices on the same day. This line has one entry showing the total number of days in the combined spring and summer/fall testing sessions that deflection testing was performed on a pavement test section.

Line No. 8 - Testing Dates, Times,
Temperatures, and Devices Used

Date of Test (Entry 1).

Equipment Used (Entries 2 through 5). Four NDT devices were used during the pavement testing. The use of the Dynaflect, Road Rater 400 (RR400), Road Rater 2000 (RR2000), and Dynatest Falling Weight Deflectometer (FWD) at a test section on a particular day may be ascertained from the second, third, fourth, and fifth entries, respectively, on this data line. A "1" as an entry indicates that a device was used, and a "0" indicates that it was not. For example, the entry "1 0 1 0" as the second through fifth entries would show that the Dynaflect and the RR2000 were used on a test section on the date shown.

Beginning and Ending Times of Testing (Entries 6 and 7).

All times shown are in military time.

Pavement Surface Temperatures (Entries 8 through 10). Pavement temperatures in degrees-Fahrenheit were measured at different times throughout the deflection testing. A maximum of three measurements were made. A zero is placed in remaining entries if fewer than three temperature measurements were taken.

Air Temperature (Entry 11). A thermometer was placed in the shade away from the pavement at the test site to obtain the air temperature in degrees-Fahrenheit.

Five-day Average Air Temperature (Entry 12). The average temperature for the five days before the test day was calculated by adding the high and low temperatures for all five days and dividing by ten. This value was used in obtaining the temperature correction factor for the deflection values. Deflections were converted to equivalent deflections at 70 degrees-F. Temperature information was obtained from the climatological data published by the National Oceanic and Atmospheric Administration (NOAA).

Line No. 9 - First NDT Deflection Device

The name of the device for which deflection data is about to be listed is named.

Lines 10, etc. - Deflection Data

Raw, pre-temperature-corrected data obtained from each NDT deflection testing device which was used on a given day is given. Unique amounts of data were recorded for each NDT device; thus each line has entries of different data types:

Dynaffect - site no., location of loading site, load magnitude, frequency magnitude, and deflections at sensors 0, 1, 2, 3, and 4.

Road Raters 400 and 2000 - site no., load no., frequency no., location of loading site, load magnitude, frequency magnitude, and deflections at sensors 0, 1, 2, and 3.

Dynatest FWD - site number, load number, location of loading site, load magnitude, and deflections at sensors 0, 1, 2, 3, 4, 5, and 7.

More detailed descriptions of the data line entries follow.

Site Number. Each test section was tested at six locations, or sites, within the section. On some JRCP test sections, a seventh site was added at a joint. The sites are numbered consecutively in the order that testing was performed.

Load Number. Load imparted to the pavement may be varied by several of the devices. These loads are numbered consecutively from lowest to highest.

Frequency Number. When frequency of loading could be varied, the frequencies were numbered consecutively from low to high.

Location of Loading Site. On jointed concrete pavements, the test sites were generally located in the right wheel path at mid-slab or at a joint. On bituminous and CRC pavements, the location of these sites was random. The following entries are made based upon location:

- 0 = not applicable
- 1 = adjacent to joint
- 2 = mid-slab

Load Magnitude. The load magnitude for the Dynaflect and Road Raters are listed in kips of force. Kilopascals (kPa) are the units for the FWD loading. The circular plate through which the FWD load is imparted has a diameter of 300mm.

Frequency Magnitude The frequency of the loading is shown in Hz.

Deflection at Sensor No. 0. This deflection sensor is located at the center of loading for each device. The remaining sensors are numbered according to their distance in feet from sensor no. 0 (or the load center). They radiate from the load center at one-foot intervals, except for sensor no. 7 which is two feet from sensor no. 5 for the FWD; there is no sensor no. 6. The deflection values shown for all sensors for the Dynaflect and Road Raters are in milli-inches, or mils. The FWD deflection values are in

microns.

Deflection at Sensor No. 1.

Deflection at Sensor No. 2.

Deflection at Sensor No. 3.

Deflection at Sensor No. 4.

Deflection at Sensor No. 5.

Deflection at Sensor No. 7.

Once deflection information is completed for a given day, lines 8 and after are repeated for the next test date on that test section. When all deflection data has been listed for a test section, the process is repeated from line 1 for the next section.

"C8" 67 "US" 231 6040 17.0 1027 "S"
 "F. s. of 170 northerly to US40" 4.05
 "F. road 3 power line tower (2.0m. s. of US40) northerly (NB)" 0.25
 1 13468 82 4 2.0 0.00 13.5 0.0 14.4 "S"
 "A-7-6" 10 "CL" 106.4 21.1 9 40.8 17.8 23.0 2.70
 94 3.6 0
 2
 "03 27-86" 1 1 0 1 0815 0845 37 0 0 35 45
 "Dynalect"
 1 0 1.0 8 0.62 0.49 0.37 0.30 0.19
 2 0 1.0 8 0.54 0.40 0.29 0.23 0.14
 3 0 1.0 8 0.53 0.39 0.28 0.21 0.13
 4 0 1.0 8 0.53 0.39 0.29 0.24 0.15
 5 0 1.0 8 0.43 0.31 0.23 0.19 0.12
 6 0 1.0 8 0.37 0.26 0.19 0.17 0.10
 "Road Rater 400"
 1 1 2 0 0.60 24.9 0.61 0.33 0.55 1.31
 1 2 2 0 1.24 24.9 1.37 0.61 1.11 1.54
 1 3 2 0 1.83 24.9 1.54 1.97 2.15 2.75
 2 1 2 0 0.58 24.9 0.36 0.18 1.76 0.45
 2 2 2 0 1.22 24.9 0.82 0.69 2.14 2.37
 2 3 2 0 1.82 25.0 1.38 1.21 1.04 2.42
 3 1 2 0 0.63 25.2 0.49 0.32 1.80 0.49
 3 2 2 0 1.26 25.3 1.06 1.05 1.47 1.46
 3 3 2 0 1.87 25.3 2.11 2.02 0.73 1.27
 4 1 2 0 0.61 25.2 0.39 0.14 0.68 0.20
 4 2 2 0 1.25 25.3 0.81 0.76 0.90 0.47
 4 3 2 0 1.85 25.3 1.71 1.55 1.29 2.75
 5 1 2 0 0.60 25.2 0.25 0.12 0.24 0.10
 5 2 2 0 1.22 25.3 0.57 1.13 2.35 0.29
 5 3 2 0 1.88 25.3 1.24 1.07 0.82 2.90
 6 1 1 0 0.62 15.4 0.24 0.17 0.13 0.34
 6 2 1 0 1.23 15.0 0.51 0.37 0.34 1.12
 6 1 2 0 0.61 25.2 0.27 0.22 0.19 0.07
 6 2 2 0 1.26 25.2 0.66 0.62 1.50 0.39
 6 3 2 0 1.84 25.2 1.38 1.34 1.15 2.75
 6 1 3 0 0.58 35.1 0.16 0.11 0.03 0.04
 6 2 3 0 1.18 35.1 0.38 0.27 0.24 0.18
 6 3 3 0 1.67 35.1 1.48 2.47 4.39 4.79
 "Dynatest FWD"
 1 2 0 461 151 114 90 58 40 0 0
 1 4 0 945 312 245 184 127 91 0 0
 2 2 0 456 132 106 74 49 34 0 0
 2 4 0 948 278 223 162 108 74 0 0
 3 2 0 456 135 106 77 50 35 0 0
 3 4 0 945 280 224 161 112 77 0 0
 4 2 0 454 126 104 74 53 37 0 0
 4 4 0 945 270 221 163 117 84 0 0
 5 2 0 455 109 83 63 41 31 0 0
 5 4 0 945 225 177 133 93 67 0 0
 6 1 0 219 46 33 27 15 13 0 0
 6 2 0 445 98 79 53 35 25 0 0
 6 3 0 689 149 118 86 55 41 0 0
 6 4 0 948 205 164 122 77 57 0 0
 "08-12-86" 1 1 1 1 1205 1235 99 101 110 77 69
 "Dynalect"
 1 0 1.0 8 0.67 0.52 0.35 0.24 0.16
 2 0 1.0 8 0.58 0.42 0.27 0.17 0.11
 3 0 1.0 8 0.56 0.40 0.25 0.17 0.11
 4 0 1.0 8 0.60 0.44 0.29 0.20 0.13
 5 0 1.0 8 0.43 0.31 0.22 0.16 0.12
 6 0 1.0 8 0.37 0.25 0.17 0.13 0.09
 "Road Rater 400"
 1 1 2 0 0.61 25.2 0.62 0.48 0.34 0.22
 1 2 2 0 1.24 25.2 1.40 1.26 0.84 0.57
 1 3 2 0 1.84 25.2 2.43 2.04 1.44 1.09
 2 1 2 0 0.62 25.2 0.49 0.38 0.27 0.16
 2 2 2 0 1.23 25.2 1.23 0.91 0.68 0.42
 2 3 2 0 1.83 25.2 2.05 1.56 1.10 0.67
 3 1 2 0 0.61 25.2 0.66 0.64 0.32 0.33

3	2	2	0	1.24	25.3	1.59	1.39	0.87	0.82
3	2	2	0	1.85	25.2	2.66	3.40	1.46	1.34
4	1	2	0	0.59	24.9	0.58	0.49	0.36	0.27
4	2	2	0	1.21	25.0	1.42	1.25	0.90	0.67
4	3	2	0	1.84	25.0	2.30	2.01	1.43	1.06
5	1	2	0	0.59	25.0	0.34	0.28	0.19	0.13
5	2	2	0	1.22	25.0	0.88	0.72	0.48	0.36
5	3	2	0	1.81	25.0	1.44	1.20	0.78	0.56
6	1	1	0	0.61	15.0	0.27	0.25	0.14	0.09
6	2	1	0	1.26	15.1	0.68	0.57	0.35	0.23
6	1	2	0	0.59	24.8	0.39	0.23	0.23	0.18
6	2	2	0	1.21	24.9	0.94	0.60	0.58	0.47
6	3	2	0	1.80	24.9	1.53	1.25	0.91	0.75
6	1	3	0	0.60	35.1	0.28	0.19	0.12	0.08
6	2	3	0	1.18	35.0	0.82	0.60	0.36	0.25
6	3	3	0	1.80	35.1	1.41	1.05	0.64	0.45
"Road Rater 2000"									
1	1	2	0	0.57	25.0	0.49	0.34	0.28	0.20
1	2	2	0	1.21	25.0	1.15	0.81	0.61	0.44
1	3	2	0	1.83	25.0	1.82	1.27	0.94	0.66
1	4	2	0	2.41	25.0	2.57	1.80	1.33	0.91
1	5	2	0	3.63	25.0	4.31	2.99	2.14	1.44
2	1	2	0	0.58	25.0	0.47	0.31	0.24	0.18
2	2	2	0	1.17	25.0	1.01	0.66	0.46	0.32
2	3	2	0	1.82	25.0	1.60	1.06	0.73	0.51
2	4	2	0	2.42	25.0	2.29	1.50	1.01	0.69
2	5	2	0	3.61	25.0	3.74	2.47	1.61	1.08
3	1	2	0	0.56	24.9	0.62	0.46	0.44	0.29
3	2	2	0	1.18	25.0	1.35	1.03	0.93	0.66
3	3	2	0	1.83	25.0	2.16	1.61	1.31	0.99
3	4	2	0	2.42	25.0	3.02	2.30	1.71	1.37
3	5	2	0	3.60	25.0	4.85	3.64	2.60	2.09
4	1	2	0	0.59	25.0	0.52	0.37	0.30	0.25
4	2	2	0	1.18	25.0	1.11	0.84	0.65	0.50
4	3	2	0	1.76	24.9	1.73	1.30	1.01	0.78
4	4	2	0	2.40	25.0	2.56	1.90	1.46	1.10
4	5	2	0	3.58	25.0	4.18	2.98	2.25	1.68
5	1	2	0	0.60	25.0	0.49	0.24	0.18	0.15
5	2	2	0	1.24	25.0	0.99	0.51	0.39	0.31
5	3	2	0	1.79	25.0	1.53	0.81	0.59	0.47
5	4	2	0	2.44	25.0	2.19	1.14	0.84	0.64
5	5	2	0	3.64	25.0	3.41	1.84	1.33	0.99
6	1	1	0	0.60	15.2	0.32	0.20	0.15	0.13
6	2	1	0	1.23	15.2	0.66	0.41	0.31	0.23
6	3	1	0	1.79	15.2	1.08	0.67	0.47	0.36
6	4	1	0	2.38	15.3	1.53	0.96	0.65	0.48
6	5	1	0	3.63	15.2	2.54	1.55	1.10	0.77
6	1	2	0	0.61	25.1	0.39	0.29	0.24	0.21
6	2	2	0	1.17	25.1	0.79	0.57	0.46	0.38
6	3	2	0	1.80	25.1	1.25	0.89	0.73	0.60
6	4	2	0	2.41	25.1	1.75	1.24	1.00	0.81
6	5	2	0	3.62	25.1	2.73	1.94	1.53	1.23
6	1	3	0	0.62	35.2	0.26	0.16	0.13	0.13
6	2	3	0	1.23	35.2	0.55	0.33	0.25	0.19
6	3	3	0	1.83	35.2	0.83	0.52	0.37	0.28
6	4	3	0	2.43	35.2	1.19	0.73	0.51	0.39
6	5	3	0	3.63	35.2	1.98	1.19	0.82	0.61
"Dynatest FWD"									
1	2	0	387	232	153	93	55	35	26
1	4	0	815	467	324	204	121	79	59
2	2	0	385	206	138	81	45	27	0
2	4	0	812	426	295	180	107	64	0
3	2	0	383	213	141	80	46	31	21
3	4	0	808	422	290	177	109	70	51
4	2	0	381	211	139	87	54	33	0
4	4	0	804	435	299	193	123	80	0
5	2	0	382	157	99	57	40	26	22
5	4	0	806	314	203	128	91	62	47
6	1	0	0	0	0	0	0	0	0
6	2	0	380	131	78	49	33	26	0

6	3	0	590	196	122	77	51	40	0	0
6	4	0	806	265	168	108	74	58	0	0

"F13" 83 "SR" 114 1750 25.0 438 "N"
 "F. Fulton/Wabash CL easterly" 3.04
 "F. Fulton/Wabash CL easterly in Disko (EB)" 0.25
 1 8561 71 15 1.9 0.00 5.6 0.0 15.6 "6"
 "A-2-4" 0 "SM" 118.2 11.0 38 0.0 0.0 0.0 2.68
 64 2.5 0

"04-02-86" 1 1 1 1 1340 1410 77 0 0 60 58
 "Dynalect"

1	0	1.0	8	0.89	0.67	0.44	0.28	0.16
2	0	1.0	8	1.01	0.65	0.36	0.20	0.12
3	0	1.0	8	1.19	0.81	0.48	0.29	0.18
4	0	1.0	8	1.24	0.81	0.46	0.26	0.15
5	0	1.0	8	1.25	0.77	0.42	0.24	0.14
6	0	1.0	8	1.16	0.73	0.40	0.23	0.14

"Road Rater 400"

1	1	2	0	0.62	25.2	0.81	0.71	0.49	0.31
1	2	2	0	1.24	25.2	2.32	1.58	1.09	0.71
1	3	2	0	1.88	25.2	3.03	2.78	2.00	1.32
2	1	2	0	0.62	25.2	0.96	0.67	0.96	0.20
2	2	2	0	1.25	25.2	2.06	1.47	0.93	0.44
2	3	2	0	1.86	25.2	3.88	2.72	1.92	0.78
3	1	2	0	0.61	25.2	0.99	0.68	0.46	0.25
3	2	2	0	1.23	25.2	2.22	1.40	1.86	1.05
3	3	2	0	1.89	25.3	4.32	3.08	1.98	3.06
4	1	2	0	0.62	25.2	1.18	0.91	0.47	0.28
4	2	2	0	1.24	25.2	2.55	2.31	1.00	0.58
4	3	2	0	1.89	25.3	4.71	3.71	1.87	1.89
5	1	2	0	0.62	25.2	1.09	1.07	0.96	0.25
5	2	2	0	1.24	25.2	2.30	2.03	0.86	0.50
5	3	2	0	1.86	25.3	4.56	3.14	1.66	0.97
6	1	1	0	0.65	15.2	0.92	0.57	0.32	0.17
6	2	1	0	1.23	15.3	2.05	1.26	0.69	0.66
6	1	2	0	0.61	25.1	1.09	0.72	0.41	0.13
6	2	2	0	1.22	25.1	2.36	1.49	0.87	0.89
6	3	2	0	1.85	25.1	4.45	3.00	1.36	1.00
6	1	3	0	0.60	35.2	0.86	0.55	0.19	0.07
6	2	3	0	1.19	35.1	2.17	1.43	0.83	0.51
6	3	3	0	1.80	35.2	4.96	3.29	1.82	0.95

"Road Rater 2000"

1	1	2	0	0.60	25.2	0.66	0.51	0.37	0.26
1	2	2	0	1.21	25.2	1.46	1.10	0.77	0.55
1	3	2	0	1.80	25.0	2.26	1.72	1.17	0.83
1	4	2	0	2.40	25.0	3.18	2.44	1.65	1.17
1	5	2	0	3.58	25.0	5.29	4.02	2.79	1.89
2	1	2	0	0.61	25.1	0.84	0.48	0.28	0.16
2	2	2	0	1.19	25.0	1.82	1.01	0.59	0.34
2	3	2	0	1.78	25.0	3.04	1.70	0.96	0.54
2	4	2	0	2.39	25.0	4.49	2.50	1.37	0.78
2	5	2	0	3.62	25.0	7.91	4.52	2.36	1.30
3	1	2	0	0.60	25.0	0.83	0.57	0.36	0.25
3	2	2	0	1.18	25.0	1.88	1.33	0.86	0.55
3	3	2	0	1.80	25.0	3.35	2.34	1.44	0.93
3	4	2	0	2.37	25.0	4.96	3.46	2.09	1.34
3	5	2	0	3.58	25.0	9.32	6.46	3.85	2.36
4	1	2	0	0.62	25.1	0.96	0.59	0.37	0.24
4	2	2	0	1.20	25.0	2.13	1.31	0.77	0.50
4	3	2	0	1.81	25.0	3.53	2.19	1.24	0.78
4	4	2	0	2.40	25.0	5.16	3.18	1.78	1.09
4	5	2	0	3.62	25.0	9.40	5.62	3.03	1.80
5	1	2	0	0.59	25.0	0.93	0.52	0.26	0.20
5	2	2	0	1.19	25.0	2.14	1.21	0.62	0.43
5	3	2	0	1.82	25.1	3.67	2.07	1.07	0.69
5	4	2	0	2.38	25.0	5.24	3.01	1.50	0.95

5	5	2	0	3.59	25.0	9.73	5.55	3.00	1.61
6	1	1	0	0.59	15.1	0.86	0.48	0.33	0.18
6	2	1	0	1.23	15.0	1.96	1.07	0.68	0.38
6	3	1	0	1.80	15.0	3.27	1.85	1.09	0.60
6	4	1	0	2.39	15.0	4.60	2.80	1.52	0.86
6	5	1	0	3.58	15.0	9.38	5.36	2.80	1.52
6	1	2	0	0.59	25.1	0.91	0.52	0.35	0.22
6	2	2	0	1.19	25.1	2.04	1.21	0.75	0.48
6	3	2	0	1.81	25.1	3.44	2.01	1.16	0.75
6	4	2	0	2.40	25.1	4.95	2.90	1.69	1.05
6	5	2	0	3.60	25.1	8.81	5.15	2.71	1.74
6	1	3	0	0.62	35.1	0.87	0.50	0.30	0.20
6	2	3	0	1.20	35.1	1.90	1.10	0.64	0.42
6	3	3	0	1.81	35.1	3.23	1.87	1.03	0.67
6	4	3	0	2.41	35.1	4.68	2.74	1.47	0.94
6	5	3	0	3.61	35.1	8.18	4.80	2.47	1.53
"Dynatest FWD"									
1	2	0	438	285	214	135	80	48	0
1	4	0	920	637	477	310	180	108	0
2	2	0	425	455	269	126	55	36	0
2	4	0	905	946	605	287	129	77	0
3	2	0	426	527	342	171	89	52	0
3	4	0	905	1080	716	385	194	111	0
4	2	0	420	531	327	156	72	42	0
4	4	0	896	1060	677	345	167	94	0
5	2	0	414	542	353	148	69	42	34
5	4	0	900	1145	736	343	149	91	0
6	1	0	192	197	135	48	29	17	0
6	2	0	420	508	285	131	63	41	0
6	3	0	649	717	436	197	101	67	0
6	4	0	900	975	587	270	139	87	0
"08-26-86"	1	1	0	1	0830	0855	82	83	78
"Dynaflect"									
1	0	1.0	8	0.67	0.52	0.34	0.22	0.15	
2	0	1.0	8	0.74	0.48	0.28	0.17	0.10	
3	0	1.0	8	0.84	0.57	0.35	0.23	0.15	
4	0	1.0	8	0.92	0.60	0.34	0.20	0.13	
5	0	1.0	8	0.82	0.56	0.33	0.20	0.13	
6	0	1.0	8	0.77	0.51	0.30	0.19	0.12	
"Road Rater 400"									
1	1	2	0	0.60	25.0	0.64	0.92	1.19	2.93
1	2	2	0	1.20	25.0	1.40	1.20	1.48	3.57
1	3	2	0	1.82	25.1	2.51	2.16	3.06	6.67
2	1	2	0	0.58	25.0	0.71	0.50	0.28	0.34
2	2	2	0	1.21	25.0	1.64	1.13	0.62	0.64
2	3	2	0	1.79	25.0	2.96	2.01	1.05	2.23
3	1	2	0	0.60	25.0	0.84	0.59	0.38	0.18
3	2	2	0	1.22	25.0	1.91	1.37	0.83	0.43
3	3	2	0	1.83	25.1	3.64	2.58	1.54	0.94
4	1	2	0	0.59	25.0	0.94	0.65	0.36	0.48
4	2	2	0	1.20	25.0	2.25	1.53	0.83	1.53
4	3	2	0	1.82	25.1	4.17	2.81	1.47	3.76
5	1	2	0	0.59	25.0	0.81	0.56	0.34	0.35
5	2	2	0	1.21	25.0	1.89	1.28	0.76	0.44
5	3	2	0	1.81	25.1	3.43	2.31	1.32	0.98
6	1	1	0	0.60	15.0	0.57	0.46	0.19	0.25
6	2	1	0	1.20	15.1	1.38	1.14	0.70	1.20
6	1	2	0	0.60	25.1	0.78	0.48	0.26	0.22
6	2	2	0	1.22	25.1	1.86	1.14	0.76	0.38
6	3	2	0	1.81	25.1	3.44	2.39	1.35	0.18
6	1	3	0	0.60	35.1	0.68	0.46	0.28	0.26
6	2	3	0	1.21	35.0	1.90	1.29	0.82	0.81
6	3	3	0	1.80	35.1	4.97	2.69	1.75	1.13
"Dynatest FWD"									
1	2	0	395	257	182	111	63	41	29
1	4	0	922	619	450	278	157	102	66
2	2	0	391	399	219	100	47	28	0
2	4	0	907	863	528	260	122	74	0
3	2	0	386	476	294	144	76	46	32
3	4	0	892	1047	693	363	189	110	76

4	2	0	382	488	271	119	58	35	0	0
4	4	0	895	1020	626	300	148	89	0	0
5	2	0	334	405	242	114	59	37	27	17
5	4	0	902	902	585	296	140	90	68	44
6	1	0	0	0	0	0	0	0	0	0
6	2	0	382	381	213	104	54	35	0	0
6	3	0	612	567	339	166	88	57	0	0
6	4	0	899	785	479	243	131	85	0	0

"F14" 1 "US" 27 6000 27.5 1650 "N"
 "F. SR124 to 0.5m. s. of Decatur C/L" 4.87
 "F. CR200N (2.3m. n. of SR124) northerly (SB)" 0.25
 1 12840 81 5 0.8 0.00 9.5 0.0 19.2 "G"
 "A-7-6" 13 "CL" 108.7 21.4 9 42.3 20.3 22.0 2.67
 68 3.5 0

2
 "04-08-86" 1 1 1 1 1010 1040 71 0 0 55 59
 "Dynalect"

1	0	1.0	8	1.04	0.77	0.50	0.33	0.21
2	0	1.0	8	1.08	0.86	0.61	0.42	0.28
3	0	1.0	8	0.92	0.74	0.54	0.39	0.27
4	0	1.0	8	0.93	0.74	0.54	0.39	0.27
5	0	1.0	8	1.00	0.79	0.56	0.40	0.27
6	0	1.0	8	0.98	0.75	0.53	0.37	0.25

"Road Rater 400"

1	1	2	0	0.57	24.2	0.85	1.82	0.55	0.36
1	2	2	0	1.24	25.0	2.49	2.17	1.32	0.95
1	3	2	0	1.81	25.0	3.35	1.96	2.27	1.66
2	1	2	0	0.60	25.0	0.83	0.50	0.55	0.43
2	2	2	0	1.20	25.0	1.85	1.84	1.22	0.96
2	3	2	0	1.80	25.0	3.24	2.82	2.16	1.61
3	1	2	0	0.61	25.0	0.73	0.52	0.51	0.39
3	2	2	0	1.23	25.0	1.62	1.41	1.12	0.89
3	3	2	0	1.79	25.0	2.74	3.40	1.42	1.47
4	1	2	0	0.60	25.0	0.73	0.76	0.38	0.42
4	2	2	0	1.21	25.0	1.66	1.58	0.83	0.96
4	3	2	0	1.83	25.0	2.81	2.85	1.97	1.46
5	1	2	0	0.59	25.0	0.75	0.62	0.31	0.38
5	2	2	0	1.22	25.0	1.73	1.15	1.25	0.89
5	3	2	0	1.81	25.0	2.50	2.79	1.87	1.48
6	1	1	0	0.62	15.2	0.68	0.56	0.43	0.43
6	2	1	0	1.24	15.2	1.58	1.24	0.85	0.87
6	1	2	0	0.60	24.9	0.84	0.72	0.52	0.42
6	2	2	0	1.24	25.1	2.01	1.40	1.12	0.91
6	3	2	0	1.82	25.1	3.57	2.62	2.31	1.20
6	1	3	0	0.61	35.3	0.66	0.57	0.29	0.25
6	2	3	0	1.21	35.0	1.58	1.35	0.64	0.60
6	3	3	0	1.81	35.0	3.57	2.68	1.47	0.89

"Road Rater 2000"

1	1	2	0	0.63	25.0	0.84	0.61	0.44	0.33
1	2	2	0	1.17	25.0	1.82	1.30	0.93	0.68
1	3	2	0	1.80	25.0	2.97	2.13	1.50	1.10
1	4	2	0	2.41	25.0	4.29	3.07	2.23	1.53
1	5	2	0	3.61	25.0	7.22	5.15	3.72	2.50
2	1	2	0	0.59	25.0	0.75	0.62	0.48	0.37
2	2	2	0	1.16	25.0	1.63	1.41	1.05	0.80
2	3	2	0	1.79	25.0	2.72	2.32	1.70	1.28
2	4	2	0	2.43	25.0	3.89	3.30	2.38	1.77
2	5	2	0	3.59	25.0	6.55	5.47	3.86	2.77
3	1	2	0	0.59	25.0	0.73	0.59	0.49	0.39
3	2	2	0	1.20	24.9	1.64	1.31	1.05	0.82
3	3	2	0	1.80	25.0	2.55	2.02	1.62	1.27
3	4	2	0	2.42	25.0	3.78	2.90	2.28	1.76
3	5	2	0	3.60	25.0	6.06	4.70	3.65	2.78
4	1	2	0	0.56	25.1	0.77	0.58	0.49	0.38
4	2	2	0	1.19	25.1	1.83	1.38	1.06	0.87
4	3	2	0	1.80	25.1	2.88	2.17	1.67	1.37

4	4	2	0	2.42	25.1	3.94	3.00	2.29	1.86
4	5	2	0	3.61	25.1	6.42	4.78	3.66	2.87
5	1	2	0	0.62	25.1	0.85	0.61	0.50	0.39
5	2	2	0	1.19	25.1	1.89	1.33	1.09	0.83
5	3	2	0	1.79	25.1	3.03	2.15	1.74	1.29
5	4	2	0	2.41	25.1	4.10	3.04	2.41	1.79
5	5	2	0	3.58	25.1	5.56	5.09	3.93	2.86
6	1	1	0	0.59	15.0	0.62	0.46	0.39	0.23
6	2	1	0	1.16	15.0	1.44	1.05	0.86	0.50
6	3	1	0	1.81	15.0	2.46	1.80	1.41	0.78
6	4	1	0	2.44	15.0	3.59	2.59	1.95	1.09
6	5	1	0	3.60	14.9	6.47	4.72	3.14	1.87
6	1	2	0	0.65	24.9	0.77	0.57	0.43	0.31
"Dynatest FWD"									
1	2	0	0	416	354	243	145	83	53
1	4	0	0	922	726	512	318	192	120
2	2	0	0	414	338	264	162	98	63
2	4	0	0	925	718	538	349	216	137
3	2	0	0	417	283	214	143	92	62
3	4	0	0	913	614	456	301	205	131
4	2	0	0	417	263	209	134	91	59
4	4	0	0	917	573	430	294	195	130
5	2	0	0	415	334	237	144	88	58
5	4	0	0	916	701	501	321	191	129
6	1	0	0	217	150	119	69	40	26
6	2	0	0	407	342	244	144	83	53
6	3	0	0	647	533	390	235	139	85
6	4	0	0	921	725	537	332	194	119
"08-28-86" 1 1 0 1 1033 1059 82 82 77 63 70									
"Dynalect"									
1	0	1.0	8	0.69	0.55	0.39	0.27	0.18	
2	0	1.0	8	0.80	0.66	0.48	0.36	0.23	
3	0	1.0	8	0.74	0.64	0.47	0.35	0.23	
4	0	1.0	8	0.75	0.62	0.47	0.35	0.25	
5	0	1.0	8	0.76	0.64	0.48	0.37	0.24	
6	0	1.0	8	0.71	0.57	0.42	0.31	0.21	
"Road Rater 400"									
1	1	2	0	0.60	25.1	0.72	0.58	0.43	0.16
1	2	2	0	1.19	25.0	1.59	1.31	0.95	0.48
1	3	2	0	1.80	25.1	2.88	2.27	1.73	1.23
2	1	2	0	0.58	25.0	0.68	0.60	0.48	0.38
2	2	2	0	1.20	25.0	1.56	1.43	1.17	0.92
2	3	2	0	1.82	25.1	2.73	2.46	1.99	1.54
3	1	2	0	0.58	25.0	0.64	0.60	0.49	0.35
3	2	2	0	1.22	25.1	1.55	1.62	1.12	0.90
3	3	2	0	1.81	25.1	2.58	2.72	2.09	1.46
4	1	2	0	0.58	25.0	0.71	0.63	0.51	0.39
4	2	2	0	1.19	25.1	1.69	1.45	1.25	1.01
4	3	2	0	1.82	25.1	2.97	1.90	2.17	1.91
5	1	2	0	0.59	25.0	0.68	0.59	0.48	0.37
5	2	2	0	1.21	25.0	1.61	1.45	1.19	0.95
5	3	2	0	1.78	25.1	2.68	2.67	1.95	1.57
6	1	1	0	0.60	15.0	0.46	0.47	0.30	0.21
6	2	1	0	1.19	15.1	1.12	1.03	0.74	0.53
6	1	2	0	0.58	25.0	0.59	0.48	0.37	0.23
6	2	2	0	1.21	25.0	1.40	1.21	0.92	0.70
6	3	2	0	1.80	25.1	2.47	1.27	1.59	2.60
6	1	3	0	0.59	35.0	0.49	0.48	0.28	0.75
6	2	3	0	1.21	35.1	1.22	1.01	0.76	0.85
6	3	3	0	1.80	35.1	2.62	3.76	1.63	0.00
"Dynatest FWD"									
1	2	0	0	407	322	212	118	73	46
1	4	0	0	921	677	468	287	177	112
2	2	0	0	406	294	212	137	87	55
2	4	0	0	921	635	473	316	203	133
3	2	0	0	410	264	190	127	85	57
3	4	0	0	926	585	437	297	197	132
4	2	0	0	408	257	187	127	84	57
4	4	0	0	923	539	426	292	197	130
5	2	0	0	406	288	207	127	81	57

5	4	0	916	634	474	304	198	132	93	55
6	1	0	0	0	0	0	0	0	0	0
6	2	0	402	287	193	117	73	47	0	0
6	3	0	628	438	312	193	118	75	0	0
6	4	0	914	623	458	290	180	114	0	0

"F15" 2 "US" 33 7430 27.5 2043 "N"
 "F. 1.1m. se. of Whitley/Allen CL southeasterly" 1.29
 "F. McDuffee Rd. (2.8m. s. of SR205) southeasterly (SB)" 0.25
 1 10652 76 10 1.6 0.00 7.1 0.0 13.0 "G"
 "A-6" 9 "CL" 101.3 6.8 11 32.4 19.2 13.2 2.65
 0 2.9 0

2
 "04-03-86" 1 1 1 1 1125 1200 54 0 0 50 60
 "Dynaflect"

1	0	1.0	8	0.99	0.70	0.45	0.26	0.14
2	0	1.0	8	0.88	0.67	0.47	0.32	0.20
3	0	1.0	8	1.05	0.79	0.56	0.36	0.22
4	0	1.0	8	0.95	0.77	0.58	0.41	0.27
5	0	1.0	8	1.03	0.82	0.61	0.41	0.27
6	0	1.0	8	0.82	0.62	0.43	0.28	0.17

"Road Rater 400"

1	1	2	0	0.61	25.0	0.91	0.57	0.46	0.28
1	2	2	0	1.23	25.0	1.90	1.45	0.97	0.57
1	3	2	0	1.83	25.0	3.32	3.06	1.68	1.41
2	1	2	0	0.59	24.9	0.71	0.56	0.42	0.28
2	2	2	0	1.22	25.0	1.53	1.03	0.62	0.59
2	3	2	0	1.82	25.0	2.61	2.04	2.94	1.02
3	1	2	0	0.60	24.9	0.81	0.69	1.47	0.33
3	2	2	0	1.22	25.0	1.75	0.75	2.15	0.69
3	3	2	0	1.84	25.0	3.20	1.71	3.29	1.32
4	1	2	0	0.59	24.9	0.70	0.50	0.44	0.30
4	2	2	0	1.22	25.0	1.52	1.34	0.99	0.69
4	3	2	0	1.84	25.0	2.62	1.71	1.73	1.21
5	1	2	0	0.60	24.9	0.73	0.85	0.28	0.29
5	2	2	0	1.24	25.0	1.57	0.77	1.76	0.68
5	3	2	0	1.82	25.0	2.67	1.62	2.20	1.18
6	1	1	0	0.61	15.3	0.56	0.44	0.30	0.19
6	2	1	0	1.27	15.3	1.29	1.01	0.69	0.16
6	1	2	0	0.61	25.1	0.65	0.52	0.36	0.20
6	2	2	0	1.24	25.2	1.41	1.45	0.78	0.73
6	3	2	0	1.86	25.2	2.46	1.60	1.38	1.52
6	1	3	0	0.57	35.1	0.54	0.42	0.22	0.19
6	2	3	0	1.18	35.1	1.32	1.05	0.61	0.50
6	3	3	0	1.82	35.2	2.94	2.38	1.25	0.98

"Road Rater 2000"

1	1	2	0	0.59	25.0	0.63	0.46	0.29	0.20
1	2	2	0	1.18	25.0	1.40	1.02	0.66	0.42
1	3	2	0	1.83	25.0	2.32	1.66	1.05	0.68
1	4	2	0	2.38	25.0	3.32	2.40	1.53	0.95
1	5	2	0	3.64	25.0	5.73	4.18	2.64	1.61
2	1	2	0	0.62	24.9	0.65	0.43	0.28	0.21
2	2	2	0	1.17	25.0	1.36	0.92	0.58	0.46
2	3	2	0	1.79	25.0	2.18	1.44	0.91	0.69
2	4	2	0	2.40	25.0	3.02	2.05	1.31	0.98
2	5	2	0	3.59	25.0	5.14	3.41	2.31	1.58
3	1	2	0	0.62	25.1	0.78	0.60	0.44	0.31
3	2	2	0	1.19	25.1	1.65	1.24	0.90	0.62
3	3	2	0	1.80	25.1	2.71	2.02	1.47	1.00
3	4	2	0	2.39	25.1	3.84	2.89	2.09	1.38
3	5	2	0	3.59	25.1	6.82	4.91	3.50	2.26
4	1	2	0	0.60	25.1	0.56	0.47	0.36	0.26
4	2	2	0	1.20	25.1	1.19	0.98	0.73	0.54
4	3	2	0	1.78	25.1	1.81	1.52	1.14	0.86
4	4	2	0	2.39	25.1	2.57	2.15	1.61	1.19
4	5	2	0	3.59	25.1	4.12	3.44	2.59	1.90
5	1	2	0	0.61	25.1	0.67	0.49	0.38	0.25

5	2	2	0	1.19	25.1	1.42	1.06	0.76	0.54
5	3	2	0	1.30	25.1	2.33	1.74	1.22	0.85
5	4	2	0	2.38	24.9	3.31	2.44	1.70	1.17
5	5	2	0	3.60	25.1	5.56	4.16	2.91	1.95
6	1	1	0	0.61	15.0	0.50	0.41	0.33	0.20
6	2	1	0	1.20	15.0	1.10	0.89	0.67	0.42
6	3	1	0	1.78	14.9	1.83	1.45	1.08	0.65
6	4	1	0	2.39	14.9	2.60	2.08	1.60	0.91
6	5	1	0	3.65	14.9	4.99	3.60	2.19	1.53
6	1	2	0	0.59	25.1	0.56	0.40	0.37	0.20
6	2	2	0	1.16	25.1	1.24	0.92	0.67	0.44
6	3	2	0	1.80	25.1	2.06	1.48	0.98	0.69
6	4	2	0	2.41	25.1	2.93	2.11	1.37	0.97
6	5	2	0	3.59	25.1	4.93	3.48	2.35	1.56
6	1	3	0	0.61	35.1	0.60	0.44	0.30	0.22
6	2	3	0	1.24	35.1	1.35	0.93	0.66	0.47
6	3	3	0	1.84	35.1	2.22	1.55	1.08	0.75
6	4	3	0	2.43	35.1	3.13	2.19	1.51	1.04
6	5	3	0	3.59	35.1	5.31	3.67	2.52	1.71
"Dynatest FWD"									
1	2	0	429	374	280	163	88	45	0
1	4	0	892	769	579	359	198	107	0
2	2	0	428	256	204	135	81	50	0
2	4	0	906	557	427	293	180	113	0
3	2	0	426	326	268	167	102	59	0
3	4	0	896	697	550	368	223	135	0
4	2	0	423	237	201	147	94	64	0
4	4	0	899	523	441	319	216	145	0
5	2	0	420	268	230	154	98	62	39
5	4	0	888	581	488	345	221	144	90
6	1	0	209	120	86	63	31	22	0
6	2	0	416	256	196	125	73	46	0
6	3	0	644	405	313	201	121	76	0
6	4	0	893	559	433	280	173	108	0
"08-27-86"									
1	1	0	1	0	0845	0920	55	62	65
61	67								
"Dynaflect"									
1	0	1.0	8	0.69	0.50	0.31	0.18	0.11	
2	0	1.0	8	0.72	0.56	0.38	0.26	0.17	
3	0	1.0	8	0.87	0.69	0.47	0.31	0.20	
4	0	1.0	8	0.74	0.62	0.45	0.32	0.23	
5	0	1.0	8	0.72	0.60	0.44	0.33	0.23	
6	0	1.0	8	0.65	0.51	0.34	0.23	0.15	
"Road Rater 400"									
1	1	2	0	0.60	25.1	0.77	0.73	0.37	0.24
1	2	2	0	1.20	25.1	1.60	1.93	0.78	1.40
1	3	2	0	1.80	24.9	2.90	2.92	1.34	4.29
2	1	2	0	0.59	25.1	0.58	0.46	0.33	0.39
2	2	2	0	1.19	25.0	1.26	1.09	0.70	2.04
2	3	2	0	1.78	25.1	2.30	1.90	1.33	2.94
3	1	2	0	0.59	25.0	0.64	0.52	0.38	0.25
3	2	2	0	1.20	25.0	1.36	1.12	0.80	0.55
3	3	2	0	1.81	25.0	2.77	2.36	1.66	4.96
4	1	2	0	0.58	25.0	0.58	0.46	0.26	0.20
4	2	2	0	1.22	25.1	1.23	1.07	0.54	0.67
4	3	2	0	1.80	25.0	2.37	1.82	3.02	1.15
5	1	2	0	0.59	25.0	0.59	0.48	0.34	0.20
5	2	2	0	1.22	25.1	1.39	1.13	0.85	2.00
5	3	2	0	1.80	25.1	2.64	3.46	1.59	5.88
6	1	1	0	0.60	15.1	0.47	0.31	0.22	0.13
6	2	1	0	1.21	15.1	1.16	0.80	0.58	0.37
6	1	2	0	0.60	25.1	0.57	0.34	0.28	0.23
6	2	2	0	1.19	25.1	1.26	0.73	0.62	0.57
6	3	2	0	1.78	25.0	2.46	1.81	1.25	1.93
6	1	3	0	0.60	35.1	0.59	0.34	0.23	0.30
6	2	3	0	1.21	35.1	1.50	0.88	0.58	0.61
6	3	3	0	1.80	35.1	3.47	3.40	5.83	1.19
"Dynatest FWD"									
1	2	0	409	297	206	119	64	33	22
1	4	0	925	638	465	282	153	80	51
2	2	0	407	241	168	108	65	41	0

2	4	0	922	521	380	250	155	97	0	0
3	2	0	402	279	211	134	76	49	35	22
3	4	0	910	636	500	326	192	122	84	55
4	2	0	405	217	170	122	79	51	0	0
4	4	0	908	500	400	289	193	126	0	0
5	2	0	398	228	177	118	75	47	37	20
5	4	0	902	523	413	288	180	117	82	44
6	1	0	0	0	0	0	0	0	0	0
6	2	0	399	220	159	101	57	37	0	0
6	3	0	614	342	255	161	97	59	0	0
6	4	0	901	502	375	240	147	89	0	0

"F16" 92 "SR" 114 2196 25.0 549 "H"
 "F. Wabash/Whitley CL easterly" 2.06
 "F. CR850W (1.6m. w. of SR105) easterly (EB)" 0.25
 1 6264 64 22 3.1 0.00 3.1 0.0 12.0 "S"
 "A-6" 8 "CL" 116.3 14.9 11 30.7 15.6 15.2 2.74
 39 2.6 0

