Tran-SET

Transportation Consortium of South-Central States

*Solving Emerging Transportation Resiliency, Sustainability, and Economic Challenges through the Use of Innovative Materials and Construction Methods: From Research to Implementation*

# Simplified Approach for Structural Evaluation of Flexible Pavements at the Network Level


**Project No. 17PUTA02**

**Lead University: University of Texas at Arlington**

**Collaborative Universities: University of Texas at Tyler, University of Texas at San Antonio**


**Preserving Existing Transportation Systems**

**Final Report**

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**16. Abstract**

Currently, there are few available simple procedures to identify structurally weak pavement sections utilizing Falling Weight Deflectometer (FWD) data at the network level (e.g., city, state or province). A simple method is required to determine the structural condition of pavement sections that can be directly implemented and automated in current pavement databases. The objective of this research study is to develop a simple analysis method to determine the structural condition of pavement sections utilizing the currently available non-destructive testing (NDT) deflection measurement devices at the network level that can be directly implemented and automated in the database of a typical transportation agency. In addition, the study had conducted an advanced mechanistic analysis to mimic the FWD deflection bowl obtained from the field. The developed structural condition parameters can be easily implemented in pavement management systems (PMS). This will aid Departments of Transportation (DOTs) and local highway agencies to make more informed decisions about the most suitable maintenance and rehabilitation strategies. Those parameters were also utilized to predict the remaining fatigue lives of the studied pavement sections.


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# SI* (MODERN METRIC) CONVERSION FACTORS

## APPROXIMATE CONVERSIONS TO SI UNITS

| Symbol | When You Know | Multiply By | To Find | Symbol |
|---|---|---|---|---|
| | | **LENGTH** | | |
| in | inches | 25.4 | millimeters | mm |
| ft | feet | 0.305 | meters | m |
| yd | yards | 0.914 | meters | m |
| mi | miles | 1.61 | kilometers | km |
| | | **AREA** | | |
| $in^2$ | square inches | 645.2 | square millimeters | $mm^2$ |
| $ft^2$ | square feet | 0.093 | square meters | $m^2$ |
| $yd^2$ | square yard | 0.836 | square meters | $m^2$ |
| ac | acres | 0.405 | hectares | ha |
| $mi^2$ | square miles | 2.59 | square kilometers | $km^2$ |
| | | **VOLUME** | | |
| fl oz | fluid ounces | 29.57 | milliliters | mL |
| gal | gallons | 3.785 | liters | L |
| $ft^3$ | cubic feet | 0.028 | cubic meters | $m^3$ |
| $yd^3$ | cubic yards | 0.765 | cubic meters | $m^3$ |
| | | NOTE: volumes greater than 1000 L shall be shown in $m^3$ | | |
| | | **MASS** | | |
| oz | ounces | 28.35 | grams | g |
| lb | pounds | 0.454 | kilograms | kg |
| T | short tons (2000 lb) | 0.907 | megagrams (or "metric ton") | Mg (or "t") |
| | | **TEMPERATURE (exact degrees)** | | |
| $^oF$ | Fahrenheit | 5 (F-32)/9<br>or (F-32)/1.8 | Celsius | $^oC$ |
| | | **ILLUMINATION** | | |
| fc | foot-candles | 10.76 | lux | lx |
| fl | foot-Lamberts | 3.426 | $candela/m^2$ | $cd/m^2$ |
| | | **FORCE and PRESSURE or STRESS** | | |
| lbf | poundforce | 4.45 | newtons | N |
| $lbf/in^2$ | poundforce per square inch | 6.89 | kilopascals | kPa |

## APPROXIMATE CONVERSIONS FROM SI UNITS

| Symbol | When You Know | Multiply By | To Find | Symbol |
|---|---|---|---|---|
| | | **LENGTH** | | |
| mm | millimeters | 0.039 | inches | in |
| m | meters | 3.28 | feet | ft |
| m | meters | 1.09 | yards | yd |
| km | kilometers | 0.621 | miles | mi |
| | | **AREA** | | |
| $mm^2$ | square millimeters | 0.0016 | square inches | $in^2$ |
| $m^2$ | square meters | 10.764 | square feet | $ft^2$ |
| $m^2$ | square meters | 1.195 | square yards | $yd^2$ |
| ha | hectares | 2.47 | acres | ac |
| $km^2$ | square kilometers | 0.386 | square miles | $mi^2$ |
| | | **VOLUME** | | |
| mL | milliliters | 0.034 | fluid ounces | fl oz |
| L | liters | 0.264 | gallons | gal |
| $m^3$ | cubic meters | 35.314 | cubic feet | $ft^3$ |
| $m^3$ | cubic meters | 1.307 | cubic yards | $yd^3$ |
| | | **MASS** | | |
| g | grams | 0.035 | ounces | oz |
| kg | kilograms | 2.202 | pounds | lb |
| Mg (or "t") | megagrams (or "metric ton") | 1.103 | short tons (2000 lb) | T |
| | | **TEMPERATURE (exact degrees)** | | |
| $^oC$ | Celsius | 1.8C+32 | Fahrenheit | $^oF$ |
| | | **ILLUMINATION** | | |
| lx | lux | 0.0929 | foot-candles | fc |
| $cd/m^2$ | $candela/m^2$ | 0.2919 | foot-Lamberts | fl |
| | | **FORCE and PRESSURE or STRESS** | | |
| N | newtons | 0.225 | poundforce | lbf |
| kPa | kilopascals | 0.145 | poundforce per square inch | $lbf/in^2$ |

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## ACRONYMS, ABBREVIATIONS, AND SYMBOLS

| | |
|---|---|
| FHWA | Federal Highway Administration |
| FWD | Falling Weight Deflectometer |
| HMA | Hot Mix Asphalt |
| LTPP | Long Term Pavement Performance |
| MEPDG | Mechanistic-Empirical Pavement Design Guide |
| NDT | Non-Destructive Testing |
| PMS | Pavement Management System |
| RDD | Rolling Dynamic Deflectometer |
| RWD | Rolling Wheel Deflectometer |
| SHRP | Strategic Highway Research Program |
| TSD | Traffic Speed Deflectograph |
| TxDOT | Texas Department of Transportation |

# EXECUTIVE SUMMARY

Currently, there is no simple procedure available to identify structurally weak pavement sections utilizing Falling Weight Deflectometer (FWD) data at the network level (e.g., city, state or province). A simple method is needed to determine the structural condition of pavement sections that can be directly implemented and automated in current pavement databases. The method needs to be simple enough to be utilized with a network level FWD database for the purpose of numerically ranking pavement sections at the network level from good to poor. Texas Department of Transportation (TxDOT), as well as many other state transportation agencies, collect FWD data at the network level in order to identify weak pavement sections that would require further analysis at the project (e.g., local street) level. At project level, backcalculation has been utilized to obtain layer moduli and determine the overlay (new added surface pavement layer) thickness. However, the use of the backcalculation technique at the network level is complicated and time consuming, which makes it impractical for network level pavement sections assessment.

The objective of this research study is to develop a simple analysis method to determine the structural condition of pavements utilizing FWD deflection measurement devices at the network level that can be directly implemented and automated in the database of a typical transportation agency (such as TxDOT). In addition, the study aims to run an advanced 3D-Move simulation analyses to mimic the FWD deflection bowl obtained from the field.

The proposed deflection and area ratio parameters will serve as indicators of the pavement structure's capacity to carry heavy traffic. In addition, deflection and area ratio parameters will help with the overall evaluation of the health of the road network and the determination of the remaining life of individual road segments. This will allow transportation officials to obtain a clearer view of the state of the network. Therefore, they can make accurate estimation of the required funds to maintain the highway network at a certain desired level. With this approach, more informed decisions about the most suitable maintenance and rehabilitation strategies can be made.

Since commonly collected deflection data by the agency will be utilized in this approach, the approach will be economically feasible. The developed single and overall parameter, $CA_r$' was well related to the number of load repetitions to fatigue failure, $N_f$, with a coefficient of determination, $R^2$ of 0.96. The single parameter can be easily implemented in the Project Management Syetem (PMS) databases and thus, $CA_r$' will help the South-Central state DOTs and local highway agency officials to make more informed decisions about the most suitable maintenance and rehabilitation strategies.

## IMPLEMENTATION STATEMENT

Current methods are either too complex to be applied at network level or require detailed parameters that are not usually available or commonly collected by transportation agencies. This idea of analysis will provide a more reliable assessment of the actual structural condition of the highway network. This will help the transportation officials have a clearer view of the state of the network. Therefore, they can have more accurate estimation of the required funds to maintain the highway network at a certain level. Thus, better management and allocation of the resources will result.

With this approach, more informed decisions about the most suitable maintenance and rehabilitation strategies can be made. The approach will not require any additional resources or testing to be implemented by various transportation agencies. The deflection data that are commonly collected by the DOTs will be utilized in this approach. Therefore, the proposed methodology has a great potential to be easily transferred to practitioners at the state level (e.g., engineers, technicians, etc.). This simplified approach will provide a more robust methodology for the structural capacity evaluation for flexible pavements at network level.

At the time of final report development, the research team managed to conclude the following activities as an effort to achieve the research information dissemination:

1. Two research papers based on the results of this study were submitted to the Transportation Research Board (TRB). Both papers were accepted as a poster presentation in TRB 98th annual meeting . The papers will be presented under the poster session number 1556 that is sponsored by the standing committee on pavement structural modeling and evaluation (AFD80).
2. After incorporating the TRB review results for the two submitted papers, the papers were revised and submitted for publication in selected peer-reviewed journals.
3. An extended abstract was submitted for the 2018 Tran-SET conference and published within the conference proceedings. In addition, during the conference, a presentation was conducted in the 4th of April 2018 at New Orleans, Louisiana.
4. Poster was presented within the Lyceum event held by the University of Texas at Tyler in the 26th of April 2018.
5. A Paper was submitted for the 2019 Tran-SET conference in San Antonio, Texas hosted by the University of Texas at San Antonio (UTSA).
6. A Paper was submitted for the International Airfield and Highway Pavements Conference of the Transportation & Development Institute (T&DI) of ASCE that will be held in Chicago, Illinois.

In the future the research team will approach TxDOT engineers to potentially implement the outcomes of the project and validate the developed parameters by analyzing the deflection data collected by the DOTs to structurally categorize pavement sections.

# 1. INTRODUCTION

Pavement deflection testing has been utilized widely as a nondestructive technique to evaluate the structural capacity of pavements at both network and project levels. By far the most popular deflection-measuring device is the Falling Weight Deflectometer (FWD). In this device, a load is applied on the pavement surface and deflections at several locations from the load are recorded. Backcalculation technique has been utilized to estimate layer moduli and determine the overlay thickness at project level. However, the use of the backcalculation technique at network level is complicated and time consuming. In addition, it requires the knowledge of layer thicknesses, which are not commonly collected at the network level, making this technique not practical for the network level assessment. Currently, there is no simple procedure available to identify structurally weak sections utilizing data obtained from the NDT deflection measurement devices at network level. A huge amount of NDT data collected by various transportation agencies has not been utilized because of the lack of an automated method of analysis. In fact, some state Departments of Transportation (DOT), such as TxDOT, used to collect NDT data at the network level, but stopped doing this collection due to the lack of a simple method to analyze the collected data.

Based on the reviewed literature, it can be concluded that researchers have developed parameters, which include the difference between the central FWD deflection and deflection at a certain distance *(1; 2; 3; 4)*, to evaluate the structural capacity of pavements. Deflection ratio is also one of the common parameters that are used by some of the highway agencies to estimate the pavement structural capacity *(5)*. Another parameter is the normalized area parameter, which is the total area of the deflection bowl normalized by the central deflection, which was found to be highly correlated to the pavement stiffness *(6)*. Although various transportation agencies use several methods, there is no standard acceptable method available to provide accurate estimate of the structural integrities of pavement layers and the subgrade.

It can be concluded that most of the up-to-date developed indices are exclusively based on either central deflections or one deflection point along FWD deflection bowl, and that there is no available comprehensive deflection or structural index that utilizes the entire FWD deflection bowl data. An innovative method is needed to determine the structural condition of pavement sections at network level that can be directly implemented and automated in the agency's database. The method needs to be simple enough to be used with network level deflection data for the purpose of numerically ranking pavement sections at network level from good to poor conditions.

## 1.1. Literature Review

### *1.1.1. Deflection-Based Measurement Devices*

Pavement deflection has been widely utilized as a nondestructive technique to evaluate the structural capacity of pavement structures at both the network and project levels. Current devices include the Quest/Dynatest Rolling Weight Deflectometer (Quest/DynatestRWD), Swedish Road Deflection Tester (Swedish RDT), Texas Rolling Dynamic Deflectometer (Texas RDD), Applied Research Associates, Inc. Rolling Wheel Deflectometer (ARA RWD), United Kingdom's Highway Agency Traffic Speed Deflectometer (UK TSD), and Falling Weight Deflectometer (FWD).

The FWD is the main deflection-measuring device in the U.S. *(1)* whereas the Deflectograph has been utilized in Australia and other countries. The FWD employs a static testing method, which studies the impact resulting from a load falling from a certain height to closely simulate the effect of rolling traffic loads on the pavement surface while the Deflectograph travels at or near the speed of traffic *(7; 8).* One of the most recent developments of traffic speed deflection measuring devices is the Danish Traffic Speed Deflectograph (TSD). The TSD uses a series of Laser sensors mounted on a stiff beam to measure the deflection of the pavement surface. However, the use of TSD is still limited and only a few countries are operating this system alongside the FWD so that the deflection measured from both devices will be correlated in order to attain a better understanding of the new system.

The FWD has been widely used as a reliable tool to measure pavement surface deflection bowl. With the advent of computer technology and the development of multilayer elastic analysis software along with the development of accelerated test tracks, the measured deflection bowl was utilized to backcalculate layer moduli, and several parameters were derived to evaluate the structural condition of pavement structures. However, the iterative backcalculation technique is not feasible to conduct at network level due to its inability to produce a simple measure of the structural integrity of pavement and, therefore, its use is limited for project level evaluation.

When the pavement surface deflects under load, the deflected shape varies depending on the pavement structural capacity, subgrade strength, load magnitude, and pulse duration. The deflection bowl can be divided into different zones with each zone partaking its own pavement structural associations. For example, the maximum center deflection is more related to the asphalt layer condition, while the entire deflection bowl reflects the stiffness of the subgrade. High center deflection is usually associated with weak asphalt layer. The maximum center deflection is utilized to divide pavement sections into homogeneous or uniform subsections based on their structural response reflected by the maximum deflection.

Carvalho et al. *(9)* provided a summary of potentially relevant agency practices for FWD data collection and use for network-level analyses (Table 1).

**Table 1. Summary of useful practices for FWD use in network-level analyses *(9)*.**

| Agency and Publication | Test Point Spacing | FWD Test Frequency | FWD Sensor Positions | Limiting Factors | Basic Details of the PMS Approach |
|---|---|---|---|---|---|
| South Africa; Benchmarking the Structural Condition of Flexible Pavements with Deflection Bowl Parameters | 0.2 km | N/A | 300 mm typical | Flexible pavements only | Pavement is divided into three zones based on depth. Uses basin parameters to characterize base, mid-depth, and subgrade structural condition such as sound, warning or severe. |
| Alaska Department of Transportation (AkDOT); Modeling Flexible Pavement Response and Performance | 0.1 mi | After repaving | SHRP positions | No limits | Deflections are converted to layer moduli, which are then used to obtain stress/strain values under a standard equivalent single axle load (ESAL). Transfer functions relate stress/strain to cracking in bound layers and permanent deformation in unbound layers. |
| Texas Department of Transportation (TxDOT); Incorporating a Structural Strength Index into the Texas Pavement Evaluation System (FHWA/TX-88/409-3F) | 0.5 mi | One recommended per year | 1 ft | Flexible pavements less than 5.5 inches AC thickness | Structural strength index (SSI) varies from zero to 100 (weak to strong). Based on normalized basin parameters, such as outer deflections, surface curvature index (SCI), and center deflection under a 9,000-lb load. Can characterize subgrades and pavement structure independently in terms of relative stiffness. System based on statistical valuation of deflections statewide. |

### *1.1.2. Existing Structural Parameters*

Many states have investigated the possibility of implementing structural capacity indicators into their network-level pavement management systems *(5; 10; 11).*

Coetzee et al. *(1)* analyzed the pavement deflection measuring devices that were used for the past few decades. In the late 1980s, FWD emerged as the new electronic deflection-measuring tool, which could simulate a moving wheel load, measure elastic response and other critical points. The device was capable of measuring deflection bowl up to a distance of 1.8 to 2.0 m away from the point of loading.

The structural adequacy index (SAI) was an early index developed by Haas et al. *(12)* utilizing the Benkelman beam test. In fact, the SAI was calculated based on a single measured deflection value by the Benkelman beam test. Thus, the calculation of this index depended only one single point deflection value.

Haas *(3)* conducted another study in which a bounded scale from 1 to 10 was allocated to the SAI and a maximum tolerable deflection (MTD) was calculated based on the pavement characteristic and the number of expected equivalent single axle loads (ESALs). Furthermore, deflection values that match the maximum calculated tolerable deflection were given five on the 1 to 10 scale and the maximum deflection that corresponds to a weak section in a bad condition was given one, while a strong pavement in a good condition having a minimal deflection value was given 10 on the same scale. The limitation of this index comes from the fact that the developed scale is not fixed and must be changed to meet the needs of the transportation agencies implementing it.

Scullion *(4)* introduced a new structural strength index to the pavement evaluation system (PES) used in Texas. In this new index, pavement conditions were rated in terms of either visual distresses or present serviceability index. After utilizing deflection bowl parameters and mechanistic approach in the calculation process of this index, the deflection bowl parameters approach proved more promising at the project level as a tool to estimate the remaining service life for different pavement sections. The report concluded that the network-level structural strength index may be calculated utilizing FWD testing at a load level of 9,000lb.

Horak and Emery *(13)* illustrated the practice and basis for utilizing the deflection bowl parameters in the measurement of the elastic response for the entire deflection bowl. This study came up with nine parameters as shown within Table 2. As demonstrated in this study, the parameters that had a good correlation with the pavement structural conditions were the maximum deflection (D0), Radius of Curvature (RoC), Base Layer Index (BLI), Middle Layer Index (MLI) and Lower Layer Index (LLI). Thus, only five out of the calculated nine may be utilized in pavement structural condition prediction.

Utilizing the five deflection bowl parameters that had a good correlation with the pavement structural condition, a structural condition rating scale was developed to distinguish between structurally strong, warning, and severe damaged pavements. However, the parameters developed were calculated based on the deflection values at four offset distances (200, 300, 600 and 900 mm) from the load plate so that all the other available deflection values after 900 mm weren’t considered in the parameters’ calculation.

**Table 2. Collection of parameters and their formulae *(13)*.**

| Parameter | Formula | Structural indicator |
|---|---|---|
| Maximum deflection | $D_0$ as measured | Gives an indication of all structural layers with about 70 % contribution by the subgrade |
| Radius of Curvature (RoC) | $RoC = (L)^2 / 2\ D_0\ (1 - D_0/D200)$ where L=127mm in the Dehlen curvature meter and 200mm for the FWD | Gives an indication of the structural condition of the surfacing and the base condition |
| Base Layer Index (BLI) | $BLI=D_0-D_{300}$ | Gives an indication of primarily the base layer structural condition |
| Middle Layer Index (MLI) | $MLI=D_{300}-D_{600}$ | Gives an indication of primarily the subbase and probably selected layer structural condition |
| Lower Layer Index (LLI) | $LLI=D_{600}-D_{900}$ | Gives an indication of the lower structural layers like the selected and the subgrade layers |
| Spreadability, S | $S = \{[(D_0 + D_1 + D_2 + D_3)/5] * 100\} / D_0$ where D1, D2, D3 spaced at 300 mm. | Supposed to reflect the structural response of the whole pavement structure, but with weak correlations |
| Area, A | $A = 6\ [1 + 2(D_1/D_0) + 2(D_2/D_0) + D_3/D_0]$ | The same as above |
| Shape factors | $F_1=(D_0-D_2)/D_1$ $F_2=(D_1-D_3)/D_2$ | The F2 shape factor seemed to give better correlations with subgrade moduli while F1 gave weak correlations |
| Slope of Deflection | $SD = \tan^{-1} (D_0 - D600)/600$ | Weak correlations observed |

Rada *(7)* has primarily concentrated on moving pavement deflection testing, especially for airports. The study discussed the improvement occurred to the testing speed and stated that this testing speed had reached to 65mph from a mere value of 3mph. In addition, within this study, moving pavement deflection testing machines such as Quest/Dynatest RWD, RDT, Texas RDD, ARA RWD and UK TSD were compared in detail.