2
 "04-02-86" 1 1 1 1 1500 1530 75 0 0 65 57
 "Dynalect"

1	0	1.0	8	1.21	0.89	0.55	0.31	0.17
2	0	1.0	8	1.18	0.89	0.57	0.33	0.18
3	0	1.0	8	1.23	0.90	0.53	0.28	0.13
4	0	1.0	8	1.34	0.96	0.57	0.30	0.14
5	0	1.0	8	1.37	0.95	0.52	0.25	0.10
6	0	1.0	8	1.16	0.85	0.53	0.31	0.16

"Road Rater 400"

1	1	2	0	0.59	25.0	1.14	0.87	0.60	0.77
1	2	2	0	1.23	25.0	2.45	3.43	1.31	1.50
1	3	2	0	1.84	25.1	4.37	4.12	2.38	2.85
2	1	2	0	0.86	29.7	1.10	0.89	1.09	0.84
2	2	2	0	1.22	25.0	2.33	1.87	0.66	0.74
2	3	2	0	1.83	25.0	4.21	3.44	2.02	2.45
3	1	2	0	0.59	25.0	1.18	0.81	0.57	0.37
3	2	2	0	1.24	25.1	2.42	2.12	1.13	0.85
3	3	2	0	1.83	25.1	4.34	3.26	2.04	2.02
4	1	2	0	0.61	25.0	1.20	0.86	0.33	0.25
4	2	2	0	1.21	25.0	2.57	1.69	1.52	0.44
4	3	2	0	1.85	25.0	4.94	3.48	2.72	1.16
5	1	2	0	0.60	25.0	1.17	0.94	0.85	0.45
5	2	2	0	1.24	25.0	2.67	2.61	1.17	1.45
5	3	2	0	1.87	25.1	4.96	1.49	2.30	1.88
6	1	1	0	0.62	15.1	0.82	0.56	0.34	0.66
6	2	1	0	1.24	15.2	1.85	1.26	0.79	1.55
6	1	2	0	0.60	25.0	1.02	0.74	0.51	0.29
6	2	2	0	1.23	25.1	2.15	2.17	1.06	0.63
6	3	2	0	1.85	25.1	4.06	1.90	2.54	1.32
6	1	3	0	0.59	35.0	1.19	0.77	0.55	0.46
6	2	3	0	1.18	35.0	2.99	2.22	1.46	1.18
6	3	3	0	1.77	35.0	6.29	5.46	3.18	2.49

"Road Rater 2000"

1	1	2	0	0.57	25.1	0.88	0.61	0.41	0.27
1	2	2	0	1.20	25.1	2.01	1.42	0.89	0.59
1	3	2	0	1.79	25.1	3.18	2.28	1.40	0.92
1	4	2	0	2.38	25.1	4.55	3.26	2.05	1.29
1	5	2	0	3.61	25.1	7.77	5.60	3.49	2.18
2	1	2	0	0.58	25.1	0.89	0.68	0.42	0.28
2	2	2	0	1.16	25.1	1.91	1.48	0.93	0.60
2	3	2	0	1.78	25.1	3.17	2.47	1.53	0.99
2	4	2	0	2.41	25.1	4.56	3.53	2.19	1.38
2	5	2	0	3.60	25.1	7.70	5.95	3.72	2.33
3	1	2	0	0.58	25.1	0.91	0.68	0.32	0.21
3	2	2	0	1.21	25.1	2.08	1.51	0.73	0.47
3	3	2	0	1.80	25.1	3.34	2.36	1.22	0.75
3	4	2	0	2.41	25.1	4.68	3.20	1.76	1.03
3	5	2	0	3.61	25.1	8.18	5.41	3.26	1.76

4	1	2	0	0.58	25.1	0.94	0.67	0.42	0.23
4	2	2	0	1.17	25.1	2.13	1.50	0.74	0.52
4	3	2	0	1.83	25.1	3.58	2.53	1.57	0.86
4	4	2	0	2.41	25.1	5.11	3.60	2.24	1.19
4	5	2	0	3.59	25.1	8.87	6.28	3.88	2.08
5	1	2	0	0.61	25.1	1.08	0.72	0.39	0.17
5	2	2	0	1.21	25.1	2.28	1.53	0.87	0.35
5	3	2	0	1.82	25.1	3.78	2.53	1.48	0.60
5	4	2	0	2.40	25.1	5.41	3.64	2.10	0.87
5	5	2	0	3.60	25.0	9.81	6.47	3.76	1.70
6	1	1	0	0.61	15.1	0.80	0.53	0.45	0.21
6	2	1	0	1.21	15.1	1.82	1.17	0.97	0.41
6	3	1	0	1.79	15.1	3.02	1.88	1.53	0.69
6	4	1	0	2.41	15.1	4.62	2.86	2.18	0.76
6	5	1	0	3.61	15.1	7.47	5.14	3.12	1.76
6	1	2	0	0.60	25.1	0.92	0.64	0.36	0.28
6	2	2	0	1.18	25.1	1.97	1.35	0.76	0.56
6	3	2	0	1.80	25.0	3.21	2.20	1.25	0.87
6	4	2	0	2.41	25.1	4.59	3.11	1.85	1.22
6	5	2	0	3.58	25.1	7.64	5.10	3.11	1.93
6	1	3	0	0.63	35.1	1.17	0.83	0.56	0.39
6	2	3	0	1.22	35.1	2.46	1.74	1.20	0.83
6	3	3	0	1.81	35.0	3.99	2.81	1.92	1.31
6	4	3	0	2.42	35.1	5.68	4.05	2.77	1.87
6	5	3	0	3.60	35.1	10.08	6.77	4.71	3.12
"Dynatest FWD"									
1	2	0	410	414	324	201	116	63	0
1	4	0	879	910	705	455	261	148	0
2	2	0	412	424	322	197	113	60	0
2	4	0	874	931	707	451	262	143	0
3	2	0	403	453	354	217	119	58	0
3	4	0	870	1025	803	509	288	147	0
4	2	0	404	517	370	214	114	58	0
4	4	0	880	1140	837	514	286	149	0
5	2	0	399	564	397	210	102	43	20
5	4	0	875	1253	900	513	259	118	48
6	1	0	193	148	111	79	41	26	0
6	2	0	404	375	278	178	105	61	0
6	3	0	635	613	459	297	178	103	0
6	4	0	873	866	651	426	259	150	0
"08-26-86"									
1	1	0	1	1055	1130	79	79	80	77
"Dynaflect"									
1	0	1.0	8	0.77	0.59	0.38	0.23	0.13	
2	0	1.0	8	0.77	0.58	0.39	0.24	0.14	
3	0	1.0	8	0.73	0.57	0.34	0.18	0.10	
4	0	1.0	8	0.83	0.60	0.35	0.20	0.11	
5	0	1.0	8	0.91	0.65	0.37	0.20	0.09	
6	0	1.0	8	0.79	0.60	0.39	0.24	0.14	
"Road Rater 400"									
1	1	2	0	0.60	25.1	0.84	0.68	0.44	0.24
1	2	2	0	1.21	25.1	1.78	1.45	0.92	0.56
1	3	2	0	1.81	25.2	3.13	2.62	1.69	1.04
2	1	2	0	0.59	25.0	0.75	0.57	0.38	0.17
2	2	2	0	1.21	25.0	1.63	1.74	0.81	0.52
2	3	2	0	1.79	25.0	2.93	2.39	1.46	1.33
3	1	2	0	0.60	25.0	0.78	0.48	0.34	0.26
3	2	2	0	1.20	25.0	1.67	1.09	0.72	0.63
3	3	2	0	1.79	25.0	2.86	1.92	1.18	1.00
4	1	2	0	0.60	25.0	0.83	0.55	0.36	0.15
4	2	2	0	1.22	25.0	1.80	1.32	0.76	0.39
4	3	2	0	1.78	25.0	3.00	2.20	1.15	0.60
5	1	2	0	0.59	25.0	0.88	0.60	0.38	0.15
5	2	2	0	1.20	25.0	1.96	1.45	0.81	0.30
5	3	2	0	1.81	25.0	3.61	2.66	1.44	0.58
6	1	1	0	0.61	15.1	0.58	0.47	0.26	0.43
6	2	1	0	1.20	15.1	1.32	0.99	0.61	0.47
6	1	2	0	0.59	25.1	0.74	0.56	0.38	0.19
6	2	2	0	1.20	25.0	1.63	1.22	0.78	0.37
6	3	2	0	1.80	25.0	2.84	2.20	1.36	0.61
6	1	3	0	0.60	35.1	0.78	0.61	0.43	0.12

6	2	3	0	1.20	35.1	1.37	1.47	1.02	0.59
6	3	3	0	1.80	35.0	4.19	3.29	2.22	1.41

"Dynatest FWD"

1	2	0	388	327	224	135	76	45	25	12
1	4	0	390	765	547	337	198	113	71	33
2	2	0	383	316	221	140	77	46	0	0
2	4	0	383	747	546	350	204	116	0	0
3	2	0	380	309	223	131	71	37	21	20
3	4	0	382	747	552	346	189	101	53	25
4	2	0	384	352	235	139	80	39	0	0
4	4	0	385	837	598	365	211	110	0	0
5	2	0	380	418	276	153	77	39	19	08
5	4	0	371	1007	703	415	220	106	45	19
6	1	0	0	0	0	0	0	0	0	0
6	2	0	379	292	215	136	81	46	0	0
6	3	0	600	483	361	232	138	79	0	0
6	4	0	378	721	543	355	214	122	0	0

"F17" 1 "US" 27 8900 27.5 2448 "N"

"F. Adams/Allen CL southerly" 5.09

"F. CR900N (4.4m. s. of Adams/Allen CL) southerly (S8)" 0.25

1 10576 78 8 2.7 0.00 12.8 0.0 0.0 "N"

"A-6" 12 "CL" 111.4 18.0 10 37.7 18.0 19.7 2.73

80 2.8 0

"04-08-86" 1 1 1 1 0900 0930 63 0 0 50 59

"Dynaflect"

1	0	1.0	8	0.46	0.41	0.34	0.28	0.22
2	0	1.0	8	0.49	0.43	0.35	0.28	0.21
3	0	1.0	8	0.65	0.57	0.46	0.36	0.26
4	0	1.0	8	0.54	0.47	0.38	0.32	0.25
5	0	1.0	8	0.42	0.37	0.31	0.26	0.20
6	0	1.0	8	0.49	0.43	0.35	0.29	0.22

"Road Rater 400"

1	1	2	0	0.56	24.2	0.29	0.09	0.53	0.19
1	2	2	0	1.19	24.7	0.67	1.52	0.67	0.45
1	3	2	0	1.83	25.1	1.14	1.35	0.95	0.81
2	1	2	0	0.61	25.1	0.37	0.88	0.29	0.20
2	2	2	0	1.26	25.2	0.79	0.52	0.62	0.56
2	3	2	0	1.84	25.2	1.29	0.82	1.04	1.07
3	1	2	0	0.61	25.1	0.54	0.86	0.68	0.24
3	2	2	0	1.23	25.1	1.10	0.94	2.08	0.56
3	3	2	0	1.83	25.2	1.91	0.88	1.69	0.93
4	1	2	0	0.60	24.9	0.31	0.82	0.22	0.15
4	2	2	0	1.20	25.0	0.64	1.46	0.49	0.39
4	3	2	0	1.82	25.0	2.49	1.25	0.82	0.68
5	1	2	0	0.60	25.0	0.24	0.27	0.17	0.13
5	2	2	0	1.21	25.0	0.50	0.58	0.37	0.29
5	3	2	0	1.80	25.0	0.81	0.45	0.63	0.51
6	1	1	0	0.66	15.7	0.34	0.31	0.33	0.20
6	2	1	0	1.31	15.6	0.72	0.68	0.70	0.46
6	1	2	0	0.60	25.1	0.30	0.22	0.07	0.15
6	2	2	0	1.22	25.1	0.60	0.44	0.12	0.36
6	3	2	0	1.82	25.1	1.00	0.70	0.55	0.60
6	1	3	0	0.59	35.0	0.24	0.13	0.15	0.11
6	2	3	0	1.19	34.9	0.53	0.31	0.37	0.30
6	3	3	0	1.81	35.0	1.02	0.67	0.76	0.58

"Road Rater 2000"

1	1	2	0	0.59	25.2	0.31	0.26	0.23	0.18
1	2	2	0	1.21	25.0	0.68	0.55	0.48	0.40
1	3	2	0	1.80	25.0	1.02	0.83	0.71	0.61
1	4	2	0	2.41	25.0	1.39	1.13	0.97	0.84
1	5	2	0	3.63	25.0	2.22	1.78	1.48	1.32
2	1	2	0	0.61	25.0	0.34	0.31	0.25	0.20
2	2	2	0	1.23	25.0	0.73	0.68	0.52	0.40
2	3	2	0	1.85	25.0	1.14	1.06	0.82	0.63
2	4	2	0	2.43	25.0	1.54	1.40	1.08	0.84

2	5	2	0	3.57	25.0	2.32	2.15	1.56	1.29	
3	1	2	0	0.62	25.0	0.44	0.35	0.33	0.23	
3	2	2	0	1.22	25.0	0.90	0.72	0.66	0.45	
3	3	2	0	1.80	25.0	1.37	1.09	0.98	0.68	
3	4	2	0	2.41	25.0	1.91	1.52	1.38	0.94	
3	5	2	0	3.57	25.0	2.90	2.34	2.14	1.46	
4	1	2	0	0.61	25.0	0.30	0.25	0.22	0.18	
4	2	2	0	1.20	25.0	0.63	0.53	0.46	0.38	
4	3	2	0	1.78	25.0	0.95	0.78	0.68	0.56	
4	4	2	0	2.45	25.0	1.29	1.08	0.95	0.77	
4	5	2	0	3.65	25.0	2.00	1.66	1.44	1.19	
5	1	2	0	0.57	25.0	0.23	0.22	0.16	0.13	
5	2	2	0	1.23	25.0	0.50	0.40	0.34	0.26	
5	3	2	0	1.84	25.0	0.72	0.58	0.49	0.40	
5	4	2	0	2.39	25.0	0.96	0.78	0.66	0.53	
5	5	2	0	3.60	25.0	1.71	1.20	1.02	0.83	
6	1	1	0	0.61	14.8	0.27	0.29	0.21	0.16	
6	2	1	0	1.21	15.0	0.60	0.62	0.48	0.39	
6	3	1	0	1.85	15.0	0.90	1.01	0.76	0.60	
6	4	1	0	2.39	14.9	1.28	1.38	1.04	0.80	
6	5	1	0	3.57	15.0	1.83	2.06	1.55	1.18	
6	1	2	0	0.62	25.0	0.28	0.26	0.21	0.15	
6	2	2	0	1.23	25.0	0.54	0.53	0.41	0.31	
6	3	2	0	1.75	25.0	0.81	0.77	0.62	0.45	
6	4	2	0	2.41	25.0	1.09	1.06	0.84	0.61	
6	5	2	0	3.61	25.0	1.55	1.55	1.23	0.93	
6	1	3	0	0.59	35.2	0.22	0.18	0.17	0.14	
6	2	3	0	1.21	35.1	0.47	0.39	0.33	0.25	
6	3	3	0	1.81	35.1	0.71	0.56	0.49	0.36	
6	4	3	0	2.41	35.1	0.93	0.77	0.66	0.49	
6	5	3	0	3.63	35.1	1.37	1.20	0.98	0.74	
"Dynatest FWD"										
1	2	0	450	102	92	78	63	50	0	0
1	4	0	934	228	197	166	137	108	0	0
2	2	0	439	100	93	77	58	45	0	0
2	4	0	932	233	203	166	130	99	0	0
3	2	0	439	130	122	96	72	53	0	0
3	4	0	927	314	264	209	155	115	0	0
4	2	0	430	104	95	77	62	49	0	0
4	4	0	922	238	201	164	131	105	0	0
5	2	0	427	79	68	58	44	36	29	17
5	4	0	929	181	154	126	101	78	62	37
6	1	0	198	42	39	29	22	17	0	0
6	2	0	425	98	84	66	51	39	0	0
6	3	0	662	156	129	103	79	61	0	0
6	4	0	920	218	179	142	110	84	0	0
"08-28-86" 1 1 0 1 0900 0930 66 68 59 53 71										
"Dynaflect"										
1	0	1.0	8	0.39	0.35	0.30	0.24	0.18		
2	0	1.0	8	0.42	0.37	0.32	0.25	0.18		
3	0	1.0	8	0.55	0.49	0.40	0.31	0.22		
4	0	1.0	8	0.44	0.39	0.33	0.27	0.20		
5	0	1.0	8	0.35	0.32	0.27	0.22	0.16		
6	0	1.0	8	0.41	0.36	0.30	0.24	0.18		
"Road Rater 400"										
1	1	2	0	0.60	25.0	0.33	0.26	0.29	0.21	
1	2	2	0	1.22	25.1	0.71	2.65	1.47	0.52	
1	3	2	0	1.82	25.1	1.19	2.85	2.13	0.88	
2	1	2	0	0.58	25.1	0.33	0.26	2.72	0.19	
2	2	2	0	1.20	25.1	0.71	1.02	1.49	0.48	
2	3	2	0	1.79	25.1	1.17	1.24	6.46	4.58	
3	1	2	0	0.58	25.0	0.42	1.02	0.31	0.23	
3	2	2	0	1.22	25.1	0.95	0.90	0.73	0.57	
3	3	2	0	1.81	25.1	1.54	1.45	1.18	2.16	
4	1	2	0	0.59	25.0	0.30	0.26	1.59	0.16	
4	2	2	0	1.20	25.1	0.68	0.62	1.61	0.42	
4	3	2	0	1.81	25.1	1.10	1.03	1.38	0.70	
5	1	2	0	0.59	25.1	0.24	0.61	0.17	0.57	
5	2	2	0	1.22	25.1	0.51	0.60	0.38	0.27	
5	3	2	0	1.81	25.0	0.81	1.28	0.64	5.60	

6	1	1	0	0.60	15.1	0.30	0.12	0.20	0.47
6	2	1	0	1.22	15.2	0.64	0.48	0.45	0.53
6	1	2	0	0.60	25.0	0.28	0.51	0.18	0.47
6	2	2	0	1.22	25.1	0.57	0.51	0.41	1.64
6	3	2	0	1.79	25.1	0.91	1.57	2.09	0.58
6	1	3	0	0.60	35.1	0.23	0.20	0.20	0.10
6	2	3	0	1.19	35.0	0.51	0.62	0.44	0.28
6	3	3	0	1.79	35.0	0.98	3.32	6.58	0.59

"Dynatest FWD"

1	2	0	426	107	92	74	61	47	39	24
1	4	0	953	245	209	174	141	112	89	54
2	2	0	424	112	92	74	55	43	0	0
2	4	0	946	255	215	174	134	101	0	0
3	2	0	420	141	117	88	66	48	36	20
3	4	0	942	326	271	208	159	113	82	45
4	2	0	421	114	92	74	59	46	0	0
4	4	0	944	256	209	169	135	107	0	0
5	2	0	422	87	69	55	42	34	27	16
5	4	0	944	194	158	128	100	78	61	37
6	1	0	0	0	0	0	0	0	0	0
6	2	0	420	101	79	60	46	35	0	0
6	3	0	650	157	127	97	76	56	0	0
6	4	0	942	225	186	143	112	83	0	0

"F18" 52 "US" 31 9510 22.0 2092 "N"

"F. Miami/Fulton CL southerly" 9.97

"F. Miami/Fulton CL & CR4005 (4.8m. s. of SR25) southerly (SR)" 0.25

1 9196 75 11 2.5 0.00 11.0 0.0 2.4 "B"

"A-4" 3 "CL-HL" 130.8 10.1 13 17.1 12.7 4.5 2.72

44 3.0 0

2

"04-02-86" 1 1 1 1 1130 1200 67 0 0 56 58

"Dynaflect"

1	0	1.0	8	0.49	0.42	0.31	0.25	0.17
2	0	1.0	8	0.41	0.34	0.24	0.19	0.12
3	0	1.0	8	0.48	0.42	0.30	0.25	0.17
4	0	1.0	8	0.38	0.32	0.23	0.23	0.13
5	0	1.0	8	0.49	0.42	0.30	0.25	0.16
6	0	1.0	8	0.51	0.44	0.30	0.31	0.18

"Road Rater 400"

1	1	2	0	0.61	25.1	0.38	0.32	0.27	0.29
1	2	2	0	1.25	25.2	0.80	0.96	0.60	1.09
1	3	2	0	1.86	25.2	1.29	1.23	1.01	2.03
2	1	2	0	0.60	25.1	0.29	0.25	0.18	0.11
2	2	2	0	1.23	25.2	0.60	0.42	1.00	0.38
2	3	2	0	1.87	25.2	0.92	0.80	1.13	0.46
3	1	2	0	0.60	25.1	0.35	0.23	0.24	0.20
3	2	2	0	1.23	25.2	0.77	1.61	0.95	0.46
3	3	2	0	1.87	25.2	1.26	1.18	1.01	0.87
4	1	2	0	0.59	25.1	0.27	0.59	0.20	0.12
4	2	2	0	1.26	25.2	0.58	1.39	0.42	0.31
4	3	2	0	1.87	25.2	0.95	1.60	0.70	0.60
5	1	2	0	0.60	25.1	0.36	0.32	0.15	0.18
5	2	2	0	1.24	25.2	0.77	1.27	1.47	0.38
5	3	2	0	1.86	25.2	1.26	0.88	1.76	0.72
6	1	1	0	0.63	15.3	0.34	0.29	0.23	0.15
6	2	1	0	1.28	15.4	0.72	0.70	0.51	0.35
6	1	2	0	0.61	25.2	0.38	0.44	0.27	0.18
6	2	2	0	1.26	25.3	0.82	2.02	0.61	0.45
6	3	2	0	1.89	25.3	1.40	1.97	1.08	0.90
6	1	3	0	0.59	35.2	0.31	0.05	0.80	0.17
6	2	3	0	1.21	35.1	0.72	0.09	1.37	0.43
6	3	3	0	1.81	35.2	1.59	3.09	1.42	1.03

"Road Rater 2000"

1	1	2	0	0.62	25.0	0.43	0.38	0.27	0.23
1	2	2	0	1.19	25.1	0.85	0.76	0.53	0.46
1	3	2	0	1.82	25.0	1.29	1.16	0.82	0.71

1	4	2	0	2.42	25.0	1.75	1.57	1.13	0.97
1	5	2	0	3.59	25.0	2.73	2.45	1.86	1.54
2	1	2	0	0.57	25.1	0.32	0.20	0.18	0.12
2	2	2	0	1.18	25.0	0.65	0.42	0.34	0.25
2	3	2	0	1.79	25.1	1.01	0.67	0.53	0.39
2	4	2	0	2.41	25.0	1.40	0.91	0.72	0.53
2	5	2	0	3.61	25.1	2.27	1.43	1.12	0.85
3	1	2	0	0.61	25.1	0.29	0.33	0.26	0.21
3	2	2	0	1.19	25.0	0.58	0.67	0.57	0.46
3	3	2	0	1.81	25.0	0.90	1.03	0.86	0.70
3	4	2	0	2.40	25.0	1.25	1.42	1.21	0.97
3	5	2	0	3.60	25.0	2.03	2.20	1.85	1.52
4	1	2	0	0.60	24.9	0.23	0.29	0.18	0.15
4	2	2	0	1.19	24.9	0.49	0.60	0.38	0.31
4	3	2	0	1.79	25.0	0.75	0.89	0.59	0.47
4	4	2	0	2.43	25.0	1.17	1.19	0.79	0.66
4	5	2	0	3.61	25.0	1.91	1.74	1.25	1.02
5	1	2	0	0.59	25.0	0.44	0.31	0.27	0.19
5	2	2	0	1.18	25.0	0.90	0.61	0.53	0.39
5	3	2	0	1.80	25.0	1.39	0.97	0.84	0.61
5	4	2	0	2.40	24.9	1.95	1.33	1.16	0.85
5	5	2	0	3.60	25.0	3.10	2.10	1.78	1.34
6	1	1	0	0.60	15.0	0.32	0.29	0.25	0.17
6	2	1	0	1.23	15.0	0.68	0.61	0.54	0.37
6	3	1	0	1.77	15.0	1.09	0.92	0.83	0.61
6	4	1	0	2.38	15.0	1.50	1.28	1.13	0.83
6	5	1	0	3.61	15.0	2.36	2.03	1.81	1.36
6	1	2	0	0.60	25.1	0.37	0.32	0.26	0.20
6	2	2	0	1.20	25.1	0.75	0.65	0.53	0.43
6	3	2	0	1.80	25.1	1.13	1.00	0.82	0.66
6	4	2	0	2.39	25.1	1.54	1.37	1.12	0.89
6	5	2	0	3.60	25.1	2.38	2.11	1.72	1.39
6	1	3	0	0.61	35.1	0.35	0.30	0.24	0.19
6	2	3	0	1.21	35.1	0.67	0.58	0.47	0.38
6	3	3	0	1.80	35.1	1.03	0.87	0.72	0.58
6	4	3	0	2.42	35.1	1.38	1.18	0.97	0.78
6	5	3	0	3.61	35.2	2.07	1.80	1.47	1.20
"Dynatest FWD"									
1	2	0	432	101	91	73	56	39	0
1	4	0	927	234	201	162	125	89	0
2	2	0	429	103	86	68	49	34	0
2	4	0	909	233	189	150	107	77	0
3	2	0	432	94	92	75	55	42	0
3	4	0	912	228	200	162	123	91	0
4	2	0	431	90	76	63	46	34	0
4	4	0	903	213	171	138	105	77	0
5	2	0	433	104	92	73	54	39	27
5	4	0	907	243	202	160	120	85	61
6	1	0	192	48	42	36	27	18	0
6	2	0	427	115	98	81	60	45	0
6	3	0	661	183	156	128	96	69	0
6	4	0	906	255	217	177	133	97	0
"08-25-86" 1 1 0 1 1050 1115 88 84 82 75 70									
"Dynaflect"									
1	0	1.0	8	0.45	0.38	0.29	0.20	0.12	
2	0	1.0	8	0.36	0.29	0.22	0.14	0.08	
3	0	1.0	8	0.43	0.36	0.27	0.18	0.11	
4	0	1.0	8	0.36	0.30	0.23	0.15	0.09	
5	0	1.0	8	0.46	0.37	0.29	0.19	0.11	
6	0	1.0	8	0.51	0.42	0.32	0.22	0.14	
"Road Rater 400"									
1	1	2	0	0.60	25.2	0.38	0.32	0.26	0.17
1	2	2	0	1.20	25.2	0.82	0.75	0.60	0.44
1	3	2	0	1.78	25.1	1.34	1.24	1.02	0.76
2	1	2	0	0.59	25.0	0.25	0.31	0.21	0.10
2	2	2	0	1.20	25.1	0.59	0.80	0.37	0.25
2	3	2	0	1.82	25.1	0.92	0.83	0.62	0.42
3	1	2	0	0.61	25.1	0.34	0.31	0.29	0.17
3	2	2	0	1.19	25.1	0.77	0.80	0.69	0.42
3	3	2	0	1.82	25.1	1.24	1.40	0.94	0.71

4	1	2	0	0.61	25.0	0.27	0.35	0.27	0.11
4	2	2	0	1.22	25.1	0.62	0.85	0.61	0.30
4	3	2	0	1.78	25.1	0.96	1.17	0.75	0.51
5	1	2	0	0.61	25.1	0.35	0.31	0.23	0.15
5	2	2	0	1.21	25.1	0.80	0.72	0.52	0.39
5	3	2	0	1.83	25.1	1.28	1.38	0.88	0.64
6	1	1	0	0.60	15.0	0.33	0.29	0.21	1.01
6	2	1	0	1.18	15.0	0.74	0.64	0.51	1.20
6	1	2	0	0.59	25.0	0.39	0.35	0.26	0.18
6	2	2	0	1.21	25.1	0.87	0.92	0.61	0.53
6	3	2	0	1.81	25.1	1.44	1.28	1.04	1.68
6	1	3	0	0.59	34.9	0.37	0.32	0.26	0.24
6	2	3	0	1.22	35.1	0.95	0.84	0.68	0.63
6	3	3	0	1.80	35.1	1.68	1.52	1.27	1.41

"Dynatest FWD"

1	2	0	394	123	97	72	50	35	21	11
1	4	0	900	890	236	178	125	86	57	26
2	2	0	391	107	78	54	36	23	0	0
2	4	0	896	257	195	137	92	62	0	0
3	2	0	391	122	93	67	48	31	22	11
3	4	0	892	287	223	165	116	78	54	27
4	2	0	391	101	75	56	39	25	0	0
4	4	0	894	241	181	137	96	64	0	0
5	2	0	390	129	97	68	46	29	20	08
5	4	0	890	307	231	168	112	73	51	27
6	1	0	0	0	0	0	0	0	0	0
6	2	0	386	139	104	79	52	36	0	0
6	3	0	604	221	170	126	87	60	0	0
6	4	0	883	325	250	187	131	90	0	0

"F19" 90 "SR" 1 2560 27.5 704 "H"

"F. 3.15m. n. of Jay/Wells CL northerly to Bluffton C/L" 7.72

"F. CR500S (1.0m. n. of SR218) southerly (SB)" 0.25

1 9196 75 8 1.6 0.00 7.4 0.0 6.0 "6"

"A-7-6" 18 "CH" 93.7 29.6 5 53.2 26.0 27.2 2.65

0 5.0 0

2

"04-08-86" 1 1 1 1 1215 1245 82 0 0 55 55

"Dynaflect"

1	0	1.0	8	1.07	0.81	0.45	0.39	0.25
2	0	1.0	8	1.27	0.93	0.81	0.45	0.30
3	0	1.0	8	1.11	0.80	0.65	0.36	0.24
4	0	1.0	8	1.02	0.75	0.64	0.32	0.20
5	0	1.0	8	1.04	0.78	0.53	0.31	0.19
6	0	1.0	8	0.94	0.71	0.58	0.31	0.19

"Road Rater 400"

1	1	2	0	0.61	25.1	1.06	1.19	0.68	0.50
1	2	2	0	1.22	25.1	2.28	1.94	1.45	1.09
1	3	2	0	1.81	25.1	4.14	3.39	2.55	1.89
2	1	2	0	0.61	25.3	1.07	0.79	0.64	0.48
2	2	2	0	1.21	25.0	2.47	1.60	1.40	1.10
2	3	2	0	1.82	25.0	4.71	3.84	2.52	1.88
3	1	2	0	0.59	25.0	0.99	1.01	0.57	0.40
3	2	2	0	1.20	25.0	2.21	1.79	1.27	0.90
3	3	2	0	1.80	25.0	4.06	2.68	2.31	1.62
4	1	2	0	0.58	25.0	0.91	0.61	1.04	0.33
4	2	2	0	1.20	25.0	2.06	2.03	1.03	0.71
4	3	2	0	1.83	25.1	3.90	3.03	2.01	1.30
5	1	2	0	0.59	24.9	0.95	0.65	1.11	0.31
5	2	2	0	1.21	25.0	2.16	2.15	1.04	0.63
5	3	2	0	1.82	25.0	4.18	4.16	2.56	1.16
6	1	1	0	0.54	14.1	0.61	0.42	0.28	0.19
6	2	1	0	1.19	15.1	1.52	1.07	0.59	0.49
6	1	2	0	0.60	25.0	0.87	0.65	0.28	0.30
6	2	2	0	1.20	25.0	1.93	1.44	1.25	0.67
6	3	2	0	1.81	25.0	3.78	2.65	1.08	1.19
6	1	3	0	0.60	35.0	0.76	0.61	0.40	0.32

6	2	3	0	1.19	35.0	1.80	1.53	0.97	0.90
6	3	3	0	1.81	35.0	3.43	2.94	1.95	1.89
"Road Rater 2000"									
1	1	2	0	0.61	25.1	1.01	0.72	0.57	0.46
1	2	2	0	1.19	25.1	2.28	1.68	1.24	0.97
1	3	2	0	1.81	25.1	3.78	2.77	1.99	1.52
1	4	2	0	2.43	25.1	5.34	3.93	2.81	2.11
1	5	2	0	3.59	25.1	9.31	6.83	4.72	3.38
2	1	2	0	0.60	25.1	0.99	0.75	0.52	0.43
2	2	2	0	1.17	25.1	2.25	1.68	1.14	0.95
2	3	2	0	1.80	25.1	3.76	2.77	1.91	1.52
2	4	2	0	2.39	25.1	5.52	4.00	2.71	2.08
2	5	2	0	3.59	25.1	9.87	7.23	4.70	3.46
3	1	2	0	0.59	25.1	1.01	0.71	0.58	0.44
3	2	2	0	1.15	25.1	2.28	1.58	1.25	0.95
3	3	2	0	1.81	25.1	3.99	2.77	2.14	1.56
3	4	2	0	2.42	25.1	5.71	3.97	2.98	2.18
3	5	2	0	3.63	25.1	9.72	7.11	5.22	3.69
4	1	2	0	0.60	25.2	0.80	0.58	0.38	0.30
4	2	2	0	1.15	25.1	1.83	1.32	0.88	0.64
4	3	2	0	1.80	25.1	3.16	2.29	1.46	1.05
4	4	2	0	2.38	25.1	4.52	3.28	2.11	1.47
4	5	2	0	3.61	25.1	8.69	6.00	3.80	2.47
5	1	2	0	0.56	25.1	0.78	0.55	0.45	0.28
5	2	2	0	1.19	25.1	1.84	1.30	0.71	0.61
5	3	2	0	1.81	25.1	3.16	2.16	1.39	0.95
5	4	2	0	2.42	25.1	4.65	3.16	2.01	1.33
5	5	2	0	3.61	25.1	8.24	5.72	3.41	2.20
6	1	1	0	0.61	14.9	0.82	0.50	0.39	0.25
6	2	1	0	1.20	14.9	1.79	1.10	0.80	0.53
6	3	1	0	1.77	15.0	2.99	1.78	1.31	0.84
6	4	1	0	2.37	14.8	4.43	2.73	1.90	1.20
6	5	1	0	3.51	15.0	7.37	5.49	3.19	2.10
6	1	2	0	0.58	25.1	0.77	0.60	0.43	0.35
6	2	2	0	1.18	25.1	1.76	1.34	0.90	0.62
6	3	2	0	1.83	25.1	3.03	2.24	1.43	0.97
6	4	2	0	2.40	25.1	4.39	3.23	2.09	1.36
6	5	2	0	3.60	25.1	7.77	5.72	3.67	2.37
6	1	3	0	0.62	35.1	0.71	0.53	0.40	0.27
6	2	3	0	1.23	35.2	1.74	1.35	0.95	0.62
6	3	3	0	1.78	35.2	2.78	2.01	1.46	0.97
6	4	3	0	2.42	35.2	4.15	3.17	2.13	1.42
6	5	3	0	3.62	35.1	7.07	5.41	3.54	2.34
"Dynaflect FWD"									
1	2	0	410	399	295	164	103	66	0
1	4	0	917	824	593	362	215	135	0
2	2	0	407	480	333	195	116	78	0
2	4	0	901	980	678	418	254	166	0
3	2	0	399	428	301	170	97	60	0
3	4	0	888	887	617	364	214	134	0
4	2	0	415	389	284	163	90	54	0
4	4	0	896	816	587	350	198	120	0
5	2	0	404	432	302	153	84	49	35
5	4	0	910	887	608	336	182	111	78
6	1	0	208	159	122	66	39	27	0
6	2	0	405	367	247	145	82	51	0
6	3	0	651	562	390	226	132	81	0
6	4	0	917	766	534	320	187	114	0
"08-28-86"									
1	1	0	1	1230	1300	84	96	90	65
"Dynaflect"									
1	0	1.0	8	0.74	0.62	0.46	0.34	0.23	
2	0	1.0	8	0.85	0.67	0.49	0.37	0.25	
3	0	1.0	8	0.81	0.64	0.45	0.32	0.21	
4	0	1.0	8	0.71	0.54	0.37	0.26	0.16	
5	0	1.0	8	0.71	0.56	0.37	0.26	0.15	
6	0	1.0	8	0.68	0.54	0.36	0.26	0.17	
"Road Rater 400"									
1	1	2	0	0.58	25.0	0.74	0.39	0.49	0.38
1	2	2	0	1.21	25.0	1.77	1.26	1.15	1.78
1	3	2	0	1.80	25.0	3.16	2.34	2.01	1.59

2	1	2	0	0.58	25.0	0.82	0.66	0.52	0.40
2	2	2	0	1.20	25.0	1.93	1.61	1.24	0.93
2	3	2	0	1.81	25.0	3.60	2.96	2.18	1.67
3	1	2	0	0.60	25.0	0.87	0.73	0.53	0.38
3	2	2	0	1.19	25.0	1.92	1.65	1.19	0.88
3	3	2	0	1.81	25.0	3.68	3.31	2.16	1.57
4	1	2	0	0.58	25.0	0.70	0.63	0.38	0.26
4	2	2	0	1.21	25.0	1.55	1.32	0.89	0.61
4	3	2	0	1.80	25.0	2.99	2.03	1.61	1.07
5	1	2	0	0.59	25.0	0.73	0.61	0.38	0.25
5	2	2	0	1.20	25.0	1.60	1.26	0.80	0.54
5	3	2	0	1.79	25.0	3.05	2.27	1.46	0.97
6	1	1	0	0.61	15.1	0.53	0.42	0.31	0.20
6	2	1	0	1.20	15.1	1.23	0.99	0.71	0.49
6	1	2	0	0.59	25.0	0.66	0.52	0.36	0.25
6	2	2	0	1.21	25.1	1.52	1.21	0.85	0.61
6	3	2	0	1.80	25.1	2.88	2.34	1.54	1.11
6	1	3	0	0.59	34.9	0.61	0.49	0.47	0.26
6	2	3	0	1.20	35.0	1.53	1.28	0.99	0.68
6	3	3	0	1.80	35.0	3.80	3.05	4.95	1.49

"Dynatest FWD"

1	2	0	393	315	216	137	89	62	43	25
1	4	0	907	726	519	327	205	137	100	57
2	2	0	382	376	245	155	100	67	0	0
2	4	0	895	805	561	362	235	157	0	0
3	2	0	384	366	242	142	92	58	41	23
3	4	0	908	806	549	339	213	136	90	52
4	2	0	382	347	229	132	75	48	0	0
4	4	0	889	768	536	312	183	112	0	0
5	2	0	378	338	218	121	70	45	31	26
5	4	0	890	754	505	293	170	106	76	47
6	1	0	0	0	0	0	0	0	0	0
6	2	0	385	306	201	115	70	45	0	0
6	3	0	612	472	324	189	115	77	0	0
6	4	0	898	678	472	282	173	103	0	0

"L10" 64 "SR" 8 2490 16.0 398 "N"
 "F. Crooked Creek bridge easterly to Porter/LaPorte CL" 2.80
 "F. 500' e. of CR500E easterly (48)" 0.25
 1 9316 73 13 1.3 0.00 4.6 0.0 7.2 "S"
 "A-4" 1 "SC" 109.2 18.2 14 29.0 19.6 9.4 2.60
 34 2.2 0

2
 "04-14-86" 1 1 1 1 1120 1150 57 0 0 48 44
 "Dynaflect"

1	0	1.0	8	1.57	1.15	1.09	0.61	0.44
2	0	1.0	8	1.46	1.12	1.10	0.61	0.44
3	0	1.0	8	1.36	1.02	0.98	0.53	0.45
4	0	1.0	8	1.46	1.11	0.75	0.53	0.40
5	0	1.0	8	1.70	1.22	0.83	0.55	0.40
6	0	1.0	8	1.49	1.14	0.83	0.60	0.45

"Road Rater 400"

1	1	2	0	0.65	25.4	1.18	0.81	0.60	0.60
1	2	2	0	1.26	25.5	2.42	1.83	1.06	1.67
1	3	2	0	1.89	25.5	5.03	3.73	2.11	2.75
2	1	2	0	0.64	25.5	1.14	0.76	0.52	0.30
2	2	2	0	1.26	25.5	2.52	2.12	1.15	0.74
2	3	2	0	1.89	25.5	4.89	3.20	2.18	1.40
3	1	2	0	0.60	25.6	1.06	0.70	0.69	0.34
3	2	2	0	1.23	25.1	2.28	1.37	1.24	0.88
3	3	2	0	1.89	25.5	4.09	3.06	1.81	0.61
4	1	2	0	0.61	25.4	1.38	0.86	0.45	0.24
4	2	2	0	1.22	25.2	2.85	1.78	1.00	0.63
4	3	2	0	1.85	25.2	5.15	3.53	1.81	1.07
5	1	2	0	0.58	25.2	1.25	0.94	0.56	0.28
5	2	2	0	1.27	25.2	2.96	2.60	0.86	0.62
5	3	2	0	1.83	25.2	5.46	4.24	1.62	1.18

6	1	1	0	0.60	15.0	1.13	0.93	0.62	0.35
6	2	1	0	1.26	15.1	2.65	1.88	1.34	0.76
6	1	2	0	0.62	25.4	1.11	0.73	0.36	0.26
6	2	2	0	1.27	25.0	2.50	1.68	0.99	0.45
6	3	2	0	1.81	25.0	4.21	3.40	1.81	1.13
6	1	3	0	0.59	35.3	0.87	0.57	0.34	0.17
6	2	3	0	1.21	35.3	2.18	1.50	0.90	0.54
6	3	3	0	1.80	35.4	4.50	3.05	1.82	1.08
"Road Rater 2000"									
1	1	2	0	0.61	24.9	0.69	0.44	0.31	0.15
1	2	2	0	1.20	24.9	2.02	1.26	0.79	0.37
1	3	2	0	1.82	24.9	3.50	2.15	1.30	0.60
1	4	2	0	2.36	24.9	5.26	3.14	1.87	1.09
1	5	2	0	3.60	24.9	10.38	6.14	3.49	2.05
2	1	2	0	0.61	24.9	0.85	0.62	0.45	0.32
2	2	2	0	1.17	24.9	1.94	1.42	0.97	0.66
2	3	2	0	1.89	25.0	3.53	2.50	1.64	1.09
2	4	2	0	2.41	24.9	5.19	3.70	2.37	1.58
2	5	2	0	3.60	24.9	9.54	6.73	4.09	2.58
3	1	2	0	0.62	25.0	0.86	0.59	0.41	0.31
3	2	2	0	1.20	24.9	2.00	1.35	0.89	0.65
3	3	2	0	1.83	24.9	3.47	2.29	1.47	1.04
3	4	2	0	2.40	24.9	5.07	3.32	2.08	1.44
3	5	2	0	3.62	25.0	9.58	6.09	3.45	2.36
4	1	2	0	0.65	24.9	0.93	0.60	0.39	0.26
4	2	2	0	1.17	24.9	1.93	1.28	0.78	0.52
4	3	2	0	1.80	24.9	3.45	2.28	1.33	0.86
4	4	2	0	2.45	24.9	5.25	3.42	1.92	1.21
4	5	2	0	3.61	24.9	9.69	6.22	3.33	2.00
5	1	2	0	0.59	25.0	0.92	0.62	0.38	0.26
5	2	2	0	1.21	24.8	2.35	1.57	0.95	0.60
5	3	2	0	1.79	24.9	3.96	2.59	1.52	0.94
5	4	2	0	2.40	24.9	5.87	3.86	2.22	1.35
5	5	2	0	3.65	25.0	11.04	7.29	3.98	2.30
6	1	1	0	0.65	15.0	0.91	0.69	0.56	0.34
6	2	1	0	1.24	15.0	2.13	1.60	1.26	0.77
6	3	1	0	1.83	15.0	3.76	2.75	2.13	1.29
6	4	1	0	2.36	15.1	5.29	3.94	2.98	1.83
6	5	1	0	3.55	15.0	9.33	6.62	4.58	3.05
6	1	2	0	0.59	25.1	0.76	0.52	0.34	0.24
6	2	2	0	1.17	25.0	1.87	1.33	0.87	0.55
6	3	2	0	1.78	25.1	3.16	2.20	1.43	0.91
6	4	2	0	2.46	25.1	4.70	3.28	2.11	1.33
6	5	2	0	3.64	25.1	7.77	5.35	3.43	2.09
6	1	3	0	0.56	35.2	0.86	0.46	0.31	0.23
6	2	3	0	1.17	35.2	1.66	1.16	0.78	0.52
6	3	3	0	1.78	35.1	2.78	1.89	1.24	0.83
6	4	3	0	2.35	35.2	4.19	2.84	1.84	1.22
6	5	3	0	3.55	35.2	7.14	4.67	3.03	1.88
"Dynatest FWD"									
1	2	0	407	578	395	202	111	73	0
1	4	0	894	1195	853	449	239	156	0
2	2	0	402	545	375	208	123	78	0
2	4	0	891	1120	805	470	271	167	0
3	2	0	400	572	356	176	110	76	0
3	4	0	880	1115	709	388	227	157	0
4	2	0	415	602	424	199	114	68	0
4	4	0	875	1215	851	422	234	144	0
5	2	0	406	628	416	212	112	73	55
5	4	0	899	1293	867	470	248	156	117
6	1	0	197	192	138	82	54	33	0
6	2	0	408	454	325	192	117	78	0
6	3	0	658	730	512	315	191	125	0
6	4	0	904	1	0	714	435	264	171
"09-04-86"									
1	1	0	1	0815	0847	79	82	79	72
"Dynaflect"									
1	0	1.0	8	0.94	0.73	0.50	0.34	0.25	
2	0	1.0	8	1.15	0.84	0.57	0.39	0.28	
3	0	1.0	8	0.98	0.71	0.52	0.36	0.26	
4	0	1.0	8	1.14	0.81	0.52	0.36	0.26	

5	0	1.0	8	1.32	0.90	0.55	0.36	0.26
6	0	1.0	8	1.16	0.89	0.60	0.42	0.31
"Road Rater 400"								
1	1	2	0	0.52	25.4	0.98	0.72	0.47
1	2	2	0	1.31	25.4	2.60	2.16	2.07
1	3	2	0	1.82	25.5	8.67	5.48	6.68
2	1	2	0	0.62	25.4	1.29	1.15	0.67
2	2	2	0	1.25	25.0	4.93	3.37	2.28
2	3	2	0	1.71	25.0	8.95	7.01	4.04
3	1	2	0	0.61	25.0	0.91	0.69	0.46
3	2	2	0	1.23	25.0	2.72	2.10	1.34
3	3	2	0	1.86	25.1	5.12	5.09	2.67
4	1	2	0	0.57	25.0	1.02	0.90	0.45
4	2	2	0	1.29	25.0	4.28	3.13	1.88
4	3	2	0	1.77	25.1	8.46	6.78	4.01
5	1	2	0	0.59	25.0	1.54	1.15	0.65
5	2	2	0	1.18	25.0	4.32	3.19	1.73
5	3	2	0	1.86	25.1	8.53	6.22	3.22
6	1	1	0	0.60	15.1	0.89	0.69	0.44
6	2	1	0	1.27	15.1	2.44	1.94	1.16
6	1	2	0	0.60	25.1	1.03	0.62	0.31
6	2	2	0	1.32	25.1	3.42	2.49	1.32
6	3	2	0	1.73	25.1	6.77	6.56	5.01
6	1	3	0	0.62	35.2	5.70	2.77	2.20

"Dynatest FWD"								
1	2	0	392	515	316	163	99	62
1	4	0	893	1127	737	396	223	139
2	2	0	392	554	346	180	101	65
2	4	0	891	1125	810	428	245	146
3	2	0	391	487	279	145	88	59
3	4	0	892	1005	617	335	195	133
4	2	0	388	521	313	154	84	56
4	4	0	887	1085	705	355	192	126
5	2	0	386	669	386	175	97	59
5	4	0	879	1390	859	415	219	130
6	1	0	0	0	0	0	0	0
6	2	0	383	435	296	166	95	62
6	3	0	606	700	485	278	157	104
6	4	0	886	1025	715	413	238	153

"L11"	64	"SR"	8	2770	16.0	443	"N"	
"F. 1.0m. e. of Kouts C/L easterly to Crooked Creek bridge"								0.74
"F. 1.0 8' w/ of Crooked Creek bridge westerly (WB)"								0.25
1	9316	73	13	1.5	0.00	6.4	0.0	5.2
"A-2-4"	0	"SC"		122.5	36.5	3	22.7	14.6
0	2.4	0					8.1	2.22

2								
"04-14-86"	1	1	1	1	1200	1230	51	0
"Dynaflect"								0
1	0	1.0	8	0000	0000	0000	0000	0000
2	0	1.0	8	3.80	3.33	2.91	2.43	1.99
3	0	1.0	8	3.30	2.87	2.39	1.92	1.53
4	0	1.0	8	2.50	2.15	1.80	1.40	1.09
5	0	1.0	8	3.46	3.13	2.38	1.77	1.28
6	0	1.0	8	3.20	2.64	2.14	1.63	1.22
7	0	1.0	8	1.51	1.22	0.93	0.68	0.48
"Road Rater 400"								
1	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
2	1	2	0	0.62	25.4	0.98	1.14	0.51
2	2	2	0	1.27	25.5	2.33	2.32	1.25
2	3	2	0	1.81	25.0	4.41	3.16	2.16
3	1	2	0	0.59	25.0	1.16	1.47	0.74
3	2	2	0	1.22	25.0	2.69	3.03	1.61
3	3	2	0	1.83	25.1	5.14	5.94	2.90
4	1	2	0	0.60	25.0	0.93	1.43	0.18

4	2	0	0.25	25.1	2.25	3.03	0.78	1.00
4	3	2	0	1.84	25.1	4.13	4.41	1.78
4	3	2	0	0.62	25.0	1.68	1.33	1.06
5	2	0	0	1.24	25.3	3.93	3.47	1.91
5	3	2	0	1.88	25.4	7.20	6.55	3.01
6	1	1	0	0.62	15.2	2.95	2.57	2.39
6	2	1	0	1.29	15.6	6.96	6.11	5.67
6	1	2	0	0.61	25.4	1.55	1.64	0.52
6	2	2	0	1.26	25.4	3.63	3.49	1.63
6	3	2	0	1.89	25.5	7.01	6.89	3.07
6	1	3	0	0.60	35.4	0.99	0.79	0.59
6	2	3	0	1.21	35.7	2.55	2.07	1.47
6	3	3	0	1.83	35.4	5.88	4.63	3.26
"Road Rater 2000"								
1	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
2	1	2	0	0.60	24.9	0.06	0.11	0.07
2	2	2	0	1.24	24.9	1.76	1.28	0.96
2	3	2	0	1.91	24.9	3.06	2.23	1.62
2	4	2	0	2.28	24.9	4.30	3.16	2.28
2	5	2	0	3.46	24.9	7.17	5.18	3.62
3	1	2	0	0.71	25.0	0.13	0.15	0.13
3	2	2	0	1.17	24.9	1.37	1.11	0.85
3	3	2	0	1.88	24.9	2.82	2.26	1.68
3	4	2	0	2.40	24.9	4.23	3.39	2.52
3	5	2	0	3.66	24.9	6.67	5.26	3.88
4	1	2	0	0.63	25.0	0.16	0.14	0.11
4	2	2	0	1.20	24.9	1.10	0.91	0.75
4	3	2	0	1.73	25.0	2.46	2.03	1.60
4	4	2	0	2.38	24.9	3.33	2.75	2.16
4	5	2	0	3.71	24.9	7.52	6.05	4.58
5	1	2	0	0.63	24.9	0.41	0.34	0.29
5	2	2	0	1.16	25.0	2.15	1.77	1.42
5	3	2	0	1.77	24.9	5.02	4.01	3.17
5	4	2	0	2.34	25.0	7.35	5.98	4.62
5	5	2	0	3.57	25.0	13.69	10.58	7.79
6	1	1	0	0.65	15.0	0.57	0.49	0.43
6	2	1	0	1.22	15.0	4.50	3.72	3.33
6	3	1	0	1.95	15.0	6.44	5.45	4.80
6	4	1	0	2.23	15.0	12.36	10.43	9.04
6	5	1	0	3.49	14.9	0.00	18.20	16.04
6	1	2	0	0.55	24.9	0.23	0.20	0.19
6	2	2	0	1.33	24.8	2.67	2.19	1.86
6	3	2	0	1.79	24.9	4.96	4.04	3.38
6	4	2	0	2.48	24.9	7.30	5.81	4.76
6	5	2	0	3.64	24.9	13.38	10.23	8.14
6	1	3	0	0.66	35.2	0.73	0.56	0.49
6	2	3	0	1.11	35.1	1.72	1.31	1.11
6	3	3	0	1.87	35.1	3.57	2.66	2.17
6	4	3	0	2.41	35.2	5.43	3.92	3.13
6	5	3	0	3.61	35.1	10.04	6.54	5.11
"Dynastest FWD"								
1	2	0	0	0	0	0	0	0
1	4	0	0	0	0	0	0	0
2	2	0	410	643	529	346	263	184
2	4	0	895	1320	1050	732	533	375
3	2	0	407	665	573	393	290	196
3	4	0	901	1415	1180	858	612	427
4	2	0	409	549	457	347	243	172
4	4	0	907	1165	974	731	519	361
5	2	0	399	877	742	456	323	207
5	4	0	889	1740	1420	950	652	438
6	1	0	205	385	348	190	148	89
6	2	0	403	836	690	452	309	206
6	3	0	640	1290	1060	720	492	330
6	4	0	882	1710	1390	975	661	446
"09'04-86"								
1	1	0	1	1	0	0.900	0.930	85
								84
								87
								77
								65

"Dynaflect"

1	0	1.0	8	2.54	2.42	2.27	2.06	1.87
2	0	1.0	8	3.28	2.96	2.46	1.98	1.52
3	0	1.0	8	2.81	2.50	2.08	1.61	1.21
4	0	1.0	8	2.20	1.93	1.56	1.21	0.91
5	0	1.0	8	3.16	2.61	2.04	1.51	1.07
6	0	1.0	8	2.84	2.37	1.86	1.38	1.01
7	0	1.0	8	1.46	1.09	0.75	0.50	0.33

"Road Rater 400"

1	1	2	0	0.62	25.1	0.48	0.42	0.31	0.22
1	2	2	0	1.23	25.1	1.11	1.01	0.76	0.60
1	3	2	0	1.85	25.1	1.92	1.75	1.25	0.90
2	1	2	0	0.60	25.1	1.01	0.86	1.15	0.45
2	2	2	0	1.20	25.1	2.52	2.18	1.53	1.07
2	3	2	0	1.85	25.2	4.43	3.85	2.35	1.81
3	1	2	0	0.60	25.1	1.09	0.79	1.79	1.76
3	2	2	0	1.25	25.1	3.12	2.73	2.04	2.13
3	3	2	0	1.90	25.1	7.90	5.30	6.53	3.66
4	1	2	0	0.62	25.1	1.05	0.95	0.82	0.59
4	2	2	0	1.22	25.1	3.62	4.25	2.40	2.81
4	3	2	0	1.80	25.2	5.23	4.83	3.55	2.39
5	1	2	0	0.61	25.1	1.89	1.03	1.26	0.98
5	2	2	0	1.23	25.1	4.61	3.76	2.90	2.26
5	3	2	0	1.82	25.1	7.59	6.75	4.72	3.55
6	1	1	0	0.63	15.2	2.85	2.50	2.07	1.65
6	2	1	0	1.25	15.2	6.82	5.92	4.75	3.83
6	1	2	0	0.61	25.0	1.74	1.49	1.24	1.01
6	2	2	0	1.24	25.1	4.39	3.76	3.03	2.45
6	3	2	0	1.81	25.1	7.27	6.25	4.84	3.74
6	1	3	0	0.59	35.1	1.09	0.89	0.69	0.53
6	2	3	0	1.18	35.1	3.88	3.06	2.25	1.70
6	3	3	0	1.68	35.1	6.67	5.78	3.88	2.83

"Dynatest FHD"

1	2	0	387	278	230	166	127	101	78	58
1	4	0	887	622	514	386	288	222	178	123
1	2	0	375	708	519	397	262	195	0	0
1	4	0	860	1530	1230	851	591	409	0	0
1	2	0	374	742	612	402	285	191	124	68
1	4	0	859	1643	1370	944	651	441	299	168
1	2	0	380	643	481	364	245	176	0	0
1	4	0	864	1395	1140	798	561	372	0	0
1	2	0	368	952	659	452	305	202	132	61
1	4	0	846	1997	1510	1050	699	453	290	135
1	1	0	0	0	0	0	0	0	0	0
1	2	0	362	954	673	457	302	199	0	0
1	3	0	574	1430	1080	725	489	338	0	0
1	4	0	834	1995	1510	1060	695	463	0	0

"L12" 46 "US" 421 10060 19.5 1962 "N"

"F. US6S northerly to US6N" 0.99

"F. concrete plant entrance n. of SR6S northerly (NB)" 0.25

1 14056 84 2 2.2 0.00 7.0 0.0 13.8 "6"

"A-2-4" 0 "SC" 0.0 12.2 20 21.7 14.9 6.9 2.69

89 3.3 0

2

"04-16-86" 1 1 1 1 0930 1000 43 0 0 38 46

"Dynaflect"

1	0	1.0	8	0.47	0.40	0.35	0.28	0.23
2	0	1.0	8	0.60	0.51	0.45	0.35	0.28
3	0	1.0	8	0.50	0.42	0.37	0.30	0.22
4	0	1.0	8	0.73	0.59	0.48	0.36	0.27
5	0	1.0	8	0.58	0.49	0.42	0.33	0.27
6	0	1.0	8	0.53	0.45	0.38	0.30	0.24

"Road Rater 400"

1	1	2	0	0.60	24.8	0.52	0.37	0.21	1.74
1	2	2	0	1.20	24.8	0.74	1.41	0.49	2.22
1	3	2	0	1.77	24.8	1.11	1.29	0.76	0.77

2	1	2	0	0.58	24.9	0.30	0.24	0.17	0.10
2	2	2	0	1.20	24.9	0.70	0.56	0.43	0.33
2	3	2	0	1.80	24.8	1.12	1.19	0.84	0.54
3	1	2	0	0.59	25.0	0.28	0.10	1.67	0.44
3	1	2	0	0.59	25.0	0.28	0.13	0.33	0.08
3	2	2	0	1.23	25.1	0.63	1.10	0.44	0.26
4	1	2	0	0.61	25.1	0.53	0.51	0.50	0.59
4	2	2	0	1.22	25.0	1.08	0.38	0.69	1.30
4	3	2	0	1.81	25.1	1.73	1.46	1.08	1.81
5	1	2	0	0.60	25.0	0.36	0.28	0.59	0.86
5	2	2	0	1.24	25.3	0.79	0.63	0.88	1.72
5	3	2	0	1.84	25.1	1.30	1.35	1.16	0.59
6	1	1	0	0.62	15.2	0.38	0.27	0.31	0.10
6	2	1	0	1.24	15.2	0.83	0.68	0.31	0.28
6	1	2	0	0.62	25.5	0.38	0.22	1.39	0.43
6	2	2	0	1.27	25.5	0.85	0.91	1.23	0.79
6	3	2	0	1.88	25.4	1.39	1.78	1.56	1.72
6	1	3	0	0.58	35.1	0.28	0.17	0.10	0.08
6	2	3	0	1.21	35.2	0.70	0.43	0.26	0.25
6	3	3	0	1.75	35.0	1.20	1.03	0.74	0.46
"Road Rater 2000"									
1	1	2	0	0.60	25.0	0.23	0.18	0.16	0.13
1	2	2	0	1.20	24.9	0.66	0.50	0.37	0.30
1	3	2	0	1.86	24.9	1.12	0.85	0.60	0.52
1	4	2	0	2.39	25.0	1.55	1.19	0.86	0.72
1	5	2	0	3.63	25.0	2.46	1.95	1.42	1.17
2	1	2	0	0.64	24.9	0.28	0.19	0.17	0.13
2	2	2	0	1.18	25.0	0.65	0.49	0.40	0.31
2	3	2	0	1.82	24.9	1.06	0.79	0.65	0.50
2	4	2	0	2.44	24.9	1.51	1.12	0.92	0.70
2	5	2	0	3.56	25.0	2.46	1.79	1.47	1.10
3	1	2	0	0.59	25.0	0.02	0.02	0.01	0.02
3	2	2	0	1.22	25.0	0.52	0.43	0.32	0.24
3	3	2	0	1.84	24.9	0.87	0.70	0.52	0.40
3	4	2	0	2.42	25.0	1.28	1.01	0.76	0.58
3	5	2	0	3.63	24.9	2.09	1.70	1.28	0.97
4	1	2	0	0.62	25.0	0.46	0.27	0.20	0.15
4	2	2	0	1.26	25.0	1.27	0.76	0.56	0.41
4	3	2	0	1.92	24.9	1.94	1.21	0.87	0.65
4	4	2	0	2.40	24.9	2.75	1.73	1.23	0.89
4	5	2	0	3.57	25.0	4.77	2.92	2.01	1.44
5	1	2	0	0.65	24.9	0.14	0.15	0.12	0.10
5	2	2	0	1.25	24.9	0.56	0.52	0.41	0.31
5	3	2	0	1.79	25.0	0.97	0.85	0.68	0.50
5	4	2	0	2.42	25.0	1.37	1.18	0.95	0.68
5	5	2	0	3.64	24.9	2.13	1.80	1.47	1.02
6	1	1	0	0.60	15.0	0.47	0.32	0.24	0.19
6	2	1	0	1.22	14.9	1.06	0.70	0.51	0.42
6	3	1	0	1.81	15.0	1.59	1.14	0.82	0.64
6	4	1	0	2.36	15.0	2.38	1.63	1.16	0.95
6	5	1	0	3.58	15.0	4.47	2.49	1.90	1.56
6	1	2	0	0.60	25.0	0.33	0.21	0.17	0.15
6	2	2	0	1.25	25.0	0.80	0.51	0.40	0.30
6	3	2	0	1.77	25.1	1.23	0.79	0.61	0.46
6	4	2	0	2.43	25.0	1.78	1.14	0.88	0.65
6	5	2	0	3.59	25.1	3.11	1.89	1.44	1.07
6	1	3	0	0.62	34.9	0.30	0.19	0.14	0.12
6	2	3	0	1.20	34.9	0.70	0.44	0.34	0.24
6	3	3	0	1.79	34.9	1.14	0.72	0.53	0.40
6	4	3	0	2.38	34.9	1.59	1.00	0.74	0.55
6	5	3	0	3.64	35.0	2.79	1.69	1.24	0.90
"Dynatest FWD"									
1	2	0	468	148	121	87	68	51	0
1	4	0	996	302	248	189	145	111	0
2	2	0	463	158	128	104	77	60	0
2	4	0	997	324	273	220	168	130	0
3	2	0	465	165	127	90	69	50	0
3	4	0	987	336	268	201	150	112	0
4	2	0	458	239	179	129	83	62	0
4	4	0	973	478	375	270	189	135	0

5	2	0	456	163	135	94	73	53	42	25
5	4	0	979	348	282	210	158	118	93	58
6	1	0	226	81	57	46	27	25	0	0
6	2	0	448	169	127	91	67	50	0	0
6	3	0	713	263	204	148	108	82	0	0
6	4	0	986	360	279	203	151	113	0	0

"09-04-86" 1 1 0 1 1040 1102 80 91 97 79 63

"Dynaflect"

1	0	1.0	8	0.51	0.42	0.34	0.26	0.21
2	0	1.0	8	0.60	0.50	0.41	0.32	0.26
3	0	1.0	8	0.51	0.42	0.34	0.27	0.22
4	0	1.0	8	0.63	0.51	0.41	0.32	0.25
5	0	1.0	8	0.56	0.47	0.39	0.30	0.23
6	0	1.0	8	0.48	0.40	0.33	0.27	0.21

"Road Rater 400"

1	1	2	0	0.59	25.1	0.38	0.30	0.21	0.14
1	2	2	0	1.26	25.2	0.88	0.73	1.79	0.40
1	3	2	0	1.87	25.2	1.56	1.26	0.91	0.67
2	1	2	0	0.61	25.1	0.41	0.32	0.24	0.16
2	2	2	0	1.21	25.2	0.96	0.76	0.57	0.41
2	3	2	0	1.88	25.2	1.76	1.36	0.97	3.52
3	1	2	0	0.61	25.1	0.30	0.25	0.17	0.12
3	2	2	0	1.25	25.2	0.79	0.67	0.47	0.35
3	3	2	0	1.85	25.2	1.37	0.59	0.65	1.34
4	1	2	0	0.61	25.1	0.54	0.44	0.32	0.23
4	2	2	0	1.19	25.2	1.46	1.37	0.86	0.59
4	3	2	0	1.78	25.2	1.78	2.57	1.87	1.37
5	1	2	0	0.60	25.1	0.41	0.37	0.23	0.16
5	2	2	0	1.23	25.2	1.04	0.87	0.61	0.45
5	3	2	0	1.85	25.2	1.84	1.54	2.22	0.80
6	1	1	0	0.62	15.1	0.42	0.36	0.26	0.18
6	2	1	0	1.22	15.1	1.04	0.84	0.63	0.46
6	1	2	0	0.60	25.0	0.41	0.31	0.21	0.41
6	2	2	0	1.23	25.1	1.10	0.86	0.57	0.41
6	3	2	0	1.83	25.1	1.91	1.23	0.94	2.64
6	1	3	0	0.57	34.9	0.41	1.97	0.16	0.10
6	2	3	0	1.14	34.9	1.12	2.67	0.52	0.35
6	3	3	0	1.65	34.9	2.49	3.84	0.89	0.88

"Dynatest FWD"

1	2	0	394	169	120	83	56	43	32	26
1	4	0	899	382	285	199	142	104	82	54
2	2	0	390	222	141	99	68	49	0	0
2	4	0	893	465	331	235	164	119	0	0
3	2	0	384	189	126	77	55	39	32	22
3	4	0	892	403	285	191	134	99	78	54
4	2	0	382	250	158	105	67	48	0	0
4	4	0	883	524	369	248	168	116	0	0
5	2	0	383	195	134	86	59	44	35	24
5	4	0	885	426	310	211	147	107	82	49
6	1	0	0	0	0	0	0	0	0	0
6	2	0	380	202	122	83	56	44	0	0
6	3	0	597	302	202	135	94	70	0	0
6	4	0	882	425	300	203	141	105	0	0

"L13" 25 "SR" 14 2510 23.0 577 "N"

"F. 1.19m. w. of Akron C/L easterly to near Fulton/Kosciusko CL" 0.52

"F. 0.15m. e. of CR1000E (1.4m. w. of SR19) easterly (W8)" 0.25

1 12340 80 6 3.2 0.00 8.9 0.0 25.2 "6"

"A-2-4" 0 "SM-SC" 115.8 9.6 28 20.0 13.6 6.4 2.68

2

"04-11-86" 1 1 0 1 1100 1130 73 0 0 53 51

"Dynaflect"

1	0	1.0	8	0.56	0.45	0.32	0.24	0.16
2	0	1.0	8	0.76	0.60	0.42	0.31	0.21
3	0	1.0	8	0.64	0.51	0.36	0.26	0.17
4	0	1.0	8	0.90	0.71	0.50	0.36	0.23

5	0	1.0	8	0.57	0.47	0.33	0.25	0.18
6	0	1.0	8	0.59	0.45	0.31	0.23	0.15
"Road Rater 400"								
1	1	2	0	0.61	25.1	0.44	0.28	0.33
1	2	2	0	1.25	25.2	0.96	0.66	0.97
1	3	2	0	1.84	25.2	1.49	1.42	0.57
2	1	2	0	0.61	25.1	0.66	0.52	0.38
2	2	2	0	1.23	25.2	1.45	1.14	0.74
2	3	2	0	1.84	25.2	2.35	1.96	1.56
3	1	2	0	0.60	25.1	0.52	0.34	0.23
3	2	2	0	1.24	25.2	1.10	0.80	0.60
3	3	2	0	1.82	25.2	1.75	1.92	1.21
4	1	2	0	0.61	25.1	0.70	0.49	0.34
4	2	2	0	1.22	25.1	1.51	2.05	0.87
4	3	2	0	1.82	25.2	2.62	2.42	1.60
5	1	1	0	0.62	15.2	0.38	0.25	0.09
5	2	1	0	1.23	15.2	0.83	0.69	0.29
5	3	2	0	0.62	25.2	0.48	0.38	0.31
5	2	2	0	1.23	25.1	0.98	1.10	1.72
5	3	2	0	1.84	25.1	1.67	0.98	2.85
5	1	3	0	0.61	35.3	0.37	0.27	0.20
5	2	3	0	1.22	35.3	0.82	0.68	0.51
5	3	3	0	1.83	35.3	1.63	1.44	1.10
6	1	2	0	0.61	25.1	0.51	1.05	0.25
6	2	2	0	1.22	25.1	1.06	0.74	0.54
6	3	2	0	1.84	25.2	1.84	1.31	0.90
"Dynatest FWD"								
1	2	0	422	145	120	90	64	45
1	4	0	944	325	259	194	142	100
2	2	0	411	203	156	110	78	55
2	4	0	932	430	332	236	165	118
3	2	0	408	179	137	91	65	45
3	4	0	926	381	288	204	142	101
4	2	0	422	259	191	133	89	62
4	4	0	930	527	393	279	188	130
5	2	0	416	156	122	91	60	43
5	4	0	931	333	261	192	134	94
6	1	0	201	74	69	41	28	16
6	2	0	407	195	141	86	56	35
6	3	0	665	298	210	134	89	57
6	4	0	923	405	284	184	122	78
"08-25-86"								
1	1	0	1	0938	1005	72	77	76
"Dynalect"								
1	0	1.0	8	0.51	0.39	0.28	0.18	0.12
2	0	1.0	8	0.65	0.49	0.33	0.22	0.14
3	0	1.0	8	0.57	0.43	0.29	0.20	0.13
4	0	1.0	8	0.67	0.52	0.36	0.25	0.17
5	0	1.0	8	0.44	0.34	0.24	0.17	0.12
6	0	1.0	8	0.46	0.34	0.24	0.17	0.12
"Road Rater 400"								
1	1	2	0	0.59	25.1	0.45	0.35	0.25
1	2	2	0	1.20	25.0	0.92	0.73	0.52
1	3	2	0	1.78	25.0	1.66	1.28	0.95
2	1	2	0	0.58	24.9	0.61	0.57	0.37
2	2	2	0	1.19	25.0	1.42	1.45	0.86
2	3	2	0	1.79	25.0	2.68	2.58	1.66
3	1	2	0	0.59	25.0	0.50	0.37	0.27
3	2	2	0	1.22	25.0	1.14	0.86	0.63
3	3	2	0	1.77	25.1	1.96	1.56	1.14
4	1	2	0	0.60	25.0	0.67	0.52	0.39
4	2	2	0	1.20	25.0	1.53	1.22	0.91
4	3	2	0	1.77	25.1	2.73	2.22	1.65
5	1	2	0	0.59	25.0	0.42	0.45	0.23
5	2	2	0	1.20	25.0	1.07	0.78	0.60
5	3	2	0	1.79	25.0	1.87	0.91	1.09
6	1	1	0	0.59	14.9	0.31	0.23	0.15
6	2	1	0	1.20	15.2	0.81	0.62	0.41
6	1	2	0	0.58	24.9	0.43	0.30	0.20
6	2	2	0	1.19	25.0	0.96	0.68	0.46
6	3	2	0	1.79	25.1	1.80	1.33	0.91

6	1	3	0	0.59	35.1	0.39	0.25	0.16	0.98
6	2	3	0	1.20	35.1	0.97	0.68	0.49	1.79
6	3	3	0	1.79	35.1	2.08	1.51	1.02	1.89

"Dynatest FWD"

1	2	0	378	166	111	74	51	34	22	12
1	4	0	875	368	265	179	125	86	55	28
2	2	0	377	226	146	104	71	50	0	0
2	4	0	871	485	348	240	156	110	0	0
3	2	0	376	186	126	85	54	38	27	16
3	4	0	874	420	293	194	129	89	63	35
4	2	0	372	271	171	116	72	52	0	0
4	4	0	865	562	380	260	171	117	0	0
5	2	0	371	164	115	70	47	33	21	16
5	4	0	871	364	262	170	118	81	66	34
6	1	0	0	0	0	0	0	0	0	0
6	2	0	367	171	102	68	42	30	0	0
6	3	0	587	263	166	106	70	47	0	0
6	4	0	894	364	243	156	105	71	0	0

"L14" 66 "US" 421 3430 20.0 686 "N"
 "F. SR114 northerly to SR14" 8.45
 "F. CR100S (1.0m. s. of SR14N) southerly (SB)" 0.25
 1 13850 82 4 1.0 0.00 4.9 0.0 6.6 "6"
 "A-6" 4 "SC" 0.0 16.4 12 26.7 13.3 13.4 2.62
 52 4.6 0

2
 "04-11-86" 1 1 0 1 1345 1415 77 0 0 60 51

"Dynaflect"

1	0	1.0	8	1.16	0.83	0.55	0.37	0.25
2	0	1.0	8	1.17	0.91	0.65	0.47	0.33
3	0	1.0	8	0.87	0.67	0.46	0.32	0.21
4	0	1.0	8	1.03	0.81	0.57	0.41	0.25
5	0	1.0	8	1.03	0.76	0.50	0.37	0.26
6	0	1.0	8	1.01	0.79	0.54	0.37	0.25

"Road Rater 400"

1	1	2	0	0.61	25.2	0.74	0.53	0.46	0.22
1	2	2	0	1.23	25.2	1.67	1.14	1.15	0.80
1	3	2	0	1.85	25.2	2.91	2.95	1.77	1.31
2	1	2	0	0.61	25.2	0.93	0.58	0.80	0.44
2	2	2	0	1.25	25.2	2.11	2.05	1.68	1.05
2	3	2	0	1.85	25.2	3.71	3.09	2.35	1.74
3	1	2	0	0.61	25.2	0.78	0.56	0.32	0.27
3	2	2	0	1.24	25.2	1.72	1.27	0.68	0.62
3	3	2	0	1.83	25.2	3.00	2.49	1.62	0.93
4	1	2	0	0.60	25.2	0.70	0.52	0.27	0.34
4	2	2	0	1.23	25.2	1.61	1.18	0.75	0.84
4	3	2	0	1.84	25.2	2.74	3.24	1.87	1.42
5	1	2	0	0.61	25.2	0.62	0.42	0.19	0.22
5	1	2	0	0.60	25.2	0.64	0.43	0.45	0.27
5	2	2	0	1.24	25.2	1.39	1.26	1.05	0.63
5	3	2	0	1.86	25.2	2.43	2.06	0.91	1.07
6	1	1	0	0.64	15.3	0.65	0.49	0.51	0.24
6	2	1	0	1.24	15.3	1.46	1.08	0.82	0.55
6	1	2	0	0.62	25.3	0.85	0.65	0.35	0.38
6	2	2	0	1.24	25.1	1.93	1.50	1.15	0.89
6	3	2	0	1.82	25.1	3.41	2.75	2.54	1.66
6	1	3	0	0.60	35.0	0.68	0.58	0.41	0.28
6	2	3	0	1.20	35.0	1.63	1.44	0.82	0.71
6	3	3	0	1.82	35.1	3.46	3.44	1.79	1.46

"Dynatest FWD"

1	2	0	412	320	244	144	95	61	0	0
1	4	0	921	654	497	327	209	138	0	0
2	2	0	413	325	258	169	106	71	0	0
2	4	0	920	714	545	356	233	154	0	0
3	2	0	409	323	243	139	82	51	0	0
3	4	0	909	632	468	296	175	112	0	0
4	2	0	419	290	219	134	97	65	0	0

4	4	0	896	589	457	314	211	139	0	0
5	2	0	415	230	216	131	83	55	39	22
5	4	0	909	575	447	287	186	122	86	77
6	1	0	196	153	133	59	50	24	0	0
6	2	0	400	337	253	152	98	59	0	0
6	3	0	641	518	388	248	154	98	0	0
6	4	0	899	693	521	338	215	135	0	0

"09-05-86" 1 1 0 1 1005 1028 81 82 87 74 66

"Dynaflect"

1	0	1.0	8	0.76	0.57	0.40	0.26	0.18
2	0	1.0	8	0.89	0.72	0.51	0.37	0.27
3	0	1.0	8	0.67	0.50	0.34	0.22	0.16
4	0	1.0	8	0.77	0.62	0.43	0.29	0.21
5	0	1.0	8	0.70	0.52	0.37	0.25	0.18
6	0	1.0	8	0.73	0.58	0.39	0.26	0.19

"Road Rater 400"

1	1	2	0	0.63	25.0	0.78	0.66	0.48	0.34
1	2	2	0	1.24	25.1	1.69	1.49	1.05	0.73
1	3	2	0	1.84	25.1	2.96	2.64	1.86	2.01
2	1	2	0	0.60	25.0	0.94	0.77	0.58	0.44
2	2	2	0	1.23	25.1	2.07	1.83	1.35	0.99
2	3	2	0	1.81	25.1	3.48	3.13	2.32	1.68
3	1	2	0	0.62	25.0	0.69	0.55	0.36	0.23
3	2	2	0	1.25	25.1	1.41	1.18	0.78	0.49
3	3	2	0	1.83	25.1	2.43	2.12	1.32	0.82
4	1	2	0	0.62	25.0	0.83	0.73	0.54	0.39
4	2	2	0	1.23	25.1	1.85	1.65	1.22	0.89
4	3	2	0	1.79	25.1	3.00	2.70	2.01	1.46
5	1	2	0	0.62	25.1	0.51	0.43	0.37	0.21
5	2	2	0	1.24	25.0	1.23	1.12	0.52	0.53
5	3	2	0	1.81	25.1	2.03	1.80	0.99	0.89
6	1	1	0	0.60	14.9	0.47	0.39	0.27	0.17
6	2	1	0	1.19	14.9	1.25	1.02	0.71	0.44
6	1	2	0	0.61	25.0	0.73	0.61	0.42	0.29
6	2	2	0	1.22	25.0	1.65	1.42	0.99	0.65
6	3	2	0	1.83	25.0	2.91	2.58	1.67	1.07
6	1	3	0	0.58	35.1	0.84	0.88	0.48	0.34
6	2	3	0	1.15	35.1	2.49	2.13	1.52	1.04
6	3	3	0	1.80	35.1	4.26	3.71	2.54	1.64

"Dynatest FWD"

1	2	0	392	345	236	131	76	50	34	19
1	4	0	893	735	533	316	186	122	86	49
2	2	0	385	365	254	155	90	62	0	0
2	4	0	886	768	574	361	222	144	0	0
3	2	0	389	300	203	100	59	37	25	14
3	4	0	889	602	417	237	139	87	59	34
4	2	0	386	339	224	133	78	52	0	0
4	4	0	885	679	491	306	190	123	0	0
5	2	0	383	310	179	100	58	38	24	15
5	4	0	874	650	408	243	146	96	70	41
6	1	0	0	0	0	0	0	0	0	0
6	2	0	383	281	195	116	66	39	0	0
6	3	0	601	423	308	182	109	65	0	0
6	4	0	889	594	440	267	163	98	0	0

"L15" 75 "SR" 10 1190 16.5 196 "N"

"F. Jasper/Starke CL easterly to US421" 2.02

"F. 400' W. of CR1100W westerly (W8)" 0.25

1 12421 80 6 2.3 0.00 5.8 0.0 4.4 "S"

"A-3" 0 "SP" 105.2 16.0 18 0.0 0.0 0.0 0.0 2.66

67 5.0 0

2

"04-14-86" 1 1 1 1 1.0 8 1030 47 0 0 45 45

"Dynaflect"

1	0	1.0	8	1.16	0.92	0.91	0.46	0.31
2	0	1.0	8	1.39	1.07	0.97	0.47	0.30
3	0	1.0	8	1.44	1.15	1.09	0.56	0.35

1	4	0	887	925	677	417	235	134	0	0
2	2	0	404	458	338	197	112	65	0	0
2	4	0	378	998	729	443	242	136	0	0
3	2	0	403	448	336	206	119	72	0	0
3	4	0	880	988	724	465	265	158	0	0
4	2	0	396	575	409	220	116	63	0	0
4	4	0	866	1235	871	490	253	127	0	0
5	2	0	398	496	372	226	131	76	53	38
5	4	0	373	1060	786	469	265	148	103	85
6	1	0	190	189	151	87	52	26	0	0
6	2	0	388	429	313	191	111	68	0	0
6	3	0	629	696	509	312	178	107	0	0
6	4	0	862	957	695	429	244	142	0	0
"09-05-86" 1 1 0 1 0915 0938 79 81 87 71 68										
"Dynalect"										
1	0	1.0	8	1.04	0.80	0.53	0.34	0.24		
2	0	1.0	8	1.17	0.87	0.56	0.35	0.23		
3	0	1.0	8	1.23	0.92	0.62	0.39	0.26		
4	0	1.0	8	1.31	0.98	0.57	0.37	0.26		
5	0	1.0	8	1.31	1.03	0.65	0.43	0.30		
6	0	1.0	8	1.19	0.90	0.59	0.40	0.29		
"Road Rater 400"										
1	1	2	0	0.60	24.8	0.98	0.73	0.53	0.30	
1	2	2	0	1.21	24.9	1.97	1.77	1.13	0.70	
1	3	2	0	1.80	24.9	3.51	3.03	1.90	1.15	
2	1	2	0	0.61	24.8	1.39	1.08	2.42	0.37	
2	2	2	0	1.23	24.9	2.51	2.21	1.28	0.77	
2	3	2	0	1.78	24.9	4.25	3.56	3.35	1.30	
3	1	2	0	0.63	24.8	1.10	1.00	0.64	0.39	
3	2	2	0	1.24	24.9	2.31	1.99	1.34	0.79	
3	3	2	0	1.80	24.9	3.81	3.38	2.17	1.29	
4	1	2	0	0.61	24.8	1.24	1.02	0.58	0.31	
4	2	2	0	1.22	24.9	2.56	2.06	1.18	0.64	
4	3	2	0	1.81	24.9	4.38	3.61	2.01	1.05	
5	1	2	0	0.60	24.9	0.99	0.83	0.56	0.32	
5	2	2	0	1.18	24.8	2.24	1.97	1.27	0.77	
5	3	2	0	1.78	24.9	3.83	3.34	2.16	1.27	
6	1	1	0	0.60	15.2	1.09	0.89	0.57	0.34	
6	2	1	0	1.27	15.3	2.19	1.68	10.86	1.74	
6	1	2	0	0.60	24.9	0.99	1.44	0.49	0.27	
6	2	2	0	1.23	25.0	2.19	1.82	1.11	0.62	
6	3	2	0	1.83	25.0	3.71	3.06	1.84	1.01	
6	1	3	0	0.59	34.7	1.25	1.05	1.24	0.38	
6	2	3	0	1.30	34.7	3.24	3.04	2.02	1.11	
6	3	3	0	1.81	34.8	5.29	5.07	15.08	19.05	
"Dynastest FWD"										
1	2	0	395	422	282	162	89	53	39	25
1										

2
 "04-16-86" 1 1 0 1 1545 1615 42 0 0 42 49

"Dynalect"

1	0	1.0	8	0.70	0.51	0.33	0.20	0.11
2	0	1.0	8	0.96	0.74	0.51	0.33	0.19
3	0	1.0	8	1.12	0.83	0.55	0.33	0.18
4	0	1.0	8	1.45	1.10	0.76	0.46	0.28
5	0	1.0	8	1.14	0.87	0.60	0.37	0.21
6	0	1.0	8	1.06	0.83	0.60	0.41	0.26

"Road Rater 400"

1	1	2	0	0.60	24.9	0.81	0.64	0.40	0.24
1	2	2	0	1.23	25.0	1.64	1.31	0.87	0.56
1	3	2	0	1.83	25.0	2.00	2.67	1.53	3.55
2	1	2	0	0.59	25.0	0.99	0.85	0.64	0.45
2	2	2	0	1.18	24.7	2.03	1.90	1.47	1.09
2	3	2	0	1.87	25.3	3.71	3.59	2.69	2.01
3	1	2	0	0.64	25.5	1.27	1.03	0.85	0.51
3	2	2	0	1.30	25.6	2.70	2.03	1.78	1.24
3	3	2	0	1.83	24.9	4.37	3.80	2.89	1.44
4	1	2	0	0.57	24.5	1.39	0.99	0.92	0.40
4	2	2	0	1.14	24.5	3.03	2.09	1.89	1.50
4	3	2	0	1.75	24.6	5.15	4.34	3.37	3.02
5	1	2	0	0.58	24.5	1.14	0.93	0.70	0.20
5	2	2	0	1.21	24.8	2.55	2.51	1.60	1.07
5	3	2	0	1.77	24.8	4.39	5.11	2.67	2.04
6	1	1	0	0.59	14.9	0.93	0.78	0.53	3.51
6	2	1	0	1.22	14.8	2.18	1.85	1.32	5.05
6	1	2	0	0.61	25.2	0.94	0.79	0.58	1.33
6	2	2	0	1.29	25.5	2.05	1.67	1.21	1.99
6	3	2	0	1.76	24.7	3.34	2.67	1.87	2.99
6	1	3	0	0.59	35.2	0.75	0.49	0.45	0.33
6	2	3	0	1.15	34.6	1.59	1.10	0.94	0.80
6	3	3	0	1.85	35.7	3.50	2.61	1.77	1.30