The paper concluded that the Quest/DynatestRWD may not be used in deflection testing and that Texas RDD had a slow operational speed with only four deflection values. Furthermore, ARA RWD and UK TSD were extensively used in the project level for the identification of the weak spots and assessing load transfer efficiency for joints. Finally, ARA RWD and UK TSD were primarily utilized to supplement FWD despite that fact that both of them are a high-speed deflection data collection device.

In 2010, Rada conducted another study in which Quest/ DynatestRWD, Swedish RDT, Texas RDD, ARA RWD and UK TSD were compared. The study stated that the three methods, Texas RDD, ARA RWD and UK TSD were viable. In addition, the study highlighted that those methods are very useful when required to meet a certain specification in measurements such as precision, and monitoring of the applied load, operating speed, distance between deflection measurements and reported deflection. The main goal of this study was to decide the measuring instrument to be utilized in future deflection measurements. Though the three methods were selected as viable, they had contradictions in the measured deflection values utilizing them. Thus, the paper recommends addressing their testing results in future research *(8).*

The structural strength index (StSI) was developed by the Texas Department of Transportation (TxDOT) to supplement structural information into their pavement management information system. This index was based on the surface curvature index and the deflection at 457.2 mm (18 in.) for a 40 kN (9,000 lb.) load level *(5)*. Two methods were utilized in StSI calculation, the first one was for thin asphalt sections, and the other for intermediate and thicker asphalt pavements. In addition, the calculated index was corrected for rainfall and traffic. An internal study performed by the TxDOT detected that the StSI was not sensitive enough to distinguish pavements efficiently based on their distresses. It is worth mentioning that the developed index was based on a single deflection value at an offset of 18 inches from the load plate. *(5)*

The structural strength indicator (SSI) was proposed in 2009 as a comprehensive index that utilized deflection values from FWD. The SSI uses the center deflections from FWD testing over a group of pavement sections to develop a function based on the cumulative distribution of the deflections. Flora *(10)* developed the basis for the SSI. The method compared the deflection measurement of a given pavement with the overall deflection values of that particular group of pavements within the network. The index was ranked on a scale from zero to 100, with 0 being a poor SSI, and 100 being a perfect SSI.

Kansas Department of Transportation and researchers from Kansas State University developed a set of regression equations to estimate the remaining service life (RSL) of a pavement section from the center deflection under a 40-kN (9,000-lb) load *(2)*. The remaining service life is the anticipated number of years left in a pavements functional or structural service life. The RSL employs sigmoidal performance models, and the center deflection was utilized to predict the remaining service life of a pavement section. The RSL equations were calibrated based on information from non-interstate routes and showed good correlation to the remaining life predictions based on serviceability.

Bryce *(14)* developed a structural-based condition index along with a methodology to use this index in network level pavement evaluation. The study was conducted in the state of Indiana, and the results stated that the center deflection of the FWD has a very little statistical correlation with the functional indicators such as International Roughness Index (IRI) and Pavement Condition Rating (PCR). A new structural-based condition index was developed. The developed SSI was of the form:

$$SSI = 100\ (1\text{-}1.0069e^{\frac{-1071.8}{d_1^{3.9622}}}) \qquad [1]$$

where:
$d_1$ = FWD center deflection.

Carvalho et al. *(9)* recommended simplified deflection-based analytical techniques suitable for rapid automated screening of pavement structural capacity for inclusion in a network-level PMS. The report was based on the information gathered from the LTPP database and other highway agencies.

The developed models were based on the three distresses: rutting, fatigue and roughness performances of pavements.

Based on roughness performance, the developed model was:

$$I_2 = \frac{1}{D_2} \quad [2]$$

where:
$D_2$ = the deflection at 8 inches (203.2 mm) from the center of the load.

Based on rutting performance, developed model was:

$$CI_3 = D_3 - D_4 \quad [3]$$

where:
$D_3$ and $D_4$ are the deflections at 12 and 18 inches, respectively.

Based on fatigue cracking performance, developed model was:

$$I_1 = \frac{1}{D1} \quad [4]$$

where:
$D_1$ = the deflection at the center of the load.

Though FWD has an efficiency to measure deflections until 1,500 mm from the center of load plate, the developed variables were based on deflection measured at a distance less than 500 mm.

Talvik and Aavik *(15)* reported on several deflection basin parameters (DBP): Surface Curvature Index (SCI), Base Damage Index (BDI) and Base Curvature Index (BCI). The DBP models vary based on the conducting transportation agency. A comparison was performed between DBP, and their representation on pavement sections.

For example, the following are the implemented BCI equations in three different countries:

USA:

$$BCI = d_{600} - d_{900} \quad [5]$$

Finland:

$$BCI = d_{900} - d_{1200} \quad [6]$$

Estonia:

$$BCI = d_{1200} - d_{1500} \quad [7]$$

where:
$d_{600}$ = deflection measured at 600 mm from the load plate,
$d_{900}$ = deflection measured at 900 mm from the load plate,
$d_{1200}$ = deflection measured at 1200 mm from the load plate, and
$d_{1500}$ = deflection measured at 1500 mm from the load plate.

The report stated that current practice in the USA utilizes FWD deflection values till 900mm from the center of the load plate, whereas the other countries are using FWD deflection values to its fullest extension (i.e., till 1,500 mm).

Rada et al. *(16; 17)* evaluated the capability of traffic speed devices that measure deflection for the sake of pavement structural evaluation. Out of the two-phase effort, the first phase concentrated on the selection and evaluation of capable devices. The report was accomplished by literature review, survey questionnaires, and interviews with device manufacturers, owners and users. Both TSD and RWD were continuously updated towards their advancement over the past decade. The report concluded that both TSD and RWD were potentially viable devices. Field validation of the two-selected TSD was the second phase, which was conducted near Albertville and in 18-mile loop in Wright County, Minnesota. Based on the tests and data analyses, some issues required further investigation.

Horak et al. *(18)* augmented a benchmark parameter called Effective Pavement Number (PNeff). It was the product of equivalent layer thickness (He) and the Surface Modulus of the entire pavement structure (SMpav). The deflection bowl was effectively utilized to derive Equivalent Long-Term Stiffness (ELTS) for PN calculation. The calculation of proposed parameter, PNeff, consisted of two methods. The first method converted the pavement layered structure above subgrade to an ideal equivalent half space and the second method was comprised of the application of Boussinesq's equation, to calculate the Surface Moduli (SMi). Though a large database of flexible pavements were successfully validated with the approach, the PNeff was not able to determine the indications of actual cause or origin of distress *(18).*

The Traffic Speed Deflection Devices (TSDD) have been continuously updated for accuracy and functionalities to overcome their shortcomings. As a result, they have been successfully implemented and were employed in testing pavement sections in the states of Kansas, Texas, Minnesota, Louisiana, Australia and New Zealand. The objective of the study by Zhang et al. *(5)* was to develop a model to predict pavement structural capacity at an interval of 0.16 km (0.1 mi.) based on the RWD measurements. In most of the previous studies conducted, the factors and parameters used to assess pavements were based on functional parameters such as surface distress and ride quality. The Structural Condition Index (SCI) was developed, which was determined by dividing Effective Structural Number (SNeff) by Required Structural Number (SNreq). The results showed that the SCI was very sensitive to the pavement deterioration, based on a sensitivity analysis conducted on the TxDOT PMS data. However, the developed model showed an acceptable accuracy with a coefficient of determination ($R^2$) of 0.80, and a Root Mean Square Error (RMSE) of 0.8, the model needed to be recalibrated prior to use by other agencies. However, pavement sections that were predicted to be structurally deficient suffered from asphalt stripping and material deterioration problems; few sections were in very good condition according to PCI values. The study also intended to compare the deflection measurements of RWD with that of FWD. RWD deflection measurements were in general agreement with FWD measurements; however, the mean center deflections from RWD and FWD were statistically different.

In 2000, the United Kingdom Highways Agency (HA) suspended the use of deflectograph for routine network-level assessment considering its limitations such as expensive operation, lane closures during testing, which was hazardous to the road users, and time-consumption for their static tests. Consequently, the need arises to improve traffic speed Deflectometer (TSD) that was firstly introduced in 2005. Operation of TSD and their calibration techniques was described by Ferne et al. in 2009 *(19)*. During the introduction of TSD, the device was equipped with three lasers at a distance of 100, 200, and 300 mm in front of the rear wheel assembly towards the

direction of travel or front bumper. In 2008, the laser positioned at 200 mm was moved to 750 mm to monitor the response of lower pavement layers. Later fourth laser was introduced as reference laser at a distance of 3.6 m from the real wheel assembly towards the direction of travel. The method employed the Doppler effect to measure the deflection velocity. The deflection slope measurements were recorded in millimeters per meter. Though the device was able to capture the pavement responses close to FWD results for a 30 m section, the device requires installation of accelerometer into asphalt pavement layer to measure reliable pavement deflection bowls. The report acknowledges that further experimentation is needed to overcome the repeatability limitations.

Sivaneswaran *(20)* identified the viable traffic speed deflection devices that may be employed for the structural evaluation of pavements at the network level. Based on the broad literature review, Sivaneswaran concluded that the ARA RWD and the Greenwood Engineering Traffic Speed Deflectometer (TSD) were potentially viable TSDD. The results reported that the indices derived from TSD measurements provided a robust assessment of pavement structural conditions. However, an improvement to the number of sensors and their locations is needed. The data collected by TSDD was averaged over distance since it is necessary for the state highway agency (SHA) to work with manageable amount of data. The report recommended to confirm the predictive power of the deflection indices, expand and validate the prediction of subgrade strain, and determine methodologies for development of structural performance curves.

Saleh *(6; 21; 22)* simplified the approach for structural capacity evaluation of flexible pavements at the network level by introducing few parameters such as Normalized Area Ratio Parameter under Area Ratio Concept. The parameters that were utilized in the report were:

Deflection Ratio:

$$D_r = D_{250} / D_0 \quad [8]$$

Normalized Deflection Ratio:

$$D_r' = D_r / D_0^2 \quad [9]$$

where:
$D_{250}$ = deflection measured at 250 mm from the load plate (micrometers (µm)), and
$D_0$ = deflection below the load plate (micrometers (µm)).

The Normalized Area Ratio was derived using synthetic deflection bowl data of 140 pavement sections with different layer thicknesses and moduli properties.

Saleh *(6; 21; 22)* introduced the AREA parameter to establish Area Ratio concept, which is the area of the deflection bowl between the point of load applied and a distance of 900 mm.

$$AREA = (50 / D_0) / \{((D_0 + D_{900})/2) + \sum_{i=50}^{850} Di\} \quad [10]$$

where:
$D_0$ = the center deflection,
$D_{900}$ = the deflection at offset 900 mm from the load, and
Di = the deflection at offset i (mm) from the load.

For comparing the strength of a pavement, an extremely stiff strong pavement was assumed, which will have same deflection measurement throughout the sensors. With the assumption of very rigid pavement, whose deflection is same for all sensors, the AREA of the deflection bowl becomes:

$$AREA = (50 / D_0) / \{(( D_0 + D_0 )/2) + 17*D_0\} \quad [11]$$
$$= 900\ mm^2/mm$$

The non-open source computer program, Circly was used to develop the deflection bowl of pavements similar to FWD loads *(22; 23)*. The area ratio and normalized area ratio values were found to be well correlated to deflection ratio and normalized deflection ratio. The Area Ratio parameter is introduced relating the AREA of deflection bowl of a pavement to the AREA of imaginary very stiff pavement (900 $mm^2/mm$).

Area Ratio:

$$A_r = (50/D_0*900) / \{(( D_0 + D_{900} )/2 ) + \sum_{i=50}^{850} Di\} \quad [12]$$
$$= AREA / 900$$

Depending on the Area Ratio, a pavement was categorized from weak to strong. If the value of $A_r$ is equal to or less than 0.3, the pavement was considered weak. For a stiff pavement, the value would be a little lesser than one. In addition, a new parameter called Normalized Area Ratio ($A_r$') was introduced by dividing the Area Ratio by the center deflection to identify the structural capacity of entire pavement structure. The entire pavement structure refers to the sub-grade below the pavement surface and the pavements (HMA layers) above sub-grade.

Normalized Area Ratio:

$$A_r' = (50 / D_0^2*900)/ \{(( D_0 + D_{900} )/2) + \sum_{i=50}^{850} Di \} = A_r/D_0 \quad [13]$$

Depending on the deflection ratio, the pavement's structural condition was classified as bound pavement, good quality unbound pavement and possibly weak unbound pavement, for $D_r>0.8$, $0.6<D_r<0.7$ and $D_r<0.6$, respectively. Finally, the area ratio was found to be less susceptible to measurement errors compared to deflection ratio because area ratio is based on several deflection readings ($\sum_{i=50}^{850} Di$) while deflection ratio was based on two points, D0 and D250. Though the study depicts a clear information regarding pavement deflection and analysis, it was designed for network level assessment and was not suitable for project level assessment.

Based on the collected literature, it can be concluded that throughout the last several decades, researchers have developed parameters to assess the structural integrity of the pavement system from the deflection bowl measurements *(1; 2; 3; 4)*. Developed parameters include the difference between the central deflection and the deflection at a certain distance. Another parameter is the normalized area parameter, which is the total area of the deflection bowl normalized by the central deflection, which was found to be highly correlated with the pavement stiffness. Pavement curvature is another parameter that is widely used in Australia and is defined as the difference between the central deflection and the deflection measured at 200 mm from the center of the load. Pavement curvature is used to express the tensile strains and therefore the fatigue life of asphalt surface layer. Horak argued that variability has been observed in methods that rely on pavement curvature because of the closeness of this point to the edge of the loading plate *(4; 24)*. Deflection

ratio is also one of the common parameters that are used by some highway agencies to estimate the pavement structural capacity. Deflection ratio is defined as the ratio between the measured deflections at 250 mm offset from the center of the load to the central deflection *(5)*. Although various transportation agencies have used several methods, there is no standard acceptable method available to provide accurate estimates of the structural integrities of pavement layers and the subgrade.

## 2. OBJECTIVE

The research study aims to achieve the following objectives:

(1) Introduce new comprehensive pavement layer deflection and deflection bowl area parameters, which are based on the entire FWD deflection bowl rather than one single deflection point.
(2) Utilize 3D-Move pavement analysis software package to simulate field-measured FWD deflection bowl.
(3) Predict the number of traffic loading cycles to failure (e.g., fatigue) based on the horizontal tensile strain at the bottom of the HMA layer and relate that to the newly developed deflection parameters.
(4) Develop a scoring system to rank the strength of the pavement sections without the need to run an FWD testing.
(5) Relate the developed deflection and deflection area parameters to field measured distresses such as fatigue cracking, rutting, and roughness.

The findings of the study will help the South-Central State DOTs and local highway agency officials to make more informed decisions about the most suitable maintenance and rehabilitation strategies for deteriorated flexible pavement structures.

## 3. SCOPE

Pavement deflection has been used widely as a nondestructive technique to evaluate the structural capacity of pavements at both network and project levels. Current devices include the Falling Weight Deflectometer and the Deflectograph, which can record the deflection bowl shape. Based on literature research, it can be noticed that several models have been developed to create parameter(s) that describe(s) the in-situ structural state of the pavement. However, most of the up-to-date developed indices are:

- Exclusively based on either central deflections or one deflection point along FWD deflection bowl. No comprehensive deflection or structural index is available that utilizes the entire FWD deflection bowl area.
- Describe the remaining life of the pavement without calculating a predicted number of traffic load cycles to failure (e.g., fatigue).

The scope of this study is to overcome the limitations associated with present structural assessment models. As an initiative, new area ratio parameter will be introduced that utilize entire FWD deflection bowl (i.e., 1524 mm from the load plate). The developed area ratio parameter will be related to the measured fatigue cracking of the respective pavement sections and the remaining service life will be predicted.

# 4. METHODOLOGY

Nondestructive deflection measuring devices such as FWD apply an impulse or transient load that simulates truck loading to a large extent. It is obvious that strong pavements show small deflections compared to weak pavements. A wealth of FWD data is available in the Long-Term Pavement Performance (LTPP) database, along with detailed information on material properties, layer thicknesses, and traffic data. LTPP is one of the largest pavement performance research programs, initiated in the year 1987, as a part of Strategic Highway Research Program (SHRP). The database includes around 2,500 pavement sections all over the USA and Canada. Thirty-Five SHRP pavement sections in the state of Texas have been considered for the study.

## 4.1. Deflection and Pavement Condition Data Extraction from LTPP

### *4.1.1. Data Collection*

The LTPP database defines the location of every individual pavement section by its latitude and longitude. The location of all pavement sections in the state of Texas is displayed under the MAP tab in the LTPP website *(25)*. The Global Positioning System (GPS) locations of 35 SHRP pavement sections are shown in Table 3. The 35 SHRP pavement sections considered for the study were selected in such a way to cover a wide area of the state of Texas. However, some areas were not covered due to the lack of enough data required to simulate the deflection bowl utilizing the computer program.

**Locations and Layer Properties of Selected LTPP Pavement Sections:** Figure 1 shows the locations of the 35 LTPP pavement sections considered for the study along with their SHRP ID. The sections were classified into two categories: active sections and out of study sections. Active sections refer to sections that are being monitored and regularly tested up to date while out of study sections were monitored and tested during the past few years. Thus, no new testing results will be available for out of study sections. The selected 35 sections included both active and out of study sections.