"Dynalect FWD"

1	2	0	430	308	228	121	71	42	0	0
1	4	0	919	665	477	271	155	92	0	0
2	2	0	428	357	270	181	106	70	0	0
2	4	0	897	786	588	384	238	153	0	0
3	2	0	424	413	308	193	117	73	0	0
3	4	0	906	902	658	419	256	158	0	0
4	2	0	420	614	423	249	146	91	0	0
4	4	0	896	1255	879	529	314	195	0	0
5	2	0	419	419	322	204	128	77	51	26
5	4	0	897	888	670	435	273	167	110	66
6	1	0	217	163	129	84	59	42	0	0
6	2	0	421	361	262	173	106	76	0	0
6	3	0	664	562	420	267	177	125	0	0
6	4	0	907	776	568	370	236	164	0	0

"09-05-86" 1 1 0 1 1111 1140 78 90 88 76 69

"Dynalect"

1	0	1.0	8	0.63	0.42	0.26	0.14	0.09
2	0	1.0	8	0.90	0.65	0.40	0.24	0.15
3	0	1.0	8	1.00	0.70	0.41	0.23	0.13
4	0	1.0	8	1.29	0.91	0.57	0.34	0.20
5	0	1.0	8	1.03	0.75	0.49	0.28	0.17
6	0	1.0	8	1.01	0.75	0.48	0.31	0.21

"Road Rater 400"

1	1	2	0	0.61	25.1	1.03	1.00	0.46	0.35
1	2	2	0	1.25	25.1	1.78	1.36	0.87	0.57
1	3	2	0	1.83	25.1	3.01	2.29	1.43	1.86
2	1	2	0	0.61	25.1	1.16	0.98	0.68	0.56
2	2	2	0	1.23	25.1	2.58	2.22	1.64	1.27
2	3	2	0	1.84	25.1	4.27	3.81	2.77	2.14
3	1	2	0	0.63	25.1	1.25	1.15	0.74	0.52
3	2	2	0	1.24	25.1	2.79	2.43	1.68	1.15
3	3	2	0	1.82	25.1	4.96	4.28	2.95	1.99
4	1	2	0	0.62	25.1	1.52	1.34	1.02	0.79
4	2	2	0	1.22	25.1	3.49	3.04	2.28	1.73
4	3	2	0	1.85	25.1	5.70	4.95	3.65	2.77
5	1	2	0	0.61	25.1	1.32	1.20	0.90	0.70

5	2	2	0	1.26	25.1	3.13	2.82	2.10	1.64
5	3	2	0	1.82	25.1	4.97	4.53	3.29	2.54
6	1	1	0	0.58	14.8	0.76	0.50	0.41	0.27
6	2	1	0	1.19	14.8	1.90	1.55	1.02	0.67
5	1	2	0	0.60	24.9	0.99	0.82	0.58	1.94
6	2	2	0	1.23	25.0	2.24	1.88	1.36	1.02
6	3	2	0	1.82	25.0	3.55	2.97	2.09	1.53
6	1	3	0	0.58	35.1	0.83	0.62	0.38	0.26
6	2	3	0	1.29	35.1	2.62	2.08	1.29	0.85
6	3	3	0	1.78	35.1	3.92	3.14	1.91	1.29

"Dynatest FWD"

1	2	0	380	303	168	83	47	29	21	12
1	4	0	880	678	407	208	111	67	51	28
2	2	0	374	412	242	135	75	47	0	0
2	4	0	863	911	577	323	185	113	0	0
3	2	0	377	498	308	155	85	51	37	16
3	4	0	871	1083	693	374	201	118	73	50
4	2	0	370	644	368	194	105	66	0	0
4	4	0	855	1355	851	458	261	156	0	0
5	2	0	368	447	300	163	95	56	44	22
5	4	0	851	979	671	386	219	132	92	53
6	1	0	0	0	0	0	0	0	0	0
6	2	0	369	401	259	138	85	59	0	0
6	3	0	573	632	418	229	140	93	0	0
6	4	0	843	929	605	337	204	135	0	0

"L17" 37 "SR" 10 3200 21.0 672 "N"

"F. Newton/Jasper CL easterly" 4.02

"F. e. of 165 easterly (EB)" 0.30

1 13892 83 3 1.1 0.00 5.5 0.0 0.0 "N"

"A-2-4" 0 "SH" 107.8 10.3 37 0.0 0.0 0.0 2.66

84 5.0 0

2

"04-17-86" 1 1 1 1 0845 0915 52 0 0 48 47

"Dynaflect"

1	0	1.0	8	0.85	0.65	0.58	0.27	0.18
2	0	1.0	8	0.75	0.57	0.53	0.27	0.18
3	0	1.0	8	0.82	0.59	0.38	0.24	0.15
4	0	1.0	8	0.72	0.57	0.41	0.28	0.19
5	0	1.0	8	0.75	0.57	0.37	0.25	0.17
6	0	1.0	8	0.86	0.64	0.42	0.28	0.18

"Road Rater 400"

1	1	2	0	0.59	24.8	0.73	0.55	0.36	0.30
1	2	2	0	1.23	24.9	1.62	1.32	0.81	0.40
1	3	2	0	1.79	24.9	2.72	2.24	1.45	0.78
2	1	2	0	0.59	24.9	0.59	0.42	0.22	0.11
2	2	2	0	1.19	24.8	1.37	0.95	0.57	0.18
2	3	2	0	1.79	24.8	2.34	2.16	1.12	1.13
3	1	2	0	0.60	24.8	0.72	0.43	0.23	0.08
3	2	2	0	1.20	24.8	1.64	1.16	0.39	0.31
3	3	2	0	1.82	25.0	3.10	2.28	1.28	0.63
4	1	2	0	0.58	24.8	0.48	0.28	0.20	0.07
4	2	2	0	1.24	25.1	1.20	0.82	0.54	0.21
4	3	2	0	1.77	24.8	1.88	1.61	0.91	0.92
5	1	2	0	0.57	24.8	0.55	0.31	0.64	0.13
5	2	2	0	1.24	25.2	1.46	1.24	1.10	0.47
5	3	2	0	1.79	24.9	2.48	2.49	1.09	1.26
6	1	1	0	0.64	15.3	0.67	0.49	0.27	0.12
6	2	1	0	1.23	15.2	1.52	1.09	0.71	0.40
6	1	2	0	0.57	24.5	0.78	0.59	0.42	0.21
6	2	2	0	1.16	24.5	1.51	1.11	0.71	0.41
6	3	2	0	1.85	25.3	2.85	2.22	1.32	0.76
6	1	3	0	0.54	35.2	0.55	0.43	0.24	0.07
6	2	3	0	1.20	35.5	1.58	1.33	0.75	0.28
6	3	3	0	1.78	35.2	3.71	3.05	1.86	0.90

"Road Rater 2000"

1	1	2	0	0.57	25.0	0.61	0.35	0.23	0.14
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1	2	2	0	1.18	24.9	1.34	0.85	0.54	0.32	
1	3	2	0	1.81	24.9	2.25	1.45	0.92	0.54	
1	4	2	0	2.38	24.9	3.18	2.05	1.31	0.76	
1	5	2	0	3.54	24.9	5.47	3.60	2.31	1.33	
2	1	2	0	0.57	24.9	0.41	0.26	0.22	0.12	
2	2	2	0	1.16	24.9	0.96	0.64	0.42	0.26	
2	3	2	0	1.74	24.9	1.55	1.05	0.70	0.41	
2	4	2	0	2.39	25.0	2.34	1.61	1.06	0.62	
2	5	2	0	3.60	24.9	4.11	2.93	1.79	1.08	
3	1	2	0	0.56	24.9	0.48	0.33	0.21	0.14	
3	2	2	0	1.21	25.0	1.19	0.81	0.53	0.32	
3	3	2	0	1.76	24.9	2.05	1.45	0.92	0.54	
3	4	2	0	2.42	25.0	3.15	2.19	1.37	0.79	
3	5	2	0	3.60	25.0	5.58	4.00	2.49	1.42	
4	1	2	0	0.58	24.9	0.41	0.30	0.19	0.12	
4	2	2	0	1.18	24.9	0.92	0.68	0.44	0.26	
4	3	2	0	1.86	25.0	1.56	1.14	0.76	0.45	
4	4	2	0	2.38	24.9	2.17	1.60	1.05	0.60	
4	5	2	0	3.61	24.9	3.59	2.72	1.81	1.06	
5	1	2	0	0.64	24.9	0.45	0.35	0.22	0.14	
5	2	2	0	1.17	24.9	0.96	0.72	0.48	0.29	
5	3	2	0	1.78	24.9	1.71	1.26	0.81	0.49	
5	4	2	0	2.40	24.9	2.52	1.86	1.19	0.70	
5	5	2	0	3.62	25.0	4.49	3.37	2.12	1.25	
6	1	1	0	0.60	15.0	0.53	0.40	0.25	0.17	
6	2	1	0	1.21	15.0	1.23	0.89	0.60	0.37	
6	3	1	0	1.83	15.0	1.98	1.44	0.98	0.62	
6	4	1	0	2.36	15.0	3.08	2.19	1.42	0.92	
6	5	1	0	3.55	15.0	5.22	4.10	2.49	1.48	
6	1	2	0	0.60	24.9	0.50	0.35	0.23	0.14	
6	2	2	0	1.21	25.0	1.20	0.84	0.54	0.34	
6	3	2	0	1.77	25.0	1.95	1.36	0.86	0.50	
6	4	2	0	2.38	25.0	2.82	1.99	1.24	0.72	
6	5	2	0	3.61	25.0	4.99	3.55	2.21	1.30	
6	1	3	0	0.61	35.1	0.59	0.40	0.27	0.18	
6	2	3	0	1.25	35.1	1.37	0.96	0.62	0.37	
6	3	3	0	1.82	35.1	2.27	1.59	1.05	0.63	
6	4	3	0	2.38	35.1	3.34	2.34	1.56	0.94	
6	5	3	0	3.62	35.1	5.96	4.24	2.82	1.72	
Dynatest FWD										
1	2	0	430	312	243	129	77	44	0	0
1	4	0	919	610	462	278	163	98	0	0
2	2	0	424	267	186	120	69	44	0	0
2	4	0	912	533	402	257	161	99	0	0
3	2	0	420	359	247	127	70	39	0	0
3	4	0	900	646	446	255	145	86	0	0
4	2	0	424	218	170	111	67	43	0	0
4	4	0	918	447	356	229	149	94	0	0
5	2	0	414	282	216	113	67	39	25	17
5	4	0	910	544	414	241	142	88	61	37
6	1	0	183	121	92	44	28	15	0	0
6	2	0	415	300	206	126	68	42	0	0
6	3	0	662	443	328	184	112	68	0	0
6	4	0	904	542	413	246	147	92	0	0
09-05-86 1 1 0 1 0815 0840 64 72 76 63 65										
Dynaflect										
1	0	1.0	8	0.71	0.49	0.31	0.19	0.14		
2	0	1.0	8	0.64	0.45	0.29	0.19	0.14		
3	0	1.0	8	0.67	0.47	0.29	0.18	0.13		
4	0	1.0	8	0.58	0.44	0.29	0.19	0.15		
5	0	1.0	8	0.57	0.41	0.26	0.18	0.14		
6	0	1.0	8	0.68	0.49	0.30	0.20	0.14		
Road Rater 400										
1	1	2	0	0.59	25.1	0.92	0.80	0.46	0.42	
1	2	2	0	1.21	25.1	1.60	1.34	0.77	0.43	
1	3	2	0	1.87	25.2	2.99	2.48	1.44	0.79	
2	1	2	0	0.60	25.1	0.71	0.56	0.31	0.16	
2	2	2	0	1.24	25.2	1.41	1.00	0.61	0.32	
2	3	2	0	1.84	25.2	2.43	2.00	1.08	0.56	
3	1	2	0	0.60	25.1	0.68	0.54	0.42	0.18	

3	2	2	0	1.25	25.2	1.51	1.49	0.72	0.39
3	3	2	0	1.89	25.2	2.78	2.78	1.29	0.68
4	1	2	0	0.63	25.2	0.60	0.49	0.32	0.23
4	2	2	0	1.24	25.2	1.17	1.08	0.66	0.39
4	3	2	0	1.84	25.2	2.00	1.73	1.11	0.68
5	1	2	0	0.64	25.2	0.58	0.47	0.27	0.15
5	2	2	0	1.27	25.2	1.37	1.16	0.65	0.36
5	3	2	0	1.85	25.2	2.39	2.04	1.08	0.57
6	1	1	0	0.58	14.9	0.89	0.75	0.46	0.27
6	2	1	0	1.19	14.9	1.30	1.07	0.65	0.39
6	1	2	0	0.62	25.0	0.75	0.60	0.35	0.22
6	2	2	0	1.25	25.0	1.58	1.33	0.74	0.41
6	3	2	0	1.82	25.0	2.64	2.22	1.24	0.69
6	1	3	0	0.61	34.9	1.00	0.80	0.46	0.27
6	2	3	0	1.21	34.9	2.68	2.27	1.33	0.75
6	3	3	0	1.76	34.9	4.08	3.35	2.00	1.15

"Dynatest FWD"

1	2	0	412	322	207	112	59	36	27	16
1	4	0	933	675	455	254	141	87	61	41
2	2	0	411	316	191	103	53	33	0	0
2	4	0	928	669	437	245	135	83	0	0
3	2	0	408	336	221	106	57	33	22	10
3	4	0	926	658	435	237	129	78	55	32
4	2	0	412	222	161	101	59	35	0	0
4	4	0	931	477	354	225	138	84	0	0
5	2	0	404	278	189	98	52	33	23	15
5	4	0	921	677	407	223	124	78	56	36
6	1	0	0	0	0	0	0	0	0	0
6	2	0	401	310	193	110	58	34	0	0
6	3	0	627	430	291	162	93	57	0	0
6	4	0	919	598	397	228	130	79	0	0

"58" 31 "US" 150 4100 8.0 328 "S"

"F. Washington/Harrison CL to 1.0m. e. of SR135" 3.46

"F. Buffalo Trace Park entrance (0.75m. e. of SR135) westerly (EB)" 0.25

1 15114 85 1 2.1 0.00 12.1 0.0 13.2 "G"

"A-6" 13 "CL" 107.6 20.7 9 39.9 17.9 22.0 2.70

90 5.0 0

3

"03-20-86" 1 1 1 0 1515 1545 38 48 0 35 50

"Dynalect"

1	0	1.0	8	0.54	0.41	0.31	0.26	0.17
2	0	1.0	8	0.39	0.29	0.24	0.22	0.15
3	0	1.0	8	0.42	0.32	0.27	0.23	0.16
4	0	1.0	8	0.49	0.38	0.31	0.27	0.19
5	0	1.0	8	0.57	0.46	0.38	0.33	0.24
6	0	1.0	8	0.46	0.36	0.32	0.27	0.19

"Road Rater 400"

1	1	2	0	0.65	25.4	0.74	0.52	0.41	1.58
1	2	2	0	1.27	25.4	1.13	1.11	0.82	0.94
1	3	2	0	1.86	25.4	1.67	1.50	1.26	1.86
2	1	2	0	0.62	25.3	0.50	0.34	0.29	0.25
2	2	2	0	1.27	25.4	1.32	0.68	0.55	0.85
2	3	2	0	1.85	25.4	1.48	1.07	0.76	0.85
3	1	2	0	0.60	25.3	0.48	0.87	0.30	0.27
3	2	2	0	1.27	25.4	0.92	0.77	0.60	0.52
3	3	2	0	1.86	25.4	1.36	0.99	1.98	1.84
4	1	2	0	0.61	25.2	0.44	0.32	0.29	0.30
4	2	2	0	1.25	25.2	0.98	0.67	0.97	0.76
4	3	2	0	1.85	25.2	1.27	1.15	0.85	0.82
5	1	2	0	0.64	25.1	0.68	0.50	0.38	0.36
5	2	2	0	1.25	25.2	1.43	1.26	0.83	0.68
5	3	2	0	1.84	25.2	1.96	1.40	1.20	1.18
6	1	1	0	0.67	15.2	0.93	1.34	0.70	7.39
6	2	1	0	1.24	15.3	1.23	1.45	0.91	1.14
6	1	2	0	0.60	24.9	0.34	0.27	0.21	0.20
6	2	2	0	1.20	24.9	0.68	0.60	0.48	0.39

6	3	2	0	1.80	25.0	1.01	0.67	0.69	0.58
6	2	3	0	1.19	34.4	0.97	0.88	0.73	0.74
6	3	3	0	1.74	34.5	1.29	1.19	1.01	1.92
6	3	3	0	1.55	35.1	1.33	0.98	1.02	0.93
"Road Rater 2000"									
1	1	2	0	0.59	25.0	0.05	0.34	0.35	0.23
1	2	2	0	1.20	25.0	0.11	0.73	0.76	0.51
1	3	2	0	1.78	25.0	0.13	1.10	1.16	0.77
1	4	2	0	2.38	25.0	0.09	1.48	1.51	1.03
2	1	2	0	0.56	25.0	0.08	0.19	0.18	0.12
2	2	2	0	1.18	25.0	0.14	0.39	0.37	0.24
2	3	2	0	1.77	25.0	0.13	0.58	0.57	0.38
2	4	2	0	2.42	25.0	0.08	0.79	0.80	0.52
3	1	2	0	0.56	25.0	0.07	0.19	0.21	0.14
3	2	2	0	1.19	25.0	0.13	0.43	0.45	0.26
3	3	2	0	1.83	25.0	0.09	0.66	0.67	0.39
3	4	2	0	2.39	25.0	0.09	0.88	0.93	0.53
4	1	2	0	0.62	25.0	0.07	0.25	0.21	0.18
4	2	2	0	1.16	25.0	0.14	0.50	0.39	0.32
4	3	2	0	1.81	25.0	0.10	0.76	0.61	0.52
4	4	2	0	2.44	25.0	0.10	1.07	0.86	0.71
5	1	2	0	0.59	25.0	0.06	0.29	0.22	0.18
5	2	2	0	1.20	25.0	0.12	0.62	0.49	0.40
5	3	2	0	1.79	25.0	0.14	0.96	0.73	0.61
5	4	2	0	2.39	25.1	0.10	1.33	1.02	0.84
6	1	1	0	0.61	15.0	0.11	0.23	0.20	0.15
6	2	1	0	1.21	15.0	0.13	0.45	0.40	0.31
6	3	1	0	1.81	15.0	0.13	0.72	0.69	0.50
6	4	1	0	2.38	15.0	0.09	0.95	0.92	0.70
6	1	2	0	0.59	25.2	0.07	0.21	0.20	0.15
6	2	2	0	1.24	25.1	0.13	0.47	0.41	0.32
6	3	2	0	1.76	25.2	0.14	0.67	0.60	0.46
6	4	2	0	2.44	25.2	0.12	0.96	0.82	0.65
6	1	3	0	0.61	35.0	0.09	0.21	0.17	0.17
6	2	3	0	1.24	35.1	0.15	0.43	0.34	0.30
6	3	3	0	1.83	35.0	0.11	0.64	0.49	0.45
6	4	3	0	2.40	35.1	0.13	0.86	0.66	0.60
"04-23-86" 0 0 0 1 1330 1400 89 0 0 66 52									
"Dynatest FWD"									
1	2	0	407	188	155	100	69	48	0 0
1	4	0	874	413	340	227	159	110	0 0
2	2	0	403	147	110	78	56	40	0 0
2	4	0	869	314	247	181	130	91	0 0
3	2	0	402	172	119	81	56	38	0 0
3	4	0	867	373	270	188	132	92	0 0
4	2	0	403	180	138	100	70	50	0 0
4	4	0	867	389	311	225	162	114	0 0
5	2	0	398	224	164	116	83	61	44 28
5	4	0	862	470	358	253	183	132	98 53
6	1	0	169	72	51	37	25	18	0 0
6	2	0	398	186	138	99	69	48	0 0
6	3	0	630	294	225	161	114	81	0 0
6	4	0	863	396	307	223	159	113	0 0
"08-07-86" 1 0 1 1 1005 1045 93 90 96 88 69									
"Dynaflect"									
1	0	1.0	8	0.58	0.47	0.33	0.31	0.15	
2	0	1.0	8	0.48	0.39	0.28	0.19	0.13	
3	0	1.0	8	0.48	0.38	0.27	0.19	0.13	
4	0	1.0	8	0.58	0.46	0.35	0.25	0.17	
5	0	1.0	8	0.67	0.54	0.41	0.30	0.23	
6	0	1.0	8	0.56	0.46	0.35	0.26	0.19	
"Road Rater 2000"									
1	1	2	0	0.63	25.1	0.64	0.47	0.42	0.30
1	2	2	0	1.23	25.1	1.31	0.97	0.86	0.58
1	3	2	0	1.83	25.1	2.07	1.48	1.24	0.91
1	4	2	0	2.41	25.2	2.81	2.03	1.65	1.22
1	5	2	0	3.61	25.1	4.63	3.31	2.57	1.95
2	1	2	0	0.60	25.2	0.49	0.28	0.22	0.15
2	2	2	0	1.20	25.2	1.02	0.59	0.43	0.31
2	3	2	0	1.82	25.1	1.57	0.93	0.66	0.48

2	4	2	0	2.40	25.1	2.17	1.30	0.92	0.67	
2	5	2	0	3.56	25.2	3.46	2.04	1.46	1.04	
3	1	2	0	0.60	25.2	0.46	0.29	0.19	0.15	
3	2	2	0	1.20	25.2	0.93	0.62	0.40	0.31	
3	3	2	0	1.84	25.1	1.51	0.99	0.64	0.48	
3	4	2	0	2.41	25.2	2.05	1.32	0.87	0.64	
3	5	2	0	3.59	25.1	3.33	2.17	1.49	1.00	
4	1	2	0	0.57	25.2	0.52	0.34	0.23	0.20	
4	2	2	0	1.20	25.2	1.11	0.74	0.48	0.43	
4	3	2	0	1.80	25.2	1.73	1.16	0.75	0.66	
4	4	2	0	2.44	25.1	2.48	1.66	1.07	0.93	
4	5	2	0	3.60	25.1	4.00	2.69	1.82	1.48	
5	1	2	0	0.64	25.1	0.64	0.38	0.31	0.24	
5	2	2	0	1.17	25.1	1.28	0.74	0.60	0.46	
5	3	2	0	1.79	25.1	2.04	1.19	0.94	0.72	
5	4	2	0	2.43	25.2	2.94	1.74	1.34	1.02	
5	5	2	0	3.58	25.1	4.92	2.85	2.19	1.62	
6	1	1	0	0.62	15.1	0.41	0.30	0.25	0.18	
6	2	1	0	1.21	15.1	0.88	0.63	0.49	0.37	
6	3	1	0	1.82	15.1	1.39	0.99	0.77	0.58	
6	4	1	0	2.40	15.1	2.04	1.42	1.07	0.76	
6	5	1	0	3.58	15.2	4.05	2.97	2.07	1.43	
6	1	2	0	0.60	25.1	0.43	0.29	0.23	0.17	
6	2	2	0	1.23	25.1	0.94	0.66	0.51	0.37	
6	3	2	0	1.80	25.1	1.45	1.02	0.77	0.56	
6	4	2	0	2.39	25.2	2.04	1.43	1.08	0.77	
6	5	2	0	3.58	25.1	3.38	2.38	1.75	1.23	
6	1	3	0	0.59	35.3	0.43	0.31	0.25	0.18	
6	2	3	0	1.22	35.2	0.92	0.65	0.50	0.37	
6	3	3	0	1.83	35.3	1.47	1.03	0.80	0.58	
6	4	3	0	2.43	35.3	2.05	1.45	1.11	0.81	
6	5	3	0	3.63	35.3	3.40	2.37	1.80	1.28	
"Dynatest FWD"										
1	2	0	397	189	143	93	64	43	30	18
1	4	0	842	414	321	216	146	100	68	39
2	2	0	397	162	98	66	46	31	0	0
2	4	0	836	346	218	149	104	74	0	0
3	2	0	398	161	104	68	46	31	24	13
3	4	0	844	352	238	158	109	75	55	29
4	2	0	390	177	133	86	62	43	0	0
4	4	0	834	390	299	206	144	98	0	0
5	2	0	391	200	144	95	68	51	40	24
5	4	0	836	424	311	214	153	113	87	51
6	1	0	0	0	0	0	0	0	0	0
6	2	0	386	177	122	86	62	41	0	0
6	3	0	615	280	201	141	98	69	0	0
6	4	0	832	391	284	199	136	97	0	0
"S9" 69 "US" 421 2280 10.0 228 "S"										
"F. Jefferson/Ripley CL to US50" 12.59										
"F. CR1050S (0.6m. n. of Jefferson/Ripley CL) northerly (NB)" 0.25										
1	10479	76	10	1.4	0.00	11.0	0.0	17.5	"6"	
"A-6" 12 "CL" 101.3 24.3 12 38.2 17.2 21.0 2.59										
60 3.6 0										
2										
"03-24-86" 1 1 1 1 0850 0920 40 0 0 35 40										
"Dynaflect"										
1	0	1.0	8	0.56	0.44	0.34	0.27	0.17		
2	0	1.0	8	0.77	0.58	0.42	0.31	0.17		
3	0	1.0	8	0.87	0.66	0.47	0.33	0.19		
4	0	1.0	8	0.61	0.46	0.35	0.27	0.16		
5	0	1.0	8	0.74	0.57	0.42	0.31	0.18		
6	0	1.0	8	0.71	0.55	0.37	0.29	0.16		
"Road Rater 400"										
1	1	2	0	0.63	25.0	0.60	0.97	0.48	1.77	
1	2	2	0	1.23	25.1	1.34	1.29	1.11	2.05	
1	3	2	0	1.82	25.1	4.50	5.13	3.90	3.70	

1	0	1.0	8	0.47	0.37	0.27	0.19	0.13
2	0	1.0	8	0.62	0.47	0.33	0.22	0.15
3	0	1.0	8	0.63	0.48	0.33	0.22	0.14
4	0	1.0	8	0.53	0.40	0.28	0.19	0.12
5	0	1.0	8	0.62	0.47	0.33	0.22	0.14
6	0	1.0	8	0.58	0.43	0.30	0.21	0.13
"Road Rater 400"								
1	1	2	0	0.61	25.1	0.48	0.38	0.29
1	2	2	0	1.20	25.1	1.03	0.83	0.45
1	3	2	0	1.30	25.0	1.75	1.41	1.30
2	1	2	0	0.59	25.0	0.68	0.56	0.43
2	2	2	0	1.22	25.0	1.53	1.30	1.00
2	3	2	0	1.30	25.0	2.75	2.35	1.81
3	1	2	0	0.60	25.0	0.81	1.06	0.45
3	2	2	0	1.20	25.0	1.82	1.92	1.14
3	3	2	0	1.81	25.0	3.57	3.74	2.34
4	1	2	0	0.60	25.0	0.51	0.36	0.27
4	2	2	0	1.20	25.0	1.10	0.84	0.61
4	3	2	0	1.80	25.0	1.95	1.51	1.13
5	1	2	0	0.60	25.0	0.64	0.50	0.38
5	2	2	0	1.22	25.0	1.45	1.19	0.92
5	3	2	0	1.79	25.0	2.51	1.98	1.57
6	1	1	0	0.61	15.0	0.40	0.29	0.21
6	2	1	0	1.21	15.0	0.91	0.66	0.47
6	1	2	0	0.60	25.1	0.60	0.46	0.35
6	2	2	0	1.21	25.1	1.32	1.06	0.80
6	3	2	0	1.79	25.2	2.37	1.92	1.46
6	1	3	0	0.59	35.1	0.43	0.33	0.26
6	2	3	0	1.20	35.1	1.01	0.80	0.64
6	3	3	0	1.81	35.1	2.22	1.82	1.42
6	3	3	0	1.77	35.1	2.19	1.34	1.37
"Road Rater 2000"								
1	1	2	0	0.60	25.1	0.70	0.45	0.36
1	2	2	0	1.23	25.1	1.55	0.98	0.79
1	3	2	0	1.80	25.1	2.40	1.56	1.26
1	4	2	0	2.41	25.0	3.48	2.23	1.79
1	5	2	0	3.61	25.1	5.98	3.81	3.07
2	1	2	0	0.56	25.1	0.70	0.54	0.46
2	2	2	0	1.18	25.1	1.62	1.23	1.07
2	3	2	0	1.77	25.0	2.68	2.06	1.75
2	4	2	0	2.41	25.1	4.10	3.12	2.52
2	5	2	0	3.59	25.1	7.22	5.55	4.37
3	1	2	0	0.60	25.1	0.84	0.63	0.52
3	2	2	0	1.22	25.1	1.90	1.47	1.12
3	3	2	0	1.81	25.1	3.06	2.35	1.74
3	4	2	0	2.40	25.1	4.48	3.48	2.64
3	5	2	0	3.56	25.1	7.72	6.03	4.53
4	1	2	0	0.58	25.1	0.67	0.43	0.36
4	2	2	0	1.18	25.1	1.37	0.89	0.76
4	3	2	0	1.81	25.1	2.17	1.42	1.20
4	4	2	0	2.44	25.1	3.17	2.08	1.72
4	5	2	0	3.57	25.1	5.15	3.40	2.69
5	1	2	0	0.58	25.1	0.67	0.50	0.40
5	2	2	0	1.20	25.1	1.53	1.14	0.92
5	3	2	0	1.81	25.1	2.49	1.82	1.47
5	4	2	0	2.41	25.1	3.62	2.61	2.08
5	5	2	0	3.58	25.1	6.22	4.51	3.55
6	1	1	0	0.61	15.2	0.47	0.31	0.24
6	2	1	0	1.18	15.1	1.11	0.70	0.51
6	3	1	0	1.79	15.2	1.79	1.22	0.87
6	4	1	0	2.38	15.2	2.68	1.81	1.21
6	5	1	0	3.57	15.2	4.76	3.29	2.37
6	1	2	0	0.60	25.1	0.68	0.50	0.39
6	2	2	0	1.18	25.1	1.44	1.04	0.84
6	3	2	0	1.82	25.1	2.49	1.77	1.40
6	4	2	0	2.40	25.1	3.52	2.51	1.95
6	5	2	0	3.60	25.0	6.02	4.26	3.27
6	1	3	0	0.61	35.0	0.51	0.36	0.29
6	2	3	0	1.20	35.1	1.07	0.75	0.61
6	3	3	0	1.79	35.0	1.72	1.19	0.94

6	4	3	0	2.41	35.1	2.42	1.66	1.29	0.99
6	5	3	0	3.60	35.1	4.05	2.73	2.07	1.55

"Dynatest FWD"

1	2	0	399	168	125	87	62	43	30	14
1	4	0	940	369	276	202	143	102	71	37
2	2	0	397	239	171	116	76	52	0	0
2	4	0	844	510	375	257	178	120	0	0
3	2	0	389	268	187	115	77	52	35	21
3	4	0	937	554	397	260	173	116	79	44
4	2	0	389	199	142	98	64	43	0	0
4	4	0	944	440	323	228	154	103	0	0
5	2	0	389	266	169	111	72	49	34	16
5	4	0	825	560	372	254	167	112	73	27
6	1	0	0	0	0	0	0	0	0	0
6	2	0	388	254	161	104	72	47	0	0
6	3	0	604	389	258	170	111	73	0	0
6	4	0	827	532	354	241	162	102	0	0

"S10" 16 "SR" 46 2800 12.5 350 "S"
 "F. Bartholomew/Decatur CL to 0.5m. w. of SR3" 6.50
 "F. CR600W (1.1m. w. of SR3) westerly (WB)" 0.25
 1 12086 79 7 1.6 0.00 10.0 0.0 14.4 "6"
 "A-7-6" 16 "CL" 102.8 22.0 7 46.3 19.3 27.0 2.72
 70 2.8 0

"03-24-86" 1 0 1 1 1430 1500 78 0 0 62 35

"Dynaflect"

1	0	1.0	8	0.81	0.59	0.39	0.26	0.14
2	0	1.0	8	0.79	0.57	0.36	0.24	0.13
3	0	1.0	8	0.71	0.51	0.33	0.22	0.11
4	0	1.0	8	0.76	0.55	0.36	0.24	0.13
5	0	1.0	8	0.80	0.57	0.37	0.24	0.13
6	0	1.0	8	0.79	0.57	0.37	0.24	0.12

"Road Rater 2000"

1	1	2	0	0.59	25.1	0.09	0.49	0.39	0.26
1	2	2	0	1.20	25.0	0.13	1.06	0.73	0.53
1	3	2	0	1.83	25.1	0.13	1.69	1.18	0.86
1	4	2	0	2.42	25.1	0.12	2.39	1.69	1.23
2	1	2	0	0.60	25.0	0.08	0.44	0.30	0.25
2	2	2	0	1.19	25.1	0.17	0.98	0.64	0.52
2	3	2	0	1.77	24.5	0.15	1.55	1.02	0.80
2	4	2	0	2.39	25.1	0.11	2.20	1.46	1.11
3	1	2	0	0.60	25.1	0.12	0.37	0.26	0.18
3	2	2	0	1.21	25.1	0.17	0.75	0.52	0.35
3	3	2	0	1.79	25.1	0.15	1.16	0.82	0.55
3	4	2	0	2.39	25.1	0.11	1.63	1.12	0.75
4	1	2	0	0.61	25.1	0.12	0.48	0.33	0.21
4	2	2	0	1.17	25.1	0.15	1.04	0.70	0.44
4	3	2	0	1.80	25.0	0.14	1.65	1.08	0.68
4	4	2	0	2.39	25.1	0.13	2.41	1.58	0.96
5	1	2	0	0.61	25.1	0.12	0.47	0.35	0.24
5	2	2	0	1.19	25.1	0.15	0.97	0.71	0.50
5	3	2	0	1.81	25.1	0.13	1.56	1.14	0.79
5	4	2	0	2.41	25.1	0.14	2.20	1.58	1.08
6	1	1	0	0.61	15.1	0.14	0.36	0.35	0.17
6	1	1	0	0.58	19.2	0.09	0.42	0.29	0.20
6	2	1	0	1.24	15.1	0.17	0.78	0.69	0.35
6	3	1	0	1.80	15.1	0.16	1.28	1.09	0.53
6	4	1	0	2.40	15.1	0.15	1.86	1.52	0.81
6	1	2	0	0.60	25.1	0.11	0.46	0.31	0.22
6	2	2	0	1.19	25.1	0.16	0.94	0.59	0.44
6	3	2	0	1.84	25.1	0.11	1.54	0.97	0.71
6	4	2	0	2.43	25.1	0.11	2.12	1.39	0.98
6	1	3	0	0.61	35.1	0.11	0.58	0.45	0.34
6	2	3	0	1.22	35.2	0.13	1.19	0.91	0.69
6	3	3	0	1.81	33.2	0.13	1.83	1.38	1.03
6	3	3	0	1.82	35.2	0.10	1.86	1.38	1.05

6	4	3	0	2.43	35.1	0.12	2.55	1.88	1.41
"Dynatest FWD"									
1	2	0	458	259	196	109	79	44	0
1	4	0	923	537	388	251	161	103	0
2	2	0	425	233	158	97	60	41	0
2	4	0	924	506	353	224	145	97	0
3	2	0	429	221	146	91	58	37	0
3	4	0	921	488	334	210	135	87	0
4	2	0	432	230	157	102	62	43	0
4	4	0	938	502	352	227	149	96	0
5	2	0	421	247	170	105	69	42	0
5	4	0	925	550	390	247	161	100	0
6	1	0	213	118	78	46	29	15	0
6	2	0	419	243	164	101	63	40	0
6	3	0	658	389	267	167	103	64	0
6	4	0	909	546	379	239	149	93	0
"08-08-86" 1 1 1 1 1124 1155 89 91 91 81 71									
"Dynalect"									
1	0	1.0	8	0.62	0.46	0.31	0.19	0.11	
2	0	1.0	8	0.80	0.58	0.37	0.22	0.12	
3	0	1.0	8	0.77	0.50	0.29	0.16	0.08	
4	0	1.0	8	0.78	0.57	0.36	0.23	0.11	
5	0	1.0	8	0.82	0.59	0.36	0.21	0.11	
6	0	1.0	8	0.86	0.61	0.36	0.21	0.11	
"Road Rater 400"									
1	1	2	0	0.59	25.1	0.57	0.48	0.32	0.22
1	2	2	0	1.22	25.1	1.41	1.21	0.86	0.59
1	3	2	0	1.82	25.1	2.46	2.12	1.48	1.01
2	1	2	0	0.61	25.1	0.76	0.60	0.42	0.55
2	2	2	0	1.20	25.1	1.75	1.47	1.03	2.35
2	3	2	0	1.79	25.1	3.19	2.64	1.79	5.56
3	1	2	0	0.60	25.1	0.65	0.46	0.27	0.72
3	2	2	0	1.21	25.1	1.60	1.11	0.70	0.72
3	3	2	0	1.82	25.1	3.08	1.87	1.38	0.80
4	1	2	0	0.60	25.1	0.73	0.55	0.37	0.23
4	2	2	0	1.22	25.1	1.81	1.46	0.95	0.66
4	3	2	0	1.79	25.1	3.73	2.99	1.89	1.23
5	1	2	0	0.59	25.1	0.74	0.56	0.34	0.22
5	2	2	0	1.20	25.1	1.86	1.41	1.79	0.59
5	3	2	0	1.81	25.1	3.85	3.35	4.75	1.18
6	1	1	0	0.59	15.0	0.59	0.45	0.27	0.16
6	2	1	0	1.19	15.1	1.54	1.18	0.73	0.43
6	1	2	0	0.60	25.1	0.75	0.57	0.36	0.21
6	2	2	0	1.20	25.1	1.97	1.43	0.89	0.56
6	3	2	0	1.79	25.1	3.90	3.80	5.15	1.07
6	1	3	0	0.59	34.9	1.09	0.94	1.21	0.51
6	2	3	0	1.19	34.9	3.66	3.24	2.57	1.59
6	3	3	0	1.80	35.0	5.59	5.50	13.78	2.52
"Road Rater 2000"									
1	1	2	0	0.59	25.1	0.75	0.43	0.30	0.22
1	2	2	0	1.24	25.1	1.70	0.96	0.64	0.47
1	3	2	0	1.76	25.1	2.58	1.49	1.00	0.70
1	4	2	0	2.43	25.1	3.70	2.17	1.41	1.00
1	5	2	0	3.56	25.1	6.15	3.56	2.39	1.57
2	1	2	0	0.57	25.1	0.89	0.55	0.35	0.29
2	2	2	0	1.20	25.1	2.01	1.28	0.88	0.63
2	3	2	0	1.78	25.2	3.08	2.04	1.33	0.98
2	4	2	0	2.39	25.1	4.32	2.87	1.93	1.36
2	5	2	0	3.59	25.1	7.33	4.70	3.15	2.24
3	1	2	0	0.63	25.1	0.72	0.45	0.27	0.18
3	2	2	0	1.24	25.1	1.49	0.97	0.54	0.38
3	3	2	0	1.81	25.1	2.37	1.55	0.85	0.58
3	4	2	0	2.41	25.1	3.43	2.22	1.25	0.79
3	5	2	0	3.59	25.1	6.04	3.81	2.14	1.30
4	1	2	0	0.60	25.2	0.87	0.51	0.33	0.27
4	2	2	0	1.22	25.1	1.88	1.14	0.71	0.56
4	3	2	0	1.83	25.1	3.05	1.90	1.13	0.87
4	4	2	0	2.41	25.1	4.37	2.76	1.68	1.22
4	5	2	0	3.60	25.1	6.88	4.77	2.87	1.99
5	1	2	0	0.59	25.1	0.80	0.50	0.32	0.24

5	2	2	0	1.24	25.1	1.84	1.14	0.73	0.50	
5	3	2	0	1.79	25.2	2.79	1.76	1.13	0.78	
5	4	2	0	2.40	25.1	4.01	2.55	1.64	1.11	
5	5	2	0	3.59	25.1	6.92	4.48	2.80	1.81	
6	1	1	0	0.60	15.2	0.69	0.42	0.28	0.17	
6	2	1	0	1.21	15.2	1.49	0.97	0.63	0.37	
6	3	1	0	1.77	15.2	2.51	1.66	0.99	0.60	
6	4	1	0	2.37	15.2	3.93	2.52	1.54	0.93	
6	5	1	0	3.58	15.1	7.22	5.08	3.20	1.97	
6	1	2	0	0.63	25.1	0.87	0.59	0.41	0.28	
6	2	2	0	1.20	25.1	1.87	1.27	0.86	0.55	
6	3	2	0	1.81	25.1	3.02	2.07	1.36	0.87	
6	4	2	0	2.44	25.1	4.50	3.07	1.98	1.22	
6	5	2	0	3.57	25.1	7.67	5.19	3.26	1.98	
6	1	3	0	0.62	35.1	1.10	0.78	0.65	0.53	
6	2	3	0	1.19	35.0	2.12	1.60	1.27	1.02	
6	3	3	0	1.79	35.0	3.31	2.46	1.89	1.52	
6	4	3	0	2.41	35.1	4.80	3.45	2.59	2.03	
6	5	3	0	3.63	35.1	8.41	5.55	3.96	2.99	
"Dynatest FWD"										
1	2	0	388	247	172	105	63	38	26	14
1	4	0	851	557	405	253	151	92	61	34
2	2	0	392	315	211	116	73	40	0	0
2	4	0	832	694	482	285	170	99	0	0
3	2	0	383	405	209	102	59	33	20	06
3	4	0	816	848	494	254	142	80	54	47
4	2	0	385	331	224	127	72	43	0	0
4	4	0	837	725	514	309	176	105	0	0
5	2	0	386	358	238	132	70	42	22	16
5	4	0	825	768	539	316	173	99	58	35
6	1	0	0	0	0	0	0	0	0	0
6	2	0	380	364	236	129	69	41	0	0
6	3	0	599	559	377	213	121	68	0	0
6	4	0	821	755	520	301	170	96	0	0
"S11" 69 "US" 50 4080 10.0 408 "S"										
"F. e. Versailles C/L to SR129" 2.35										
"F. 0.7m. e. of US421 easterly to State Park entrance (W8)" 0.25										
1	11227	78	8	2.1	0.00	5.9	0.0	6.0	"6"	
"A-7-6" 20 "CH" 102.6 22.8 5 58.6 20.0 38.6 2.75										
80 3.2 0										
2										
"03-24-86" 1 1 1 1 1020 1350 62 90 0 40 48										
"Dynaflect"										
1	0	1.0	8	0.25	0.19	0.21	0.15	0.10		
2	0	1.0	8	0.28	0.21	0.24	0.17	0.11		
3	0	1.0	8	0.31	0.25	0.29	0.21	0.13		
4	0	1.0	8	0.37	0.30	0.35	0.24	0.15		
5	0	1.0	8	0.44	0.37	0.42	0.27	0.19		
6	0	1.0	8	0.51	0.42	0.46	0.31	0.22		
"Road Rater 400"										
1	1	2	0	0.59	24.9	0.21	0.10	0.15	0.11	
1	2	2	0	1.19	25.0	0.42	0.95	0.93	0.42	
1	3	2	0	1.86	25.0	0.89	1.18	0.71	0.75	
2	1	2	0	0.62	25.0	0.25	0.16	0.19	0.10	
2	2	2	0	1.24	25.0	0.54	1.21	0.43	0.55	
2	3	2	0	1.80	25.0	1.13	1.08	0.97	2.51	
3	1	2	0	0.61	24.9	0.26	0.22	0.19	0.15	
3	2	2	0	1.22	25.0	0.52	0.24	1.48	0.38	
3	3	2	0	1.79	25.0	2.49	0.99	1.03	0.75	
4	1	2	0	0.61	25.0	0.28	0.26	0.20	0.47	
4	2	2	0	1.21	25.0	0.60	1.13	0.48	1.27	
4	3	2	0	1.78	25.0	1.20	2.39	1.03	2.59	
5	1	2	0	0.59	24.9	0.21	0.18	0.16	0.40	
5	2	2	0	1.22	25.0	0.50	0.44	0.44	0.94	
5	3	2	0	1.82	25.0	1.03	0.91	0.83	2.98	
6	1	1	0	0.63	15.3	0.36	0.34	1.71	2.53	