**Table 3. Location details of 35 SHRP pavement sections in Texas.**

| Serial Number | SHRP ID | County | GPS location (Latitude, Longitude) |
|---|---|---|---|
| 1 | 1046 | Carson | 35.2076, -101.34516 |
| 2 | 1047 | Carson | 35.20766, -101.17967 |
| 3 | 1049 | Nacogdoches | 31.65924, -94.67828 |
| 4 | 1056 | Ochiltree | 36.19438, -100.70943 |
| 5 | 1068 | Lamar | 33.50472, -95.58941 |
| 6 | 1069 | Kaufman | 32.61718, -96.42596 |
| 7 | 1076 | Terry | 33.16708, -102.28275 |
| 8 | 1093 | Atascosa | 28.77723, -98.30895 |
| 9 | 1111 | Lubbock | 33.53144, -101.80471 |
| 10 | 1113 | Rusk | 31.95767, -94.7002 |
| 11 | 1116 | Rusk | 31.89281, -94.68111 |
| 12 | 2172 | Mitchell | 32.36639, -100.99145 |
| 13 | 2176 | Hale | 34.16527, -101.70905 |
| 14 | 3669 | Angelina | 31.32793, -94.78652 |
| 15 | 3679 | Angelina | 31.37204, -94.50556 |
| 16 | 3729 | Cameron | 26.08664, -97.5844 |
| 17 | 3835 | Brazos | 30.7342, -96.43423 |
| 18 | 6079 | Deaf Smith | 35.18151, -103.03008 |
| 19 | 9005 | Bexar | 29.5168, -98.721 |
| 20 | A502 | Kaufman | 32.61423, -96.41357 |
| 21 | A504 | Kaufman | 32.6134, -96.40476 |
| 22 | A505 | Kaufman | 32.6134, -96.3972 |
| 23 | A507 | Kaufman | 32.6134, -96.40186 |
| 24 | A508 | Kaufman | 32.61364, -96.40928 |
| 25 | B310 | Kaufman | 32.62042, -96.43343 |
| 26 | B320 | Kaufman | 32.61927, -96.43085 |
| 27 | D310 | Mitchell | 32.37174, -100.9831 |
| 28 | D320 | Mitchell | 32.37023, -100.98542 |
| 29 | D330 | Mitchell | 32.36432, -100.99456 |
| 30 | D350 | Mitchell | 32.36296, -100.99666 |
| 31 | M310 | Duval | 27.93181, -98.55456 |
| 32 | M320 | Duval | 27.93369, -98.55273 |
| 33 | M330 | Duval | 27.93513, -98.55131 |
| 34 | M340 | Duval | 27.93657, -98.5499 |
| 35 | M350 | Duval | 27.93839, -98.54814 |

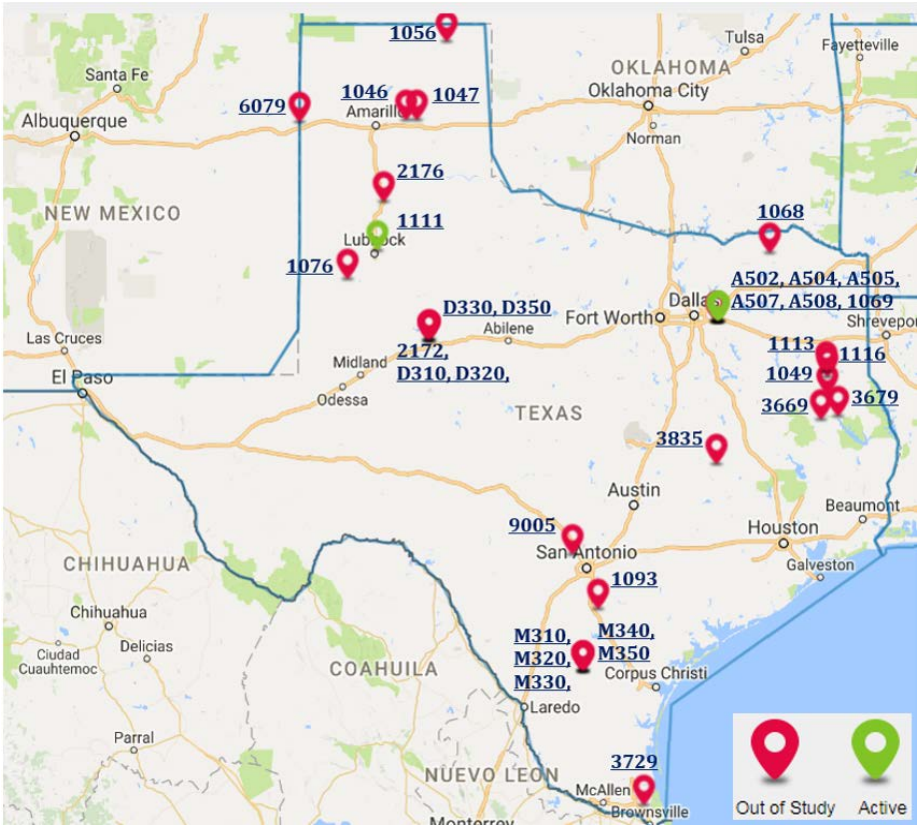


**Figure 1. Location of the utilized 35 SHRP pavement sections.**

The out of study sections were considered within this research study due to the limited available number of active sections, especially, that the only difference between the active and out of study sections is the availability of the up-to-date test results. Therefore, it was believed that both types of sections include equally valuable data that can be utilized in this study. The extracted layer thicknesses for the pavement sections are shown in Table 4. The Elastic moduli values that will be utilized in the deflection simulation of selected pavement sections are shown in Table 5. HMA elastic moduli values were estimated utilizing ANNACAP software package as recommended by LTPP *(26).* The values were then adjusted to reflect the actual distress/ condition of pavement sections at the time of FWD testing as recommended by the Mechanistic-Empirical Pavement Design Guide (MEPDG) part 3 chapter 6 recommendations (REF). The elastic moduli for the base and subbase layers were provided by LTPP in terms of soil classification type. Few pavement sections comprised of bound layers (lime or cement treated) without soil classification data were assigned typical elastic modulus for such layers based on recommendations given in MODULUS 6.1, a pavement design software recommended by the TxDOT *(27).*

**Table 4. Layer thicknesses for the 35 SHRP pavement sections in Texas.**

| Serial Number | SHRP ID | Layer thickness, inch | | | | |
|---|---|---|---|---|---|---|
| | | HMA Layer-1 | HMA Layer-2 | HMA Layer-3 | Base | Subbase |
| 1 | 1046 | 10.0 | 2.4 | - | 8.4 | 5.1 |
| 2 | 1047 | 10.0 | - | - | 15.3 | 14.4 |
| 3 | 1049 | 4.6 | - | - | 11.2 | 7.8 |
| 4 | 1056 | 1.8 | - | - | 14.4 | - |
| 5 | 1068 | 2.1 | 7.8 | - | 6.0 | 8.0 |
| 6 | 1069 | 9.5 | - | - | 15.2 | 6.5 |
| 7 | 1076 | 5.4 | - | - | 8.4 | - |
| 8 | 1093 | 1.9 | 2.4 | - | 17.2 | - |
| 9 | 1111 | 9.5 | - | - | 8.4 | - |
| 10 | 1113 | 4.2 | - | - | 11.5 | - |
| 11 | 1116 | 4.6 | - | - | 10.9 | - |
| 12 | 2172 | 0.9 | 10.0 | - | 6.8 | 8.8 |
| 13 | 2176 | 2.3 | - | - | 9.4 | - |
| 14 | 3669 | 4.2 | - | - | 8.0 | 7.9 |
| 15 | 3679 | 1.6 | - | - | 8.4 | - |
| 16 | 3729 | 11.6 | - | - | 10.5 | 5.4 |
| 17 | 3835 | 8.5 | - | - | 13.0 | 6.0 |
| 18 | 6079 | 2.6 | 1.6 | 5.2 | 5.0 | - |
| 19 | 9005 | 1.9 | 1.2 | - | 9.4 | - |
| 20 | A502 | 9.3 | - | - | 14.6 | 8.0 |
| 21 | A504 | 5.0 | 8.9 | - | 10.0 | 8.0 |
| 22 | A505 | 2.1 | 9.4 | - | 15.0 | 10.4 |
| 23 | A507 | 8.8 | - | - | 15.0 | 8.3 |
| 24 | A508 | 9.5 | - | - | 14.0 | 8.0 |
| 25 | B310 | 9.9 | - | - | 15.2 | 6.5 |
| 26 | B320 | 9.7 | - | - | 15.2 | 6.5 |
| 27 | D310 | 1.9 | 9.9 | - | 6.8 | 8.8 |
| 28 | D320 | 2.2 | 1.9 | 7.3 | 15.0 | 10.4 |
| 29 | D330 | 3.1 | - | - | 15.6 | 8.4 |
| 30 | D350 | 0.8 | 10.1 | - | 6.8 | 8.8 |
| 31 | M310 | 0.6 | 1.6 | - | 8.1 | 8.8 |
| 32 | M320 | 1.7 | - | - | 8.1 | 8.8 |
| 33 | M330 | 1.9 | - | - | 8.1 | 8.8 |
| 34 | M340 | 1.7 | - | - | 8.1 | 8.8 |
| 35 | M350 | 1.6 | - | - | 8.1 | 8.8 |

**Table 5. Layers properties of considered 35 SHRP pavement sections.**

| Serial Number | SHRP ID | Elastic Modulus (E), psi | | | | | |
|---|---|---|---|---|---|---|---|
| | | HMA Layer-1 | HMA Layer-2 | HMA Layer-3 | Base | Subbase | Sub-grade |
| 1 | 1046 | 882,000 | 798,035 | - | 32,000 | 26,000 | 26,000 |
| 2 | 1047 | 756,000 | - | - | 32,000 | 32,000 | 24,000 |
| 3 | 1049 | 1,296,000 | - | - | 400,000 | 100,000 | 26,000 |
| 4 | 1056 | 12,600 | - | - | 28,000 | - | 13,500 |
| 5 | 1068 | 324,000 | 324,000 | - | 32,000 | 100,000 | 8,000 |
| 6 | 1069 | 648,000 | - | - | 28,000 | 17,000 | 17,000 |
| 7 | 1076 | 378,000 | - | - | 26,000 | - | 26,000 |
| 8 | 1093 | 648,000 | 504,000 | - | 26,000 | - | 17,000 |
| 9 | 1111 | 630,000 | - | - | 32,000 | - | 26,000 |
| 10 | 1113 | 486,000 | - | - | 38,000 | - | 32,000 |
| 11 | 1116 | 486,000 | - | - | 38,000 | - | 17,000 |
| 12 | 2172 | 1,377,000 | 1,071,000 | - | 26,000 | 32,000 | 17,000 |
| 13 | 2176 | 693,000 | - | - | 250,000 | - | 26,000 |
| 14 | 3669 | 648,000 | - | - | 350,000 | 100,000 | 26,000 |
| 15 | 3679 | 1,620,000 | - | - | 400,000 | - | 29,000 |
| 16 | 3729 | 1,458,000 | - | - | 32,000 | 8,000 | 8,000 |
| 17 | 3835 | 1,539,000 | - | - | 40,000 | 24,000 | 24,000 |
| 18 | 6079 | 1,008,000 | 1,296,000 | 1,008,000 | 32,000 | - | 24,000 |
| 19 | 9005 | 1,340,603 | 1,134,000 | - | 26,000 | - | 17,000 |
| 20 | A502 | 1,134,000 | - | - | 28,000 | 100,000 | 17,000 |
| 21 | A504 | 504,000 | 648,000 | - | 28,000 | 17,000 | 17,000 |
| 22 | A505 | 756,000 | 972,000 | - | 28,000 | 17,000 | 17,000 |
| 23 | A507 | 1,134,000 | - | - | 28,000 | 100,000 | 17,000 |
| 24 | A508 | 1,296,000 | - | - | 28,000 | 100,000 | 17,000 |
| 25 | B310 | 972,000 | - | - | 28,000 | 100,000 | 17,000 |
| 26 | B320 | 648,000 | - | - | 28,000 | 100,000 | 17,000 |
| 27 | D310 | 1,296,000 | 1,008,000 | - | 26,000 | 32,000 | 17,000 |
| 28 | D320 | 1,260,000 | 1,620,000 | - | 28,000 | 17,000 | 17,000 |
| 29 | D330 | 1,620,000 | - | - | 40,000 | 20,000 | 20,000 |
| 30 | D350 | 1,053,000 | 819,000 | - | 26,000 | 32,000 | 17,000 |
| 31 | M310 | 48,600 | 37,800 | - | 32,000 | 15,000 | 5,000 |
| 32 | M320 | 63,000 | - | - | 32,000 | 40,000 | 6,000 |
| 33 | M330 | 37,800 | - | - | 24,000 | 40,000 | 6,000 |
| 34 | M340 | 63,000 | - | - | 32,000 | 20,000 | 8,000 |
| 35 | M350 | 37,800 | - | - | 32,000 | 20,000 | 8,000 |

**Falling Weight Deflectometer (FWD) Data:** FWD deflection measurements were collected from the Pavement Monitoring (MON) module in the LTPP database. FWD measurements and their corresponding deflection data were stored in tables with MON_DEFL as a part of their names. The extracted data included: (1) peak drop load, (2) drop height, (3) sensors offset distances from the load point, and (4) peak deflection values recorded by each sensor.

FWD machines are equipped with one of the two types of geophone-offset configuration from the center of the load plate: (a) 9 sensors and (b) 7 sensors. Offsets in front of the load plate (i.e., in the travel direction) are considered positive and those behind the load plate (i.e., opposite to the direction of travel) are considered negative *(28)* , as shown in Table 6. The deflections recorded by the geophone sensors were referred to as peak deflections (PEAK_DEFL). For example, the

extracted FWD deflection data for the LTPP section 1049 is shown in Table 7. Similarly, the extracted field measured FWD deflection measurements for the rest of the LTPP pavement sections are summarized in Appendix A. Generally, the deflection measured by the ninth sensor (D9) is excluded since it is the replica of deflection measured by third sensor, D3 (305 mm).

**Table 6. Deflection sensor offsets for 9 and 7 sensor FWDs.**

| Deflection | Sensors | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 | D9 |
|---|---|---|---|---|---|---|---|---|---|---|
| Offset Distance (mm) | 9 sensors | 0 | 203 | 305 | 457 | 610 | 914 | 1,219 | 1,524 | – 305 |
| | 7 sensors | 0 | 203 | 305 | 457 | 610 | 914 | 1,524 | - | - |

**Table 7. FWD data collected on 28-Mar-1996 on pavement section with SHRP ID: 1049.**

| Drop Height | Drop load (kPa) | Average all point locations peak deflections micrometers | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| 1 | 391.7 | 75.3 | 60.7 | 54.3 | 46.9 | 40.5 | 31.0 | 17.6 |
| 2 | 589.4 | 112.9 | 91.4 | 82.0 | 71.1 | 61.5 | 46.9 | 26.5 |
| 3 | 788.5 | 152.8 | 124.3 | 111.6 | 96.9 | 84.0 | 63.9 | 36.1 |
| 4 | 1,040.6 | 205.9 | 168.2 | 151.2 | 131.4 | 114.3 | 87.0 | 48.9 |

The load applied by the FWD to the load plate differs for each drop height. There are four typical drop heights (load levels) defined for LTPP FWD testing. The acceptable load range for each drop height is between 90 percent and 110 percent of the targeted load value, as shown in Table 8. *(28)*

At each drop height, four FWD deflection measurements are recorded (i.e., four replicates). The four replicates associated to each drop height were averaged to represent a single deflection measurement reading at that specific location. Upon application of the FWD load, and at each drop height, the resulting deflection values were measured and recorded by geophone sensors installed at specified distances from the load plate. FWD tests were conducted along different point locations throughout the 152 meters long pavement sections (Figure 2). In order to have a good representation of the pavement section condition, all measured deflections values at all point locations were averaged and utilized in the analysis. The response of the pavement section varies depending on the applied drop loads. Drop loads corresponding to drop height 1 will result in a lower measured deflection values compared to measured deflection values corresponding to drop height 4.

**Table 8. Targeted loads and acceptable ranges (1kip = 1x103 lb).**

| Drop Height | Targeted Load, kN (kips) | Acceptable Range, kN (kips) |
|---|---|---|
| 1 | 26.7 (6.0) | 24.0 to 29.4 (5.4 to 6.6) |
| 2 | 40.0 (9.0) | 36.0 to 44.0 (8.1 to 9.9) |
| 3 | 53.4 (12.0) | 48.1 to 58.7 (10.8 to 13.2) |
| 4 | 71.2 (16.0) | 64.1 to 78.3 (14.4 to 17.6) |

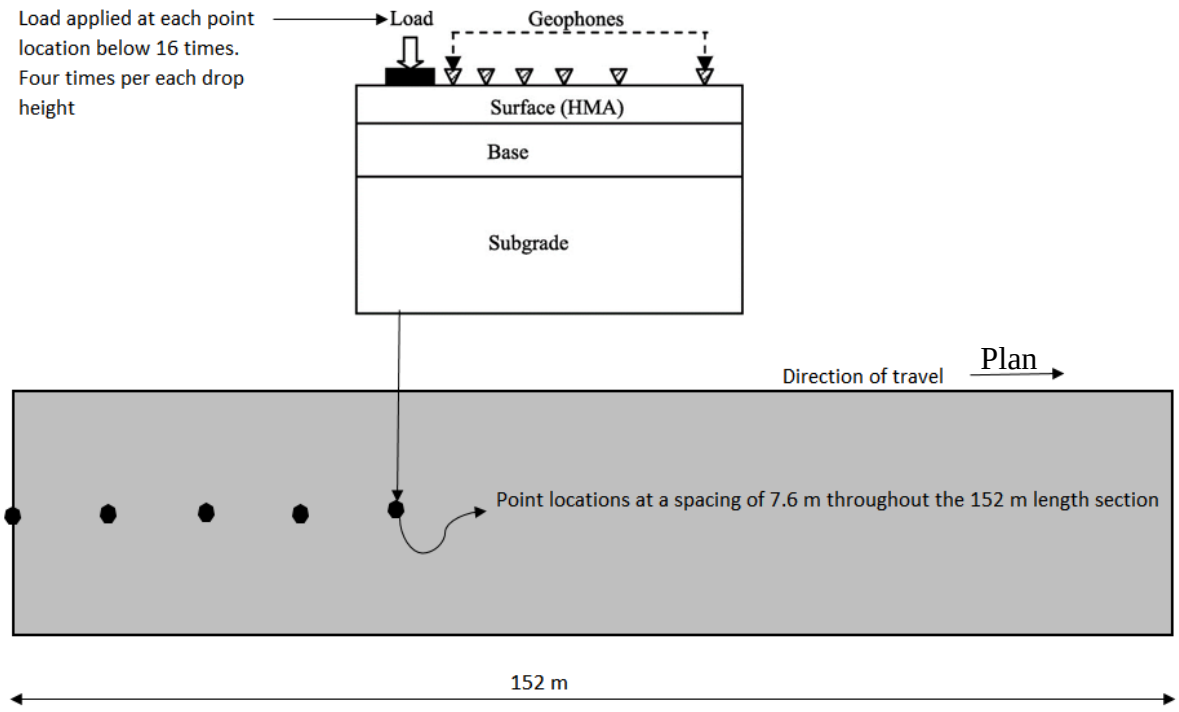


**Figure 2. Illustration of the number of FWD test conducted at different point locations.**

**Distress Condition Data:** Structural distresses such as fatigue cracking and rutting were measured in $m^2$ and mm, respectively. Functional distress such as International Roughness Index (IRI) was measured in m/km. The measurements of both structural and functional distresses were conducted based on the LTPP Distress Identification Manual *(29)*. The distress data were extracted from the performance tab for each section at the corresponding FWD measured date as shown in Table 9.

**Table 9. Distress data: Fatigue, Rutting, and IRI.**

| Serial Number | SHRP ID | Fatigue ($m^2$) | Rutting (mm) | IRI (m/km) |
|---|---|---|---|---|
| 1 | 1046 | 0 | - | - |
| 2 | 1047 | 1.3 | - | - |
| 3 | 1049 | 13.7 | - | - |
| 4 | 1056 | 197.4 | 23 | 1.893 |
| 5 | 1068 | 96.9 | 7 | 1.4 |
| 6 | 1069 | 50.3 | 14 | 1.834 |
| 7 | 1076 | 65.3 | 11 | 2.681 |
| 8 | 1093 | 140.8 | 16 | 1.531 |
| 9 | 1111 | 0.9 | - | 1.013 |
| 10 | 1113 | 97.2 | 10 | 1.088 |
| 11 | 1116 | 143.22 | - | 1.383 |
| 12 | 2172 | 0 | 5 | 0.754 |
| 13 | 2176 | 96.4 | 7 | 1.444 |
| 14 | 3669 | 20.6 | 14 | 1.469 |
| 15 | 3679 | 0 | - | 1.79 |
| 16 | 3729 | 10.7 | 10 | 1.42 |
| 17 | 3835 | 12.4 | 4 | 1.782 |
| 18 | 6079 | 4.7 | 7 | - |
| 19 | 9005 | 50.8 | - | 2.25 |
| 20 | A502 | 0 | 13 | 1.375 |
| 21 | A504 | 0 | 11 | 1.301 |
| 22 | A505 | 0 | 4 | 1.315 |
| 23 | A507 | 1 | 10 | 1.463 |
| 24 | A508 | 2.8 | 9 | 1.258 |
| 25 | B310 | 4.2 | 5 | - |
| 26 | B320 | 69.9 | 15 | 1.545 |
| 27 | D310 | 0 | 5 | 1.137 |
| 28 | D320 | 0 | 6 | 0.834 |
| 29 | D330 | 0 | 6 | 0.834 |
| 30 | D350 | 0 | 5 | 1.137 |
| 31 | M310 | 176.6 | - | 3.047 |
| 32 | M320 | 149.7 | - | 2.497 |
| 33 | M330 | 189.8 | - | 2.361 |
| 34 | M340 | 171.4 | - | 2.69 |
| 35 | M350 | 114.2 | - | 1.312 |

## 4.2. Computer Simulation of FWD for the Most Common Flexible Pavement Structures

### *4.2.1. Background: 3D-Move Analysis Software Package*

3D-Move Analysis Software is a powerful software package that has been utilized for the analysis of asphalt pavements. The program was released by University of Nevada, Reno (UNR), under a cooperative agreement with the Federal Highway Administration (FHWA) to analyze asphalt pavements under variety of loading conditions. The software uses a continuum-based finite-layer approach to compute pavement responses. The finite layer approach treats each pavement layer as

a continuum and uses the Fourier transform technique. Therefore, the program can handle complex surface loadings such as multiple loads and non-uniform tire pavement contact stress distribution *(30)*. One of the important aspects of the program is that the tire and loading configurations are adjustable to meet user requirements. A shot of the program's main screen is shown in Figure 3. Some of the advanced applications of 3D-Move Analysis include: 1) Estimation of pavement performance at intersections, which account for effect of braking on pavement response and 2) Estimation of damage under off-road farm vehicles *(31)*. There are numerous computer programs available for analyzing and modelling flexible pavement structures. The reasons for utilizing the 3D-Move software package in this study are *(32)*:

(1) It is an open source free software.
(2) The software utilizes finite layer continuum approach.
(3) It models moving 3D-surface stresses (dynamic, normal and shear contact stresses).
(4) It accounts for visco-elastic material characterization utilizing symmetrical sigmoidal function.
(5) It analyzes tire imprints of any shape (circular, rectangular or elliptical).
(6) It has ability to analyze non-generic axle and tire configurations.
(7) It has ability to predict responses at any locations required by the user. This is very important to replicate the FWD sensor locations, so that the new defined response points will be equivalent to the actual FWD sensor locations.
(8) It accounts for the effect of braking forces on pavement response.
(9) It has ability to analyze pavement responses due to non-standard vehicles such as off-road farm vehicles and oversize or overweight (OS/OW) vehicles.

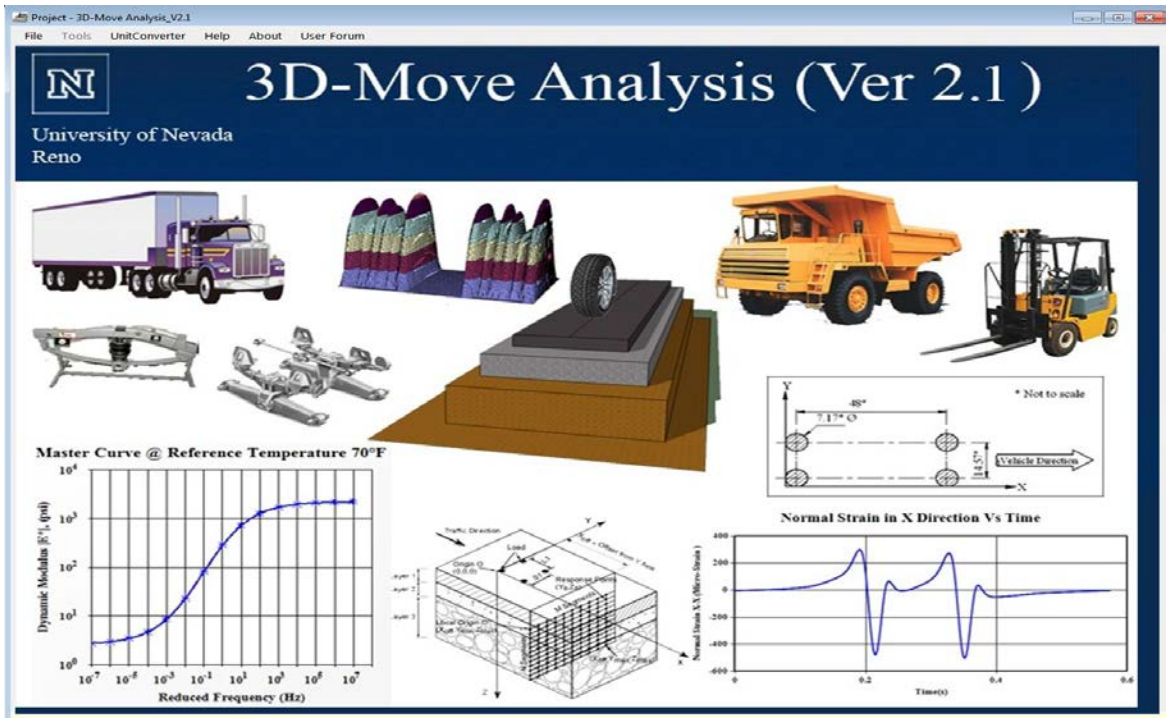


**Figure 3. Screenshot of the 3D Move Analysis computer program.**

### *4.2.2. Detailed Analysis Approach*

For a better demonstration of the analysis approach, a detailed step by step process along with actual snaps from the software will be illustrated and discussed for one LTPP pavement section (SHRP ID: 48-1049) out of the 35 sections considered. 3D-Move Analysis program has the ability to perform both static and dynamic analyses. Since this study aims to replicate FWD measured deflection bowls, the static analysis approach was utilized. The following are the steps involved in simulation of field measured FWD deflection bowl utilizing 3D-Move analysis software package:

- Project identification,
- Analysis type,
- Axle configuration/contact pressure distribution,
- Pavement structure,
- Pavement layer properties, and
- Response points.

**Project Identification and Analysis Type:** The first required input data by the software is the identification data of the pavement section considered for analysis. This data includes project location, milepost, and traffic direction (Figure 4). Upon supplementing the pavement section identification details, the static analysis was selected.

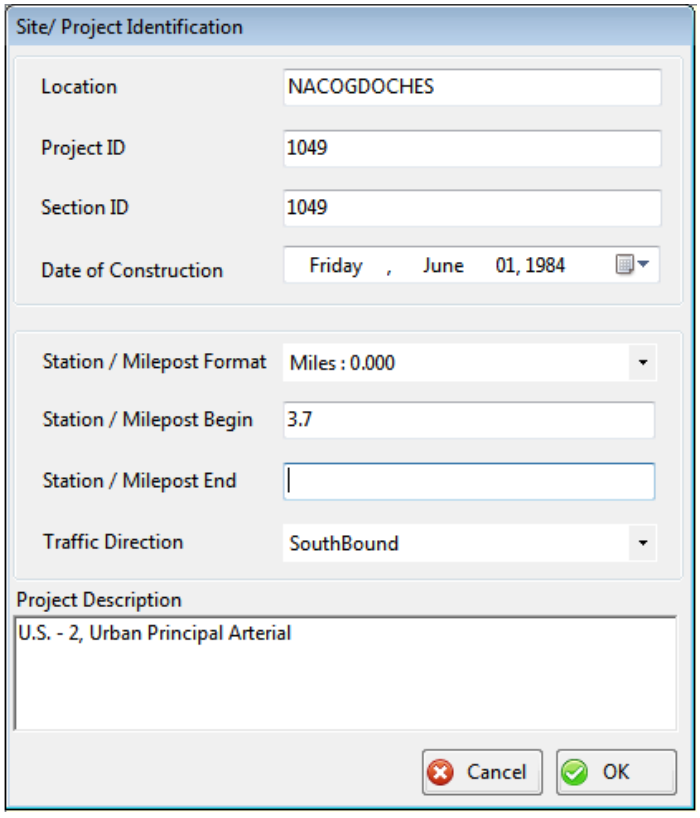


**Figure 4. Location identification details for the SHRP section 1049.**

**Axle configuration/Contact Pressure Distribution:** Upon the selection of static analysis approach, the next step is to select the axle configuration/contact pressure distribution. This section

can be divided into two parts, the first is the selection of the tire configuration and the second is the applied load. 3D-Move program offers six options (A through F) that can be selected as a tire configuration setting based on the user needs.

Out of the six configurations offered by the software, option B may be utilized to replicate FWD test conditions since this option offers the required flexibility to model various types of axle configurations. As discussed earlier, the measured FWD deflections at different locations due to the application of four different loads are linked to four drop heights. All four loads were utilized in the analysis, starting from drop height 1 that has the lowest applied load and ending with the highest applied load allocated to drop height number 4 (Table 7). The average stress at different point locations for each drop height (four values, one for each drop height) extracted under data collection in this report were utilized to calculate the applied load. The calculation was completed by the multiplication of the FWD stress with the known area of the load plate (300 mm in diameter). The tire pressure for the analysis was considered uniform with a constant value of 120 psi. The geometry of the load area was selected to be circular to match the diameter of the circular FWD plate. The radius was calculated internally by the software utilizing the equation shown in Figure 5.

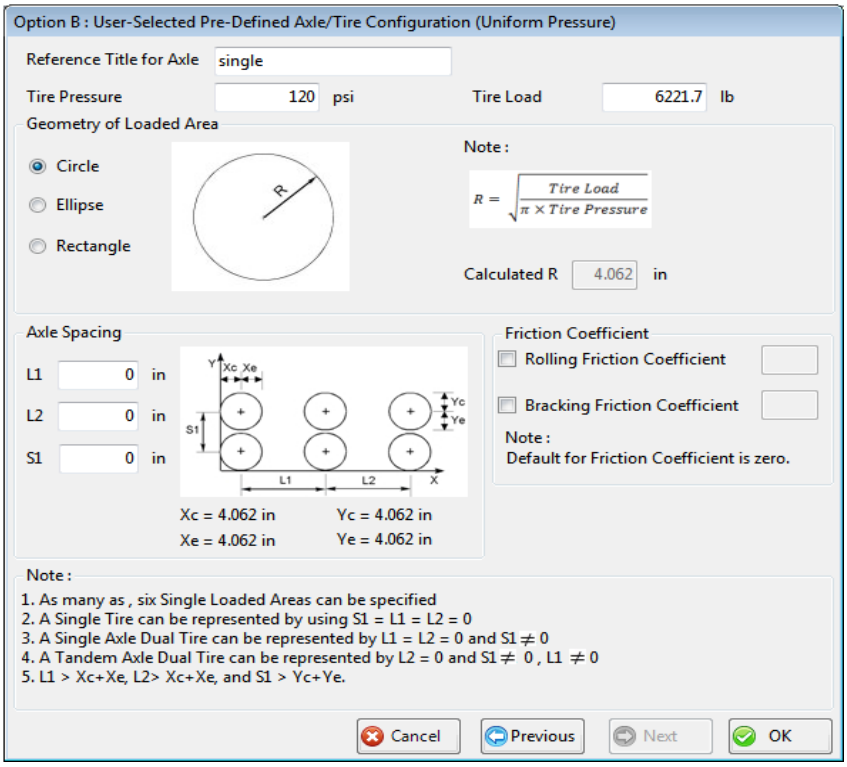


**Figure 5. FWD recorded drop load is considered as tire load for analysis.**

**Pavement Structure:** Each pavement section has a unique structure, layer thickness and material properties such as binder grade, base, subbase, and subgrade soil types. This section allows the user to select the number of layers and their corresponding thicknesses. Upon entering the thickness of individual layers as per the extracted pavement cross section details, the software generates a separate tab to input each layer properties. Layer properties included modulus values and Poisson's ratio for asphalt layer (Figure 6a) and unbound layers (Figure 6b). The extracted

moduli values for the different layers were utilized as an input at this stage. For all sections, Poisson's ratio values of 0.35, 0.4 and 0.45 for the asphalt layer, base or subbase and subgrade, respectively, were considered in the analysis.

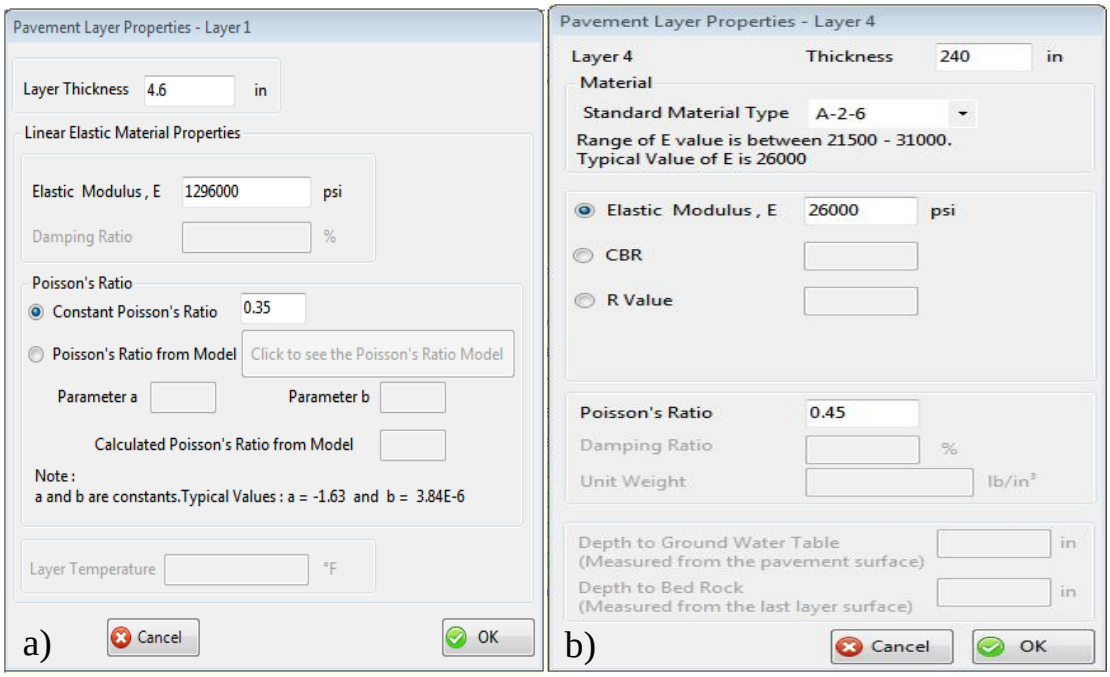


**Figure 6. Pavement layer properties window of the 3D Move Analysis program: (a) Asphalt layer, and (b) Unbound layer.**

**Response Points:** For a successful 3D-Move Analysis simulation, the simulated deflection bowls must be obtained at locations equivalent to the actual FWD sensor locations. To model this, a better understanding of the software coordinates is required. The graphical representation of the response points is shown in Figure 7 and the response points considered for the analysis of SHRP section 1049 is shown in Table 10. It should be noted that the Z-Coordinate was assigned a constant value of 0.001 mm to calculate the deflection at the pavement surface.

**Software Simulated Deflection Bowl Outputs:** Out of the many outputs produced by the 3D-Move Analysis software package, the displacements predicted at the surface of the pavement section were retained. The simulation results for the pavement section with SHRP ID 1049 are shown in Table 11. Similarly, the deflections computed for the rest of the SHRP sections are shown in Appendix B.

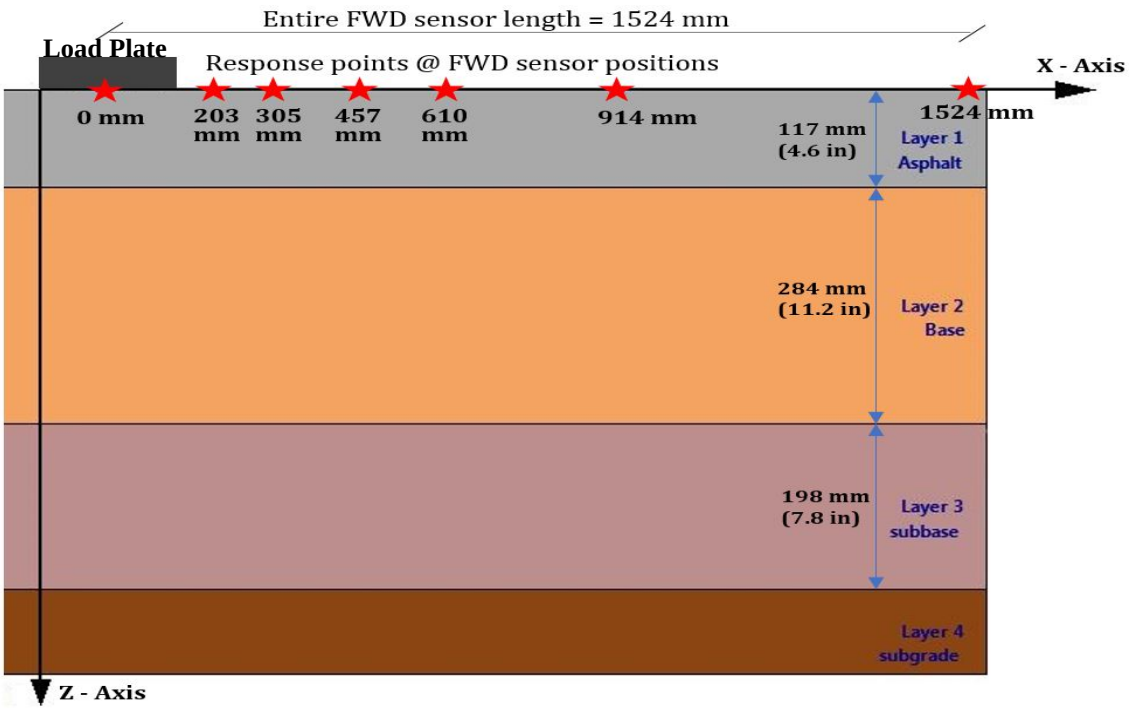


**Figure 7. Graphical representation of locations of the response points for the section 1049.**

**Table 10. Typical response points coordinates for seven sensor FWD.**

| Sensor Offset (mm) | Z-Coord (mm) | Layer No |
|---|---|---|
| 0 | 0.001 | 1 |
| 203 | 0.001 | 1 |
| 305 | 0.001 | 1 |
| 457 | 0.001 | 1 |
| 610 | 0.001 | 1 |
| 914 | 0.001 | 1 |
| 1524 | 0.001 | 1 |

**Table 11. Predicted displacement at response points for the SHRP section 1049.**

| Sensor Offset (mm) | Displacement (μm) |
|---|---|
| 0 | 70.716 |
| 203 | 51.658 |
| 305 | 45.266 |
| 457 | 38.380 |
| 610 | 32.898 |
| 914 | 24.114 |
| 1524 | 12.041 |

## 4.3. Comparison between Measured FWD and Simulated 3D-Move Deflection Bowls

The field measured FWD deflection bowls as extracted from the LTPP database were plotted against the deflection bowls simulated by 3D-Move Analysis software package. Figure 8 illustrates the field measured FWD deflection bowls and 3D-Move simulated deflection bowls for SHRP sections 1049 and 1116 at 4 different drop heights. SHRP section 1049 experienced a low deflection while SHRP section 1116 experienced a high deflection for the same target loads.

The deflection values produce a good indication of the structural condition of pavement sections. For example, at drop height1 the SHRP section 1049 had a maximum central deflection of 70 micrometers (μm) whereas SHRP section 1116 had a maximum central deflection of 276 μm. So, section SHRP 1116 had about four times the amount of deflection experienced by section 1049. Figure 8 illustrates the prediction capability of 3D-Move Analysis to replicate the field measured FWD deflection bowls as well. Similarly, the results of FWD deflection simulated bowls for all LTPP pavement sections considered in this study are shown in Appendix C.