6	2	1	0	1.22	15.3	0.77	0.77	0.64	0.61
6	1	2	0	0.61	25.0	2.49	0.20	0.21	1.17
6	2	2	0	1.22	25.0	0.56	0.79	0.45	- 0.99
6	3	2	0	1.31	25.0	1.13	2.78	1.03	10.73
6	1	3	0	0.59	35.4	0.23	0.57	0.14	0.50
6	2	3	0	1.24	35.4	0.51	1.50	0.38	0.41
6	3	3	0	1.77	35.4	1.45	2.16	1.20	7.65
"Road Rater 2000"									
1	1	2	0	0.59	25.0	0.07	0.17	0.16	0.16
1	2	2	0	1.22	25.0	0.11	0.36	0.29	0.28
1	3	2	0	1.80	25.0	0.12	0.52	0.43	0.42
1	4	2	0	2.39	25.0	0.10	0.70	0.58	0.55
2	1	2	0	0.57	25.0	0.07	0.21	0.21	0.18
2	2	2	0	1.15	25.0	0.15	0.43	0.39	0.35
2	3	2	0	1.83	25.0	0.08	0.68	0.60	0.55
2	4	2	0	2.38	25.0	0.08	0.88	0.79	0.73
3	1	2	0	0.59	25.0	0.07	0.21	0.21	0.18
3	2	2	0	1.21	25.1	0.16	0.45	0.42	0.37
3	3	2	0	1.81	25.0	0.11	0.67	0.63	0.55
3	4	2	0	2.39	25.0	0.09	0.89	0.83	0.72
4	1	2	0	0.59	25.1	0.09	0.23	0.21	0.19
4	2	2	0	1.19	25.0	0.13	0.48	0.44	0.38
4	3	2	0	1.80	25.0	0.11	0.73	0.67	0.57
4	4	2	0	2.42	25.0	0.09	0.96	0.90	0.77
5	1	2	0	0.60	25.0	0.07	0.20	0.20	0.16
5	2	2	0	1.18	25.0	0.14	0.41	0.37	0.31
5	3	2	0	1.82	25.0	0.09	0.61	0.56	0.48
5	4	2	0	2.40	25.0	0.10	0.81	0.72	0.64
6	1	1	0	0.58	15.1	0.12	0.27	0.25	0.20
6	2	1	0	1.21	15.1	0.18	0.57	0.50	0.43
6	3	1	0	1.80	15.1	0.16	0.86	0.80	0.64
6	4	1	0	2.43	15.1	0.18	1.18	1.06	0.90
6	1	2	0	0.62	25.0	0.07	0.23	0.20	0.17
6	2	2	0	1.21	25.0	0.13	0.48	0.40	0.32
6	3	2	0	1.82	25.0	0.08	0.71	0.59	0.48
6	4	2	0	2.40	25.0	0.08	0.95	0.80	0.64
6	1	3	0	0.62	35.1	0.11	0.21	0.19	0.14
6	2	3	0	1.25	35.1	0.13	0.40	0.35	0.26
6	3	3	0	1.81	35.1	0.12	0.58	0.51	0.39
6	4	3	0	2.42	35.1	0.13	0.79	0.70	0.54
"Dynatest FWD"									
1	2	0	447	56	46	38	32	24	0 0
1	4	0	964	117	96	82	69	55	0 0
2	2	0	463	60	49	41	33	29	0 0
2	4	0	976	127	99	86	74	60	0 0
3	2	0	454	63	52	45	37	30	0 0
3	4	0	969	129	108	95	81	67	0 0
4	2	0	446	82	61	53	40	34	0 0
4	4	0	943	167	130	113	92	75	0 0
5	2	0	439	74	57	51	39	34	0 0
5	4	0	941	154	123	112	92	72	0 0
6	1	0	223	46	34	29	22	18	0 0
6	2	0	446	91	70	60	45	37	0 0
6	3	0	686	140	108	95	76	59	0 0
6	4	0	938	191	149	130	105	83	0 0
"08-08-86" 1 1 1 1 1010 1035 95 93 0 77 76									
"Dynaflect"									
1	0	1.0	8	0.24	0.21	0.19	0.15	0.10	
2	0	1.0	8	0.26	0.22	0.20	0.15	0.11	
3	0	1.0	8	0.28	0.25	0.22	0.18	0.14	
4	0	1.0	8	0.32	0.27	0.24	0.19	0.14	
5	0	1.0	8	0.32	0.28	0.25	0.20	0.15	
6	0	1.0	8	0.41	0.37	0.32	0.26	0.19	
"Road Rater 400"									
1	1	2	0	0.61	25.1	0.25	0.17	0.18	0.14
1	2	2	0	1.21	25.2	0.54	0.45	0.39	2.04
1	3	2	0	1.79	25.2	0.86	0.76	0.68	2.07
2	1	2	0	0.61	25.1	0.29	0.24	0.21	0.18
2	2	2	0	1.18	25.0	0.62	0.54	0.48	0.43
2	3	2	0	1.81	25.0	1.01	0.93	0.83	0.73

6	2	0	381	108	66	64	51	41	0	0
6	3	0	615	170	111	100	81	63	0	0
6	4	0	839	233	151	136	110	86	0	0

"S12" 10 "SR" 60 5420 11.5 623 "S"
 "F. e. Borden C/L easterly" 1.73
 "F. 4.8m. e. of SR335 (at Scenic Valley Apts.) easterly (EB)" 0.25
 1 12341 80 6 2.4 0.00 10.8 0.0 7.6 "G"
 "A-6" 8 "CL" 111.7 18.9 12 31.7 20.8 10.9 2.73
 91 3.6 0
 3
 "03-21-86" 1 1 1 0 1050 1120 37 0 0 30 50
 "Dynalect"

1	0	1.0	8	0.53	0.42	0.35	0.32	0.22
2	0	1.0	8	0.57	0.45	0.36	0.31	0.22
3	0	1.0	8	0.51	0.40	0.32	0.28	0.17
4	0	1.0	8	0.50	0.39	0.31	0.27	0.16
5	0	1.0	8	0.46	0.35	0.28	0.25	0.17
6	0	1.0	8	0.49	0.37	0.28	0.25	0.16

"Road Rater 400"

1	1	2	0	0.59	25.0	0.24	0.20	0.54	0.10
1	2	2	0	1.23	25.1	0.58	0.50	1.23	0.30
1	3	2	0	1.77	25.1	1.14	1.71	3.67	0.65
2	1	2	0	0.60	25.0	0.28	0.18	0.38	0.80
2	2	2	0	1.22	25.1	0.62	0.45	0.38	2.34
2	3	2	0	1.82	25.1	1.20	1.97	0.89	3.02
3	1	2	0	0.61	25.1	0.25	0.21	0.60	0.15
3	2	2	0	1.21	25.1	0.55	0.53	0.88	0.51
3	3	2	0	1.86	25.1	1.20	0.85	3.14	3.66
4	1	2	0	0.58	25.0	0.27	0.22	0.17	0.33
4	2	2	0	1.22	25.1	0.63	0.81	0.41	0.53
4	3	2	0	1.84	25.1	1.20	1.02	0.82	2.44
5	1	2	0	0.59	25.0	0.26	0.26	0.69	0.25
5	2	2	0	1.23	25.1	0.61	1.86	0.39	3.58
5	3	2	0	1.81	25.1	1.20	1.03	2.88	3.66
6	1	1	0	0.62	15.0	0.38	0.27	0.12	0.45
6	2	1	0	1.22	15.1	0.88	0.69	0.78	1.70
6	1	2	0	0.68	25.2	0.30	0.21	0.53	0.14
6	2	2	0	1.23	25.2	0.64	0.74	0.37	0.24
6	3	2	0	1.86	25.2	1.39	1.66	4.87	6.00
6	1	3	0	0.59	34.8	0.23	0.14	0.28	0.22
6	2	3	0	1.18	34.8	0.48	0.36	0.44	0.35
6	2	3	0	1.34	34.8	1.78	1.18	3.65	3.13

"Road Rater 2000"

1	1	2	0	0.65	25.0	0.07	0.24	0.21	0.17
1	2	2	0	1.22	25.1	0.15	0.47	0.40	0.32
1	3	2	0	1.81	25.0	0.10	0.71	0.60	0.49
1	4	2	0	2.42	25.0	0.11	0.97	0.82	0.67
2	1	2	0	0.56	25.0	0.06	0.20	0.16	0.13
2	2	2	0	1.83	25.1	0.14	0.67	0.54	0.41
2	3	2	0	1.16	25.0	0.14	0.43	0.34	0.26
2	4	2	0	2.39	25.0	0.09	0.90	0.73	0.56
3	1	2	0	0.57	25.0	0.09	0.18	0.15	0.13
3	2	2	0	1.21	25.0	0.14	0.41	0.32	0.25
3	3	2	0	1.84	25.0	0.10	0.62	0.49	0.38
3	4	2	0	2.40	25.1	0.14	0.83	0.67	0.51
4	1	2	0	0.59	25.1	0.09	0.21	0.16	0.13
4	2	2	0	1.21	25.0	0.12	0.44	0.36	0.27
4	3	2	0	1.80	25.0	0.10	0.66	0.54	0.41
4	4	2	0	2.38	25.0	0.09	0.90	0.73	0.55
5	1	2	0	0.59	25.1	0.08	0.19	0.16	0.13
5	2	2	0	1.16	25.0	0.15	0.42	0.33	0.25
5	3	2	0	1.78	25.0	0.12	0.64	0.52	0.40
5	4	2	0	2.41	25.0	0.11	0.89	0.72	0.54
6	1	1	0	0.60	15.0	0.09	0.30	0.30	0.22
6	2	1	0	1.20	15.0	0.14	0.59	0.63	0.45
6	3	1	0	1.77	15.0	0.15	0.90	0.76	0.70

6	4	1	0	2.39	15.0	0.10	1.31	1.38	0.95
6	1	2	0	0.58	25.1	0.08	0.19	0.26	0.15
6	2	2	0	1.22	25.1	0.14	0.42	0.54	0.28
6	3	2	0	1.84	25.1	0.12	0.63	0.86	0.43
6	4	2	0	2.42	25.0	0.11	0.86	1.18	0.59
6	1	3	0	0.63	35.0	0.07	0.17	0.22	0.13
6	2	3	0	1.26	24.4	0.11	0.36	0.42	0.20
6	3	3	0	1.81	35.0	0.12	0.54	0.60	0.29
6	4	3	0	2.41	35.1	0.12	0.74	0.74	0.44
"04-23-86" 0 0 0 1 1450 1520 77 0 0 61 52									
"Dynatest FWD"									
1	2	0	404	182	136	97	74	55	0 0
1	4	0	871	383	295	220	168	126	0 0
2	2	0	400	223	146	99	68	49	0 0
2	4	0	867	465	328	229	160	114	0 0
3	2	0	400	168	118	81	53	42	0 0
3	4	0	868	357	260	186	132	96	0 0
4	2	0	399	155	101	73	54	38	0 0
4	4	0	865	329	234	173	128	91	0 0
5	2	0	398	134	97	70	50	35	26 13
5	4	0	863	296	227	168	123	86	61 30
6	1	0	181	58	35	25	17	12	0 0
6	2	0	400	152	101	73	49	34	0 0
6	3	0	631	241	169	124	84	58	0 0
6	4	0	863	324	236	174	120	83	0 0
"08-07-86" 1 1 1 1 1200 1235 106 106 106 82 72									
"Dynalect"									
1	0	1.0	8	0.53	0.44	0.33	0.25	0.19	
2	0	1.0	8	0.59	0.47	0.34	0.25	0.18	
3	0	1.0	8	0.49	0.40	0.30	0.23	0.17	
4	0	1.0	8	0.49	0.39	0.29	0.20	0.14	
5	0	1.0	8	0.41	0.34	0.26	0.18	0.12	
6	0	1.0	8	0.43	0.34	0.25	0.18	0.12	
"Road Rater 400"									
1	1	2	0	0.59	24.9	0.42	0.35	0.23	0.17
1	2	2	0	1.18	24.9	0.92	1.17	0.50	0.69
1	3	2	0	1.79	25.0	1.61	1.26	0.93	1.72
2	1	2	0	0.60	25.0	0.45	0.28	0.34	0.12
2	2	2	0	1.22	25.0	0.92	0.61	1.62	0.30
2	3	2	0	1.81	25.0	1.57	2.23	1.37	0.51
3	1	2	0	0.59	25.0	0.35	0.22	0.14	0.11
3	2	2	0	1.21	25.0	0.75	0.89	0.34	0.40
3	3	2	0	1.79	25.0	1.27	1.53	1.25	0.46
4	1	2	0	0.59	25.0	0.42	0.27	0.20	0.22
4	2	2	0	1.21	25.0	0.87	0.73	0.41	0.26
4	3	2	0	1.81	25.0	1.51	1.08	0.73	0.50
5	1	2	0	0.60	25.0	0.35	0.22	0.16	0.12
5	2	2	0	1.20	25.0	0.71	0.75	0.35	0.19
5	3	2	0	1.80	25.0	1.18	1.19	0.63	0.77
6	1	1	0	0.60	15.0	0.41	0.32	0.25	0.37
6	2	1	0	1.21	15.0	0.87	0.66	0.53	0.58
6	1	2	0	0.61	25.1	0.35	0.24	0.17	0.17
6	2	2	0	1.21	25.2	0.73	0.52	0.36	0.40
6	3	2	0	1.81	25.1	1.21	0.89	0.61	0.42
6	1	3	0	0.59	34.9	0.27	0.20	0.11	0.16
6	2	3	0	1.19	35.0	0.64	0.53	0.30	0.39
6	3	3	0	1.81	35.0	1.36	0.98	0.67	0.54
"Road Rater 2000"									
1	1	2	0	0.61	25.2	0.50	0.29	0.27	0.19
1	2	2	0	1.23	25.2	1.08	0.66	0.58	0.40
1	3	2	0	1.82	25.2	1.68	1.02	0.92	0.61
1	4	2	0	2.40	25.3	2.33	1.39	1.25	0.83
1	5	2	0	3.58	25.2	3.93	2.32	1.97	1.34
2	1	2	0	0.60	25.2	0.50	0.26	0.19	0.15
2	2	2	0	1.16	25.2	1.01	0.56	0.39	0.29
2	3	2	0	1.82	25.2	1.69	0.91	0.62	0.43
2	4	2	0	2.42	25.2	2.43	1.32	0.90	0.64
2	5	2	0	3.61	25.2	4.09	2.21	1.51	1.03
3	1	2	0	0.60	25.2	0.41	0.23	0.17	0.14
3	2	2	0	1.24	25.2	0.85	0.46	0.34	0.26

3	3	2	0	1.84	25.2	1.30	0.73	0.53	0.39		
3	4	2	0	2.43	25.2	1.83	1.03	0.74	0.54		
3	5	2	0	3.59	25.2	3.11	1.70	1.22	0.87		
4	1	2	0	0.60	25.2	0.38	0.25	0.18	0.13		
4	2	2	0	1.20	25.2	0.81	0.50	0.38	0.26		
4	3	2	0	1.81	25.2	1.24	0.79	0.58	0.41		
4	4	2	0	2.42	25.2	1.77	1.11	0.81	0.57		
4	5	2	0	3.58	25.2	2.89	1.79	1.29	0.89		
5	1	2	0	0.61	25.2	0.36	0.21	0.15	0.14		
5	2	2	0	1.17	25.2	0.73	0.44	0.31	0.23		
5	3	2	0	1.81	25.2	1.19	0.71	0.51	0.37		
5	4	2	0	2.43	25.2	1.63	0.98	0.72	0.50		
5	5	2	0	3.65	25.2	2.79	1.65	1.23	0.83		
6	1	1	0	0.61	15.1	0.48	0.32	0.26	0.21		
6	2	1	0	1.24	15.1	0.96	0.64	0.53	0.43		
6	3	1	0	1.77	15.1	1.62	1.00	0.83	0.68		
6	4	1	0	2.42	15.1	2.28	1.54	1.18	0.92		
6	5	1	0	3.61	15.1	3.87	2.42	1.93	1.48		
6	1	2	0	0.63	25.2	0.37	0.21	0.17	0.14		
6	2	2	0	1.17	25.1	0.76	0.43	0.32	0.23		
6	3	2	0	1.83	25.2	1.25	0.72	0.51	0.36		
6	4	2	0	2.43	25.2	1.76	1.01	0.72	0.50		
6	5	2	0	3.61	25.2	3.01	1.72	1.23	0.85		
6	1	3	0	0.63	35.2	0.38	0.20	0.15	0.12		
6	2	3	0	1.23	35.2	0.76	0.40	0.29	0.20		
6	3	3	0	1.82	35.2	1.22	0.64	0.46	0.32		
6	4	3	0	2.37	35.2	1.74	0.90	0.65	0.44		
6	5	3	0	3.62	35.2	3.02	1.54	1.07	0.74		
"Dynatest FWD"											
1	2	0	390	183	121	65	63	47	36	23	
1	4	0	830	402	281	199	147	108	79	52	
2	2	0	386	211	138	84	56	42	0	0	
2	4	0	828	467	315	203	136	97	0	0	
3	2	0	386	169	108	72	50	36	30	20	
3	4	0	825	370	246	170	117	83	66	44	
4	2	0	380	180	107	73	46	33	0	0	
4	4	0	819	389	255	173	115	81	0	0	
5	2	0	382	138	97	66	44	30	22	15	
5	4	0	819	312	231	163	112	76	53	29	
6	1	0	0	0	0	0	0	0	0	0	
6	2	0	378	148	96	67	44	31	0	0	
6	3	0	593	242	166	113	75	52	0	0	
6	4	0	815	340	233	164	108	75	0	0	
"S13" 3 "SR" 46 7830 8.0 626 "S"											
"F. e. Columbus City C/L to SR9" 4.81											
"F. 3.4m. w. of SR9 westerly to near county market (WB)" 0.25											
1	10666	76	10	1.0	0.00	11.0	0.0	5.0	"6"		
"A-2-6"	1	"SC"			108.6	18.4	18	31.0	19.5	11.5	2.68
68	3.0	0									
2											
"03-24-86"	1	0	1	1	1715	1745	72	0	0	62	35
"Dynaflect"											
1	0	1.0	8	1.09	0.76	0.49	0.34	0.21			
2	0	1.0	8	0.91	0.68	0.46	0.32	0.20			
3	0	1.0	8	0.93	0.64	0.39	0.27	0.16			
4	0	1.0	8	0.99	0.67	0.38	0.24	0.13			
5	0	1.0	8	1.03	0.76	0.47	0.31	0.18			
6	0	1.0	8	1.13	0.80	0.48	0.31	0.16			
"Road Rater 2000"											
1	1	2	0	0.62	25.1	0.11	0.51	0.35	0.24		
1	2	2	0	1.22	25.1	0.14	1.06	0.74	0.50		
1	3	2	0	1.80	25.1	0.13	1.67	1.13	0.77		
1	4	2	0	2.39	25.1	0.11	2.36	1.62	1.10		
2	1	2	0	0.61	25.1	0.12	0.40	0.27	0.18		
2	2	2	0	1.15	25.0	0.14	0.81	0.57	0.38		
2	3	2	0	1.78	25.1	0.15	1.29	0.91	0.59		

2	4	2	0	2.39	25.1	0.11	1.30	1.27	0.82
3	1	2	0	0.59	25.1	0.10	0.48	0.36	0.19
3	2	2	0	1.20	25.1	0.15	1.05	0.88	0.41
3	3	2	0	1.85	25.1	0.12	1.75	1.66	0.68
3	4	2	0	2.44	25.1	0.13	2.39	2.36	0.92
4	1	2	0	0.58	25.1	0.08	0.46	0.40	0.20
4	2	2	0	1.20	25.1	0.17	1.00	0.70	0.44
4	3	2	0	1.80	25.1	0.12	1.68	1.06	0.72
4	4	2	0	2.43	25.1	0.13	2.46	1.50	1.03
5	1	2	0	0.59	25.1	0.10	0.43	0.27	0.21
5	2	2	0	1.19	25.1	0.15	0.90	0.57	0.41
5	3	2	0	1.77	25.1	0.14	1.45	0.92	0.64
5	4	2	0	2.39	25.1	0.11	2.03	1.29	0.88
6	1	1	0	0.61	15.1	0.12	0.50	0.42	0.26
6	2	1	0	1.24	15.1	0.19	1.14	0.87	0.54
6	3	1	0	1.79	15.1	0.17	1.75	1.41	0.86
6	4	1	0	2.40	15.1	0.15	2.60	2.06	1.24
6	1	2	0	0.58	25.1	0.08	0.49	0.29	0.23
6	2	2	0	1.23	25.2	0.15	1.11	0.71	0.55
6	3	2	0	1.81	25.2	0.14	1.76	1.11	0.84
6	4	2	0	2.38	25.1	0.11	2.40	1.59	1.17
6	1	3	0	0.61	35.1	0.10	0.47	0.29	0.23
6	2	3	0	1.22	35.1	0.14	0.95	0.61	0.44
6	3	3	0	1.78	35.0	0.13	1.46	0.93	0.67
6	4	3	0	2.41	35.0	0.12	2.05	1.30	0.91
"Dynatest FWD"									
1	2	0	428	335	227	130	79	52	0 0
1	4	0	917	713	493	287	173	113	0 0
2	2	0	432	244	174	113	68	46	0 0
2	4	0	919	530	385	245	153	101	0 0
3	2	0	427	342	215	118	69	43	0 0
3	4	0	903	675	445	253	149	98	0 0
4	2	0	420	363	224	116	63	40	0 0
4	4	0	916	758	487	259	145	90	0 0
5	2	0	425	302	209	126	83	55	0 0
5	4	0	921	637	447	288	185	126	0 0
6	1	0	218	167	113	61	36	23	0 0
6	2	0	421	339	229	128	75	49	0 0
6	3	0	656	531	365	203	120	77	0 0
6	4	0	921	737	513	277	173	105	0 0
"08-08-86" 1 1 1 1 1400 1430 112 108 0 87 72									
"Dynaflect"									
1	0	1.0	8	0.81	0.59	0.38	0.25	0.17	
2	0	1.0	8	0.79	0.58	0.38	0.25	0.17	
3	0	1.0	8	0.70	0.50	0.32	0.21	0.13	
4	0	1.0	8	0.74	0.52	0.31	0.18	0.11	
5	0	1.0	8	0.82	0.58	0.35	0.24	0.15	
6	0	1.0	8	0.90	0.62	0.37	0.22	0.14	
"Road Rater 400"									
1	1	2	0	0.58	25.2	0.63	0.90	0.32	0.26
1	2	2	0	1.20	25.1	1.60	1.79	1.05	0.75
1	3	2	0	1.81	25.1	2.66	2.51	1.70	1.22
2	1	2	0	0.60	25.0	0.76	0.50	0.31	0.06
2	2	2	0	1.21	25.0	1.79	1.25	0.75	0.36
2	3	2	0	1.79	25.1	3.14	2.66	1.98	0.86
3	1	2	0	0.59	25.0	0.64	0.43	0.28	0.19
3	2	2	0	1.22	25.1	1.56	1.18	0.51	0.46
3	3	2	0	1.78	25.1	3.15	2.40	2.94	0.95
4	1	2	0	0.59	25.0	0.77	0.52	0.32	0.26
4	2	2	0	1.18	25.0	2.01	1.36	0.80	1.99
4	3	2	0	1.79	25.1	3.93	2.79	1.55	1.89
5	1	2	0	0.59	25.0	0.72	0.55	0.35	0.22
5	2	2	0	1.21	25.0	2.26	1.77	1.10	0.71
5	3	2	0	1.80	25.1	3.67	2.82	1.71	1.07
6	1	1	0	0.62	15.2	0.81	0.69	0.38	0.23
6	2	1	0	1.21	15.1	1.99	1.54	0.87	0.56
6	1	2	0	0.60	25.1	0.89	0.63	0.37	0.23
6	2	2	0	1.22	25.1	2.18	1.43	0.91	0.61
6	3	2	0	1.80	25.2	3.96	2.82	0.75	1.11
6	1	3	0	0.60	35.1	0.80	0.55	0.31	0.20

6	2	3	0	1.22	35.1	2.29	1.59	1.03	0.61
6	3	3	0	1.80	35.1	4.69	3.38	2.68	1.15
"Road Rater 2000"									
1	1	2	0	0.61	25.0	0.65	0.44	0.34	0.26
1	2	2	0	1.16	25.0	1.32	0.95	0.72	0.52
1	3	2	0	1.83	25.1	2.27	1.63	1.22	0.88
1	4	2	0	2.39	25.0	3.22	2.30	1.66	1.22
1	5	2	0	3.56	25.0	5.40	3.87	2.88	2.03
2	1	2	0	0.57	25.1	0.72	0.44	0.34	0.22
2	2	2	0	1.21	25.1	1.68	0.95	0.68	0.46
2	3	2	0	1.81	25.0	2.66	1.52	1.09	0.73
2	4	2	0	2.44	25.0	3.84	2.19	1.55	1.05
2	5	2	0	3.60	25.1	6.14	3.56	2.47	1.66
3	1	2	0	0.59	25.1	0.54	0.38	0.27	0.19
3	2	2	0	1.20	25.1	1.20	0.85	0.61	0.40
3	3	2	0	1.83	25.0	1.92	1.37	0.95	0.65
3	4	2	0	2.43	25.0	2.73	2.02	1.40	0.94
3	5	2	0	3.62	25.1	4.43	3.31	2.27	1.53
4	1	2	0	0.60	25.1	0.71	0.44	0.30	0.20
4	2	2	0	1.17	25.1	1.68	0.97	0.68	0.44
4	3	2	0	1.81	25.1	2.82	1.59	1.10	0.71
4	4	2	0	2.41	25.0	4.17	2.38	1.59	1.01
4	5	2	0	3.61	25.0	7.01	3.99	2.64	1.67
5	1	2	0	0.60	25.0	0.74	0.44	0.30	0.21
5	2	2	0	1.18	25.0	1.64	1.00	0.67	0.44
5	3	2	0	1.83	25.1	2.75	1.64	1.11	0.73
5	4	2	0	2.44	25.1	3.90	2.35	1.55	1.00
5	5	2	0	3.57	25.1	6.58	3.98	2.58	1.61
6	1	1	0	0.59	15.0	0.87	0.45	0.32	0.23
6	2	1	0	1.21	15.1	1.99	1.08	0.69	0.47
6	3	1	0	1.78	15.1	3.29	1.77	1.18	0.72
6	4	1	0	2.46	15.1	4.72	2.56	1.71	1.05
6	5	1	0	3.62	15.1	8.35	4.95	3.18	1.97
6	1	2	0	0.61	25.1	0.89	0.53	0.37	0.25
6	2	2	0	1.19	25.0	1.94	1.18	0.82	0.55
6	3	2	0	1.78	25.0	3.09	1.86	1.28	0.86
6	4	2	0	2.45	25.1	4.50	2.74	1.85	1.25
6	5	2	0	3.58	25.1	7.45	4.48	2.98	1.96
6	1	3	0	0.60	35.1	0.81	0.48	0.34	0.23
6	2	3	0	1.22	35.1	1.76	1.04	0.73	0.49
6	3	3	0	1.80	35.1	2.81	1.69	1.14	0.76
6	4	3	0	2.42	35.1	3.96	2.41	1.58	1.04
6	5	3	0	3.62	35.1	6.68	4.01	2.58	1.66

"Dynatest FWD"

1	2	0	382	355	205	118	71	46	34	18
1	4	0	824	738	458	269	161	103	75	47
2	2	0	388	360	193	104	61	42	0	0
2	4	0	823	753	427	242	146	97	0	0
3	2	0	381	281	176	101	63	41	28	14
3	4	0	825	588	385	230	142	92	65	37
4	2	0	378	358	195	106	61	38	0	0
4	4	0	815	727	423	243	142	87	0	0
5	2	0	379	334	217	122	70	44	35	22
5	4	0	821	684	460	279	163	103	75	42
6	1	0	0	0	0	0	0	0	0	0
6	2	0	376	373	232	126	69	44	0	0
6	3	0	587	556	358	199	113	69	0	0
6	4	0	817	761	496	281	163	98	0	0

"S14" 3 "SR" 9 2190 8.0 175 "S"

"F. Shelby/Bartholomew CL to town of Hope" 2.40

"F. 7.4m. n. of SR46 northerly to near CR900N (NB)" 0.25

1 11299 78 8 2.0 0.00 9.0 0.0 13.0 "B"

"A-7-6" 12 "CL" 100.4 23.0 9 41.3 19.2 22.1 2.58

38 3.4 0

2

"03-24-86" 1 0 1 1 1610 1640 80 0 0 65 35

"Dynalect"

1	0	1.0	8	0.42	0.32	0.24	0.20	0.12
2	0	1.0	8	0.88	0.68	0.50	0.38	0.27
3	0	1.0	8	0.83	0.60	0.38	0.25	0.12
4	0	1.0	8	1.04	0.74	0.46	0.29	0.14
5	0	1.0	8	1.20	0.87	0.56	0.37	0.20
6	0	1.0	8	0.74	0.54	0.35	0.24	0.13

"Road Rater 2000"

1	1	2	0	0.57	25.0	0.08	0.27	0.18	0.16
1	2	2	0	1.19	24.6	0.13	0.58	0.40	0.33
1	3	2	0	1.78	25.0	0.13	0.90	0.60	0.50
1	4	2	0	2.39	25.0	0.09	1.21	0.83	0.69
2	1	2	0	0.59	25.0	0.08	0.55	0.40	0.36
2	2	2	0	1.18	25.0	0.13	1.10	0.83	0.73
2	3	2	0	1.76	25.0	0.13	1.67	1.28	1.11
2	4	2	0	2.41	25.0	0.10	2.30	1.76	1.50
3	1	2	0	0.61	25.0	0.08	0.49	0.29	0.19
3	2	2	0	1.20	25.0	0.13	1.03	0.66	0.42
3	3	2	0	1.78	25.0	0.14	1.61	1.01	0.64
3	4	2	0	2.43	25.0	0.11	2.31	1.45	0.90
4	1	2	0	0.60	25.0	0.05	0.62	0.45	0.30
4	2	2	0	1.22	25.0	0.12	1.34	0.97	0.66
4	3	2	0	1.77	25.0	0.13	2.11	1.55	1.03
4	4	2	0	2.40	25.0	0.08	3.00	2.14	1.43
5	1	2	0	0.59	25.0	0.06	0.80	0.65	0.45
5	2	2	0	1.21	25.0	0.12	1.77	1.40	1.04
5	3	2	0	1.82	25.0	0.10	2.78	2.20	1.62
5	4	2	0	2.40	25.0	0.09	3.89	3.03	2.22
6	1	1	0	0.60	15.0	0.11	0.35	0.29	0.16
6	2	1	0	1.20	14.9	0.13	0.76	0.57	0.31
6	3	1	0	1.76	14.9	0.16	1.15	0.93	0.48
6	4	1	0	2.44	15.0	0.13	1.70	1.42	0.69
6	1	2	0	0.58	25.1	0.09	0.42	0.48	0.18
6	2	2	0	1.20	25.2	0.12	0.88	1.02	0.39
6	3	2	0	1.86	25.2	0.11	1.38	1.62	0.63
6	4	2	0	2.39	25.1	0.11	1.87	2.17	0.83
6	1	3	0	0.65	35.2	0.07	0.50	0.37	0.21
6	2	3	0	1.22	35.2	0.12	1.04	0.73	0.41
6	3	3	0	1.82	35.2	0.11	1.62	1.08	0.62
6	4	3	0	2.44	35.1	0.14	2.29	1.48	0.88

"Dynatest FWD"

1	2	0	437	104	81	61	45	32	0	0
1	4	0	928	228	178	137	102	74	0	0
2	2	0	429	226	170	121	85	59	0	0
2	4	0	929	480	363	264	181	129	0	0
3	2	0	432	260	192	119	69	41	0	0
3	4	0	926	577	432	273	161	96	0	0
4	2	0	426	340	244	140	84	46	0	0
4	4	0	918	746	535	325	191	110	0	0
5	2	0	426	357	264	163	96	59	0	0
5	4	0	913	769	576	357	213	131	0	0
6	1	0	212	110	83	47	32	14	0	0
6	2	0	421	212	159	97	61	37	0	0
6	3	0	656	347	259	162	100	63	0	0
6	4	0	918	492	361	234	145	91	0	0

"08-08-86"

1	1	1	1	1300	1326	112	107	0	84	72
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"Dynalect"

1	0	1.0	8	0.39	0.31	0.23	0.17	0.10
2	0	1.0	8	0.96	0.77	0.53	0.36	0.23
3	0	1.0	8	0.80	0.58	0.34	0.19	0.09
4	0	1.0	8	0.92	0.67	0.40	0.22	0.12
5	0	1.0	8	1.19	0.89	0.53	0.32	0.18
6	0	1.0	8	0.70	0.54	0.34	0.20	0.12

"Road Rater 400"

1	1	2	0	0.60	25.0	0.32	0.46	0.16	0.13
1	2	2	0	1.22	25.0	0.77	0.92	0.49	0.36
1	3	2	0	1.79	25.0	1.24	1.46	0.85	0.61
2	1	2	0	0.59	25.0	0.85	0.75	0.61	1.55
2	2	2	0	1.22	25.0	1.97	1.80	1.49	1.19
2	3	2	0	1.80	25.0	3.16	2.92	2.37	1.92

6	2	0	383	236	175	105	61	37	0	0
6	3	0	595	373	281	171	102	62	0	0
6	4	0	822	517	393	241	146	88	0	0

"S15" 10 "SR" 3 910 11.5 105 "S"
 "F. SR203 to Clark/Scott CL" 0.72
 "F. 3.9m. s. of SR356 southerly (betw. SR362 & SR203) (SB)" 0.25
 1 11901 79 7 1.9 0.00 8.6 0.0 6.0 "S"
 "A-4" 8 "CL" 112.5 18.0 12 23.7 16.2 7.5 2.59
 78 5.0 0

3
 "03-21-86" 1 1 1 0 1430 1500 63 0 0 38 47
 "Dynaflect"

1	0	1.0	8	1.12	0.87	0.59	0.47	0.30
2	0	1.0	8	0.88	0.67	0.45	0.37	0.23
3	0	1.0	8	0.96	0.70	0.46	0.38	0.24
4	0	1.0	8	0.90	0.70	0.48	0.40	0.26
5	0	1.0	8	0.90	0.69	0.46	0.39	0.27
6	0	1.0	8	1.05	0.79	0.52	0.42	0.26

"Road Rater 400"

1	1	2	0	0.62	24.9	0.94	0.78	0.59	0.43
1	2	2	0	1.20	24.9	1.81	1.56	1.20	0.89
1	3	2	0	1.81	25.0	4.14	3.62	2.71	2.00
2	1	2	0	0.61	24.9	0.81	0.74	0.52	0.39
2	2	2	0	1.20	24.9	1.51	1.34	1.07	0.81
2	3	2	0	1.81	25.0	3.48	3.00	2.33	1.78
3	1	2	0	0.61	24.9	0.89	0.93	0.50	0.31
3	2	2	0	1.20	24.9	1.65	1.39	0.98	0.71
3	3	2	0	1.82	25.0	3.89	3.19	2.29	1.76
4	1	2	0	0.58	24.9	0.73	0.63	0.43	0.32
4	2	2	0	1.21	24.9	1.56	1.26	0.94	0.71
4	3	2	0	1.83	25.0	3.37	2.61	1.95	1.49
5	1	2	0	0.62	24.9	0.69	0.59	0.42	0.33
5	2	2	0	1.19	24.9	1.52	1.32	0.92	0.66
5	3	2	0	1.83	25.0	3.55	2.81	2.09	1.60
6	1	1	0	0.64	15.0	0.78	0.58	0.47	0.36
6	2	1	0	1.22	15.1	1.75	1.30	1.05	0.77
6	1	2	0	0.60	24.9	0.92	0.75	0.57	0.43
6	2	2	0	1.23	24.9	1.93	1.07	1.90	1.42
6	3	2	0	1.80	24.9	4.26	3.67	0.97	2.04
6	1	3	0	0.67	35.3	0.84	0.59	0.41	0.31
6	2	3	0	1.21	35.3	1.61	1.22	0.86	1.09
6	3	3	0	1.76	35.3	4.70	6.42	19.03	0.00

"Road Rater 2000"

1	1	2	0	0.62	25.1	0.11	0.65	0.51	0.36
1	2	2	0	1.20	25.1	0.15	1.40	0.97	0.76
1	3	2	0	1.77	25.1	0.15	2.25	1.50	1.21
1	4	2	0	2.37	25.1	0.11	3.30	2.14	1.72
2	1	2	0	0.59	25.1	0.10	0.57	0.52	0.32
2	2	2	0	1.18	25.1	0.15	1.23	1.12	0.88
2	3	2	0	1.78	25.1	0.16	2.00	1.83	1.08
2	4	2	0	2.36	25.1	0.10	2.81	2.63	1.51
3	1	2	0	0.56	25.1	0.08	0.49	0.38	0.29
3	2	2	0	1.22	25.2	0.14	1.13	0.89	0.66
3	3	2	0	1.80	25.0	0.11	1.87	1.44	1.05
3	4	2	0	2.39	25.1	0.12	2.61	2.01	1.46
4	1	2	0	0.56	25.7	0.09	0.43	0.39	0.24
4	1	2	0	0.58	25.2	0.06	0.45	0.41	0.27
4	2	2	0	1.22	25.1	0.15	1.02	0.93	0.59
4	3	2	0	1.82	25.1	0.14	1.67	1.48	0.94
4	4	2	0	2.39	25.1	0.11	2.31	2.03	1.27
5	1	2	0	0.60	25.1	0.10	0.50	0.39	0.28
5	2	2	0	1.17	25.1	0.18	1.11	0.87	0.63
5	3	2	0	1.84	25.1	0.13	1.90	1.46	1.05
5	4	2	0	2.42	25.1	0.13	2.66	2.04	1.46
6	1	1	0	0.61	15.0	0.11	0.56	0.50	0.33
6	2	1	0	1.18	15.0	0.14	1.21	1.02	0.69

6	3	1	0	1.78	15.0	0.15	2.02	1.68	1.13
6	4	1	0	2.41	15.0	0.13	3.06	2.43	1.57
6	1	2	0	0.38	25.1	0.09	0.61	0.58	0.31
6	2	2	0	1.21	25.1	0.15	1.35	1.20	0.72
6	3	2	0	1.83	25.1	0.13	2.21	1.79	1.19
6	4	2	0	2.42	25.1	0.13	3.12	2.51	1.67
6	1	3	0	0.62	35.2	0.08	0.44	0.35	0.23
6	2	3	0	1.20	35.1	0.14	1.01	0.77	0.49
6	3	3	0	1.84	35.1	0.13	1.60	1.25	0.78
6	4	3	0	2.39	35.0	0.11	2.24	1.70	1.11
"04-24-86" 0 0 0 1 1000 1030 74 0 0 64 50									
"Dynatest FWD"									
1	2	0	401	401	302	176	122	80	0 0
1	4	0	850	817	630	422	273	178	0 0
2	2	0	405	334	256	166	105	66	0 0
2	4	0	864	695	543	365	236	148	0 0
3	2	0	401	369	273	167	102	64	0 0
3	4	0	856	749	566	372	229	147	0 0
4	2	0	399	400	275	174	105	64	0 0
4	4	0	852	818	595	387	241	148	0 0
5	2	0	397	409	271	156	92	59	42 25
5	4	0	849	813	574	352	217	139	96 57
6	1	0	159	150	103	59	33	21	0 0
6	2	0	395	428	307	187	112	68	0 0
6	3	0	621	673	495	310	190	113	0 0
6	4	0	848	904	672	433	264	160	0 0
"08-07-86" 1 1 1 1 1520 1548 104 102 102 81 72									
"Dynaflect"									
1	0	1.0	8	0.83	0.63	0.42	0.29	0.20	
2	0	1.0	8	0.75	0.57	0.38	0.26	0.17	
3	0	1.0	8	0.79	0.60	0.40	0.27	0.17	
4	0	1.0	8	0.78	0.58	0.39	0.27	0.18	
5	0	1.0	8	0.80	0.57	0.37	0.25	0.17	
6	0	1.0	8	0.86	0.65	0.44	0.29	0.18	
"Road Rater 400"									
1	1	2	0	0.60	25.1	0.71	0.50	0.38	0.27
1	2	2	0	1.21	25.1	1.46	1.05	0.78	0.60
1	3	2	0	1.82	25.1	2.80	2.03	2.71	1.05
2	1	2	0	0.59	25.0	0.70	0.74	0.38	0.27
2	2	2	0	1.21	25.0	1.57	0.72	0.87	0.66
2	3	2	0	1.82	25.1	2.86	2.27	1.59	1.17
3	1	2	0	0.60	25.0	0.71	0.55	0.44	0.29
3	2	2	0	1.21	25.0	1.57	1.25	0.73	0.64
3	3	2	0	1.81	25.1	2.85	1.83	2.69	1.07
4	1	2	0	0.60	25.0	0.65	0.44	0.33	0.23
4	2	2	0	1.21	25.0	1.41	1.15	0.75	0.55
4	3	2	0	1.81	25.1	2.57	1.77	1.32	0.95
5	1	2	0	0.60	25.0	0.73	0.49	0.36	0.26
5	2	2	0	1.19	25.0	1.61	1.12	0.78	0.60
5	3	2	0	1.80	25.1	3.06	2.22	1.36	1.05
6	1	1	0	0.60	15.1	0.64	0.50	0.34	0.23
6	2	1	0	1.19	15.1	1.56	1.15	0.82	0.55
6	1	2	0	0.60	25.0	0.83	0.57	0.47	0.36
6	2	2	0	1.20	25.0	1.79	1.42	1.01	0.80
6	3	2	0	1.79	25.0	3.25	2.51	1.79	1.36
6	1	3	0	0.60	35.0	0.66	0.97	0.33	0.22
6	2	3	0	1.21	34.9	1.86	1.42	0.92	0.64
6	3	3	0	1.78	35.1	4.27	4.15	14.84	1.47
"Road Rater 2000"									
1	1	2	0	0.60	25.2	0.68	0.47	0.41	0.27
1	2	2	0	1.21	25.2	1.52	1.04	0.80	0.56
1	3	2	0	1.81	25.2	2.48	1.67	1.23	0.85
1	4	2	0	2.41	25.2	3.64	2.45	1.74	1.21
1	5	2	0	3.60	25.2	6.44	4.28	2.91	1.96
2	1	2	0	0.62	25.2	0.76	0.49	0.37	0.30
2	2	2	0	1.23	25.2	1.59	1.05	0.74	0.62
2	3	2	0	1.84	25.2	2.56	1.65	1.16	0.93
2	4	2	0	2.40	25.2	3.57	2.33	1.60	1.27
2	5	2	0	3.57	25.1	6.40	4.01	2.77	2.02
3	1	2	0	0.61	25.2	0.76	0.47	0.35	0.28