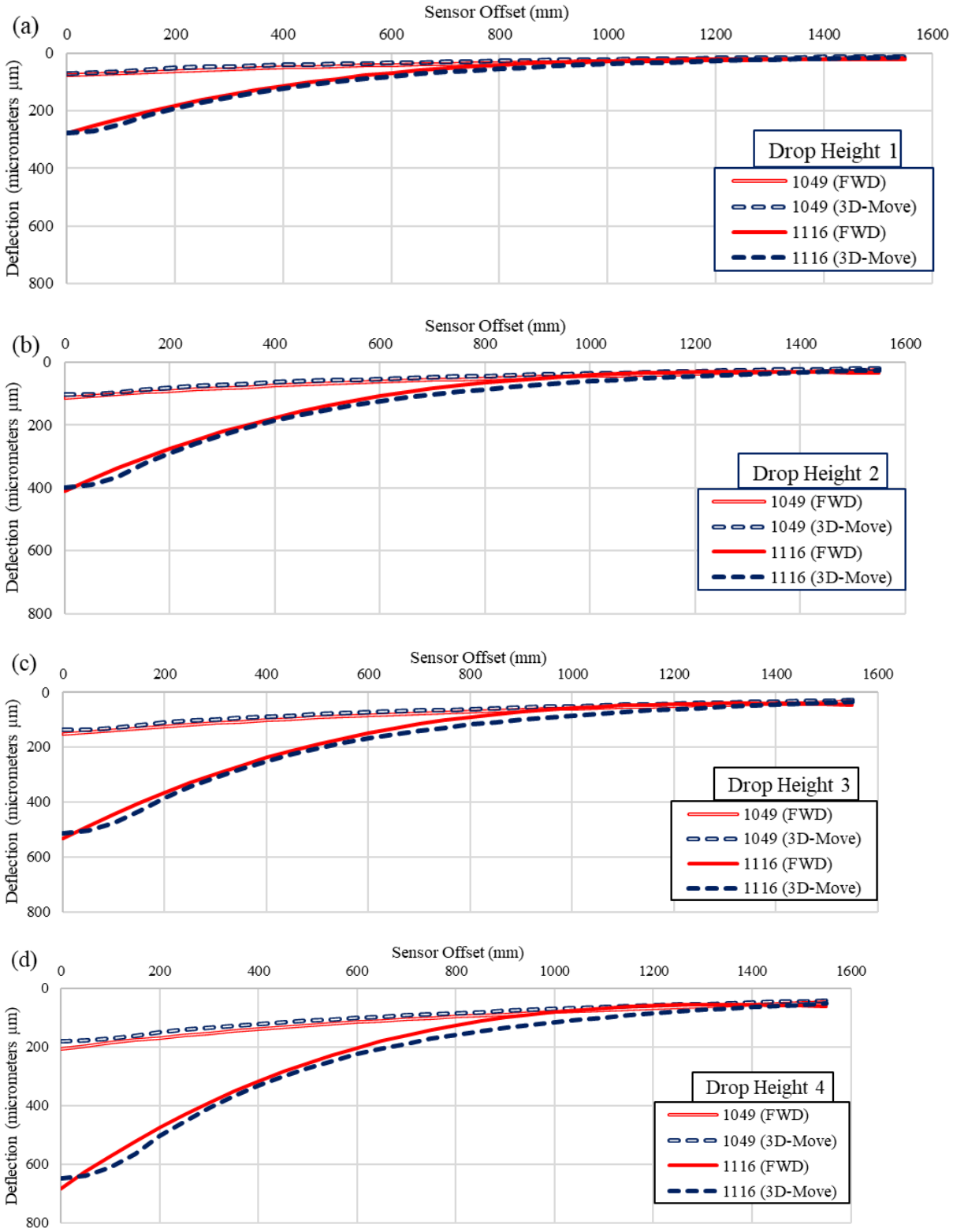


**Figure 8. Measured FWD & 3D Move simulated deflection bowls for SHRP sections 1049 and 1116: (a) Drop Height 1, (b) Drop Height 2, (c) Drop Height 3, and (d) Drop Height 4.**

### *4.3.1. Simulated Deflection Values*

The central deflection ($D_0$) is the deflection measured under the center of the load plate during regular FWD field testing. As discussed in the literature review, $D_0$ has been utilized as an indication of the overall structural status of pavement structure. The actual measured FWD central deflections and 3D-Move simulated central deflections for all the 35 SHRP pavement sections at 4 drop heights were plotted (Figure 9). The figure clearly shows the ability of 3D-Move to replicate the actual FWD measured central deflections with a high coefficient of determination ($R^2$). Similar to the comparison between central deflections, deflections measured at all sensors of 35 SHRP pavement sections were compared to that of the simulated deflections (Figure 10).

The relationship had a coefficient of determination ($R^2$) value of 0.91 for 1028 data points. A high value of the coefficient of determination ($R^2$) indicates that 3D-Move may be utilized to simulate not only the central deflection ($D_0$) but all the other deflection values at different locations along the deflection bowl. The outcome of 3D-Move Analysis simulated deflection bowls will be utilized to develop structural condition parameters.

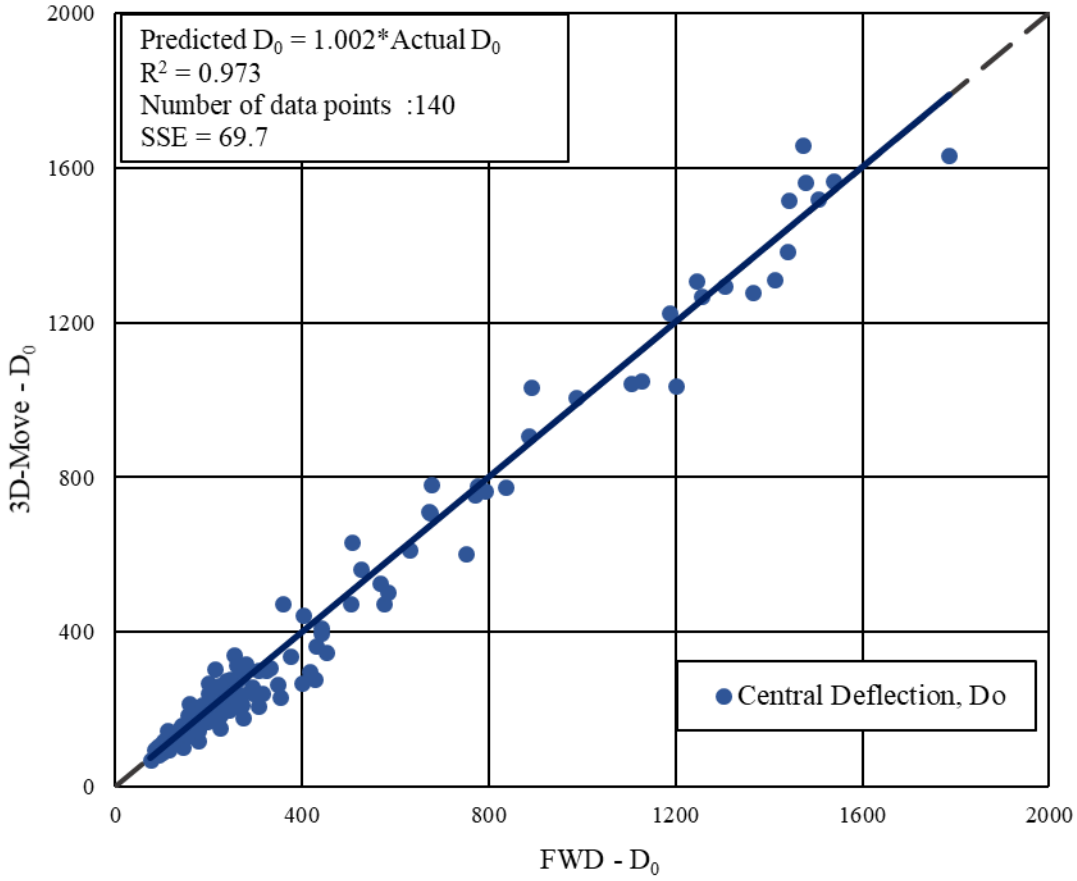


**Figure 9. FWD Measured and 3D Move simulated central deflections for 35 SHRP sections.**

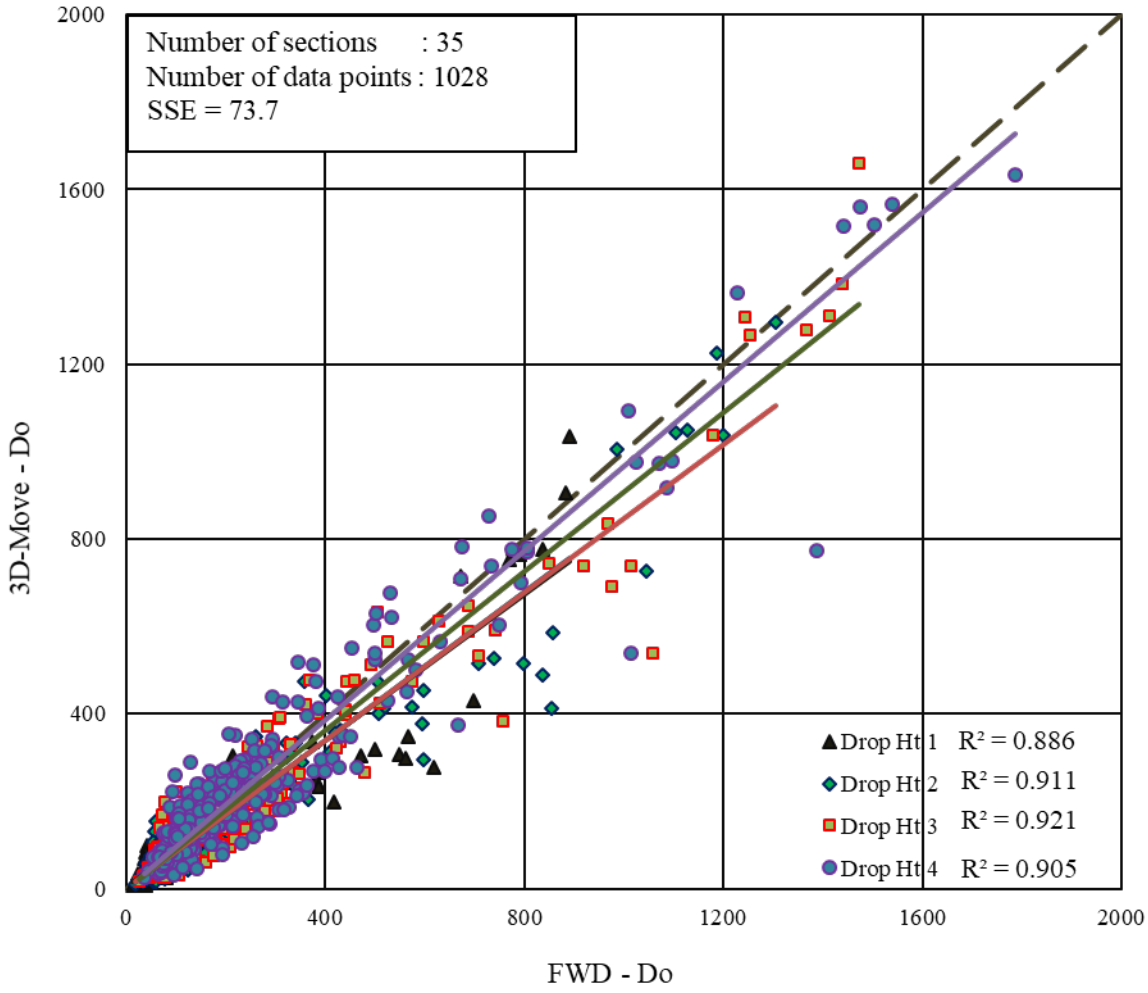


**Figure 10. FWD Measured and 3D Move simulated deflections at all sensors for 35 SHRP sections.**

## 4.4. Deflection Parameters Generation and Evaluation

The simulated FWD deflection bowls were utilized to develop deflection parameters, which can be utilized to categorize pavement sections as structurally good, fair, and poor. By observing measured FWD deflection bowls of 35 pavement sections and their corresponding structural layer thicknesses and properties, it can be observed that there is a direct relationship between pavement moduli, layer thicknesses and stiffness to the shape of deflection bowls.

The pavement section with thin HMA layer or weak subgrade experiences higher central deflection, while the section with thick HMA layer and stiff base layer experiences smaller central deflection. However, central deflection alone cannot be considered as a parameter to decide the structural condition of a pavement section. The deflection bowl shape can be divided into different zones with each associated to pavement structural condition of individual layers. For example, the central deflection represents more the bearing capacity of asphalt layer along with other pavement layers such as base and subgrade while the subgrade stiffness highly affects the overall deflection bowl shape. Deflections measured by the sensors in the middle (neither close to the load plate nor close to the farthest sensor) reflect the stiffness of the base and subbase layers.

### *4.4.1. Comprehensive Deflection Ratio ($CD_r$)*

Deflection ratio is considered one of the important parameters developed and employed by different agencies such as DTMR (Department of Transportation and Main Roads) in Australia. Deflection ration is defined as:

$$D_r = D_{250} / D_0 \quad [14]$$

where:

$D_r$ = deflection ratio,

$D_{250}$ = deflection measured at 250 mm from center of the load plate, and

$D_0$ = central deflection.

Depending on the deflection ratio, the pavement's structural condition was classified as bound pavement, good quality unbound pavement and possibly weak unbound pavement, for $D_r>0.8$, $0.6<D_r<0.7$ and $D_r<0.6$, respectively *(28)*. However, for thicker asphalt pavements, the deflection ratio is calculated based on deflection at 250 mm, which is close to the load plate and captures similar stiffness of pavement layers compared to $D_0$. Hence, a new parameter is introduced to include the effect of base and subbase layers on surface deflection. The new parameter is termed as Comprehensive Deflection ratio ($CD_r$):

$$CD_r = D_{600} / D_0 \quad [15]$$

where:

$D_{600}$ = deflections measured at 600 mm from center of the load plate.

$D_r$ was found to be ineffective for few pavement sections. Though central deflections differed to great extent between pavement sections, $D_r$ remained same, which states that both sections are structurally similar in their performance. However, the field measured fatigue cracking for the SHRP section B320 was 69.9 $m^2$ whereas the same for SHRP section M340 was 171 $m^2$. The total area of a typical pavement section was around 550 $m^2$. The measured fatigue area for the SHRP section M340 was nearly one-third of the total surface area of the pavement section, which clearly

states the poorer condition of that section. However, when the sections are categorized based on $D_r$, both pavement sections would be concluded as structurally fair, which is not true based on field measured fatigue cracking.

$CD_r$ was found to be effective for sections with deflections differing less in magnitude. For example, the comparison between calculated deflection ratio ($D_r$) and comprehensive deflection ratio ($CD_r$) for two pavement sections (SHRP: B320 and M340) is shown in Figure 11. The deflection bowls for both pavement sections were based on drop height 1 (target load of 27 kN).

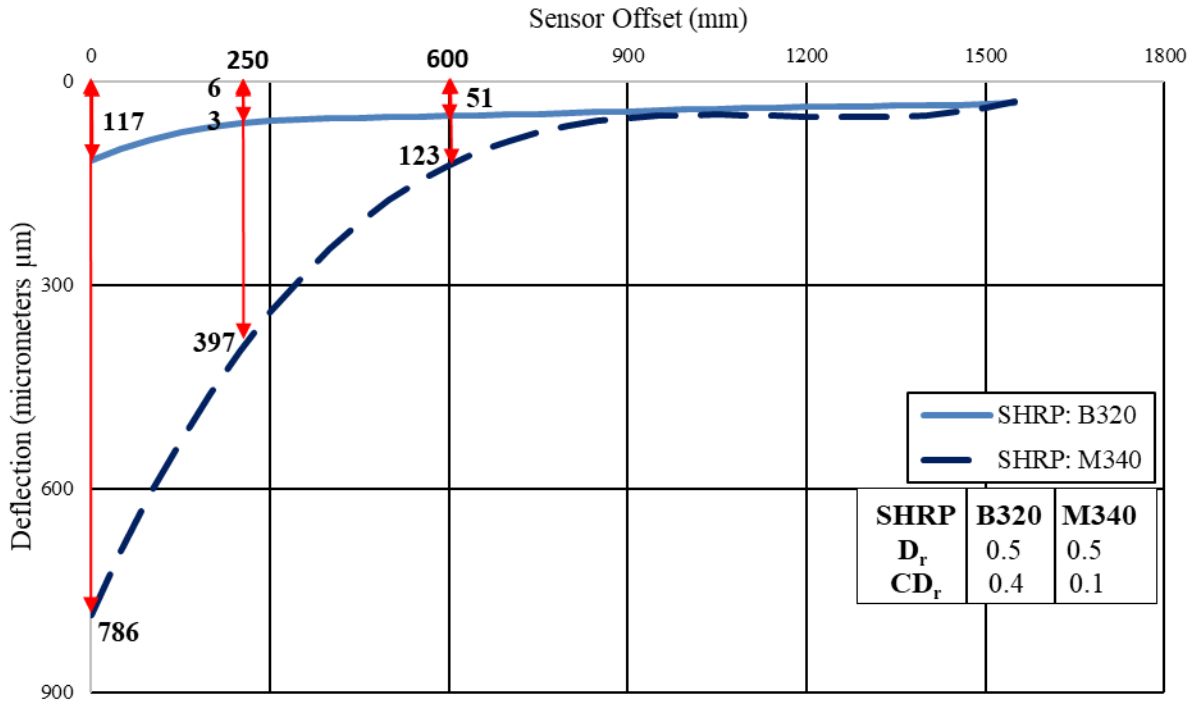


**Figure 11. Deflection ratio ($D_r$) and comprehensive deflection ratio ($CD_r$) illustration with SHRP pavement sections B320 and M340.**

It is obvious that a stiff pavement section must possess higher deflection ratio than a soft pavement section. However, the deflection ratio remains same for both pavement sections irrespective of their central deflections. It can be noted that the comprehensive deflection ratio is greater for section with the smaller deflection than the section with the higher deflection. Hence, $CD_r$ is found to be more effective for assessing pavement sections. In addition, $CD_r$ was well related to the central deflection $D_0$ as well, which can be observed in Figure 12. The coefficient of determination proves the relationship between $D_0$ and $CD_r$.

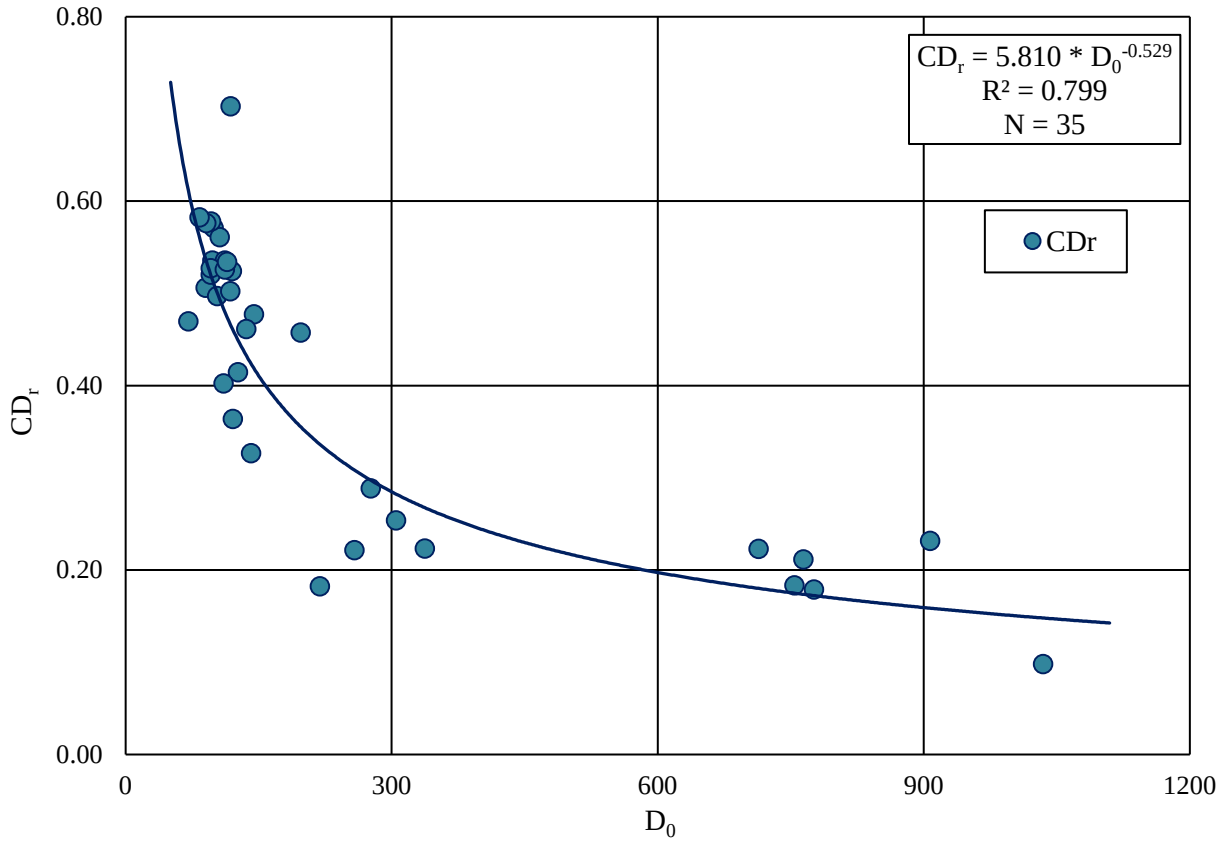


**Figure 12. Relationship between deflection ratio ($D_r$) and central deflection ($CD_r$).**

Utilizing the relationship between $CD_r$ and $D_0$, the sections can be categorized as structurally good, fair and weak, whose $CD_r$ values are less than 0.3, between 0.3 and 0.5, and greater than 0.5, respectively. The figure also illustrates the importance of $CD_r$ compared to consideration of central deflection ($D_0$) alone. Pavement sections with maximum $D_0$ (around 800 micrometers) consecutively resulted in lesser $CD_r$, while few other pavement sections with lesser $D_0$ (around 200 micrometers) also resulted in lesser $CD_r$. When central deflection is solely considered for the structural assessment of pavement sections, erroneous conclusions about pavement sections will result.

It should be noted that the graph shown in Figure 11 corresponded to drop height 1 (27 kN). The ranking system would differ for other three-drop load levels as central deflections eventually differ for different load levels. This phenomenon is due to the four-drop load levels utilized during FWD testing. Different ranking system based on target load levels can be related to most probable traffic load utilizing the considered pavement section. With the increase in magnitude of target drop loads, both deflections at center of the load plate and 600 mm would increase, which would result in the same trend as seen for the drop load of 27 kN. Based on the discussion, it can be concluded that $CD_r$ is more effective to represent structural condition of pavement sections than $D_r$.

### *4.4.2. Normalized Comprehensive Deflection Ratio ($CD_r$')*

$CD_r$ was calculated for all 35-pavement sections for all four-drop heights since FWD tests were conducted for four-drop load levels (27 kN, 40 kN, 53 kN, and 70 kN). 3D-Move Analysis

simulated deflection bowls for four-drop heights for the SHRP section 1047 are shown in the Figure 13. It can be noted that the slope or rate of change in deflection is uniform from the center of the load plate (i.e., deflection bowls are nearly parallel). Because of the uniformity in deflection bowls, the calculated $CD_r$ values were same for all four-drop heights irrespective of the load change. To include the effect of load and resulting deflection, the concept of normalization is introduced. The normalized deflection ratios for the same SHRP section 1047 corresponding to different loads are significantly different. $CD_r$' for deflection bowls based on lesser load was found to be maximum and that based on greater load was found to be minimum. The developed parameter, $CD_r$' is effective to account the change in target load, which is shown in Figure 14. In addition, it was well related to the central deflection ($D_0$), which proves the sensitivity of $CD_r$' (Figure 15).

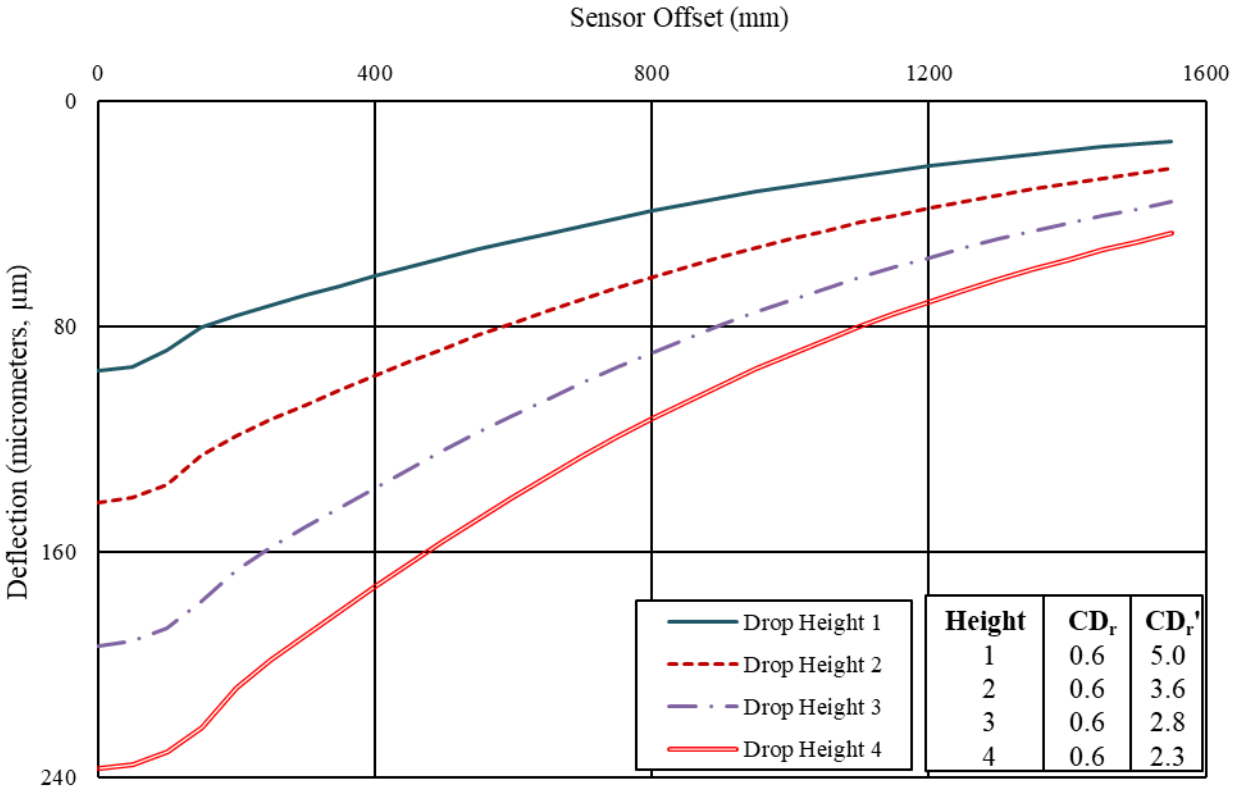


**Figure 13. Illustration on importance of normalized comprehensive deflection ratio ($CD_r$') based on SHRP section 1047.**

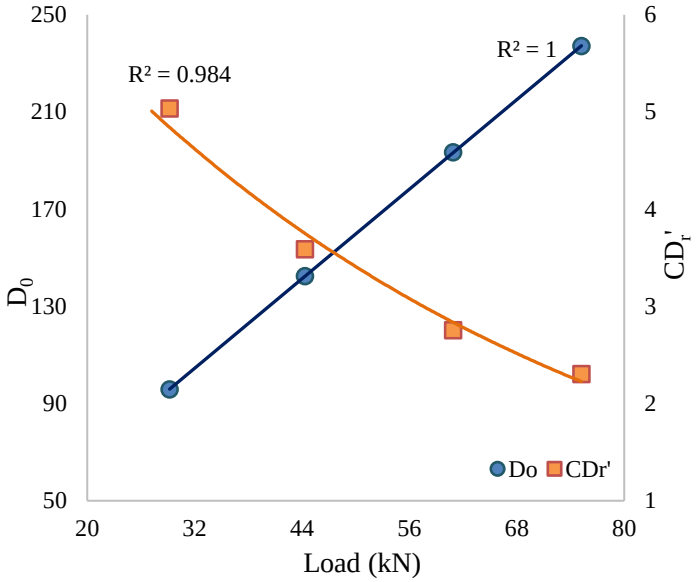


**Figure 14. Sensitivity of normalized comprehensive deflection ratio ($CD_r$') and central deflection ($D_0$) to load variation.**

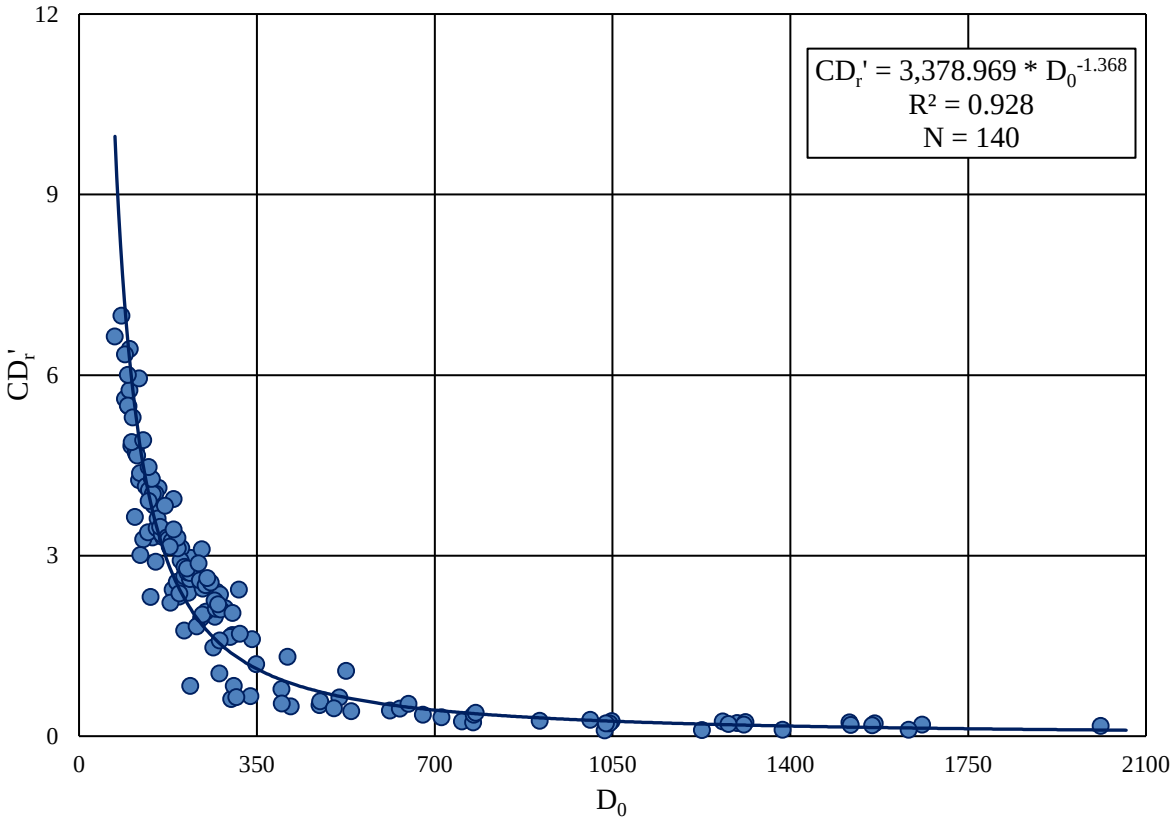


**Figure 15. Relationship between normalized comprehensive deflection ratio ($CD_r$') and central deflection ($D_0$).**

### *4.4.3. Comprehensive Area under Pavement Profile (CAPP)*

Though $CD_r$ is capable of predicting the structural condition of pavement sections to great extent, the model is developed based on deflections at 2 points only (i.e., 0 mm and 600 mm). To overcome the shortcoming of utilizing only two deflections, area ratio concept was primarily introduced back

in 1980s *(33)* and later updated to include deflections at regular intervals throughout the 900 mm length of deflection sensors *(22)*. The area parameter was developed based on different deflections measured by different sensors from the center of the load plate. The reports claimed that the area parameter that combines deflections at different offsets and central deflection could provide useful information regarding the pavement structural capacity. In order to represent the structural condition of a pavement section, the area parameter was updated to a parameter termed as Comprehensive Area under Pavement Profile (CAPP). The developed CAPP involves deflection throughout the entire length of deflections measured by FWD (i.e., 1500 mm from the center of the load plate).

### *4.4.4. Comprehensive Area Ratio ($CA_r$)*

It is well known that weak section deflects more whereas deflection would be minimum for a stiff or thick pavement section. For a strong pavement section, deflections measured at different sensor offsets would differ in minimum magnitude compared to the central deflection. In order to determine the strength of a pavement, an extremely stiff pavement section was assumed, which would have same deflection measurements throughout the sensors. The concept of comprehensive area ratio is to divide the comprehensive area of the pavement profile by the comprehensive area of the imaginary rigid pavement section. To precisely calculate the area of the deflection bowl, entire deflection bowl was divided into 50 mm segments and the area of each 50 mm segment was added together. The area of each segment can be calculated as $50*(\frac{D0 + D50}{2})$.

For the imaginary perfectly rigid pavement section, whose deflection is same throughout the sensors (i.e., $D_0 = D_{50} = D_{100} = \ldots. = D_{1500}$), the CAPP of the deflection bowl was calculated as:

$$CAPP = (\frac{1}{D0})*\{50*[(\frac{D0 + D50}{2}) + (\frac{D50 + D100}{2}) + \ldots + (\frac{D1450 + D1500}{2})]\} \quad [16]$$
$$= (\frac{1}{D0})* \{50*[(\frac{D0 + D0}{2}) + 29 * D_0]\}$$
$$= 1500\ mm^2/mm.$$

When the calculated CAPP for a pavement section is divided by the CAPP of imaginary rigid pavement section, the result would be the portion of considered pavement section in the imaginary rigid section profile, which is termed as the comprehensive area ratio ($CA_r$). Based on the area ratio concept, the comprehensive area ratio ($CA_r$) is defined as:

$$CA_r = (\frac{1}{1500*D0})*\{50*[(\frac{D0 + D1500}{2}) + \sum_{i=50}^{1450} Di\ ]\} \quad [17]$$

A strong pavement section would cover more area than a weak pavement section and hence $CA_r$ would be higher for a strong section and comparatively less for a weak section. For an extremely stiff pavement section, the $CA_r$ value could be nearly 1.0 while a weak section could have a $CA_r$ value of 0.1. In order to understand the area ratio concept, two pavement sections (SHRP: 1093 and 3729) with different properties were compared as shown in Figure 16. Both pavement sections were normalized with respect to their central deflection ($D_0$) to have unit peak deflection. The outer dashed line represents the imaginary rigid pavement section with same deflections throughout the length of 1500 mm. By observing the figure, it can be understood that for SHRP section 3729, the area covered by the pavement profile is more than half the area of imaginary

rigid pavement whereas the SHRP section 1093 covers comparatively lesser area of imaginary rigid pavement section. As expected, the $CA_r$ for SHRP section 3729 is 0.7 whereas 0.3 for SHRP section 1093. Deflection bowls for both pavement sections considered corresponded to drop height 1 with target load of 27 kN. However, the trend remains same for the rest of the three targeted load levels.

The central deflection has significant impact on the $CA_r$ and it can be noticed in the figure. $D_0$ for the SHRP section 3729 is 118 µm (micrometers) whereas $D_0$ is 337 µm (micrometers) for section 1093. However, it cannot be concluded that $CA_r$ is dependent on $D_0$ since deflections at 50 mm intervals throughout the length of 1500 mm (shape of deflection bowl) has to be considered. This criterion is proved in the Figure 17, which correlates $D_0$ and $CA_r$. Though a trend can be seen in the relationship, it is non-linear, which shows that $CA_r$ is not solely dependent on $D_0$. The relationship shown for 35 SHRP pavement sections was based on FWD target load of 27 kN and the trend was observed to be same for the remaining three targeted load levels.

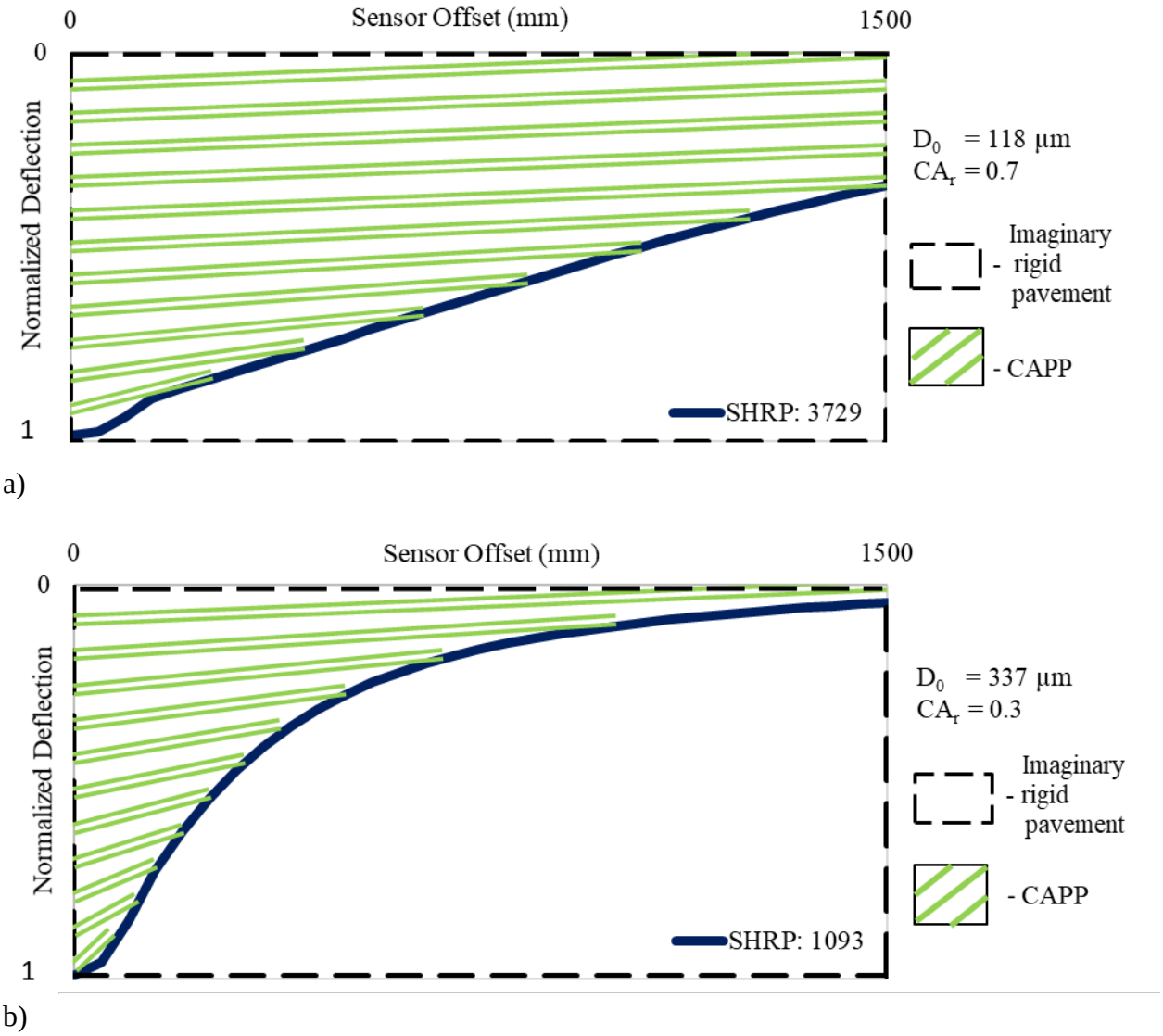


**Figure 16. Normalized area of deflection profiles for SHRP sections: (a) 3729 and (b) 1093.**

In addition, $CA_r$ was compared to $CD_r$ as shown in Figure 18, and a strong correlation was found between the parameters $CA_r$ and $CD_r$. The relationship trend was linear with coefficient of determination ($R^2$) being 0.99, which shows that $CA_r$ is much dependent on $CD_r$ and vice versa. The relationships established between $D_0$ and $CD_r$ or $CA_r$ were based on single targeted load level whereas the relationship between $CA_r$ and $CD_r$ was established for all four targeted load levels of 35 SHRP pavement sections. This was successful since both $CD_r$ and $CA_r$ vary in the same trend depending on applied load or condition of the pavement structure. Hence, $CA_r$ can be considered as a parameter to assess a pavement section, but it should be noted that the area ratio parameter accounts only for the structural condition above the subgrade.