3	2	2	0	1.21	25.2	1.62	1.00	0.75	0.57
3	3	2	0	1.81	25.2	2.60	1.64	1.16	0.87
3	4	2	0	2.40	25.2	3.76	2.37	1.63	1.22
3	5	2	0	3.59	25.2	6.76	4.22	2.83	2.02
4	1	2	0	0.64	25.2	0.70	0.44	0.36	0.24
4	2	2	0	1.23	25.2	1.45	0.95	0.67	0.49
4	3	2	0	1.81	25.2	2.32	1.50	1.07	0.76
4	4	2	0	2.41	25.1	3.40	2.21	1.52	1.06
4	5	2	0	3.59	25.2	6.06	3.89	2.62	1.76
5	1	2	0	0.64	25.2	0.75	0.51	0.37	0.27
5	2	2	0	1.23	25.2	1.56	1.01	0.72	0.51
5	3	2	0	1.81	25.2	2.51	1.65	1.13	0.81
5	4	2	0	2.37	25.2	3.60	2.30	1.56	1.09
5	5	2	0	3.59	25.1	6.49	4.12	2.63	1.82
6	1	1	0	0.61	15.0	0.80	0.50	0.39	0.26
6	2	1	0	1.22	15.0	1.77	1.12	0.79	0.52
6	3	1	0	1.82	15.0	2.92	1.93	1.27	0.81
6	4	1	0	2.34	15.0	4.29	2.68	1.92	1.12
6	4	1	0	2.37	15.0	4.26	2.73	1.91	1.11
6	5	1	0	3.59	15.0	8.61	5.67	3.50	2.12
6	1	2	0	0.58	25.1	0.87	0.57	0.43	0.36
6	2	2	0	1.20	25.1	1.90	1.27	0.84	0.73
6	3	2	0	1.81	25.1	3.13	2.10	1.34	1.12
6	4	2	0	2.41	25.1	4.59	3.02	1.95	1.57
6	5	2	0	3.59	25.1	8.31	5.40	3.45	2.58
6	1	3	0	0.63	35.0	0.85	0.50	0.32	0.24
6	2	3	0	1.23	35.1	1.79	1.07	0.64	0.49
6	3	3	0	1.79	35.1	2.97	1.76	0.97	0.78
6	4	3	0	2.41	35.1	4.52	2.68	1.31	1.14
6	5	3	0	3.60	35.1	8.95	4.87	2.75	1.98

"Dynatest FWD"

1	2	0	379	312	195	116	77	53	39	25
1	4	0	817	654	445	273	179	123	90	56
2	2	0	383	301	191	114	73	48	0	0
2	4	0	816	631	425	269	171	113	0	0
3	2	0	378	319	199	117	75	50	39	25
3	4	0	811	664	444	280	174	120	86	51
4	2	0	377	313	183	108	72	47	0	0
4	4	0	815	661	424	260	169	111	0	0
5	2	0	378	363	218	120	71	47	36	22
5	4	0	801	751	480	284	170	110	80	47
6	1	0	0	0	0	0	0	0	0	0
6	2	0	371	375	250	143	85	54	0	0
6	3	0	582	600	420	243	151	92	0	0
6	4	0	797	819	578	350	214	131	0	0

"S16" 55 "SR" 135 1610 11.0 177 "S"

"F. Brown/Morgan CL to s. Morgantown C/L" 1.91

"F. 0.8m. s. of SR252W southerly (SB)" 0.25

1 10963 77 9 1.8 0.00 6.2 0.0 8.6 "6"

"A-6" 7 "CL" 107.8 19.9 10 29.4 14.8 14.6 2.74

70 5.0 0

2

"03-25-86" 1 1 0 1 1510 1635 93 0 0 75 34

"Dynalect"

1	0	1.0	8	1.23	0.89	0.75	0.40	0.25
2	0	1.0	8	1.11	0.79	0.68	0.35	0.23
3	0	1.0	8	1.21	0.87	0.71	0.37	0.23
4	0	1.0	8	1.12	0.81	0.65	0.37	0.24
5	0	1.0	8	1.15	0.79	0.52	0.36	0.24
6	0	1.0	8	1.23	0.89	0.59	0.41	0.27

"Road Rater 400"

1	1	2	0	0.64	25.3	0.94	0.74	0.48	0.33
1	2	2	0	1.25	25.3	1.91	1.46	0.96	0.71
1	3	2	0	1.89	25.4	3.99	3.29	2.03	1.22
2	1	2	0	0.60	24.9	0.76	0.56	1.36	0.20
2	2	2	0	1.21	24.9	1.71	1.92	2.93	0.46

2	3	2	0	1.32	24.9	3.66	2.51	1.62	0.94
3	1	2	0	0.59	24.9	0.86	0.55	1.34	0.20
3	2	2	0	1.22	24.9	1.36	1.93	2.99	0.35
3	3	2	0	1.80	24.9	2.49	3.09	1.70	0.99
4	1	2	0	0.58	24.9	0.70	0.47	0.31	0.13
4	2	2	0	1.20	24.9	1.56	1.40	0.68	0.41
4	3	2	0	1.77	24.9	3.41	2.46	1.57	0.91
5	1	2	0	0.60	24.9	0.77	0.53	0.34	0.23
5	2	2	0	1.20	24.9	1.30	1.23	0.74	0.49
5	3	2	0	1.82	24.9	4.31	3.05	1.54	1.59
6	1	1	0	0.61	15.0	0.76	0.57	0.37	0.27
6	2	1	0	1.23	15.0	1.80	1.31	0.88	0.60
6	1	2	0	0.61	25.0	0.77	0.58	0.36	0.20
6	2	2	0	1.24	25.1	1.82	1.29	0.84	0.25
6	3	2	0	1.82	25.1	4.18	3.03	1.80	1.08
6	1	3	0	0.58	35.0	0.64	0.49	0.25	0.14
6	2	3	0	1.27	35.1	4.92	3.77	6.50	5.74
6	3	3	0	1.49	35.0	6.23	4.38	4.38	5.80
"Dynatest FWD"									
1	2	0	0	407	364	250	147	86	51
1	4	0	0	880	787	551	338	204	128
2	2	0	0	417	373	229	131	73	45
2	4	0	0	889	774	501	293	171	105
3	2	0	0	411	360	243	135	77	48
3	4	0	0	883	759	529	308	178	112
4	2	0	0	410	326	218	123	67	43
4	4	0	0	903	704	481	285	167	108
5	2	0	0	409	398	237	124	72	42
5	4	0	0	905	780	492	284	166	106
6	1	0	0	198	164	100	55	33	23
6	2	0	0	408	381	246	135	81	52
6	3	0	0	635	567	373	219	128	84
6	4	0	0	885	771	522	306	184	118
"08-11-86" 1 1 1 1 1340 1510 100 103 98 72 71									
"Dynaflect"									
1	0	1.0	8	0.99	0.72	0.44	0.28	0.20	
2	0	1.0	8	0.82	0.60	0.37	0.25	0.17	
3	0	1.0	8	0.86	0.61	0.38	0.26	0.18	
4	0	1.0	8	0.75	0.56	0.37	0.26	0.19	
5	0	1.0	8	0.88	0.64	0.40	0.28	0.21	
6	0	1.0	8	0.96	0.70	0.44	0.31	0.23	
"Road Rater 400"									
1	1	2	0	0.60	25.0	0.68	0.81	0.29	0.21
1	2	2	0	1.26	25.0	1.71	2.09	0.74	0.55
1	3	2	0	1.86	25.1	2.90	3.50	1.33	0.87
2	1	2	0	0.60	25.0	0.54	0.69	0.33	0.17
2	2	2	0	1.20	25.0	1.48	1.80	0.63	0.46
2	3	2	0	1.81	25.1	2.49	3.02	1.17	0.75
3	1	2	0	0.58	25.0	0.51	0.63	0.31	0.17
3	2	2	0	1.22	25.0	1.38	1.77	0.82	0.47
3	3	2	0	1.86	25.1	2.46	3.20	1.42	0.79
4	1	2	0	0.59	25.0	0.49	0.54	0.26	0.14
4	2	2	0	1.23	25.1	1.30	1.49	0.72	0.42
4	3	2	0	1.87	25.1	2.06	2.65	1.26	0.73
5	1	2	0	0.59	25.0	0.55	0.68	0.32	0.19
5	2	2	0	1.20	25.0	1.43	1.91	0.89	0.55
5	3	2	0	1.84	25.1	4.16	3.80	1.66	0.99
6	1	1	0	0.61	15.2	0.75	0.82	0.41	0.26
6	2	1	0	1.29	15.3	1.87	2.19	1.07	0.63
6	1	2	0	0.60	24.9	0.75	0.80	0.34	0.22
6	2	2	0	1.21	24.9	1.77	2.22	0.94	0.61
6	3	2	0	1.80	24.9	3.32	4.45	1.83	1.10
6	1	3	0	0.59	34.8	0.47	0.78	0.18	0.21
6	2	3	0	1.07	34.8	3.44	4.91	1.68	1.32
"Road Rater 2000"									
1	1	2	0	0.59	25.0	0.87	0.47	0.30	0.18
1	2	2	0	1.20	25.0	1.93	1.06	0.66	0.39
1	3	2	0	1.80	25.0	3.12	1.72	1.09	0.62
1	4	2	0	2.39	25.0	4.44	2.46	1.53	0.85
1	5	2	0	3.60	25.0	7.47	4.21	2.52	1.39

1	1	2	0	0.59	25.0	0.81	0.57	0.57	0.20
1	2	2	0	1.19	25.0	1.81	1.33	0.69	0.48
1	3	2	0	1.81	25.1	3.35	2.71	1.72	1.01
2	1	2	0	0.61	25.0	0.82	0.50	0.44	0.13
2	2	2	0	1.21	25.0	1.84	1.27	0.81	0.38
2	3	2	0	1.84	25.1	3.91	2.56	1.69	0.81
3	1	2	0	0.60	25.0	0.77	0.52	0.31	0.17
3	2	2	0	1.23	25.0	1.83	1.32	0.74	0.44
3	3	2	0	1.83	25.0	3.82	3.32	1.44	0.85
4	1	2	0	0.60	25.0	0.71	0.46	0.64	0.14
4	2	2	0	1.23	25.0	1.62	1.17	1.53	0.26
4	3	2	0	1.85	25.1	3.68	2.46	1.37	0.97
5	1	2	0	0.60	25.0	0.84	0.56	0.31	0.19
5	2	2	0	1.21	25.0	2.01	1.41	0.77	0.56
5	3	2	0	1.82	25.0	4.74	3.14	1.64	1.06
6	1	1	0	0.60	14.9	0.70	0.54	0.43	0.28
6	2	1	0	1.23	15.0	1.58	1.17	0.83	0.63
6	1	2	0	0.60	25.0	0.65	0.45	0.44	0.19
6	2	2	0	1.22	25.0	1.52	1.24	0.60	0.41
6	3	2	0	1.82	25.0	3.22	2.53	1.39	0.97
6	1	3	0	0.60	35.1	0.55	0.37	0.20	0.08
6	2	3	0	1.18	35.1	1.32	0.91	0.53	0.17
6	3	3	0	1.82	35.1	3.95	3.09	2.56	2.71

"Dynatest FWD"

1	2	0	418	351	249	135	76	44	0	0
1	4	0	881	757	526	304	167	102	0	0
2	2	0	409	371	214	109	57	37	0	0
2	4	0	886	784	470	248	136	85	0	0
3	2	0	406	384	224	113	62	38	0	0
3	4	0	886	815	510	265	148	92	0	0
4	2	0	402	289	201	116	65	42	0	0
4	4	0	897	646	455	266	156	98	0	0
5	2	0	404	371	214	111	64	42	0	0
5	4	0	885	778	464	255	143	96	0	0
6	1	0	200	155	95	52	31	22	0	0
6	2	0	402	314	205	116	71	49	0	0
6	3	0	639	494	328	187	116	78	0	0
6	4	0	889	685	456	264	163	109	0	0

"V6" 19 "US" 231 5800 19.5 1131 "S"

"F. Spencer/Dubois CL northerly to s. Huntingburg C/L" 5.15

"F. 3.5m. n. of 164 northerly to CR900S (3.75m. s. of SR64) (SB)" 0.25

1 14628 85 1 1.2 0.00 4.7 0.0 13.1 "G"

"A-6" 6 "CL" 110.8 17.5 10 35.8 19.1 16.7 2.76

57 2.9 0

3

"03-19-86" 1 1 1 0 0945 1045 42 0 0 49 46

"Dynalect"

1	0	1.0	8	0.82	0.61	0.44	0.35	0.23
2	0	1.0	8	0.89	0.60	0.35	0.25	0.15
3	0	1.0	8	0.71	0.48	0.28	0.20	0.10
4	0	1.0	8	0.57	0.36	0.20	0.14	0.07
5	0	1.0	8	0.81	0.53	0.31	0.21	0.12
6	0	1.0	8	0.75	0.51	0.30	0.21	0.11

"Road Rater 400"

1	1	2	0	0.59	24.8	1.06	1.20	1.06	0.60
1	2	2	0	1.22	24.9	2.03	1.74	1.10	1.22
1	3	2	0	1.79	24.9	2.82	2.83	2.00	1.70
2	1	2	0	0.59	24.8	1.36	0.98	0.66	0.52
2	2	2	0	1.22	24.9	2.73	1.99	1.24	1.05
2	3	2	0	1.83	24.9	4.33	3.63	3.67	1.60
3	1	2	0	0.60	24.8	1.05	0.82	0.51	0.39
3	2	2	0	1.18	24.9	1.93	1.58	1.06	0.70
3	3	2	0	1.82	24.9	2.97	2.99	1.48	1.03
4	1	2	0	0.56	24.8	0.80	0.53	0.19	0.17
4	2	2	0	1.20	24.9	1.43	1.00	0.76	0.32
4	3	2	0	1.79	24.9	2.02	1.58	1.23	0.46

5	1	2	0	0.60	24.8	1.19	1.05	0.52	0.36
5	2	2	0	1.22	25.1	2.46	1.63	1.15	0.72
5	3	2	0	1.86	25.1	4.16	2.92	2.94	1.70
6	1	1	0	0.61	15.2	2.34	2.16	1.27	0.87
6	2	1	0	1.21	15.2	2.64	2.08	1.30	1.17
6	1	2	0	0.61	25.0	2.49	1.12	0.90	0.34
6	2	2	0	1.22	25.0	2.20	1.97	1.28	0.77
6	3	2	0	1.87	25.1	3.33	2.98	1.53	1.15
6	1	3	0	0.66	34.8	1.21	1.04	0.63	0.38
6	2	3	0	1.17	34.8	2.23	1.90	1.18	0.71
6	3	3	0	1.73	34.8	3.46	2.64	1.86	1.35
"Road Rater 2000"									
1	1	2	0	0.64	25.1	0.24	0.18	0.00	0.35
1	2	2	0	1.25	25.2	0.35	0.27	0.00	0.58
1	3	2	0	1.78	25.2	0.43	0.31	0.00	0.57
1	4	2	0	2.45	25.1	0.55	0.37	0.00	0.75
1	5	2	0	3.51	25.2	0.94	0.61	0.00	1.76
2	1	2	0	0.60	25.2	0.18	0.14	0.00	1.07
2	2	2	0	1.20	25.1	0.34	0.25	0.00	2.31
2	3	2	0	1.78	25.1	0.40	0.31	0.00	2.27
2	4	2	0	2.39	25.1	0.53	0.40	0.00	2.40
2	5	2	0	3.60	25.1	0.93	0.64	0.00	2.68
3	1	2	0	0.55	25.1	0.18	0.13	0.00	1.31
3	2	2	0	1.18	25.2	0.34	0.25	0.00	1.91
3	3	2	0	1.81	25.2	0.47	0.33	0.00	7.86
3	4	2	0	2.42	25.2	0.55	0.39	0.00	1.67
3	5	2	0	3.64	25.2	0.88	0.63	0.00	4.61
4	1	2	0	0.56	25.1	0.18	0.15	0.00	0.49
4	2	2	0	1.25	25.2	0.35	0.27	0.01	0.67
4	3	2	0	1.84	25.1	0.46	0.33	0.00	0.63
4	4	2	0	2.36	25.2	0.56	0.37	0.00	0.87
4	5	2	0	3.66	25.1	0.85	0.61	0.00	1.17
5	1	2	0	0.61	25.2	0.19	0.14	0.01	0.94
5	2	2	0	1.16	25.2	0.35	0.26	0.00	1.71
5	3	2	0	1.79	25.1	0.45	0.32	0.00	1.90
5	4	2	0	2.37	25.1	0.60	0.38	0.00	2.13
5	5	2	0	3.62	25.1	0.90	0.69	0.01	2.50
6	1	1	0	0.56	15.2	0.20	0.16	0.00	0.66
6	2	1	0	1.21	15.1	0.38	0.24	0.00	0.82
6	3	1	0	1.84	15.1	0.50	0.33	0.00	1.40
6	4	1	0	2.38	15.1	0.71	0.45	0.01	1.30
6	5	1	0	3.67	15.2	1.41	0.84	0.01	2.40
6	1	2	0	0.62	25.2	0.19	0.29	0.00	0.34
6	2	2	0	1.15	25.2	0.39	0.50	0.00	0.42
6	3	2	0	1.77	25.2	0.51	0.69	0.01	0.64
6	4	2	0	2.36	25.2	1.01	1.10	0.01	1.23
6	5	2	0	3.66	25.2	0.81	0.57	0.00	8.44
6	1	3	0	0.62	35.2	0.14	0.13	0.00	0.39
6	2	3	0	1.21	35.2	0.27	0.19	0.00	1.09
6	3	3	0	1.72	35.2	0.33	0.22	0.00	1.65
"04-22-86" 0 0 0 1 0845 0915 50 0 0 40 53									
"Dynaflect FWD"									
1	2	0	444	248	194	131	95	69	0 0
1	4	0	931	484	385	277	205	154	0 0
2	2	0	434	265	190	126	79	51	0 0
2	4	0	926	507	385	261	173	114	0 0
3	2	0	437	250	187	121	79	48	0 0
3	4	0	926	472	363	252	169	108	0 0
4	2	0	440	196	134	75	39	23	0 0
4	4	0	927	365	264	155	87	51	0 0
5	2	0	434	296	211	119	73	43	28 12
5	4	0	914	559	413	260	167	103	66 28
6	1	0	215	103	81	42	30	16	0 0
6	2	0	436	221	160	108	63	41	0 0
6	3	0	679	329	251	165	104	65	0 0
6	4	0	924	432	333	222	143	91	0 0
"08-06-86" 1 1 1 1 0745 0835 78 79 79 0 70									
"Dynaflect"									
1	0	1.0	8	0.58	0.47	0.36	0.27	0.20	
2	0	1.0	8	0.56	0.42	0.30	0.20	0.13	

"Dynatest FWD"

1	2	0	407	243	130	134	95	59	51	31
1	4	0	859	505	330	274	214	144	114	67
2	2	0	403	282	146	128	83	40	0	0
2	4	0	855	585	262	280	189	128	0	0
3	2	0	402	252	171	119	71	47	27	10
3	4	0	856	545	393	271	177	115	69	30
4	2	0	403	215	126	63	34	17	0	0
4	4	0	857	460	286	150	82	46	0	0
5	2	0	391	298	208	122	71	43	27	15
5	4	0	841	633	463	295	179	110	69	33
6	1	0	0	0	0	0	0	0	0	0
5	2	0	399	206	141	80	48	29	0	0
6	3	0	622	319	224	133	81	49	0	0
6	4	0	856	435	308	189	119	71	0	0

"V7" 19 "US" 231 10200 19.5 1989 "S"

"F. n. Huntingburg C/L northerly" 1.41

"F. s. of power lines (0.3m. n. of Huntingburg C/L) northerly (N8)" 0.25

1 9059 73 13 2.8 0.00 8.3 0.0 4.8 "6"

"A-4" 1 "SC" 113.1 10.6 16 23.8 15.6 8.2 2.71

52 2.7 0

3

"03-19-86" 1 1 0 0 1145 1300 42 0 0 44 46

"Dynalect"

1	0	1.0	8	0.81	0.67	0.51	0.40	0.26
2	0	1.0	8	0.60	0.48	0.38	0.30	0.18
3	0	1.0	8	0.66	0.54	0.42	0.33	0.21
4	0	1.0	8	0.65	0.53	0.43	0.36	0.23
5	0	1.0	8	0.72	0.60	0.50	0.40	0.29
6	0	1.0	8	0.61	0.48	0.39	0.30	0.20

"Road Rater 400"

1	1	2	0	0.62	25.1	1.10	0.75	0.68	0.51
1	3	2	0	1.84	25.2	1.71	1.44	0.86	0.89
2	1	2	0	0.62	25.2	0.69	0.52	0.64	0.34
2	2	2	0	1.21	25.2	1.06	0.85	0.65	0.51
2	3	2	0	1.85	25.2	1.36	0.96	1.67	0.63
3	1	2	0	0.61	25.2	0.75	0.59	0.42	0.37
3	2	2	0	1.22	25.2	1.12	0.86	0.57	0.49
3	3	2	0	1.86	25.2	1.52	1.22	0.88	1.03
4	1	2	0	0.63	25.2	0.73	0.57	0.40	0.35
4	2	2	0	1.22	25.2	1.08	1.20	0.97	0.54
4	3	2	0	1.83	25.2	1.33	1.35	0.85	0.76
5	1	2	0	0.62	25.2	0.66	0.46	0.35	0.33
5	2	2	0	1.22	25.2	1.04	0.90	0.65	0.54
5	3	2	0	1.84	25.2	1.43	1.34	1.07	0.74
6	1	1	0	0.62	15.4	1.01	0.99	0.36	0.44
6	2	1	0	1.29	15.5	1.35	1.26	0.56	0.59
6	1	2	0	0.62	25.0	0.54	0.46	0.45	0.20
6	2	2	0	1.20	25.0	0.92	0.82	0.40	0.40
6	3	2	0	1.87	25.1	1.30	1.08	0.81	1.04
6	1	3	0	0.66	35.3	0.71	0.48	0.41	0.20
6	2	3	0	1.13	35.3	0.85	0.65	0.50	0.33
6	3	3	0	1.72	35.3	1.17	1.09	0.85	1.37

"04-22-86" 0 0 0 1 1000 1030 50 0 0 40 53

"Dynatest FWD"

1	2	0	433	167	145	115	89	64	0	0
1	4	0	916	365	322	259	201	147	0	0
2	2	0	431	139	113	95	68	49	0	0
2	4	0	915	318	267	218	161	114	0	0
3	2	0	425	143	126	93	72	49	0	0
3	4	0	910	328	290	222	172	121	0	0
4	2	0	424	135	116	93	68	49	0	0
4	4	0	909	309	267	214	161	117	0	0
5	2	0	422	146	129	103	79	57	41	19
5	4	0	905	338	294	240	185	134	97	48
6	1	0	189	59	48	34	26	17	0	0
6	2	0	418	137	113	89	63	45	0	0

6	3	0	656	219	186	145	104	73	0	0	
6	4	0	898	299	259	201	147	103	0	0	
"08-06-86"	1	1	1	1	0925	0950	80	91	84	73	71

"Dynalect"

1	0	1.0	8	0.96	0.77	0.55	0.36	0.23
2	0	1.0	8	0.85	0.67	0.46	0.29	0.17
3	0	1.0	8	0.85	0.69	0.48	0.28	0.17
4	0	1.0	8	0.81	0.65	0.46	0.30	0.20
5	0	1.0	8	1.01	0.82	0.60	0.42	0.30
6	0	1.0	8	0.78	0.62	0.42	0.28	0.16

"Road Rater 400"

1	1	2	0	0.61	25.1	0.79	0.66	0.48	0.26
1	2	2	0	1.21	25.1	1.80	1.53	1.12	0.62
1	3	2	0	1.80	25.2	3.28	2.91	2.07	7.40
2	1	2	0	0.59	25.1	0.68	0.42	0.39	0.14
2	2	2	0	1.22	25.1	1.50	1.05	0.88	0.45
2	3	2	0	1.79	25.1	2.81	2.98	1.68	1.10
3	1	2	0	0.60	25.1	0.61	2.01	0.38	3.33
3	2	2	0	1.22	25.1	1.41	2.01	0.91	2.26
3	3	2	0	1.81	25.1	2.60	1.90	1.71	1.90
4	1	2	0	0.59	25.1	0.61	0.65	0.30	0.23
4	2	2	0	1.21	25.1	1.39	1.08	0.71	0.54
4	3	2	0	1.81	25.1	2.51	2.30	3.02	1.02
5	1	2	0	0.60	25.1	0.73	0.56	0.46	0.32
5	2	2	0	1.21	25.1	1.63	1.53	1.03	0.81
5	3	2	0	1.81	25.2	2.94	2.72	1.95	1.06
6	1	1	0	0.61	15.2	0.50	0.43	0.28	0.15
6	2	1	0	1.23	15.3	1.19	0.98	0.66	0.40
6	1	2	0	0.61	25.1	0.58	0.50	0.31	0.18
6	2	2	0	1.21	25.1	1.28	1.28	0.74	0.45
6	3	2	0	1.82	25.1	2.30	1.58	1.36	0.85
6	1	3	0	0.60	35.2	0.51	0.40	0.26	0.15
6	2	3	0	1.17	35.1	2.70	2.47	1.56	0.97
6	2	3	0	1.41	35.1	3.74	3.99	3.15	1.72

"Road Rater 2000"

1	1	2	0	0.60	25.1	1.16	0.91	0.69	0.52
1	2	2	0	1.21	25.1	2.55	2.04	1.53	1.15
1	3	2	0	1.80	25.1	3.96	3.22	2.38	1.82
1	4	2	0	2.42	25.1	5.67	4.57	3.39	2.64
1	5	2	0	3.63	25.1	9.26	7.51	5.57	4.32
2	1	2	0	0.59	25.1	0.75	0.58	0.40	0.30
2	2	2	0	1.20	25.1	1.56	1.24	0.86	0.64
2	3	2	0	1.80	25.1	2.46	1.91	1.36	1.01
2	4	2	0	2.44	25.1	3.45	2.72	1.91	1.42
2	5	2	0	3.58	25.1	5.69	4.44	3.31	2.35
3	1	2	0	0.64	25.1	0.71	0.51	0.38	0.25
3	2	2	0	1.21	25.1	1.51	1.07	0.78	0.52
3	3	2	0	1.82	25.0	2.42	1.76	1.29	0.84
3	4	2	0	2.44	25.1	3.42	2.49	1.80	1.16
3	5	2	0	3.63	25.1	5.80	4.18	3.01	1.97
4	1	2	0	0.58	25.1	0.60	0.42	0.27	0.18
4	2	2	0	1.23	25.1	1.33	0.99	0.64	0.40
4	3	2	0	1.84	25.1	2.10	1.57	1.01	0.63
4	4	2	0	2.44	25.1	3.03	2.21	1.45	0.89
4	5	2	0	3.60	25.1	5.00	3.71	2.45	1.51
5	1	2	0	0.64	25.1	0.69	0.45	0.37	0.22
5	2	2	0	1.21	25.1	1.33	0.89	0.62	0.41
5	3	2	0	1.81	25.1	2.07	1.42	0.89	0.64
5	4	2	0	2.43	25.1	2.87	2.00	1.25	0.92
5	5	2	0	3.61	25.1	4.73	3.27	2.14	1.49
6	1	2	0	0.62	25.1	0.81	0.56	0.43	0.30
6	2	2	0	1.19	25.1	1.63	1.17	0.85	0.60
6	3	2	0	1.75	25.1	2.51	1.86	1.35	0.92
6	4	2	0	2.41	25.1	3.58	2.66	1.95	1.37
6	5	2	0	3.57	25.1	5.91	4.38	3.25	2.24
7	1	1	0	0.59	15.2	0.55	0.40	0.29	0.19
7	2	1	0	1.21	15.2	1.17	0.87	0.62	0.38
7	3	1	0	1.78	15.1	1.93	1.39	1.01	0.61
7	4	1	0	2.35	15.1	2.76	2.02	1.46	0.86
7	5	1	0	3.64	15.2	4.49	3.48	2.49	1.47

7	1	2	0	0.62	25.1	0.53	0.41	0.24	0.18
7	2	2	0	1.22	25.1	1.16	0.85	0.52	0.37
7	3	2	0	1.77	25.1	1.79	1.33	0.85	0.59
7	4	2	0	2.45	25.0	2.60	1.97	1.28	0.85
7	5	2	0	3.60	25.0	4.29	3.19	2.14	1.37
7	1	3	0	0.59	35.2	0.57	0.40	0.28	0.19
7	2	3	0	1.23	35.1	1.23	0.88	0.54	0.37
7	3	3	0	1.79	35.2	1.95	1.38	0.86	0.59
7	4	3	0	2.42	35.2	2.80	2.00	1.24	0.86
7	5	3	0	3.62	35.1	4.86	3.31	2.15	1.45

"Dynatest FWD"

1	2	0	397	305	239	178	108	71	45	26
1	4	0	840	702	561	422	268	174	111	58
2	2	0	396	332	261	180	106	59	0	0
2	4	0	834	763	614	428	264	148	0	0
3	2	0	392	296	248	168	99	54	29	13
3	4	0	837	713	593	414	254	145	79	36
4	2	0	396	258	208	144	89	49	0	0
4	4	0	839	606	496	349	221	128	0	0
5	2	0	394	329	269	186	118	71	44	20
5	4	0	830	752	620	440	289	182	110	50
6	1	0	0	0	0	0	0	0	0	0
6	2	0	393	266	208	138	78	44	0	0
6	3	0	613	435	343	230	135	75	0	0
6	4	0	844	609	483	328	196	107	0	0

"WB" 77 "SR" 154 1850 11.5 213 "S"

"F. 2.2m. w. of SR63 to 3.0m. e. of SR63 (except Graysville)"

4.95

"F. 0.75m. e. of SR63 easterly (WB)"

0.25

1 9479 73 13 1.9 0.00 4.9 0.0 5.0 "B"

"A-7-6" 19 "CH" 96.1 27.0 5 54.5 24.1 30.4 2.72

77 3.2 0

3

"03-17-86" 1 0 0 0 1400 1430 102 0 0 60 45

"Dynalect"

1	0	1.0	8	1.65	1.23	0.84	0.61	0.40
2	0	1.0	8	1.23	0.95	0.65	0.48	0.31
3	0	1.0	8	1.12	0.90	0.68	0.53	0.36
4	0	1.0	8	1.01	0.74	0.54	0.43	0.30
5	0	1.0	8	1.09	0.88	0.66	0.51	0.34
6	0	1.0	8	0.73	0.56	0.39	0.31	0.19

"04-18-86" 0 1 1 1 0815 0845 54 0 0 57 49

"Road Rater 400"

1	1	2	0	0.56	24.6	1.13	1.26	0.59	1.01
1	2	2	0	1.23	25.0	2.37	2.86	1.27	1.71
1	3	2	0	1.83	25.2	4.68	4.22	2.58	3.22
2	1	2	0	0.57	24.5	0.72	0.55	0.26	0.25
2	2	2	0	1.26	25.5	1.81	1.82	1.12	0.70
2	3	2	0	1.86	25.0	3.38	2.82	2.04	2.37
3	1	2	0	0.57	24.5	0.61	1.63	0.40	0.57
3	2	2	0	1.25	25.4	1.54	1.17	1.00	0.70
3	3	2	0	1.87	25.3	3.25	2.91	2.15	3.20
4	1	2	0	0.59	24.7	0.56	0.54	0.36	0.15
4	2	2	0	1.22	25.0	1.35	1.71	0.62	0.48
4	3	2	0	1.87	24.8	2.50	3.03	1.41	2.22
5	1	2	0	0.58	24.6	0.56	1.16	0.34	0.23
5	2	2	0	1.19	24.7	1.28	1.75	0.87	0.62
5	3	2	0	1.75	24.7	2.45	2.65	1.63	1.16
6	1	1	0	0.63	15.4	0.56	0.49	0.37	0.49
6	2	1	0	1.24	15.3	1.27	1.10	0.79	1.16
6	1	2	0	0.60	24.9	0.53	0.92	0.32	0.69
6	2	2	0	1.23	25.0	1.23	1.22	0.84	0.69
6	3	2	0	1.79	24.9	2.33	2.62	1.64	2.23
6	1	3	0	0.58	35.2	0.36	0.39	0.19	0.10
6	2	3	0	1.18	35.1	0.84	2.05	0.54	1.36
6	3	3	0	1.79	35.2	1.79	1.86	5.10	0.84

"Road Rater 2000"

1	1	2	0	0.59	25.1	0.80	0.58	0.42	0.30		
1	2	2	0	1.20	25.1	1.94	1.37	0.97	0.71		
1	3	2	0	1.78	25.0	3.17	2.27	1.56	1.13		
1	4	2	0	2.42	25.1	4.56	3.23	2.21	1.56		
1	5	2	0	3.60	25.1	7.70	5.32	3.59	2.47		
2	1	2	0	0.65	25.1	0.78	0.58	0.42	0.30		
2	2	2	0	1.21	25.1	1.55	1.16	0.85	0.60		
2	3	2	0	1.83	25.0	2.48	1.78	1.30	0.91		
2	4	2	0	2.40	25.1	3.52	2.47	1.80	1.26		
2	5	2	0	3.57	25.1	5.67	3.81	2.84	1.95		
3	1	2	0	0.63	25.1	0.78	0.52	0.42	0.32		
3	2	2	0	1.20	25.0	1.51	1.04	0.84	0.62		
3	3	2	0	1.75	25.1	2.38	1.65	1.29	0.96		
3	4	2	0	2.40	25.1	3.30	2.27	1.78	1.31		
3	5	2	0	3.60	25.0	5.37	3.60	2.81	2.06		
4	1	2	0	0.63	25.0	0.56	0.38	0.32	0.24		
4	2	2	0	1.22	25.1	1.15	0.79	0.66	0.49		
4	3	2	0	1.76	25.1	1.74	1.21	0.98	0.75		
4	4	2	0	2.42	25.2	2.44	1.67	1.36	1.03		
4	5	2	0	3.60	25.1	3.81	2.68	2.13	1.62		
5	1	2	0	0.60	25.1	0.58	0.45	0.35	0.25		
5	2	2	0	1.22	25.2	1.38	0.94	0.75	0.54		
5	3	2	0	1.77	25.2	2.11	1.45	1.14	0.82		
5	4	2	0	2.41	25.2	2.99	2.05	1.59	1.14		
5	5	2	0	3.59	25.1	4.79	3.24	2.50	1.77		
6	1	1	0	0.58	15.0	0.44	0.32	0.27	0.20		
6	2	1	0	1.22	15.0	1.02	0.79	0.62	0.45		
6	3	1	0	1.86	15.1	1.69	1.32	0.99	0.74		
6	4	1	0	2.37	15.1	2.37	1.85	1.44	1.05		
6	5	1	0	3.56	15.0	3.71	2.87	2.28	1.54		
6	1	2	0	0.64	25.1	0.58	0.45	0.38	0.31		
6	2	2	0	1.24	25.1	1.21	0.95	0.81	0.64		
6	3	2	0	1.80	25.0	1.87	1.46	1.24	0.97		
6	4	2	0	2.39	25.1	2.55	1.99	1.66	1.32		
6	5	2	0	3.59	25.1	3.93	3.07	2.53	2.00		
6	1	3	0	0.62	35.1	0.31	0.22	0.18	0.14		
6	2	3	0	1.23	35.1	0.87	0.61	0.49	0.36		
6	3	3	0	1.78	35.1	1.35	0.93	0.74	0.54		
6	4	3	0	2.40	35.1	1.89	1.31	1.03	0.75		
6	5	3	0	3.61	35.1	2.93	2.08	1.61	1.18		
"Dynatest FWD"											
1	2	0	401	403	289	175	116	80	0	0	
1	4	0	871	821	594	371	243	166	0	0	
2	2	0	415	275	209	140	88	62	0	0	
2	4	0	881	571	437	294	194	133	0	0	
3	2	0	416	246	207	146	103	071	0	0	
3	4	0	891	546	429	312	219	151	0	0	
4	2	0	416	194	150	113	79	59	0	0	
4	4	0	947	405	318	237	171	125	0	0	
5	2	0	412	217	186	136	96	66	48	31	
5	4	0	867	485	393	289	203	140	102	32	
6	1	0	173	75	55	43	28	22	0	0	
6	2	0	411	180	141	101	71	51	0	0	
6	3	0	644	280	218	156	115	79	0	0	
6	4	0	872	373	298	211	152	106	0	0	
"08-05-86"											
1	1	1	1	1	0900	0940	79	88	94	75	68
"Dynaflect"											
1	0	1.0	8	1.27	0.97	0.69	0.48	0.34			
2	0	1.0	8	0.96	0.75	0.53	0.36	0.25			
3	0	1.0	8	1.02	0.82	0.60	0.43	0.30			
4	0	1.0	8	0.76	0.61	0.47	0.35	0.26			
5	0	1.0	8	0.98	0.79	0.59	0.42	0.29			
6	0	1.0	8	0.67	0.51	0.37	0.26	0.18			
"Road Rater 400"											
1	1	2	0	0.60	25.0	0.95	0.82	0.51	0.23		
1	2	2	0	1.21	25.0	2.34	1.83	1.24	0.67		
1	3	2	0	1.81	25.1	5.13	3.88	2.52	1.74		
2	1	2	0	0.59	25.0	0.80	0.58	0.41	0.29		
2	2	2	0	1.20	25.0	1.94	1.40	0.99	0.69		
2	3	2	0	1.79	25.0	4.17	2.82	2.40	1.93		

3	1	2	0	0.59	25.0	0.72	0.59	0.44	0.30
3	2	2	0	1.20	25.0	1.78	1.41	1.06	0.69
3	3	2	0	1.80	25.0	3.50	2.05	1.36	0.52
4	1	2	0	0.59	25.0	0.55	0.40	0.29	0.16
4	2	2	0	1.19	25.0	1.31	1.03	0.72	0.45
4	3	2	0	1.80	25.1	2.65	2.65	1.39	0.98
5	1	2	0	0.59	25.0	0.67	0.53	0.37	0.24
5	2	2	0	1.21	25.0	1.67	1.39	0.96	0.65
5	3	2	0	1.81	25.0	3.12	2.96	1.69	1.04
6	1	1	0	0.59	15.0	0.52	0.38	0.28	0.40
6	2	1	0	1.20	15.1	1.40	1.35	0.76	0.55
6	1	2	0	0.59	25.0	0.67	0.51	0.42	0.18
6	2	2	0	1.21	25.0	1.62	1.34	1.03	0.62
6	3	2	0	1.81	25.0	3.10	2.61	1.92	1.52
6	1	3	0	0.60	35.0	0.45	0.34	0.24	0.12
6	2	3	0	1.20	35.0	1.09	0.83	0.60	0.33
6	3	3	0	1.77	35.0	3.18	2.67	4.89	3.42
"Road Rater 2000"									
1	1	2	0	0.59	25.1	1.02	0.68	0.45	0.34
1	2	2	0	1.20	25.2	2.30	1.47	0.95	0.71
1	3	2	0	1.82	25.1	3.79	2.40	1.50	1.10
1	4	2	0	2.42	25.1	5.53	3.43	2.27	1.51
1	5	2	0	3.62	25.2	9.51	5.72	3.64	2.41
2	1	2	0	0.60	25.2	0.76	0.54	0.39	0.28
2	2	2	0	1.22	25.1	1.61	1.13	0.83	0.58
2	3	2	0	1.80	25.1	2.53	1.78	1.26	0.88
2	4	2	0	2.41	25.1	3.59	2.49	1.74	1.20
2	5	2	0	3.57	25.1	5.92	4.04	2.76	1.86
3	1	2	0	0.61	25.1	0.84	0.55	0.42	0.31
3	2	2	0	1.23	25.2	1.77	1.20	0.90	0.64
3	3	2	0	1.79	25.1	2.69	1.79	1.34	0.96
3	4	2	0	2.39	25.2	3.75	2.51	1.86	1.31
3	5	2	0	3.57	25.1	6.15	4.08	2.97	2.06
4	1	2	0	0.60	25.2	0.50	0.37	0.29	0.22
4	2	2	0	1.24	25.2	1.13	0.79	0.59	0.45
4	3	2	0	1.83	25.1	1.73	1.23	0.90	0.67
4	4	2	0	2.44	25.1	2.37	1.66	1.22	0.91
4	5	2	0	3.60	25.1	4.00	2.68	1.91	1.43
5	1	2	0	0.59	25.1	0.65	0.48	0.35	0.26
5	2	2	0	1.18	25.2	1.41	1.02	0.73	0.53
5	3	2	0	1.83	25.1	2.32	1.70	1.17	0.85
5	4	2	0	2.41	25.1	3.20	2.32	1.60	1.15
5	5	2	0	3.62	25.2	5.18	3.72	2.54	1.79
6	1	1	0	0.63	15.1	0.59	0.39	0.30	0.22
6	2	1	0	1.22	15.1	1.27	0.83	0.57	0.45
6	3	1	0	1.81	15.0	1.97	1.30	0.92	0.67
6	4	1	0	2.41	15.0	2.79	1.87	1.28	0.96
6	5	1	0	3.59	15.1	4.53	2.95	2.22	1.54
6	1	2	0	0.57	25.1	0.69	0.47	0.38	0.31
6	2	2	0	1.21	25.1	1.51	1.01	0.80	0.66
6	3	2	0	1.80	25.1	2.24	1.53	1.18	0.97
6	4	2	0	2.41	25.1	3.09	2.14	1.63	1.33
6	5	2	0	3.63	25.1	4.97	3.42	2.61	2.07
6	1	3	0	0.63	35.1	0.57	0.33	0.24	0.20
6	2	3	0	1.24	35.1	1.12	0.68	0.45	0.38
6	3	3	0	1.82	35.1	1.71	1.06	0.64	0.58
6	4	3	0	2.42	35.1	2.34	1.46	0.84	0.79
6	5	3	0	3.64	35.1	3.87	2.34	1.45	1.21
"Dynatest FWD"									
1	2	0	386	437	176	167	107	73	0
1	4	0	832	929	368	373	234	161	0
2	2	0	385	324	200	137	86	58	0
2	4	0	835	675	340	296	186	126	0
3	2	0	386	311	155	153	102	70	0
3	4	0	834	656	382	332	222	150	0
4	2	0	884	227	126	114	77	56	0
4	4	0	835	489	318	246	168	119	0
5	2	0	379	264	186	140	93	63	48
5	4	0	830	581	335	319	206	138	101
6	1	0	151	73	85	30	25	12	0