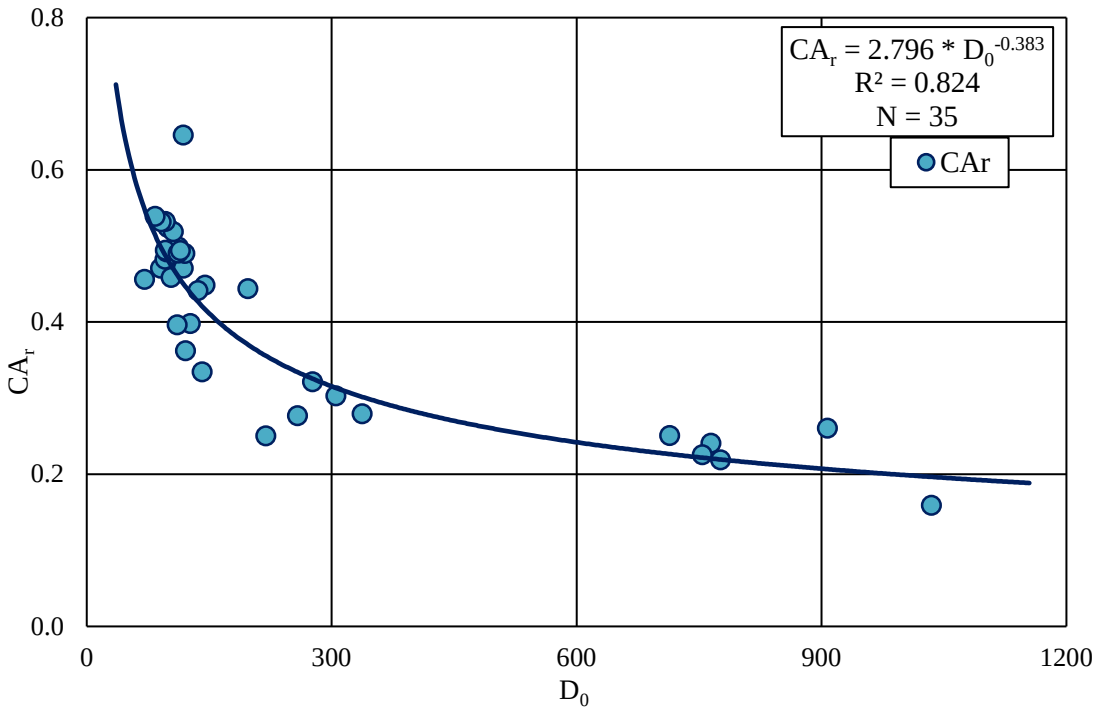


**Figure 17. Relationship between comprehensive area ratio ($CA_r$) and central deflection ($D_0$).**

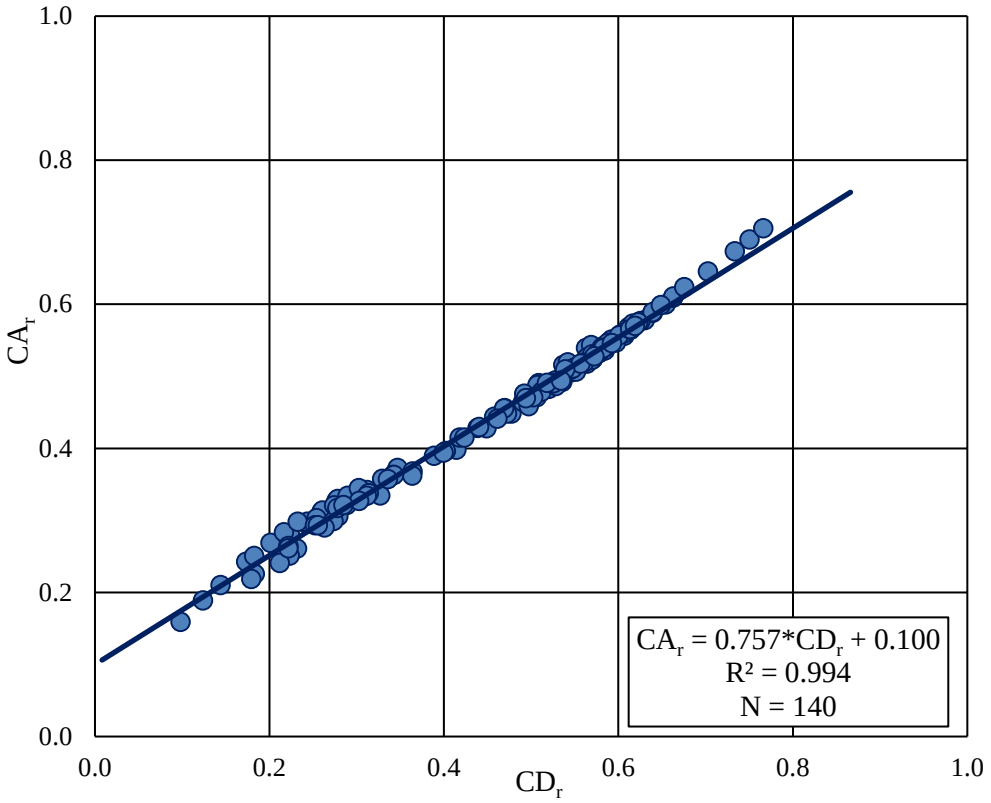


**Figure 18. Relationship between comprehensive area ratio ($CA_r$) and comprehensive deflection ratio ($CD_r$).**

### *4.4.5. Normalized Comprehensive Area Ratio ($CA_r$')*

Based on the literature and discussion in previous section, it is well known that the area ratio parameter account only for the structural capacity of pavement sections above subgrade. The concept of normalized area ratio was then introduced in order to overcome the limitation associated with the area ratio parameter, $CA_r$. By combining the area ratio and central deflection into a single parameter could account for the structural property of the entire pavement section (both subgrade and layers on top of subgrade). The developed parameter was found to be very effective to assess the structural capacity of pavement sections. The area parameter is normalized by dividing the $CA_r$ by $D_0$, and the new parameter was termed as $CA_r$':

$$CA_r' = \left(\frac{1}{1500 * D0}\right) * \left(\frac{1}{D0}\right) * \{50 * [(\frac{D0 + D1500}{2}) + \sum_{i=50}^{1450} Di\ ]\} = CA_r / D_0 \qquad [18]$$

Furthermore, the change in area ratio for a pavement section based on different target load levels was observed to be too minimum to differentiate the structural property of the pavement section. The resulted deflection bowls based on all four-target load levels for the SHRP section 1049 was considered as shown in Figure 19. The calculated $CA_r$ for the section was 0.5 for all four targeted load levels irrespective of the change in central deflection due to the increase in the loads. By observing the calculated parameters of the SHRP section 1049, the area ratio values categorize the pavement section as medium strong section.

It is obvious that the response by structural layers of pavement differ for different loading conditions or targeted load levels. However, the parameter $CA_r$ was not capable of accounting the change in response by pavement section to differing target load levels. The newly developed parameter $CA_r$' was capable of accounting even the minimum change in response by the pavement section. It can be identified in the figure that the values of $CA_r$' varies from 2.6 for target load level 4 (73 kN) all the way to 6.9 for target load level 1 (27 kN) while $CA_r$ remains the same as 0.5.

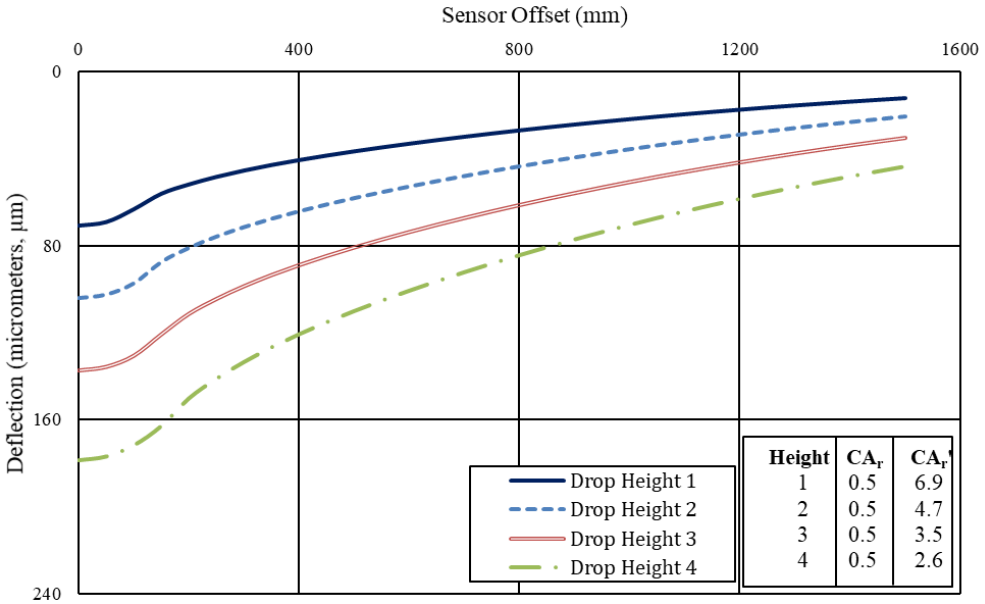


**Figure 19. Illustration on importance of normalized comprehensive area ($CA_r$') ratio based on SHRP section 1049.**

## 4.5. Relationship between Normalized Comprehensive Area Ratio (CAr') and Central Deflection ($D_0$)

A comparison was established between $CA_r$' and the central deflection ($D_0$) as shown in Figure 20. Strong correlation was observed between $D_0$ and $CA_r$', which proves that $CA_r$' can be utilized as a structural assessment parameter. The normalized comprehensive area ratio is an effective parameter to assess the structural condition of a pavement section. As seen in previous section, the comprehensive area ratio parameter $CA_r$ does not effectively account for the change in loading levels though central deflection differed. Hence, the area ratio parameter is normalized with respect to $D_0$. The developed $CA_r$' accounts for the different targeted load conditions unlike the area ratio parameter. Thus, $CA_r$' for all four-target load levels could be plotted in a single graph for comparison.

Since the structure of a pavement section remains the same for all four target load levels, the resulted plot shows the variation of $CA_r$' and $D_0$ with respect to target loads. SHRP sections 1049 and A505 are shown in the report to understand the variation in parameters based on target loads (Figure 21). $CA_r$' decreases with increase in load whereas $D_0$ increases with increase in load, which represents the effect of normalization with respect to $D_0$. In addition, $CA_r$' was found to be capable of representing $CD_r$' as well. This relationship is shown in the Figure 22, which proves the effectiveness of the overall single parameter $CA_r$'.

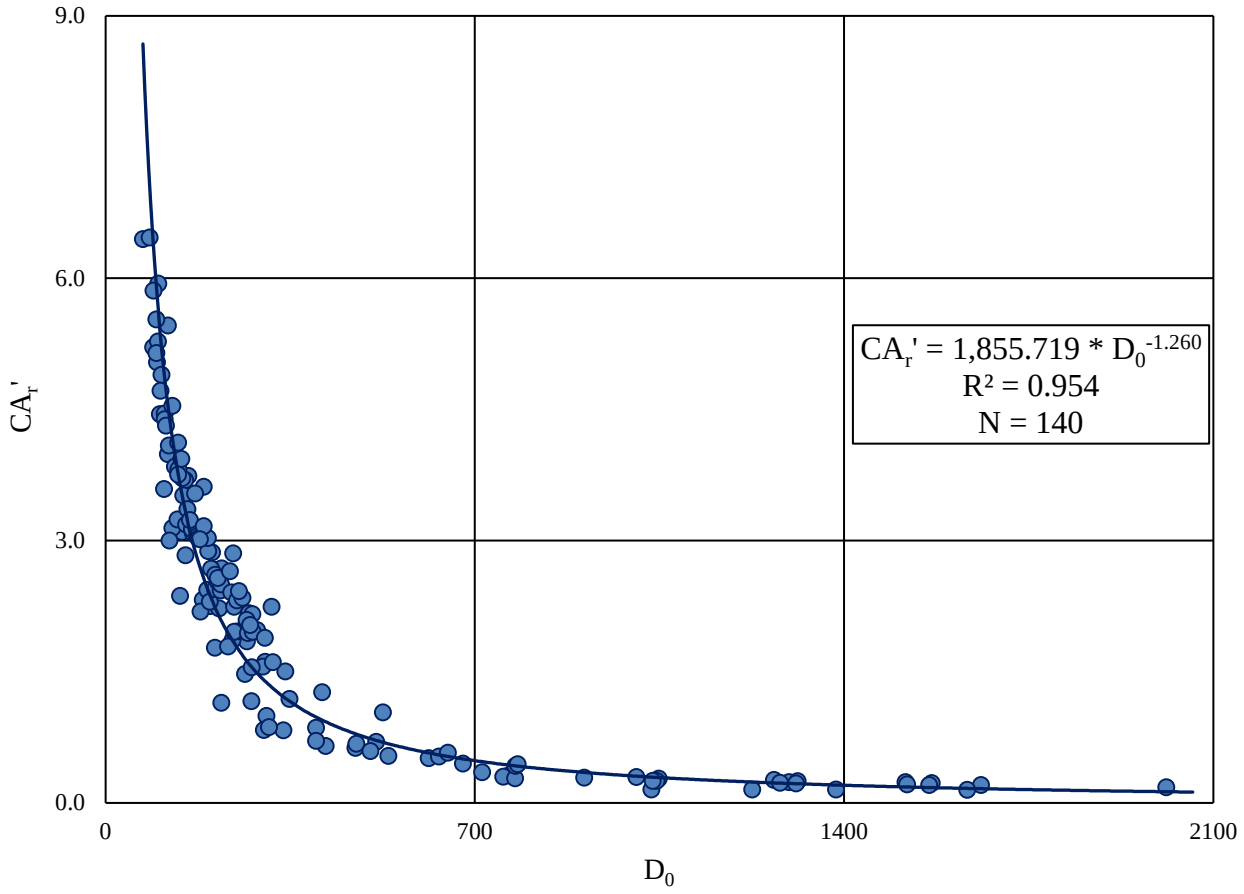


**Figure 20. Relationship between normalized comprehensive area ratio ($CA_r$') and central deflection ($D_0$).**

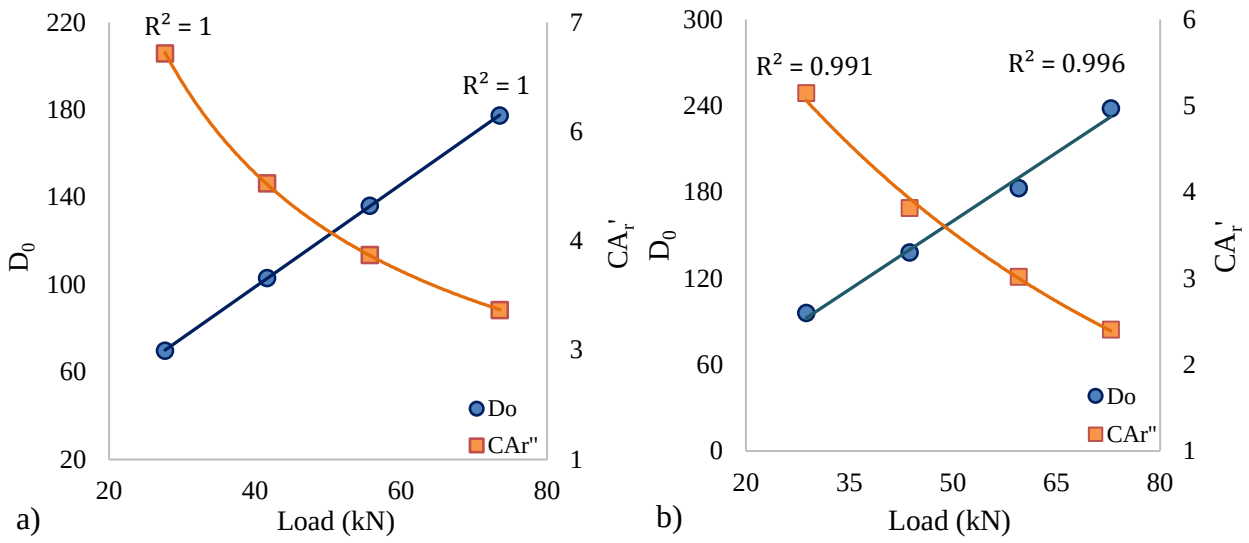


**Figure 21. Sensitivity of normalized comprehensive area ratio ($CA_r$') and central deflection ($D_0$) to load variation: (a) SHRP 1049 and (b) SHRP A505.**

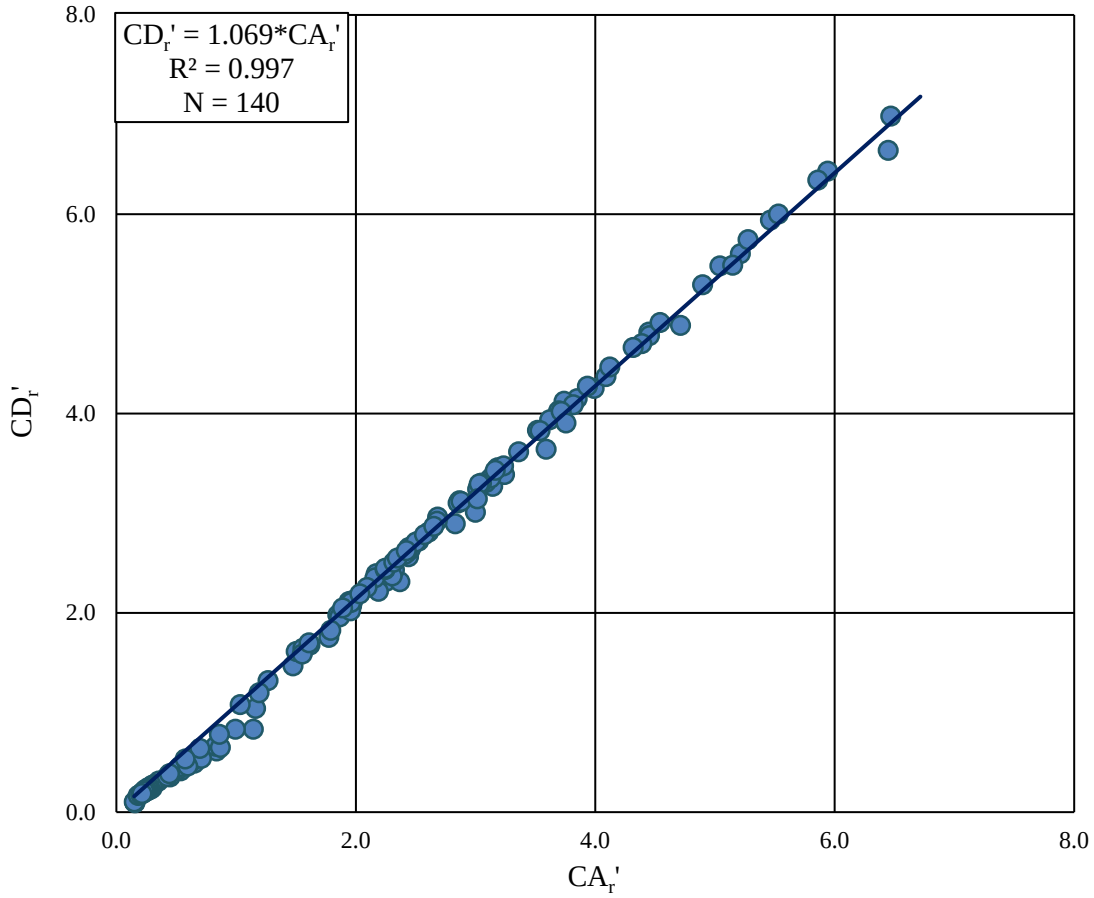


**Figure 22. Relationship between normalized comprehensive area ratio ($CA_r$') and normalized comprehensive deflection ratio ($CD_r$').**

### *4.5.1. Simplified Approach for Project Level Assessment*

The developed parameter was simplified in such a way that it can be implemented for assessment of project level pavement sections. This approach will not require any simulations of the section utilizing the 3D-Move Analysis software package and can be conducted based on FWD field measured data. The approach is same as the ratio of the comprehensive area of deflection bowl to the area of imaginary rigid pavement deflection bowl. Developed approach includes the entire deflection bowl from the center of the load plate to 1524 mm. This method could be effectively utilized by local transportation agencies to assess project level pavement sections.