6	2	0	379	220	111	101	67	46	0	0
6	3	0	598	337	170	159	110	73	0	0
6	4	0	837	456	218	220	151	103	0	0

"V9" 87 "I" 64 7910 37.0 2927 "S"
 "F. SR61 to Warrick/Spencer CL" 14.58
 "Betw. MP 47&48, about 8.0m. e. of SR61 (EB)" 0.25
 1 9581 75 11 3.0 0.00 13.0 0.0 0.0 "N"
 "A-7-6" 13 "CL" 115.2 16.8 9 41.5 19.9 21.6 2.75
 58 3.2 0

"03-18-86" 1 0 0 0 1115 1145 75 0 0 62 52
 "Dynaflect"

1	0	1.0	8	0.39	0.30	0.23	0.21	0.14
2	0	1.0	8	0.35	0.27	0.23	0.21	0.14
3	0	1.0	8	0.37	0.29	0.25	0.23	0.16
4	0	1.0	8	0.39	0.31	0.26	0.24	0.17
5	0	1.0	8	0.38	0.30	0.25	0.24	0.18
6	0	1.0	8	0.36	0.29	0.25	0.24	0.18

"04-18-86" 0 1 0 1 1300 1330 87 0 0 70 47

"Road Rater 400"

1	1	2	0	0.61	25.1	0.22	0.95	0.13	0.63
1	2	2	0	1.24	25.1	0.47	1.63	0.34	0.84
1	3	2	0	1.83	25.2	0.71	2.34	0.56	2.24
2	1	2	0	0.62	25.4	0.22	0.11	0.12	0.10
2	2	2	0	1.21	24.9	0.46	0.26	0.30	0.24
2	3	2	0	1.77	25.0	0.75	0.40	0.47	0.46
3	1	2	0	0.60	25.3	0.22	0.18	0.16	0.11
3	2	2	0	1.25	25.4	0.48	0.43	0.37	0.28
3	3	2	0	1.87	25.4	0.78	0.72	0.62	0.50
4	1	2	0	0.61	25.2	0.19	0.20	0.11	0.05
4	2	2	0	1.24	25.2	0.43	1.77	0.30	0.21
4	3	2	0	1.85	25.2	0.68	2.45	0.50	0.37
5	1	2	0	0.60	25.1	0.18	0.13	0.09	0.50
5	2	2	0	1.24	25.2	0.35	0.29	0.23	1.38
5	3	2	0	1.83	25.2	0.56	0.39	0.41	1.15
6	1	1	0	0.63	15.2	0.22	0.17	0.15	0.09
6	2	1	0	1.25	15.3	0.44	0.34	0.20	0.23
6	1	2	0	0.62	25.3	0.17	0.09	0.10	0.06
6	2	2	0	1.25	25.3	0.36	1.66	0.24	0.18
6	3	2	0	1.85	25.3	0.57	1.39	1.08	0.34
6	1	3	0	0.58	35.4	0.13	0.09	0.05	0.06
6	2	3	0	1.20	35.4	0.34	0.29	0.13	0.16
6	3	3	0	1.84	35.4	0.65	0.56	0.39	0.37

"Dynatest FWD"

1	2	0	390	74	60	47	36	28	0	0
1	4	0	851	161	129	102	80	62	0	0
2	2	0	386	89	70	54	38	31	0	0
2	4	0	825	190	151	116	87	68	0	0
3	2	0	385	77	63	52	43	32	0	0
3	4	0	827	167	136	113	92	71	0	0
4	2	0	385	76	59	49	39	29	0	0
4	4	0	825	161	130	109	87	66	0	0
5	2	0	382	63	51	45	37	30	25	17
5	4	0	821	134	112	98	81	65	53	33
6	1	0	176	34	22	21	14	13	0	0
6	2	0	379	65	50	44	34	28	0	0
6	3	0	602	102	83	69	57	45	0	0
6	4	0	835	136	112	95	78	62	0	0

"08-15-86" 1 1 1 0 0855 0918 88 90 0 76 70

"Dynaflect"

1	0	1.0	8	0.41	0.32	0.25	0.17	0.13
2	0	1.0	8	0.50	0.50	0.28	0.19	0.13
3	0	1.0	8	0.44	0.36	0.29	0.21	0.15
4	0	1.0	8	0.45	0.38	0.29	0.21	0.15
5	0	1.0	8	0.39	0.34	0.29	0.22	0.17
6	0	1.0	8	0.39	0.34	0.28	0.22	0.17

"Road Rater 400"

1	1	2	0	0.60	25.0	0.30	0.27	0.21	0.15
1	2	2	0	1.25	25.1	0.72	0.65	0.52	0.39
1	3	2	0	1.81	25.1	1.03	1.27	0.80	0.61
2	1	2	0	0.60	25.0	0.40	0.33	0.23	0.17
2	2	2	0	1.23	25.1	0.76	0.82	0.41	0.39
2	3	2	0	1.83	25.1	1.50	1.30	1.22	0.62
3	1	2	0	0.60	25.0	0.30	0.27	0.14	0.15
3	1	2	0	0.60	25.1	0.31	0.27	0.16	0.16
3	2	2	0	1.24	25.1	0.74	0.66	0.43	0.39
3	3	2	0	1.85	25.1	1.12	1.03	0.81	0.50
4	1	2	0	0.59	25.0	0.29	0.25	0.18	0.12
4	2	2	0	1.22	25.1	0.81	0.72	0.54	0.37
4	3	2	0	1.85	25.1	1.23	1.11	0.84	0.58
5	1	2	0	0.59	25.0	0.23	0.15	0.17	0.12
5	2	2	0	1.24	25.1	0.55	0.50	0.41	0.31
5	3	2	0	1.83	25.1	0.78	0.71	0.59	0.46
6	1	1	0	0.60	15.0	0.22	0.20	0.17	0.13
6	2	1	0	1.21	15.0	0.52	0.47	0.40	0.31
6	1	2	0	0.60	24.9	0.21	0.18	0.15	0.10
6	2	2	0	1.22	24.9	0.52	0.47	0.39	0.29
6	3	2	0	1.82	25.0	0.78	0.73	0.60	0.46
6	1	3	0	0.59	35.1	0.22	0.19	0.14	0.10
6	2	3	0	1.20	35.1	0.56	0.52	0.41	0.30
6	3	3	0	1.80	35.1	0.94	0.86	0.70	0.52

"Road Rater 2000"

1	1	2	0	0.62	24.8	0.42	0.22	0.22	0.14
1	2	2	0	1.21	24.9	0.86	0.46	0.36	0.29
1	3	2	0	1.84	24.9	1.39	0.72	0.52	0.45
1	4	2	0	2.38	24.9	1.83	0.94	0.67	0.61
1	5	2	0	3.59	24.9	2.82	1.46	1.09	0.94
2	1	2	0	0.64	24.9	0.53	0.25	0.18	0.14
2	2	2	0	1.23	24.9	1.09	0.55	0.37	0.28
2	3	2	0	1.82	24.9	1.65	0.84	0.58	0.43
2	4	2	0	2.39	24.9	2.30	1.16	0.78	0.59
2	5	2	0	3.57	24.8	3.68	1.84	1.25	0.91
3	1	2	0	0.58	25.2	0.35	0.20	0.16	0.12
3	2	2	0	1.19	25.2	0.79	0.48	0.37	0.31
3	3	2	0	1.84	25.2	1.25	0.75	0.59	0.46
3	4	2	0	2.42	25.2	1.69	1.03	0.80	0.62
3	5	2	0	3.61	25.2	2.71	1.58	1.27	0.97
4	1	2	0	0.62	25.0	0.29	0.20	0.16	0.12
4	2	2	0	1.21	25.0	0.63	0.45	0.35	0.26
4	3	2	0	1.84	25.0	0.99	0.68	0.53	0.39
4	4	2	0	2.43	25.1	1.34	0.94	0.73	0.54
4	5	2	0	3.57	25.1	2.04	1.42	1.11	0.82
5	1	2	0	0.60	25.0	0.23	0.15	0.14	0.11
5	2	2	0	1.16	25.0	0.50	0.35	0.28	0.21
5	3	2	0	1.83	25.0	0.82	0.55	0.46	0.35
5	4	2	0	2.42	25.0	1.10	0.75	0.62	0.48
5	5	2	0	3.62	25.0	1.69	1.15	0.96	0.73
6	1	1	0	0.57	14.9	0.38	0.25	0.23	0.16
6	2	1	0	1.20	15.0	0.76	0.57	0.51	0.33
6	3	1	0	1.76	14.9	1.11	0.81	0.72	0.49
6	4	1	0	2.44	15.0	1.54	1.13	0.95	0.65
6	5	1	0	3.60	14.9	2.59	1.62	1.38	1.01
6	1	2	0	0.60	25.1	0.33	0.22	0.16	0.14
6	2	2	0	1.22	25.0	0.69	0.42	0.30	0.22
6	3	2	0	1.77	25.0	0.99	0.62	0.45	0.33
6	4	2	0	2.40	25.0	1.37	0.85	0.62	0.46
6	5	2	0	3.59	25.1	2.18	1.34	0.94	0.69
6	1	3	0	0.63	35.1	0.33	0.20	0.14	0.11
6	2	3	0	1.20	34.8	0.66	0.41	0.27	0.19
6	3	3	0	1.83	34.8	1.02	0.63	0.42	0.30
6	4	3	0	2.44	35.1	1.45	0.90	0.58	0.41
6	5	3	0	3.61	35.1	2.35	1.45	0.87	0.62

"11-18-86" 0 0 0 1 1350 1413 45 47 47 53 32

"Dynatest FWD"

1	2	0	406	56	47	39	30	23	19	13
1	4	0	897	125	105	85	69	54	44	28

2	2	0	418	67	52	42	32	26	0	0
2	4	0	894	149	119	96	75	59	0	0
3	2	0	417	55	49	41	34	28	23	13
3	4	0	893	126	110	94	77	64	51	33
4	2	0	419	53	45	39	31	26	0	0
4	4	0	891	120	102	87	72	59	0	0
5	2	0	417	47	41	34	29	25	21	13
5	4	0	887	107	93	80	68	56	47	31
6	1	0	0	0	0	0	0	0	0	0
6	2	0	416	48	40	37	30	25	0	0
6	3	0	628	79	66	61	49	43	0	0
6	4	0	887	107	92	80	69	57	0	0

"V10" 62 "1" 64 7870 32.0 2518 "S"
 "F. Perry/Dubois CL to 0.4m. e. of SR145" 5.64
 "F. 0.5m. e. of Perry/Dubois CL (betw. MP 67&68) (EB)" 0.25
 1 9512 76 10 2.9 0.00 13.4 0.0 0.0 "N"
 "A-4" 7 "CL" 110.3 14.4 12 23.6 15.0 8.6 2.68
 59 3.2 0

4
 "03-18-86" 1 0 0 0 1245 1315 70 0 0 60 47
 "Dynalect"

1	0	1.0	8	0.42	0.34	0.36	0.29	0.23
2	0	1.0	8	0.47	0.38	0.43	0.33	0.27
3	0	1.0	8	0.44	0.37	0.33	0.33	0.27
4	0	1.0	8	0.44	0.37	0.33	0.34	0.27
5	0	1.0	8	0.44	0.36	0.32	0.33	0.27
6	0	1.0	8	0.50	0.42	0.37	0.38	0.31

"04-18-86" 0 1 0 1 1445 1515 94 0 0 73 56

"Road Rater 400"

1	1	2	0	0.65	25.7	0.20	0.22	1.31	0.07
1	2	2	0	1.25	25.4	0.40	1.17	0.27	1.28
1	3	2	0	1.89	25.5	0.63	0.80	0.67	1.55
2	1	2	0	0.60	25.2	0.19	0.16	0.13	0.03
2	2	2	0	1.23	25.2	0.43	0.37	0.31	0.07
2	3	2	0	1.85	25.3	0.70	0.58	0.51	0.31
3	1	2	0	0.60	25.2	0.16	0.08	0.71	0.12
3	2	2	0	1.24	25.3	0.36	0.24	1.33	0.47
3	3	2	0	1.86	25.3	0.57	0.52	0.41	1.71
4	2	2	0	1.24	25.3	0.36	0.31	0.35	0.08
4	3	2	0	1.87	25.3	0.57	0.50	0.41	0.80
4	3	2	0	1.83	25.2	0.57	0.49	0.42	0.76
5	1	2	0	0.61	25.2	0.24	0.20	0.36	0.27
5	2	2	0	1.24	25.2	0.36	0.25	1.04	0.39
5	3	2	0	1.86	25.3	0.57	0.30	2.29	0.71
6	1	1	0	0.61	15.2	0.21	0.15	0.14	0.11
6	2	1	0	1.22	15.2	0.39	0.34	0.22	0.21
6	1	2	0	0.60	25.1	0.18	0.14	0.14	0.20
6	2	2	0	1.23	25.1	0.38	0.32	0.20	0.11
6	3	2	0	1.84	25.2	0.60	0.51	1.50	1.47
6	1	3	0	0.58	35.1	0.13	0.09	0.11	0.09
6	2	3	0	1.17	35.1	0.29	0.23	0.31	0.26
6	3	3	0	1.79	35.2	0.54	0.46	0.23	0.44

"Dynalect FWD"

1	2	0	400	67	53	49	41	33	0	0
1	4	0	853	156	127	111	92	74	0	0
2	2	0	397	84	70	59	50	41	0	0
2	4	0	850	184	157	135	111	91	0	0
3	2	0	394	67	56	47	41	33	0	0
3	4	0	845	143	119	101	86	69	0	0
4	2	0	396	67	57	49	41	35	0	0
4	4	0	842	140	118	101	87	72	0	0
5	2	0	392	65	50	46	38	31	28	20
5	4	0	846	138	109	96	79	65	56	37
6	1	0	194	29	29	24	19	15	0	0
6	2	0	399	66	57	47	39	32	0	0
6	3	0	614	105	90	75	62	51	0	0

6 4 0 848 150 123 101 84 69 0 0
 "08-15-86" 1 1 1 0 1047 1100 100 102 0 82 72

"Dynafllect"

1	0	1.0	8	0.43	0.37	0.32	0.26	0.22
2	0	1.0	8	0.48	0.41	0.35	0.28	0.23
3	0	1.0	8	0.48	0.42	0.37	0.31	0.26
4	0	1.0	8	0.49	0.44	0.39	0.34	0.29
5	0	1.0	8	0.48	0.43	0.38	0.33	0.29
6	0	1.0	8	0.51	0.45	0.40	0.35	0.30

"Road Rater 400"

1	1	2	0	0.57	25.1	0.21	0.16	0.12	0.11
1	2	2	0	1.24	25.1	0.51	0.45	0.35	0.26
1	3	2	0	1.82	25.1	0.78	0.69	0.55	0.42
2	1	2	0	0.60	25.0	0.23	0.19	0.14	0.10
2	2	2	0	1.23	25.1	0.57	0.50	0.39	0.29
2	3	2	0	1.83	25.1	0.89	0.78	0.61	0.46
3	1	2	0	0.60	25.1	0.23	0.18	0.15	0.12
3	2	2	0	1.23	25.1	0.51	0.44	0.36	0.27
3	3	2	0	1.83	25.1	0.75	0.67	0.54	0.41
4	1	2	0	0.59	25.1	0.21	0.18	0.16	0.11
4	2	2	0	1.23	25.1	0.48	0.42	0.16	0.26
4	3	2	0	1.84	25.1	0.75	0.67	0.46	0.45
5	1	2	0	0.59	25.1	0.21	0.18	0.15	0.11
5	2	2	0	1.24	25.1	0.49	0.44	0.36	0.28
5	3	2	0	1.84	25.1	0.73	0.66	0.54	0.42
6	1	1	0	0.63	15.1	0.25	0.26	0.25	0.12
6	2	1	0	1.16	14.9	0.48	0.56	0.63	0.25
6	1	2	0	0.60	24.9	0.23	0.14	0.08	0.10
6	2	2	0	1.23	25.0	0.52	0.39	0.24	0.26
6	3	2	0	1.83	25.0	0.77	0.61	0.36	0.41
6	1	3	0	0.58	35.0	0.19	0.13	0.10	0.09
6	2	3	0	1.15	35.0	0.50	0.20	0.30	0.23
6	3	3	0	1.78	35.0	0.80	0.68	0.50	0.40

"Road Rater 2000"

1	1	2	0	0.59	24.9	0.35	0.17	0.15	0.15
1	2	2	0	1.18	24.9	0.72	0.35	0.28	0.22
1	3	2	0	1.82	24.9	1.13	0.54	0.44	0.34
1	4	2	0	2.37	24.9	1.50	0.72	0.59	0.45
1	5	2	0	3.59	24.9	2.48	1.13	0.92	0.70
2	1	2	0	0.62	25.0	0.30	0.19	0.15	0.13
2	2	2	0	1.18	25.0	0.59	0.39	0.30	0.22
2	3	2	0	1.80	25.0	0.93	0.62	0.48	0.36
2	4	2	0	2.40	25.0	1.30	0.85	0.67	0.50
2	5	2	0	3.63	25.0	2.08	1.39	1.09	0.83
3	1	2	0	0.63	25.0	0.28	0.19	0.15	0.14
3	2	2	0	1.20	25.0	0.51	0.39	0.31	0.24
3	3	2	0	1.82	25.0	0.78	0.55	0.44	0.34
3	4	2	0	2.38	25.1	1.05	0.72	0.59	0.45
3	5	2	0	3.63	25.0	1.62	1.15	0.89	0.70
4	1	2	0	0.59	25.0	0.32	0.19	0.16	0.16
4	2	2	0	1.16	25.0	0.63	0.37	0.31	0.24
4	3	2	0	1.81	25.0	0.99	0.55	0.46	0.36
4	4	2	0	2.44	25.0	1.33	0.78	0.62	0.50
4	5	2	0	3.59	25.0	2.09	1.23	0.95	0.78
5	1	2	0	0.58	25.0	0.30	0.16	0.16	0.15
5	2	2	0	1.22	25.0	0.64	0.35	0.29	0.23
5	3	2	0	1.82	25.0	0.99	0.55	0.55	0.53
5	4	2	0	2.41	25.0	1.31	0.71	0.60	0.48
5	5	2	0	3.58	25.0	2.09	1.08	0.90	0.70
6	1	1	0	0.60	15.0	0.34	0.21	0.17	0.14
6	2	1	0	1.21	15.1	0.65	0.40	0.34	0.27
6	3	1	0	1.77	15.0	1.03	0.61	0.51	0.40
6	4	1	0	2.38	15.0	1.37	0.87	0.68	0.54
6	5	1	0	3.58	15.0	2.67	1.28	1.05	0.84
6	1	2	0	0.61	25.1	0.32	0.18	0.16	0.13
6	2	2	0	1.18	25.1	0.58	0.36	0.29	0.23
6	3	2	0	1.78	25.1	0.90	0.56	0.46	0.35
6	4	2	0	2.43	25.1	1.26	0.75	0.61	0.47
6	5	2	0	3.62	25.1	2.05	1.14	0.93	0.72
6	1	3	0	0.62	34.9	0.27	0.16	0.14	0.14

6	2	3	0	1.22	34.9	0.55	0.30	0.24	0.18
6	3	3	0	1.79	35.0	0.83	0.44	0.35	0.26
6	4	3	0	2.40	35.0	1.16	0.60	0.48	0.35
6	5	3	0	3.62	35.0	1.88	0.92	0.72	0.53
"11-18-86"	0	0	0	1	1503	1526	39	43	45 53 29
"Dynatest FWD"									
1	2	0	415	47	42	37	31	25	25 15
1	4	0	899	113	100	86	74	61	55 34
2	2	0	417	55	51	46	37	31	0 0
2	4	0	885	130	118	109	88	74	0 0
3	2	0	419	44	40	37	32	25	25 13
3	4	0	877	103	91	80	68	59	51 34
4	2	0	417	46	42	42	31	28	0 0
4	4	0	870	98	92	92	68	61	0 0
5	2	0	416	43	41	35	30	24	23 13
5	4	0	858	96	86	78	65	57	48 35
6	1	0	0	0	0	0	0	0	0 0
6	2	0	416	46	49	43	29	26	0 0
6	3	0	634	77	73	64	51	44	0 0
6	4	0	865	105	94	84	69	61	0 0

APPENDIX D - CONDITION SURVEY FORMS

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH _____ SECTION C-8
 DATE Aug 12, 1986 SAMPLE UNIT _____
 SURVEYED BY _____ AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shoulder Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
<div center;"="" style="border: 1px solid black; width: 20px; height: 40px; margin: 0 auto; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);</div> </td> <td style=" text-align:="">10</div>						
	6 = L					
	15 = L					
	20 = L					
TOTAL SEVERITY	L	41				
	M					
	H					
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	$PCI = 100 - CDV =$ <div style="text-align: right; font-size: 1.5em;">94</div> <hr style="border: 1px solid black; width: 100px; margin: 5px auto;"/> RATING = <div style="text-align: right;"> <hr style="border: 1px solid black; width: 100px; margin: 5px auto;"/> <hr style="border: 1px solid black; width: 100px; margin: 5px auto;"/> </div>		
10	2.4	L	6			
DEDUCT TOTAL			6			
CORRECTED DEDUCT VALUE (CDV)			6			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH 114 SECTION F-13
 DATE Aug 26 '86 SAMPLE UNIT _____
 SURVEYED BY LINDY AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shoulder Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
7	10	15	12			
9' = L	9' = L	1' x 100' = L				
	16' = M					
	72' = L					
	15' = M					
	11' = L					
	73' = L					
	27' = L					
TOTAL SEVERITY	L	9	273	100		
M			21			
H						
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = <u>64</u>		
7	0.6	L	3			
10	17.5	L	22			
12	1.3	M	10			
15	6.4	L	23			
DEDUCT TOTAL			58	RATING = _____		
CORRECTED DEDUCT VALUE (CDV)			36			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 27 SECTION F-14
 DATE 8/24/86 SAMPLE UNIT _____
 SURVEYED BY LINDY AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Slidr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
<div center;"="" style="border: 1px solid black; width: 20px; height: 40px; margin: 0 auto; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);</div> </td> <td style=" text-align:="">7</div>	10					
	36=L	79=L				
	12=M	32=L				
	15=L	44=L				
	59=M	20=L				
	21=M					
TOTAL SEVERITY	L	51	235			
	M	92				
	H					
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = <div style="text-align: right; margin-top: 10px;"> <u><u>68</u></u> </div> RATING = <div style="text-align: right; margin-top: 10px;"> <u><u><u> </u></u></u> </div>		
7	2.9	L	5			
7	5.3	M	19			
10	13.6	L	19			
DEDUCT TOTAL			43			
CORRECTED DEDUCT VALUE (CDV)			32			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH 114 SECTION F-16
 DATE 8/26/86 SAMPLE UNIT _____
 SURVEYED BY LINDLY AREA OF SAMPLE _____

Distress Types				SKETCH:																																																																													
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shoulder Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling																																																																																
EXISTING DISTRESS TYPES																																																																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%;">10</td> <td style="width: 15%;">15</td> <td style="width: 15%;">9</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td></td> <td>121' = L</td> <td>117 x 1.5' = L</td> <td>100' = L</td> <td></td> <td></td> </tr> <tr> <td></td> <td>45' = L</td> <td>117 x 1.5' = M</td> <td></td> <td></td> <td></td> </tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg);">TOTAL SEVERITY</td> <td>L</td> <td>121</td> <td>175.5</td> <td>100</td> <td></td> </tr> <tr> <td>M</td> <td>43</td> <td>175.5</td> <td></td> <td></td> </tr> <tr> <td>H</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>							10	15	9				121' = L	117 x 1.5' = L	100' = L				45' = L	117 x 1.5' = M																																														TOTAL SEVERITY	L	121	175.5	100		M	43	175.5			H				
	10	15	9																																																																														
	121' = L	117 x 1.5' = L	100' = L																																																																														
	45' = L	117 x 1.5' = M																																																																															
TOTAL SEVERITY	L	121	175.5	100																																																																													
	M	43	175.5																																																																														
	H																																																																																
PCI CALCULATION																																																																																	
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = <div style="text-align: center; border-bottom: 3px double black;">39</div> RATING = <div style="text-align: center; border-bottom: 3px double black;"></div>																																																																													
9	7.1	L	9																																																																														
10	8.6	L	15																																																																														
10	3.1	M	17																																																																														
15	12.5	L	29																																																																														
15	12.5	M	47																																																																														
DEDUCT TOTAL			117																																																																														
CORRECTED DEDUCT VALUE (CDV)			61																																																																														

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 27 SECTION F-17
 DATE Aug 28, 1988 SAMPLE UNIT _____
 SURVEYED BY LINDLEY AREA OF SAMPLE _____

Distress Types					SKETCH:
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Carrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Slidr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling	<div style="text-align: center;">#5</div> <div style="text-align: center;">#4</div>			
EXISTING DISTRESS TYPES					
10					
104 = L					
13 = M					
2 = M					
48 = L					
L 152					
M 15					
H					
PCI CALCULATION					
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	$PCI = 100 - CDV =$ <div style="text-align: right; font-size: 1.5em;">80</div> RATING = <div style="text-align: right; font-size: 1.5em;">80</div>	
10	10.8	L	18		
10	1.0	M	9		
DEDUCT TOTAL			27		
CORRECTED DEDUCT VALUE (CDV)			20		

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 31 SECTION F-18
 DATE Aug 25, 1986 SAMPLE UNIT _____
 SURVEYED BY LINDLY AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Slidr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
	7	12	10	15		
	141 = L	141 x 8 = L	282 = M	2 x 1 x 141 = L		
			76 = L			
			33 = L			
TOTAL SEVERITY	L	141	1128	109	282	
	M			282		
	H					
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	$PCI = 100 - CDV =$ <div style="font-size: 2em; text-align: right;">44</div>		
7	8.3	L	10			
12	66.6	L	14			
10	6.4	L	13			
10	16.7	M	37			
15	16.7	L	33			
DEDUCT TOTAL				107		
CORRECTED DEDUCT VALUE (CDV)				56		
				RATING =		

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 1 SECTION F-19
 DATE 8/28/86 SAMPLE UNIT _____
 SURVEYED BY LINDLY AREA OF SAMPLE _____

Distress Types					SKETCH:
1. Alligator Cracking	*10. Long & Trans Cracking				
2. Bleeding	11. Patching & Util Cut Patching				
3. Block Cracking	12. Polished Aggregate				
*4. Bumps and Sags	*13. Potholes				
5. Corrugation	14. Railroad Crossing				
6. Depression	15. Rutting				
*7. Edge Cracking	16. Shoving				
*8. Jt Reflection Cracking	17. Slippage Cracking				
*9. Lane/Shoulder Drop Off	18. Swell				
	19. Weathering and Raveling				

EXISTING DISTRESS TYPES						
TOTAL SEVERITY	L					
	M					
	H					

PCI CALCULATION				
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	<div>PCI = 100 - CDV =</div> <div style="text-align: right;">=====</div> <div>RATING =</div> <div style="text-align: right;">=====</div>
DEDUCT TOTAL				
CORRECTED DEDUCT VALUE (CDV)				

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

RECENTLY AGGREGATE SEALED.
 DO NOT USE THIS FORM.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 8 SECTION L-10
 DATE SEP 4, '86 SAMPLE UNIT _____
 SURVEYED BY LINDLY AREA OF SAMPLE _____

Distress Types						SKETCH:
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shoulder Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
	10	2	11	15		
	9 = L	7 x 120 = M	1.5 x 120 = L	2 x 30 = L		
	4 = M			1/2 x 120 = M		
	77 = L			1.33 x 120 = M		
TOTAL SEVERITY	L	86		180	60	
	M	4	840		220	
	H					
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = <u>34</u> RATING = _____		
10	5.5	L	12			
10	0.26	M	2			
2	53.3	M	29			
11	11.5	L	17			
15	3.8	L	13			
15	14.1	M	49			
DEDUCT TOTAL				127		
CORRECTED DEDUCT VALUE (CDV)				66		

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 8 SECTION L-11
 DATE SEPT. 4, '86 SAMPLE UNIT _____
 SURVEYED BY LINDY AREA OF SAMPLE _____

Distress Types					SKETCH:			
1. Alligator Cracking	*10. Long & Trans Cracking							
2. Bleeding	11. Patching & Util Cut Patching							
3. Black Cracking	12. Polished Aggregate							
*4. Bumps and Sags	*13. Potholes							
5. Corrugation	14. Railroad Crossing							
6. Depression	15. Rutting							
*7. Edge Cracking	16. Shoving							
*8. Jt Reflection Cracking	17. Slippage Cracking							
*9. Lane/Shldr Drop Off	18. Swell							
	19. Weathering and Raveling							
EXISTING DISTRESS TYPES								
TOTAL SEVERITY	L							
	M							
	H							
PCI CALCULATION								
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = ===== RATING = =====				
DEDUCT TOTAL								
CORRECTED DEDUCT VALUE (CDV)								

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

AGGREGATE SEAL 1 YEAR AGO,
 DO NOT USE THIS FORM.

BRANCH US 421 SECTION L-12
DATE SEP 4, 1986 SAMPLE UNIT _____
SURVEYED BY LINDLY AREA OF SAMPLE _____

Distress Types				SKETCH:
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shldr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shaving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <p># 4</p> </div> <div> <p># 3</p> </div> </div>		

EXISTING DISTRESS TYPES							
<div style="border: 1px solid black; width: 100%; height: 100%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div>	10	7					
TOTAL SEVERITY L M H	L	95	34				
	M						
	H						

PCI CALCULATION			
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	3.5	L	3
7	1.3	L	8
DEDUCT TOTAL			11
CORRECTED DEDUCT VALUE (CDV)			11

PCI = 100 - CDV = 89

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH 14 SECTION L-13
DATE 8/26/86 SAMPLE UNIT _____
SURVEYED BY LINDLY AREA OF SAMPLE _____

Distress Types				SKETCH:		
1. Alligator Cracking	*10. Long & Trans Cracking					
2. Bleeding	11. Patching & Util Cut Patching					
3. Block Cracking	12. Polished Aggregate					
*4. Bumps and Sags	*13. Potholes					
5. Corrugation	14. Railroad Crossing					
6. Depression	15. Rutting					
*7. Edge Cracking	16. Shoving					
*8. Jt Reflection Cracking	17. Slippage Cracking					
*9. Lane/Shoulder Drop Off	18. Swell					
	19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
TOTAL SEVERITY	L					
	M					
	H					
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	$PCI = 100 - CDV =$ $RATING =$ 		
DEDUCT TOTAL						
CORRECTED DEDUCT VALUE (CDV)						

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

RECENTLY AGGREGATE SEALED,
DO NOT USE THIS FORM.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 421 SECTION L-14
 DATE SEPT. 5, '86 SAMPLE UNIT _____
 SURVEYED BY LINDLY AREA OF SAMPLE _____

Distress Types		SKETCH:
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Slidr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling	

EXISTING DISTRESS TYPES					
	7	10	1	15	19
<div style="border: 1px solid black; width: 100%; height: 100%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div>	39 = L	117 = L	16 ft ² = L	15' x 11.7' = L	1' x 100' = L
		3) = L	7 ft ² = L		
		117 = L			
		25 = L			
TOTAL SEVERITY	L 39	290	23	146.25	100
M					
H					

PCI CALCULATION			
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
7	2.8	L	5
10	20.6	L	24
1	1.6	L	14
15	10.4	L	28
19	7.1	L	4
DEDUCT TOTAL			75
CORRECTED DEDUCT VALUE (CDV)			48

PCI = 100 - CDV = 52

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 10 SECTION L-15
 DATE SEP 5 1986 SAMPLE UNIT _____
 SURVEYED BY LINDLY AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shoulder Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
<div center;"="" style="border: 1px solid black; width: 20px; height: 40px; margin: auto; transform: rotate(-45deg); background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);</div> </td> <td style=" text-align:="">10</div>	7	1				
	16 = M	32 = M	8 Ft = L			
	31 = L		13 Ft = M			
	19 = M					
	4 = L					
	31 = L					
	10 = M					
	7 = L					
	6 = M					
	TOTAL SEVERITY	L	73	8		
M	51	32	18			
H						
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = <u>67</u> RATING = _____		
10	4.7	L	10			
10	3.3	M	18			
7	2.1	L	4			
1	0.5	L	6			
1	1.2	M	23			
DEDUCT TOTAL			61			
CORRECTED DEDUCT VALUE (CDV)			33			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 114 SECTION L-16
 DATE SEP 5, 1986 SAMPLE UNIT _____
 SURVEYED BY LINDLY AREA OF SAMPLE _____

Distress Types		SKETCH:
1. Alligator Cracking	*10. Long & Trans Cracking	
2. Bleeding	11. Patching & Util Cut Patching	
3. Block Cracking	12. Polished Aggregate	
*4. Bumps and Sags	*13. Potholes	
5. Corrugation	14. Railroad Crossing	
*6. Depression	15. Rutting	
*7. Edge Cracking	16. Shoving	
*8. Jt Reflection Cracking	17. Slippage Cracking	
*9. Lane/Shoulder Drop Off	18. Swell	
	19. Weathering and Raveling	

EXISTING DISTRESS TYPES						
	7	10	10	10	12	1
	25 = L	42 = M	18 = L	24 = L	5 x 152 = L	12 x 1 = L
	55 = M	8 = L	16 = L	12 = L		
	16 = L	17 = M	4 = M	15 = M		
	24 = L	14 = L	33 = L	26 = M		
		26 = L	9 = M	22 = L		
		9 = M	7 = L	4 = M		
		9 = L	27 = L	9 = M		
		13 = M	4 = M	13 = L		
TOTAL	L	65	56	103	71	12
SEVERITY	M	55	90	23	47	
	H					

PCI CALCULATION				
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	
7	3.3	L	5	PCI = 100 - CDV = <u><u><u>51</u></u></u>
7	2.8	M	14	
10	11.6	L	18	
10	7.6	M	27	
12	33.5	-	9	
1	0.6	L	8	
15	3.9	L	18	
DEDUCT TOTAL			99	
CORRECTED DEDUCT VALUE (CDV)			49	
				RATING = <u><u><u> </u></u></u>

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 10 SECTION L-17
 DATE SEP 5, '86 SAMPLE UNIT _____
 SURVEYED BY LINDLY AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Slidr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
7	10	9				
56 = L	10 = L	122 = L				
	3 = M					
	7 = L					
	21 = L					
TOTAL SEVERITY						
L	56	38	122			
M		8				
H						
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = <div style="text-align: right;">84</div>		
7	4.1	L	6			
10	2.8	L	7			
10	0.6	M	5			
9	9.0	L	11			
				RATING = <div style="text-align: right;">_____</div>		
DEDUCT TOTAL			29			
CORRECTED DEDUCT VALUE (CDV)			12			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH _____ SECTION S-8
 DATE 2/7/86 SAMPLE UNIT _____
 SURVEYED BY GUPTA, LINDLY AREA OF SAMPLE _____

Distress Types					SKETCH:
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Slidr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling
EXISTING DISTRESS TYPES					
<div style="writing-mode: vertical-rl; transform: rotate(180deg);">TOTAL SEVERITY</div>	9				
	200 = L				
L	200				
M					
H					
PCI CALCULATION					
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	$PCI = 100 - CDV =$ <div style="text-align: center; margin-top: 10px;"> <u><u>90</u></u> </div> RATING = <u> </u>	
9	8.3	L	10		
DEDUCT TOTAL			10		
CORRECTED DEDUCT VALUE (CDV)			10		

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH _____ SECTION S-9
 DATE Aug 8, 1986 SAMPLE UNIT _____
 SURVEYED BY GUPTA, LINDY AREA OF SAMPLE _____

Distress Types						SKETCH: ↑ N
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shoulder Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
7	10	10	9	10		
145 = M	3 = L	5 = M	161 = L	2 = L		
	25 = M			9 = M		
	14 = L			5 = M		
	4 = M			24161 = L		
	7 = L					
	11 = L					
	5 = M					
	13 = L					
TOTAL SEVERITY	L	48	161	324		
M	145	34	5	14		
H						
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	$PCI = 100 - CDV =$ <div style="text-align: right; font-size: 1.5em;">60</div>		
7	7.5	M	22			
10	19.3	L	23			
10	2.7	M	16			
9	8.3	L	10			
DEDUCT TOTAL			71	$RATING =$ <div style="text-align: right; font-size: 1.5em;">71</div>		
CORRECTED DEDUCT VALUE (CDV)			40			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH _____ SECTION S-10
 DATE 8/8/86 SAMPLE UNIT _____
 SURVEYED BY GUPA, LINDLY AREA OF SAMPLE _____

Distress Types	SKETCH:
1. Alligator Cracking *10. Long & Trans Cracking 2. Bleeding 11. Patching & Util Cut Patching 3. Block Cracking 12. Polished Aggregate *4. Bumps and Sags *13. Potholes 5. Corrugation 14. Railroad Crossing 6. Depression 15. Rutting *7. Edge Cracking 16. Shoving *8. Jt Reflection Cracking 17. Slippage Cracking *9. Lane/Shoulder Drop Off 18. Swell 19. Weathering and Raveling	

EXISTING DISTRESS TYPES					
TOTAL SEVERITY	10	15			
	138 = L	1 x 138 = L			
	23 = L				
	8 = L				
L	169	138			
M					
H					

PCI CALCULATION			
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	10.2	L	16
15	8.3	L	25
DEDUCT TOTAL			41
CORRECTED DEDUCT VALUE (CDV)			30

PCI = 100 - CDV = 70

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH _____ SECTION S-11
 DATE 8/8/86 SAMPLE UNIT _____
 SURVEYED BY GUPTA LINDLY AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation *6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shldr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling
EXISTING DISTRESS TYPES						
10 153=L 79=L 16=L 17=L						
TOTAL SEVERITY L M H	265					
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = <div style="text-align: center; margin-top: 10px;"> <u>80</u> </div> RATING = <div style="text-align: center; margin-top: 10px;"> <u> </u> </div>		
10	15.1	L	20			
DEDUCT TOTAL			20			
CORRECTED DEDUCT VALUE (CDV)			20			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B ASPHALT PAVEMENT INSPECTION SHEET

BRANCH _____ SECTION S-12
 DATE Aug 7, 1986 SAMPLE UNIT _____
 SURVEYED BY _____ AREA OF SAMPLE _____

Distress Types				SKETCH:	
1. Alligator Cracking	*10. Long & Trans Cracking
2. Bleeding	11. Patching & Util Cut Patching				
3. Block Cracking	12. Polished Aggregate				
*4. Bumps and Sags	*13. Potholes				
5. Corrugation	14. Railroad Crossing				
6. Depression	15. Rutting				
*7. Edge Cracking	16. Shoving				
*8. Jt Reflection Cracking	17. Slippage Cracking				
*9. Lane/Shoulder Drop Off	18. Swell				
	19. Weathering and Raveling				

EXISTING DISTRESS TYPES					
<div style="background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px); width: 10px; height: 100px; margin: 0 auto;"></div>	7	10			
	29 = L	46 = L			
TOTAL SEVERITY	L	29	46		
	M				
	H				

PCI CALCULATION			
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
7	1.6	L	3
10	2.5	L	6
DEDUCT TOTAL			9
CORRECTED DEDUCT VALUE (CDV)			9

PCI = 100 - CDV = 91

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH _____ SECTION S-13
 DATE 8/2/86 SAMPLE UNIT _____
 SURVEYED BY GUPTA, LINDY AREA OF SAMPLE _____

Distress Types				SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shldr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling				
EXISTING DISTRESS TYPES					
ID	ID	ID			
79=L	4=M	1x144 L			
12=M	4=L				
12=M					
4=L					
5=M					
4=M					
16=L					
4=L					
TOTAL SEVERITY	L	115	4	144	
M	21		4		
H					
PCI CALCULATION					
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = <div style="text-align: center; border-bottom: 3px double black;">63</div> RATING = <div style="text-align: center; border-bottom: 3px double black;"></div>	
10	6.9	L	14		
10	1.5	M	11		
15	5.3	L	26		
DEDUCT TOTAL			51		
CORRECTED DEDUCT VALUE (CDV)			32		

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH _____ SECTION S-14
 DATE Aug 3, 1986 SAMPLE UNIT _____
 SURVEYED BY GUPTA, LINDLY AREA OF SAMPLE _____

Distress Types		SKETCH:
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shoulder Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling	#5 #4

EXISTING DISTRESS TYPES				
	10	1	15	
	7 = L	1 x 123 = M	1 x 60 = L	
	3 = L	1 x 12 = M	1 x 75 = M	
	21 = M			
	4 = L			
	17 = M			
	36 = L			
	9 = M			
TOTAL SEVERITY	L 50		60	
	M 46	135	75	
	H			

PCI CALCULATION			
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	3.1	L	7
10	2.3	M	16
1	3.3	M	44
15	3.7	L	13
15	13.0	M	46
DEDUCT TOTAL			131
CORRECTED DEDUCT VALUE (CDV)			68

PCI = 100 - CDV = 32

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH _____ SECTION S-15
 DATE 8/7/86 SAMPLE UNIT _____
 SURVEYED BY GUPTA, LINDLY AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shoulder Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
10	10	7				
35=L	50=L	7=M				
15=L	47=L	7=L				
53=L	11=M	23=M				
	3=M					
	13=L					
TOTAL SEVERITY	L 103	110	7			
M		14	30			
H						
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	PCI = 100 - CDV = <div style="text-align: center;">78</div> <hr style="border: none; border-top: 3px double black;"/>		
10	11.5	L	18			
10	0.8	M	7			
7	0.4	L	2			
7	1.6	M	10			
				RATING = <hr style="border: none; border-top: 3px double black;"/>		
DEDUCT TOTAL			37			
CORRECTED DEDUCT VALUE (CDV)			22			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH _____ SECTION S-16
 DATE Aug 11, 1986 SAMPLE UNIT _____
 SURVEYED BY GUPTA AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shldr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shaving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> #5 #4 </div> </div>				
EXISTING DISTRESS TYPES						
<div style="writing-mode: vertical-rl; transform: rotate(180deg);">TOTAL SEVERITY</div>	9	10	15			
	27 = L	46 = L	1 x 33 = L			
		37 = L				
		4 = L				
		42 = L				
		12 = L				
	27	146	80			
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	<div style="margin-bottom: 20px;"> $PCI = 100 - CDV =$ <div style="text-align: right; font-size: 1.5em;">70</div> </div> <div> $RATING =$ </div>		
9	1.7	L	3			
10	9.1	L	16			
15	5.0	L	21			
DEDUCT TOTAL			40			
CORRECTED DEDUCT VALUE (CDV)			30			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 231 SECTION V-6
 DATE 8/6/86 SAMPLE UNIT _____
 SURVEYED BY GUPTA, LINDLY AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Black Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shldr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching *12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shaving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
10	10	15	12			
40=L	4=L	1 x 30A=L	6 x 20B			
35=L	4=L					
28=L	22=L					
10=L	8=L					
	9=L					
	20B=M					
TOTAL SEVERITY						
L	113	46	208	1248		
M		208				
H						
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	$PCI = 100 - CDV =$ <div style="text-align: center; border-bottom: 3px double black; margin-top: 10px;">57</div> RATING = <div style="text-align: center; border-bottom: 3px double black; margin-top: 10px;"></div>		
10	5.9	L	12			
10	7.7	M	28			
15	7.7	L	25			
12	46.1	—	11			
DEDUCT TOTAL			76			
CORRECTED DEDUCT VALUE (CDV)			43			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 154 SECTION Y-8
 DATE 8/5/86 SAMPLE UNIT _____
 SURVEYED BY GUPTA, LINDLY AREA OF SAMPLE _____

Distress Types					SKETCH:	
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Shoulder Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling					
EXISTING DISTRESS TYPES						
10	7	2				
27=L	9=L	2x28 L				
12=L						
16=M						
13=M						
22=L						
14=M						
L	61=L	9=L	436=L			
M	43=M					
H						
PCI CALCULATION						
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	$PCI = 100 - CDV =$ <div style="text-align: center; font-size: 1.5em;">77</div> <hr style="border: 1px solid black; width: 100%;"/> $RATING =$ <hr style="border: 1px solid black; width: 100%;"/>		
10	2.33	L	5			
10	1.64	M	12			
7	0.34	L	2			
2	16.7	L	4			
DEDUCT TOTAL			23			
CORRECTED DEDUCT VALUE (CDV)			23			

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH I-64 SECTION V-9
 DATE Aug 15 1986 SAMPLE UNIT _____
 SURVEYED BY LINDY / BARBOUR AREA OF SAMPLE _____

Distress Types	SKETCH:
1. Alligator Cracking *10. Long & Trans Cracking 2. Bleeding 11. Patching & Util Cut Patching 3. Block Cracking 12. Polished Aggregate *4. Bumps and Sags *13. Potholes 5. Corrugation 14. Railroad Crossing 6. Depression 15. Rutting *7. Edge Cracking 16. Shoving *8. JT Reflection Cracking 17. Slippage Cracking *9. Lane/Shoulder Drop Off 18. Swell 19. Weathering and Raveling	#4 #2

EXISTING DISTRESS TYPES						
	10	12	15			
	5 = L	6' x 194	33.3 x 2 = M			
	8 = M					
	50 = L					
	5 = M					
	54 = L					
	10 = M					
	66 = L					
TOTAL SEVERITY	L 175	1164	776			
M	18					
H						

PCI CALCULATION			
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	7.5	L	14
10	0.3	M	7
12	50	L	12
15	33.3	L	41
DEDUCT TOTAL			74
CORRECTED DEDUCT VALUE (CDV)			42

PCI = 100 - CDV = 58

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH I-64 SECTION V-10
 DATE Aug 15 '96 SAMPLE UNIT _____
 SURVEYED BY BARBARA LINDLY AREA OF SAMPLE _____

Distress Types					SKETCH:
1. Alligator Cracking 2. Bleeding 3. Block Cracking *4. Bumps and Sags 5. Corrugation 6. Depression *7. Edge Cracking *8. Jt Reflection Cracking *9. Lane/Slidr Drop Off	*10. Long & Trans Cracking 11. Patching & Util Cut Patching 12. Polished Aggregate *13. Potholes 14. Railroad Crossing 15. Rutting 16. Shoving 17. Slippage Cracking 18. Swell 19. Weathering and Raveling				
EXISTING DISTRESS TYPES					
<div style="border: 1px solid black; width: 20px; height: 50px; margin: 0 auto; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div>	15				
	402 x 2 = L				
TOTAL SEVERITY	L	804			
M					
H					
PCI CALCULATION					
DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE	$PCI = 100 - CDV =$ <div style="text-align: center; margin-top: 10px;"> 59 <hr style="border: none; border-top: 3px double black; width: 100px;"/> </div> RATING = 	
15	33.3	L	41		
DEDUCT TOTAL			41		
CORRECTED DEDUCT VALUE (CDV)			41		

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

APPENDIX E - OVERLAY DESIGN GUIDE

This guide is written to assist the user in determining overlay thickness requirements for flexible pavements. The approach considers both the structural requirement (load-carrying ability) and a functional performance requirement (distress resistance). Of the two requirements, the greater thickness controls. In some cases, adequate structural capacity provides an opportunity for milling and recycling of pavements.

In applying the following procedures, several assumptions are made:

1. An on-site inspection has determined that an overlay is feasible.
2. A falling weight deflectometer (FWD) nondestructive test (NDT) device will be used to test the potential overlay site.
3. Adequate site repairs and preparation will precede the overlay.
4. Adequate materials and construction will be used for the overlay.

5. The overlay will not be placed on an unstable (rutted) pavement where new rutting would be quickly mirrored in the surface.

The guide is divided into five sections: background data and testing requirements, functional performance design, structural design, overlay thickness selection and potential for recycling, and an example.

BACKGROUND DATA AND TESTING REQUIREMENTS

Contact the Program Development Division of the IDOH to obtain the following data for the pavement to be overlaid:

1. Pavement cross-section. Asphalt and subbase thickness

variability should be investigated. Note: this guide does not consider concrete pavements.

2. Traffic. Trucks per day

(3 or more axles) during the overlay design life and total 18-kip equivalent single axle loads (ESAL) for the entire design life in both directions. These values should reflect a traffic growth factor as determined by Program Development Division to account for increased traffic over the design life.

Once the above information has been obtained, a graph depicting the variations in the data along the section

should be developed. An example graph is provided in Figure E1. In this figure, a proposed overlay project has been divided into units of homogeneous cross-section, traffic, subgrade, and topography (hilly areas, river valleys, etc.). These units form the basis for further analysis.

Next, pavement cores and subgrade samples must be taken. If homogeneous units are longer than one mile in length, a minimum of two cores and borings should be made per mile. If units are less than one mile in length, a minimum of two cores and borings should be made per unit. Shelby tube samples of the subgrade should extend to a depth of at least two feet below the subbase. The particle size analysis and Atterberg Limits on the subgrade samples will allow the soil to be classified by either the AASHTO (AASHTO M 145-82) or the Unified (ASTM D 2487-85) soil classification systems. Figure E2 can then be consulted to estimate a reasonable value of CBR for the subgrade soil beneath each unit. However, future research may result in recommendations for tests that better define the subgrade properties. Pavement cores and boring logs must be examined to confirm layer thicknesses, including those of the subbase, throughout the unit. If necessary, units can be redefined.

Conduct non-destructive tests on each unit. If possible, perform FWD tests during the spring thaw, spring/fall wet periods, and summer to define the subgrade properties

throughout the year. Conduct the FWD tests with a 9000 pound test load, which represents a dual-wheel truck load. Tests should be run in the right wheelpath of the outside driving lane. At this time the necessary data are deflections at 0 ft. (directly beneath the applied load) and at 7 ft. offset from load). A minimum of 10 readings per unit or 20 readings per mile should be taken. The following spacings are suggested:

Rolling Terrain.....100 ft.
 Numerous Cut-to-Fill Transitions....100 ft.
 Level Terrain.....250 ft.

At the site, pavement surface temperature should be recorded at least twice per testing session and at least twice per hour for longer sessions. An infrared gun-type device is recommended for ease of use. After testing has been completed, the mean air temperature during the five days prior to the day of testing should be determined. This is computed as the average of the sum of the maximum and minimum air temperatures of the five previous days. This data is available for most Indiana counties on a monthly basis in 'Climatological Data Indiana' published by the Ional Oceanic and Atmospheric Administration, National Climate Data Center, Asheville, N.C.. Unfortunately, the data is usually published several months after the end of the month in question.

Finally, enter field verified pavement data into com-

puterized IDOH data base.

FUNCTIONAL PERFORMANCE DESIGN

A procedure is explained for determining the thickness of overlay asphalt necessary to maintain a functionally acceptable pavement for the overlay design life. A design equation was developed through a regression analysis of data collected throughout Indiana.

Given the inputs as previously determined, the required overlay thickness in inches is given by equation (E1).

$$\text{olay} = 0.7592 + 0.00145(\text{tottrk})^2 + 0.00379(\text{age})^2 + 0.000162(\text{pci})^2 - 0.000429(\text{cbr})^2 \quad (\text{E1})$$

where:

olay = calculated thickness of required, new overlay in inches

tottrk = total trucks {defined as (trucks/day in both directions) (overlay age) (365)/365,000}
over the life of the overlay

age = design life of new overlay (years)
10 is normally specified

pci = desired PCI value at the end of the design life of the overlay (PCI is normally specified as 35, which approximates a PSI value of 2.5)

cbr = estimated subgrade CBR

Equation (E1) has been verified for the following range of design values:

1. Anticipated overlay age: 5-20 years
- 2a. Anticipated daily trucks: 50-3000

2b. Tottrk: less than 32.2

Note: If tottrk exceeds 32.2, the calculated overlay value may exceed 3.0 inches. If so, 3.0 inches should be specified.

3. PCI: 35-65

4. CBR: 0-40%

Equation (E1) does not include provisions to vary overlay thickness "reliability." For example, a reliability of 95% means that the overlay will be successful 95 out of 100 times. Reliability relates to potential success of the overlay to provide service for the time period it is intended to last. The reliability for thickness designs using (E1) is approximately 50%: half the pavements will last longer than predicted; half will last shorter than predicted. If reliability greater than 50% is desired, add the following thicknesses to result from equation (E1) to attain the higher reliabilities.

Reliability (%)	Additional Thickness (in.)
95	0.9
90	0.7
85	0.6
75	0.4

Use of the additional thicknesses is not usually recommended because reliability-based design has not been

tested in Indiana. However, for higher volume roads where high reliability may be desired, additional thickness should be considered.

STRUCTURAL DESIGN

A structural overlay design procedure is recommended based on procedures in the "AASHTO Guide for Design of Pavement Structures", 1986. A structural analysis is conducted for future traffic loads to determine if an overlay is needed to provide additional structural capacity. If an overlay is required, the thickness is determined.

A design life and P_t (terminal PSI) are required for the overlay analysis. Usually, design life is 10 years and p_t is 2.5.

The minimum required field deflections are the 0 ft. temperature corrected deflections (described below) and the 7 ft. uncorrected deflections measured in the summer. Additionally, the 7 ft. deflections from spring thaw and spring/fall wet seasons are desired.

Using the pavement surface temperature and 5-day mean air temperature, find a temperature correction factor for the 0 ft. deflections. The correction factor is determined by first summing the average pavement surface temperature during testing and the five day mean air temperature. With this sum, enter Figure E3 to find a mean asphalt temperature. Enter Figure E4 with the mean pavement temperature

and find the deflection correction factor to be multiplied by the 0 ft. deflections to obtain the temperature corrected deflections.

Construct a graph similar to Figure E5 to determine pavement sub-units (further breakdown of homogeneous units) over which the deflections are relatively similar. For each of these sub-units, compute the 85th percentile deflection, which is defined as the mean plus 1.04 times the standard deviation of all temperature corrected 0 ft. deflections in that sub-unit. This value will be known as the 0 ft. design deflection for each sub-unit. With the design deflection values, calculate the required overlay thickness for each sub-unit. If thicknesses for the sub-units vary greatly, different overlay thicknesses may be required along the pavement length. The individual structural overlay thickness design procedure follows:

The structural capacity required for the overlay is determined in terms of the structural number (SN_{OL}) as

$$SN_{OL} = SN_Y - F_{RL}(SN_{XEFF}) \quad (E2)$$

where:

SN_{OL} = the structural capacity of the overlay which must be added.

SN_Y = the total structural capacity required to support the overlay traffic over existing subgrade conditions (i.e. a new design).

SN_{XEFF} = the effective structural capacity of the existing pavement immediately prior to overlay.

F_{RL} = the remaining life factor which accounts

for damage to the existing pavement as well as the desired degree of damage to the overlay at the end of the overlay traffic.

The components of equation (E2) are determined with the following procedure:

I. Find SN_Y -- use the nomograph in Figure E6. with the following steps.

1. Select desired level of reliability from Table E1
2. Select standard deviation of 0.35 (as recommended in AASHTO)
3. Total 18-kip EAL = 18-kip EAL over the overlay design life in one direction as provided by the Program Development Division (divide traffic in both directions by 2). If roadway is multi-lane, traffic may be distributed based on expected lane use.
4. Effective Roadbed Soil Resilient Modulus (M_R) is given by $M_R = (PS_F) / (D_R)$ (E3)

where:

P = the NDT load in pounds at time of testing
 S_F = the subgrade modulus prediction factor given by in terms of subgrade Poisson's Ratio (PR).
 PR = .50 $S_F = 0.269$
 PR = .40 $S_F = 0.289$
 PR = .30 $S_F = 0.297$

D_R = the measured NDT deflection (in.)

R = radial distance from the center of the load (in.)

- a. Find M_R based on the above equation for each season in which testing was done using the deflections at 7 ft.
- b. Use Figure E7 to determine an effective M_R for the entire year. Interpolate for months in which M_R values are not known.
- c. If deflections for more than one season are not available, use the modulus obtained from summer deflections

5. Design serviceability loss is generally

$$4.5 - 2.5 = 2.0$$

The SN value read from the bottom of the chart is SN_Y

II. Determination of SN_{XEFF}

Find SN_{XEFF} from the FORTRAN program listed at the end of this appendix. The program computes SN_{XEFF} based on an elastic layer theory equation from Appendix PP of the 1986 AASHTO Guide which relates temperature-corrected deflection directly under load to subgrade strength (calculated previously as M_R) and pavement strength (SN_{XEFF}). SN_{XEFF} can then be calculated because deflection and M_R are already known. An input file is required of which the first line is the number of SN_{XEFF} calculations to be made. Subsequent lines contain input data for each

desired SN_{XEFF} calculation and consists of the following items with a space between each item:

1. title (one word)
2. effective modulus of roadbed soil (psi)
3. poisson's ratio of roadbed soil
4. thickness of pavement system above the roadbed soil (in.)
5. applied NDT load (lb.)
6. temperature-corrected deflection beneath load (mils/Klb).

III. Calculation of F_{RL} requires determining values for the following 3 intermediate variables before final calculation of F_{RL} : pavement condition factor C_X , remaining life value of the existing pavement R_{LX} , and remaining life value of the overlaid system after overlay traffic has been reached R_{LY} .

1. Find R_{LX}

$$a. C_X = SN_{XEFF} / SN_0 \quad (E4)$$

where:

SN_0 = the SN of the existing pavement when new and undamaged.
 (Currently, Indiana uses a composite layer coefficient for asphalt of $a_1 = 0.34$.
 The subbase layer coefficient is taken as $a_2 = 0.14$)

SN_{XEFF} = calculated above

b. With C_X , enter Figure E8 to find R_{LX}

$$2. \text{ Find } R_{LY} = (N_{FY} - Y) / (N_{FY}) \quad (E5)$$

where:

Y = design traffic (18-kip ESAL truck
 traffic in one direction in design lane)
 (same as I.3.)

N_{FY} = the number of 18-kip ESAL's to
reduce the PSI from 4.5 to 2.0

To compute N_{FY} :

- a. Using the same reliability and standard deviation as determined in Steps I-1 and I-2, enter Figure E6 at the left and find the corresponding point on the first turning line.
- b. Starting at the bottom of the grid at SN_Y , proceed upward to the $\Delta PSI=2.5$ curve and over to the left edge. This corresponds to a PSI drop from 4.5 to 2.0. Using the M^R established earlier, proceed to the second turning line.
- c. The line connecting the points established on the turning lines passes through the value N_{FY} .

3. Use Figure E9 and the values of R_{LX} and R_{LY} to determine F_{RL} .

Now, with SN_Y , SN_{XEFF} , and F_{RL} known, SN_{OL} can be calculated from Equation (E2). The thickness of the asphalt overlay required to maintain structural adequacy can be determined by the equation: SN_{OL}/a_1 = inches of asphalt. The layer coefficient currently used in Indiana, a_1 , is 0.34.

Note: A negative value of SN_{OL} indicates that the pavement does not require a structural overlay during the design period.

OVERLAY THICKNESS SELECTION AND POTENTIAL FOR MILLING AND RECYCLING

If both the structural and functional performance

analyses yield positive values for required overlay thickness, the larger of the two values should be specified. However, Indiana experience shows that in most cases, a maximum overlay thickness of three inches will be satisfactory.

No structural overlay is required if structural overlay thickness is negative. In fact, the pavement should not fail structurally if $(SN_{OL}/0.34)$ inches of asphalt are removed from the pavement. This situation presents the opportunity to mill and recycle the surface of the pavement instead of adding additional thickness.

The following is recommended if no structural overlay is required and milling is to be evaluated:

1. Do not mill a thickness exceeding the required functional performance overlay thickness.
2. The overlay may consist of a combination of recycled and/or new asphalt equal to the required functional performance overlay thickness.

The recommendations above are conservative because their net effect does not decrease the structural capacity of the pavement. If the designer is certain that the effective structural capacity far exceeds future requirements, he may mill a thickness exceeding the functional performance thickness. However, recommendation #2 should

not be violated because without required functional performance overlay, the pavement will deteriorate quickly and require another overlay before the end of the design period.

EXAMPLE

I Given:

- 1) A principal arterial road
- 2) Deflection testing performed once--in summer
- 3) Design life = 10 years, $p_t = 2.5$
- 4) In situ pavement structure from coring and subgrade classification
 - 11.2 inches asphalt
 - 4.8 inches subbase
 - A-4 / SC subgrade
- 5) Trucks/day (3 or more axles; two directions) = 2175
 18-kip ESAL (over design life, two directions)
 = 3,100,000
- 6) 5-day mean air temperature = 72°F
- 7) Pavement surface temperature = 85°F
- 8) Raw data from field testing
 - FWD load = 13.4 kips (not the 9 kip recommended load)
 - FWD plate radius = 5.9 inches
 - Design 0 ft. deflection
 = 0.03020 inches
 - Design 7 ft. deflection
 = 0.00236 inches

II Functional performance overlay thickness.

1. Estimate CBR using Figure E2.

Result: CBR = 14

2. Use Equation (E1) to calculate required

functional performance overlay where

$$\begin{aligned} \text{CBR} &= 14, \text{ age} = 10, \text{ pci} = 35, \\ \text{tottrk} &= \frac{(2175)(10)(365)}{365,000} = 21.75 \end{aligned}$$

Result: Olay = 2.0 inches

III Structural overlay

1. Find mean asphalt temperature. Do this by averaging temperatures at 3 depths within the asphalt layer found using Figure E3: 1" deep, mid-layer, and bottom of asphalt layer.

Result: mean asphalt temperature = 77°F

2. Find temperature adjustment factor using Figure E4.

Result: Adjustment factor = 0.93

3. Calculate temperature corrected 0 ft. design deflection

Result: $(0.93)(0.0302 \text{ in}) = 0.0281 \text{ in.}$

4. Calculate M_R using Equation (E3)

with: $P = 13,400 \text{ lb.}, S_F = 0.29,$
 $D_R = .00236 \text{ inches}, R = 84 \text{ inches}$

Result: $M_R = 19,600 \text{ psi}$

5. Calculate SN_y using Figure E6

with: Reliability = 0.85, S.D. = 0.35,
 one-directional 18-kip ESAL = 1,550,000
 $\Delta PSI = 4.5 - 2.5 = 2.0$

Result: $SN_y = 2.4$

6. Calculate SN_{XEFF} from computer program

with: $M_R = 19,600$
 $\mu = 0.35$
 pavement thickness = 16 inches
 load = 13,400 lb.
 deflection = .0281 in. or $\frac{28.1 \text{ mils}}{13.4 \text{ k-lb}} = 2.11 \text{ mils/k-lb}$

Result: $SN_{XEFF} = 3.13$

7. Find F_{RL} :

where $SN^o = a_1 D_1 + a_2 D_2$
 a_1 = asphalt layer coefficient
 a_2 = subbase layer coefficient
 D_1 = asphalt layer thickness
 D_2 = subbase layer thickness

$$SN_O = (11.2)(0.34) + (4.8)(0.14) = 4.48$$

From equation (E4), $C_X = 3.13/4.48 = 0.70$

From Figure E8, $R_{LX} = 8\%$

Calculate N_{FY} using same input as in step (5) except $\Delta PSI = 4.5 - 2.0 = 2.5$

Result: $N_{FY} = 1,700,000$ 18-kip EAL

$$R_{LY} = \left(\frac{1,700,000 - 1,550,000}{1,750,000} \right) = 9\%$$

From Figure E9, $F_{RL} = 0.61$

8. From Equation (E2),
 $SN_{OL} = 2.4 - (0.61)(3.13)$
 $= 0.49$

9. Required structural overlay = $0.49/0.34 = 1.45$ inches

IV. Recommend overlay thickness.

$2.0 \text{ inches} > 1.45 \text{ inches},$

Therefore,
 2.0 inch functional overlay controls.

Table E1. Reliability Values.

Functional Classification	Recommended Level of Reliability	
	Urban	Rural
Interstate and other freeways	85 - 99.9	80 - 99.9
Principal Arterials	80 - 99	75 - 95
Collectors	80 - 95	75 - 95
Local	50 - 80	50 - 80

Note: Results based on a survey of the AASHTO Pavement Design Task Force

Figure E1. Determination of Pavement Units.

(1) For the basic idea, see O. J. Porter, "Foundations for Flexible Pavements," Highway Research Board Proceedings of the Twenty-second Annual Meeting, 1942, Vol. 22, pages 100-136.

(2) ASTM Designation D2487.

(3) "Classification of Highway Subgrade Materials," Highway Research Board Proceedings of the Twenty-third Annual Meeting, 1945, Vol. 25, pages 378-392.

(4) Airport Paving, U.S. Department of Commerce, Federal Aviation Agency, May 1948, pages 11-16. Estimated using values given in FAA Design Manual for Airport Pavements. (Formerly used FAA Classification; Unified Classification now used.)

(5) C. E. Warner, "Correlation Between R Value and k Value," unpublished report, Portland Cement Association, Rocky Mountain-Northwest Region, October 1971 (best-fit correlation with correction for saturation).

(6) See T. A. Middlebrooks and G. E. Biertram, "Soil Tests for Design of Runway Pavements," Highway Research Board Proceedings of the Twenty-second Annual Meeting, 1942, Vol. 22, page 162.

(7) See item (6), page 164.

Figure E2. Estimation of CBR.

Figure E3. Estimation of Mean Asphalt Temperature.

Curve Identification

Base Material	Curve (Base Thickness)
Asphalt (Full Depth)	A (All Thicknesses)
Asphalt (Deep Strength)	B (4" of granular subbase) *
Portland Cement Concrete	G
Granular (Non Stabilized)	C(6"); D(12"); E(20"); F(25")
Cement Treated Base	
Sound	D(4"); E(8")
Cracked	C(4"); D(8")

(*) If more than 4" of granular material present use "Granular (Non Stabilized)" base material category

Figure E4. Temperature Adjustment Factor.

Figure E5. Determination of Pavement Sub-Units.

NOMOGRAPH SOLUTION:

$$\log_{10} 18 = z_R^* S_o + 9.36 \log_{10} (SN+1) - 0.20 + \frac{\log_{10} \left[\frac{\Delta \text{PSI}}{4.2 - 1.5} \right]}{1094} + 2.32 \log_{10} M_R - 8.07$$

$$0.40 + \frac{5.19}{(SN+1)}$$

Figure E6. AASHTO Nomograph for SN Determination.

Figure E7. Determination of Effective M_R .

Figure E8. Determination of R_{LX} .

Figure E9. Determination of F_{RL} .


```

c This program calculates the effective structural
c number (sn) of a pavement based on equations from
c Appendix PP of the 1986 AASHTO Guide. It reads input
c from a file whose first line is the number of problems.
c Each subsequent line consists of: title; modulus of
c roadbed soil (psi); poisson's ratio of roadbed soil;
c thickness of pavement system above the roadbed soil
c (in.); applied NDT load (lb.); deflection beneath load
c (mils/Klb). Input problems one to a line in free
c format. The program uses an iterative
c procedure to implicitly determine effective
c structural number. It is based on the assumption that
c if the SN assumed is too low, the deflection
c calculated will be higher than that actually
c recorded. Furthermore, the program assumes a single
c load applied through a single plate whose radius is
c 5.9 inches. This is the case with the FWD. Since sn
c started low, the theoretical deflection should be
c greater than the actual deflection until sn takes on
c a value large enough to make the theoretical deflection
c just less than the actual one. At this point stop
c iterating and print the results.

```

```

      character*10 title
      real p, ht, ac, sn, urs, ers, do, fb
      real increm, temp, parta, partb, diff
      integer j, numprobs, iter, maxiter
c The radius of the applied load for the FWD was
c 5.9 inches
      ac=5.9
c Structural Number (sn) will be incremented by
c 0.01 each loop
      increm=0.01
c The maximum number of iteration will be 1500
      maxiter=1500
      read*, numprobs
      do 10 j=1,numprobs
        read*, title, ers, urs, ht, p, do
c Convert deflection in mils/Klb to inches
        do= do*p/1000000
c Start with a very low sn and initialize number of
c iterations to 0
        sn=0.01
        iter=0
c Calculate deflection piecewise
      20  fb=((36161.5*(sn**2))/((ac**2)*
        & (ers**0.667))+1)**-0.5
        parta=2*p*((0.0043*ht)**3)/
        & (3.1416*ac*(sn**3))
        partb=1+fb*(((sn**3)*(1-(urs**2)))/
        & (ers*((0.0043*ht)**3))-1)

```

```

c Theoretical deflection is 'temp.'
    temp=parta*partb
c Since sn started low, the theoretical deflection
c should be greater than the actual deflection i
c until sn takes on a value large enough to make the
c theoretical deflection just less than the actual one.
c At this point stop iterating and print the results.
    diff=do-temp
    if (diff.gt.0) then
        goto 50
    endif
c Also, if the number of iterations is too high, data
c is probably faulty and the program should be stopped.
c With increm=0.01, this corresponds to an SN greater
c than 15.
    if (iter.gt.maxiter) then
        goto 50
    endif
c If sn is too low to give a satisfactory deflection
c value and iterations are less than the maximum,
c increment sn by 'increm' and iter by 1. Then
c re-calculate the theoretical deflection.
    iter=iter+1
    sn=sn+increm
    goto 20
c Print the results
50  print*, title
    if (iter.gt.maxiter) then
        print*, 'Maximum number of iterations reached'
    endif
    print*, ' '
    print*, 'Ers = ',ers
    print*, 'urs = ',urs
    print*, 'ht = ',ht
    print*, 'P = ',p
    print*, 'do = ',do
    print*, ' '
    print(55), 'SN = ', sn
55  format (a7,f5.2)
    print*, ' '
    print*, ' '
    print*, ' '
c Continue and read in data for the next problem
10  continue
    stop
end

```

APPENDIX F - AASHTO GUIDE APPENDIX PP

PP.1 BACKGROUND

The Non-Destructive Testing (NDT) Method 2 analysis presented in Chapters 3 and 5 of Part III is based upon the maximum measured deflection from the dynamic NDT equipment and, as such, does not require a computerized analysis to back calculate layer moduli (E_i) as necessary in the NDT Method 1 approach. This method is to be used for the evaluation of flexible overlays constructed over existing flexible pavement systems.

In essence, this method uses the maximum NDT deflection, d_o , at the NDT load plate center and the roadbed soil modulus, E_{RS} , determined from the analysis of the deflection basin (outer geophone) presented in Chapter 5 of Part III and Appendix M to determine the in-situ or "effective" structural number, SN_{xeff} . The total pavement thickness, h_t , of all layers above the subgrade is also necessary in the solution sequence.

The purpose of this appendix is to present the analytical background development of the equations used to predict SN_{xeff} for a particular NDT device, maximum deflection and roadbed soil modulus. A typical set of SN_{xeff} predictive curves, developed for a variable load FWD impulse device (plate diameter 11.8 inches) is presented to illustrate how the equations can be used to develop similar curves applicable for any dynamic NDT device a user agency may have. Finally, an example problem is developed to illustrate how the particular set of curves can be used to predict the SN_{xeff} value.

PP.2 THEORETICAL DEVELOPMENT

Figure PP.1 illustrates a flexible pavement as a multi-layer elastic system, having layer characteristics of thickness, h_i , structural layer

Figure pp.1. Equivalent transformed pavement philosophy.

coefficient, a_i , elastic modulus, E_i , and Poissons ratio, u_i . From Theo de Barros, the total pavement thickness, h_t , can be viewed as being comprised of a single equivalent transformed material of modulus, E_e .

The equivalent pavement modulus, E_e , can be expressed by:

$$E_e = \sum \frac{h_i}{h_t} * \left[\frac{E_i (1-u_e^2)}{(1-u_i^2)} \right]^{1/3} \quad (PP.1)$$

For the conventional AASHO analysis, the structural number of a flexible pavement system is viewed as:

$$SN = \sum h_i a_i \quad (PP.2)$$

If one considers a pavement layer material, of thickness h_{im} and quality a_{im} , differing from that of the same category material that was used at the AASHO Road Test (quality a_{is}), the equivalent thickness of the standard material, h_{es} , can be determined by equating the SN_i value of both materials:

$$h_{es} = \frac{a_{im}}{a_{is}} * h_{im} \quad (PP.3)$$

An alternative form of this relationship is:

$$a_{im} = \frac{h_{es}}{h_{im}} * a_{is} \quad (PP.4)$$

If one views both of these pavement layers (h_{im} ; h_{es}) as having equal SN_i values, it can be concluded that the "stiffness" of both layers is

also identical. Thus:

$$\frac{E_{im} h_{im}^3}{12 (1-u_{im}^2)} = \frac{E_{is} h_{es}^3}{12 (1-u_{is}^2)} \quad (PP.5)$$

$$\frac{h_{es}^3}{h_{im}^3} = \frac{E_{im} (1-u_{is}^2)}{E_{is} (1-u_{im}^2)} \quad (PP.6)$$

$$\frac{h_{es}}{h_{im}} = \left[\frac{E_{im} (1-u_{is}^2)}{E_{is} (1-u_{im}^2)} \right]^{1/3} \quad (PP.7)$$

If it is assumed that for any given general material type category (i.e., granular material or asphaltic material), that u_{is} is equal to u_{im} , then:

$$a_{im} = a_{is} \left[\frac{E_{im}}{E_{is}} \right]^{1/3} \quad (PP.8)$$

Based upon the following, for any given pavement structure comprised of pavement layers having different quality levels (a_i):

$$SN = \sum h_i a_{im} = \sum h_i a_{is} \left[\frac{E_{im}}{E_{is}} \right]^{1/3} \quad (PP.9)$$

In lieu of using a relative standard material for each layer (i.e., a_{1s} , a_{2s} , a_{3s} , etc.), an arbitrary standard material having a layer coefficient can be selected (a_{ss}). For this condition:

$$a_{1s} = a_{ss} \left[\frac{E_{1s} (1-u_{ss}^2)}{E_{ss} (1-u_{1s}^2)} \right]^{1/3} \quad (\text{PP.10})$$

$$a_{2s} = a_{ss} \left[\frac{E_{2s} (1-u_{ss}^2)}{E_{ss} (1-u_{2s}^2)} \right]^{1/3} \quad (\text{PP.11})$$

•
•
•

$$a_{ns} = a_{ss} \left[\frac{E_{ns} (1-u_{ss}^2)}{E_{ss} (1-u_{ns}^2)} \right]^{1/3} \quad (\text{PP.12})$$

In general,

$$a_{is} = a_{ss} \left[\frac{E_{is} (1-u_{ss}^2)}{E_{ss} (1-u_{is}^2)} \right]^{1/3} \quad (\text{PP.13})$$

or

$$SN = \sum h_i a_{ss} \left[\frac{E_{is} E_{im} (1-u_{ss}^2)}{E_{ss} E_{is} (1-u_{is}^2)} \right]^{1/3} \quad (PP.14)$$

Since a_{ss} is a constant (once the material is selected as a standard),

$$SN = a_{ss} \left[\frac{(1-u_{ss}^2)}{E_{ss}} \right]^{1/3} * \sum h_i \left[\frac{E_{im}}{(1-u_{is}^2)} \right]^{1/3} \quad (PP.15)$$

In Part II, Chapter 2 of this Guide, it is noted that the AASHO Road Test results for the crushed stone (granular base) are represented by:

$$a_2 = 0.14$$

$$E_2 = 30,000 \text{ psi}$$

If these values are arbitrarily selected as the standard material, $a_{ss} = 0.14$; $E_{ss} = 30,000$ psi and letting $u_{ss} = 0.35$; then,

$$SN = 0.14 \left[\frac{(1-0.35^2)}{30000} \right]^{1/3} * \sum h_i \left[\frac{E_i}{(1-u_i^2)} \right]^{1/3} \quad (PP.16)$$

or

$$SN = 0.0043 \sum h_i \left[\frac{E_i}{(1-u_i^2)} \right]^{1/3} \quad (PP.17)$$

Referring back to Figure PP.1, and substituting the equivalent pavement moduli expression for E_e into the equation above the SN, an expression can be developed that relates the E_e value as a function of the total pavement thickness and structural number. If it is assumed that u_e is equal to u_{RS} (roadbed soil), then:

$$E_e = \left[\frac{SN}{0.0043 \cdot h_t} \right]^3 (1 - u_{RS}^2) \quad (PP.18)$$

As will be seen, this equation represents a very important result.

When one views the transformed pavement section of Figure PP.1, it can be seen that the original multi-layered pavement can be expressed as an equivalent two layer pavement structure having $E_1 = E_e$, $E_2 = E_{RS}$ (referred to as M_R in Part II), and $h_1 = h_t$. In addition, u_e can be selected to have any value, $u_1 = u_e = u_{RS}$. If a dynamic NDT device of known load, P , and plate radius, a_c , is placed on both systems, the maximum deflection, d_o , can be found from Burmeister's two layer deflection theory. This equation is:

$$d_o = \frac{2 P_c a_c (1 - u_{RS}^2) F_w}{E_{RS}} \quad (PP.19)$$

The F_w parameter is called the Burmeister two layer deflection factor and is expressed by:

$$F_w = \frac{E_{RS} (1 - u_e^2)}{E_e (1 - u_{RS}^2)} + F_b \left[1 - \frac{E_{RS}}{E_e} \right] \quad (PP.20)$$

In this equation, F_b is the Boussinesq one layer deflection factor and is given by:

$$F_b = \left[\left[1 + \frac{h_e}{a_c} \right]^2 \right]^{.5} - \frac{h_e}{a_c} \left[1 + \frac{(h_e/a_c)}{2(1-u_{RS}) \left[1 + (h_e/a_c)^2 \right]^{.5}} \right] \quad (\text{PP.21})$$

The term h_e is called the equivalent transformed thickness and is given by:

$$h_e = 0.9 h_t \left[\frac{E_e (1-u_{RS}^2)}{E_{RS} (1-u_e^2)} \right]^{1/3} \quad (\text{PP.22})$$

Substitution of the E_e equation into this expression leads to:

$$\begin{aligned} \frac{h_e}{a_c} &= \frac{0.9 SN}{0.0043 a_c} \left[\frac{(1-u_{RS}^2)}{E_{RS}} \right]^{1/3} \\ &= \frac{209.3 SN}{a_c} \left[\frac{(1-u_{RS}^2)}{E_{RS}} \right]^{1/3} \end{aligned} \quad (\text{PP.23})$$

and

$$\left[\frac{h_e}{a_c} \right]^2 = \left[\frac{43806.5 \text{ SN}}{a_c^2} \right] \left[\frac{(1-u_{RS}^2)}{E_{RS}} \right]^{2/3} \quad (\text{PP.24})$$

Finally, the Burmeister deflection equation can also be written in terms of the NDT plate load, P, rather than plate pressure and rearranged to yield:

$$d_o = \left[\frac{2 P (1-u_{RS}^2)}{3.1416 a_c E_e} \right] \left[1 + F_b \left[\frac{E_e}{E_{RS}} - 1 \right] \right] \quad (\text{PP.25})$$

Substitution of the E_e equation into the above results in:

$$d_o = \left[\frac{2 P (0.0043 h_t)^3}{3.1416 a_c \text{SN}^3} \right] \left[1 + F_b \left[\frac{\text{SN}^3 (1-u_{RS}^2)}{E_{RS} (0.0043 h_t)^3} - 1 \right] \right] \quad (\text{PP.26})$$

The equation for F_b as a function of h_e (which in itself is a function of SN, a_c , u_{RS} , and E_{RS}) has been previously defined.

From a functional viewpoint, the d_o equation can be described by:

$$d_o = f_1 (P, a_c, u_{RS}, E_{RS}, \text{SN}_{\text{xeff}}, \text{and } h_t)$$

This implies that:

$$\text{SN}_{\text{xeff}} = f_2 (P, a_c, u_{RS}, E_{RS}, h_t, d_o)$$

For a given dynamic NDT deflection device, both the dynamic load, P,

and load plate radius, a_c , are constant. For a given pavement system, the measured deflection, d_o , on a pavement of total thickness, h_t , is only a function of the SN_{xeff} and the roadbed soil properties (E_{RS} and u_{RS}). As the value of u_{RS} can be accurately assumed and E_{RS} can be determined from the procedure presented in Part III, Chapter 5 and Appendix M, the effective structural number, SN_{xeff} , value can be directly estimated.

PP.3 DEVELOPMENT OF SN RELATIONSHIPS FOR A UNIQUE NDT DEVICE

As noted, the solution to obtain the in-situ structural capacity (SN_{xeff}) is a function of the particular load and load plate characteristics of the specific NDT deflection equipment used (steady state vibratory or impulse FWD). The final evaluation equation presented in the previous section is readily adaptable to either a computer or graphical analysis. Figure PP.2 represents a typical solution for a 10,000 pound FWD device, having a plate diameter of 11.8 inches ($a_c = 5.91$ inches).

The set of curves are developed for a range of support conditions (E_{RS}) and a total pavement thickness (h_t) of 10.0 inches. Similar curves for other h_t values can be established from the equations so that a family of E_{RS} and h_t curves can be established. Although the curves have been developed for a specific NDT dynamic load (P) of 10,000 pounds, the general assumption of linear elasticity implies that pavement deflection, d_o , is proportional to the dynamic load. As a result, the set of curves are really applicable to the entire range of dynamic loads used on a particular NDT device. This is accomplished by adjusting a measured deflection at any load P_j to the deflection that would occur at a load of 10,000 pounds.

For the curves shown in Figure PP.2, a u_{RS} of 0.5 has been assumed. When this value of Poisson's ratio is utilized, the equation for F_b is greatly simplified:

Figure PP.2. Effective structural number prediction curves based on maximum NDT Deflection.

$$F_b = \left[1 + \frac{36161.5 \text{ SN}_{\text{xeff}}^2}{a_c^2 E_{RS}^{2/3}} \right]^{-1/2} \quad (\text{PP.27})$$

PP.4 EXAMPLE SOLUTION

One of the most important factors to remember when using the NDT Method 2 procedure (SN_{xeff} curves) is that the measured deflection, d_o , must be corrected to a standardized temperature condition in accordance with the method presented in Appendix L. This adjusted deflection is the value that is used to predict the SN_{xeff} value. However, equally important is the fact that the adjustment must not be accomplished until after the roadbed soil modulus value, E_{RS} , has been predicted from the original (unadjusted) deflection basin measurements.

An example to illustrate the use of the procedure is as follows:

Given:

An NDT deflection test is conducted on a flexible pavement structure comprised of a 3-inch asphalt surface course and a 7-inch asphalt base material. A Falling Weight Deflectometer is used to measure the deflection basin under a 10,000 pound load. The device uses a 11.8-inch diameter load plate. The average pavement temperature during the time of the test was found to be 95°F (from Appendix L). A maximum deflection of 0.019 inches was obtained during the test. An analysis of the outer geophone deflection indicated that the in-situ roadbed soil modulus at the time of the test was 20,000 psi (computed in accordance with Appendix M).

Find:

For this input data, determine the effective structural number of the

existing pavement by NDT Method 2.

Solution:

For this problem:

$$\begin{aligned} P &= 10 \text{ kips,} \\ a_c &= 5.91 \text{ inches, and} \\ h_t &= h_1 + h_2 = 10 \text{ inches.} \end{aligned}$$

Therefore, the NDT load-pavement thickness allows for the use of Figure PP.2. Referring to Figure L.3 (of Appendix L), the deflection-temperature adjustment factor, F_d , for full depth asphalt pavements at 95 °F is 0.63.

The adjusted d_o value is therefore:

$$d_o(\text{adj}) = (0.19 \text{ inches}) \times 0.63 = 0.012 \text{ inches}$$

For an in-situ roadbed soil modulus (E_{RS}) of 20,000 and an adjusted maximum deflection (d_o) of 0.012 inches, Figure PP.2 is used to determine that:

$$SN_{\text{xeff}} = 3.30$$

As a final point to this example problem, it should be recognized that the SN_{xeff} value is determined with the actual E_{RS} value at the time of the NDT test and with a temperature adjusted d_o value. For an eventual overlay analysis, the roadbed soil modulus value of 20,000 psi need not be the eventual design value as the designer must assess the annual environmental impact in accordance with procedures noted in Part II of this Guide. Nonetheless, the prediction of the SN_{xeff} value from NDT results must use the actual in-situ roadbed soil modulus at the time of the NDT test and not the eventual design value.

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