The Normalized Comprehensive Area Ratio ($CA_r$') based on field measured deflection bowl can be manually calculated by:

$$CA_r' = \left(\frac{1}{1524*D0}\right) * \{203*\left(\frac{D0+D203}{2}\right) + 102*\left(\frac{D203+D305}{2}\right) + 152*\left(\frac{D305+D457}{2}\right) + 153*\left(\frac{D457+D610}{2}\right) + 304*\left(\frac{D610+D914}{2}\right) + 610*\left(\frac{D914+D1524}{2}\right)\} \quad [19]$$

$$= \left(\frac{1}{2*1524*D0}\right) * \{203*D_0+305*D_{203}+254*D_{305}+307*D_{457}+457*D_{610}+914*D_{914}+610*D_{1254})\}$$

**Validation for Simplified Approach:** Based on the above discussion, several pavement sections were analyzed to validate the new approach based on the area ratio that utilizes computer simulated deflection bowls. The comparison between the simulated deflection bowl area ratio parameter and field measured FWD deflection bowl area ratio parameter is shown in Table 12. The pavement sections considered for comparison were selected in such a way to include extreme conditions based on the value of the central deflection ($D_0$).

**Table 12. Comparison of simplified approach for project level assessment model.**

| SHRP ID | Central Deflection, ($D_0$) | $CA_r$' Comparison | |
|---|---|---|---|
| | | Based on FWD deflection bowls | Based on Computer Simulated bowls |
| 1049 | 113 | 4.646 | 4.700 |
| 1069 | 158 | 2.369 | 2.360 |
| 1116 | 402 | 0.783 | 0.730 |

# 5. FINDINGS

3D-Move Analysis software package was utilized in this project to emulate the measured FWD deflection bowls. Comparison between measured FWD and simulated 3D-Move deflection bowls for the SHRP sections 1049 and 1116 at 4 different drop heights are shown in Figure 8. It illustrates the capability of 3D-Move Analysis package to replicate the field measured FWD deflection bowls, which can be employed to limit the extensive FWD field-testing. The relationship between the measured and predicted values of the central deflection ($D_0$) was studied. The $R^2$ value was found to be 0.973, which indicates the ability of 3D-Move software package to predict the field measured FWD deflection values.

A simple method was developed based on pavement critical responses such as surface deflection and tensile strain determined at the bottom of the HMA layer for 35 SHRP pavement sections in Texas. The developed parameter, $CA_r$', was well related to the field measured fatigue cracking as well as tensile strain developed at the bottom of the HMA layer. Based on the National Cooperative Highway Research Program's (NCHRP) fatigue failure model, the remaining service life ($N_f$) for the considered pavement sections were calculated *(34).* $N_f$ was well related with the $CA_r$' as well and thus, the developed model was found to be effective to predict the remaining service life of pavement sections.

## 5.1. Development of a Scale to Classify the Structural Capacity for Different Pavement Categories

### *5.1.1. Development of Normalized Comprehensive Area Ratio ($CA_r$') Scale Based on Fatigue*

Deflection parameters were developed based on simulated deflection bowls for the 35 SHRP pavement sections. Among the developed parameters, the Normalized Comprehensive Area Ratio, $CA_r$' and Normalized Comprehensive Deflection Ratio, $CD_r$' were found to be effective and reliable to assess structural adequacy of a pavement section. To develop a scale to categorize good, fair, and poor pavement sections, developed parameters were compared to that of their corresponding structural distresses such as fatigue and rutting, and functional distress such as IRI (International Roughness Index). Distresses in pavement sections were collected from the LTPP database. Fatigue cracking, generally termed as alligator cracking, is the series of interconnected cracks caused by fatigue failure of the asphalt layer under repeated traffic loading. Fatigue failure is considered one of the important failures in a pavement section, which would lead to serious issues resulting in major reconstruction of a pavement structure. Fatigue cracking is crucial as it can initiate rainwater infiltration and result in formation of potholes. Fatigue cracking is measured in terms of area on surface of a pavement section. It is obvious that structurally good pavement section must possess lesser area of fatigue cracking compared to a structurally poor pavement section.

In order to categorize and develop a scoring scale to rank pavement sections, developed parameters were compared with the measured fatigue cracking extracted from the LTPP database (Table 9), as shown in Figure 23. The relationship between fatigue cracking and the developed parameter $CA_r$' was found to be sensible and reliable with coefficient of determination of greater than 0.8. As expected, pavement sections with lesser fatigue cracking area exhibited higher $CA_r$' whereas

sections with higher fatigue cracking area exhibited lesser $CA_r$', which proves the ability of the developed parameter to assess pavement sections. Though the area of fatigue is measured in square meters, the illustration is based on the percentage of area to make it accessible by other transportation agencies.

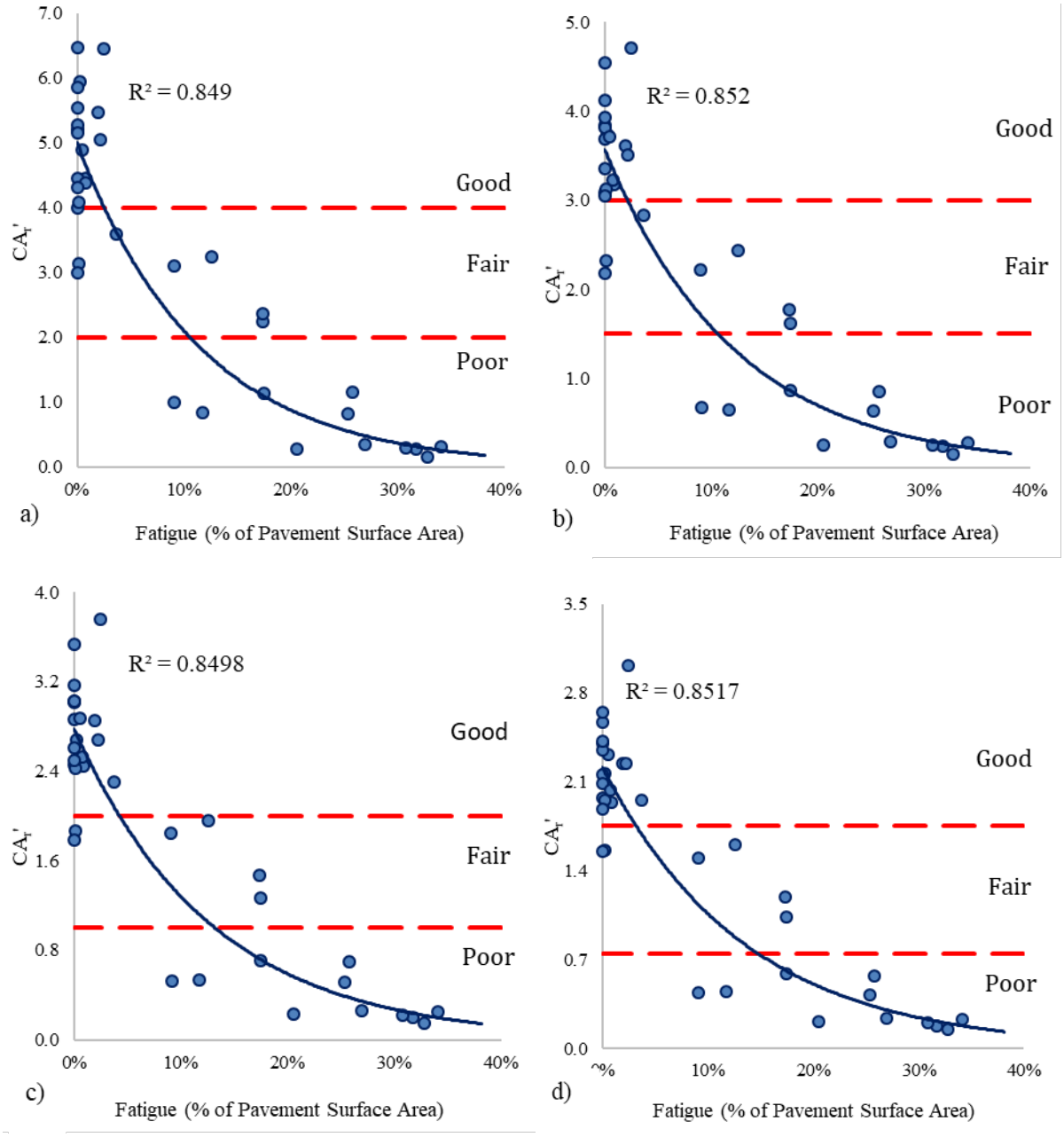


**Figure 23. Development of normalized comprehensive area ratio ($CA_r$') scale to rank pavement sections based on Fatigue: (a) Height 1, (b) Height 2, (c) Height 3, and (d) Height 4.**

LTPP SHRP pavement sections are typically 152 meters long and 3.7 or 4.0 m wide, which may differ compared to the area of pavement section considered by agencies in other countries. In addition, $CA_r$' was found to be effective to include the impact of change in target loads on the

pavement structure. This can be observed by looking at the variation of $CA_r$' with respect to fatigue percentage based on target loads. For example, in case of drop height 1 with target load of 27 kN (6000 lbs.), $CA_r$' for structurally good pavement section was found to be greater than 4.0 whereas pavement sections can be considered structurally good when the $CA_r$' is greater than 1.8 for drop height 4 with target load of 71 kN (16,000 lbs.). It can be observed as well that the percentage of fatigue in a pavement section is minimum corresponding to higher $CA_r$'.

### *5.1.2. Classification of Pavement Sections based on Normalized Comprehensive Area Ratio (CAr')*

Based on the illustration (Figure 23), a scale was developed with ranges to categorize structurally good, fair, and poor pavement sections. The scale was developed based on individual drop load levels, which can be employed to any pavement section that has the maximum probable traffic load matching the target load level. The developed scoring scale is shown in Table 13.

**Table 13. Proposed range of scale for normalized comprehensive area ratio ($CA_r$').**

| **Normalized Comprehensive Area Ratio, $CA_r$' ranges** | | | |
|---|---|---|---|
| Target | Pavement | structural capacity | ranking |
| Load | Good | Fair | Poor |
| 27 kN (6,000 lbs) | > 4.0 | 2.0 - 4.0 | < 2.0 |
| 40 kN (9,000 lbs.) | > 3.0 | 1.5 - 3.0 | < 1.5 |
| 53 kN (12,000 lbs.) | > 2.0 | 1.0 - 2.0 | < 1.0 |
| 71 kN (16,000 lbs.) | > 1.8 | 0.8 - 1.8 | < 0.8 |

The table illustrates the range of $CA_r$' to rank any flexible pavement section based on structural condition. For pavement sections with target load of 27 kN, structurally good pavement section should exhibit $CA_r$' greater than 4.0, fair, and poor must exhibit $CA_r$' values of 2.0 – 4.0 and <2.0, respectively. Similarly, for the rest of the three target loads have their corresponding ranges of $CA_r$'.

For a typical Equivalent Single Axle Load (ESAL), design load considered during pavement design is 18 kips ($18*10^3$ lbs.). Required $CA_r$' scale for network level pavement sections (interstates and highways) is shown in Table 14.

**Table 14. Normalized comprehensive area ratio ($CA_r$') scale for 18 kips traffic load.**

| **Target** | **Pavement** | **structural capacity** | **ranking** |
|---|---|---|---|
| **Load** | **Good** | **Fair** | **Poor** |
| 40 kN (9,000 lbs.) | > 3.0 | 1.5 - 3.0 | < 1.5 |

### *5.1.3. Validation of Developed $CA_r$' Scale*

To validate the developed scale, pavement sections from each category were considered to compare their structural properties. SHRP sections 1049, 1069, and 1116 were considered from structurally good, fair, and poor categories, respectively. It is obvious that SHRP section 1049 must be structurally sound than other two pavement sections, which is because of lesser fatigue area than other two pavement sections. Similarly, SHRP section 1069 should be more structurally sound than SHRP section 1116. The physical properties of the three pavement sections were compared, as shown in Table 15. According to the table, the range of $CA_r$' for structurally good,

fair, and poor sections can be identified. In order to understand the comparison, each section has to be individually examined. The pictorial representations of the three pavement sections along with their stiffness moduli are shown in Figure 24.

**Table 15. Comparison of pavement structural properties with respect to fatigue and normalized comprehensive area ratio ($CA_r$').**

| SHRP ID | Pavement layer properties | | | | | | $CA_r$' | Fatigue Area (%) | Pavement Classification |
|---|---|---|---|---|---|---|---|---|---|
| | Layer thicknesses (mm) | | | Layer moduli (MPa) | | | | | |
| | HMA | Base | Subbase | HMA | Base | Subbase | | | |
| 1049 | 117 | 284 | 198 | 10,053 | 2,758 | 689 | 6.5 | 2 | Good |
| 1069 | 241 | 386 | 165 | 4,468 | 193 | 117 | 3.1 | 9 | Fair |
| 1116 | 117 | 277 | 0 | 3,351 | 262 | 0 | 1.2 | 26 | Poor |

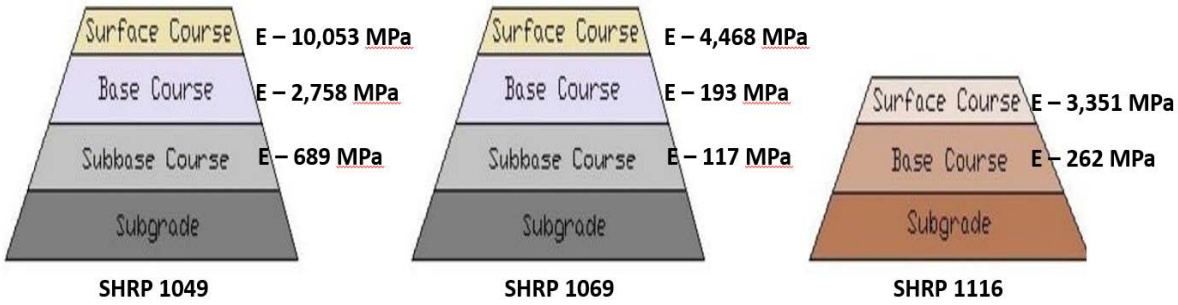


**Figure 24. Cross section of the three pavement sections considered for validation.**

SHRP sections were considered in such a way that all sections possess same subgrade moduli of 117 MPa (17,000 psi). Since the thickness of subgrade for all pavement sections were considered as a constant value of 6,096 mm (240 inches), the subgrade property and thickness were excluded from the comparison. SHRP section 1049 has a $CA_r$' of 6.5 and is comprised of 117 mm thick asphalt layer, 284 mm thick cement treated base layer, and 198 mm thick lime treated subbase layer, with corresponding layer moduli of 10,053 MPa, 2,758 MPa, and 689 MPa, respectively., SHRP section 1116 does not include a subbase layer like the other two pavement sections. In addition, the modulus of asphalt layer is 3,351 MPa, which is lesser than both SHRP pavement sections 1049 and 1069. It is obvious that lesser thickness and layer moduli would result in weaker pavements and vice versa.

By observing Figure 23, it should be noted that there are two SHRP sections (SHRP sections 1111 and 3679) with zero fatigue cracking, which is an indication for structurally good pavement sections. However, the sections categorized as structurally fair pavement sections. This can be explained with their pavement layer properties. For example, SHRP section 1111 has the pavement structure comprised of two layers above subgrade similar to that of SHRP section 1116, which is shown in Table 14 without a subbase layer. The SHRP section 1111 included a 241 mm thick HMA layer with a modulus of 4,344 MPa, 213 mm thick base layer with a modulus of 221 MPa, and subgrade properties for both pavement sections were same. The layer moduli of SHRP section 1111 is significantly greater than layer moduli observed for the SHRP section 1116. This indicates that developed parameters such as $CA_r$' and $CD_r$' are effective to assess the structural condition of any pavement section with respect to entire pavement structure.

It can also be noted that two SHRP sections, SHRP 1069 and 9005 with same fatigue percentage (9%) have been categorized as structurally fair and poor, respectively. In addition, other 2 pavement sections such as SHRP B320 and 1076 with same fatigue percentage around 12% have been ranked structurally fair and poor, respectively. This phenomenon can be understood by comparing their respective horizontal tensile strain developed at the bottom of asphalt layer. It is obvious that a stiff pavement would exhibit lesser tensile strain at the bottom of HMA than a weak pavement section would do. Hence, pavement sections experiencing higher tensile strain can be considered weak and vice versa. 3D-Move Analysis software package is capable of predicting the tensile strain developed at the bottom of HMA along with the simulation of FWD deflection bowls.

Considering the SHRP sections (SHRP 1069 and 9005), the computed horizontal tensile strain at the bottom of HMA for both sections are shown in Figure 25. The variation in tensile strain was expressed with respect to targeted load levels. The plot clearly illustrates the significant difference in strain between both pavement sections.

The maximum strain developed for targeted load level 1 was 85 μs (micro-strain) for the SHRP section 1069 whereas 255 μs for the SHRP section 9005. Similarly, in case of targeted load level 4, maximum tensile strain developed for the SHRP section 1069 was 176 μs while the same for SHRP section 9005 was observed to be 429 μs. This significant increase in the strain values of SHRP section 9005 indicates a structurally poor pavement section.

Similarly, SHRP pavement sections B320 and 1076 were considered for comparison with respect to their corresponding tensile strains. Tensile strains developed at the bottom of HMA for the SHRP section 1076 was found to be 310 and 532 for targeted load levels 1 and 4, respectively. Whereas the SHRP section B320 experienced lesser tensile strain such as 84 and 171 for targeted load levels one and four, respectively. This comparison proves the structural capacity of all four-pavement sections considered. It is well known that the tensile strain developed at the bottom of HMA is directly related to the stiffness of both asphalt layer and base layers. Hence, $CA_r$' and $CD_r$' can be considered effective parameters to assess structural condition of pavement sections provided the relationship between strain and parameters are well correlated.

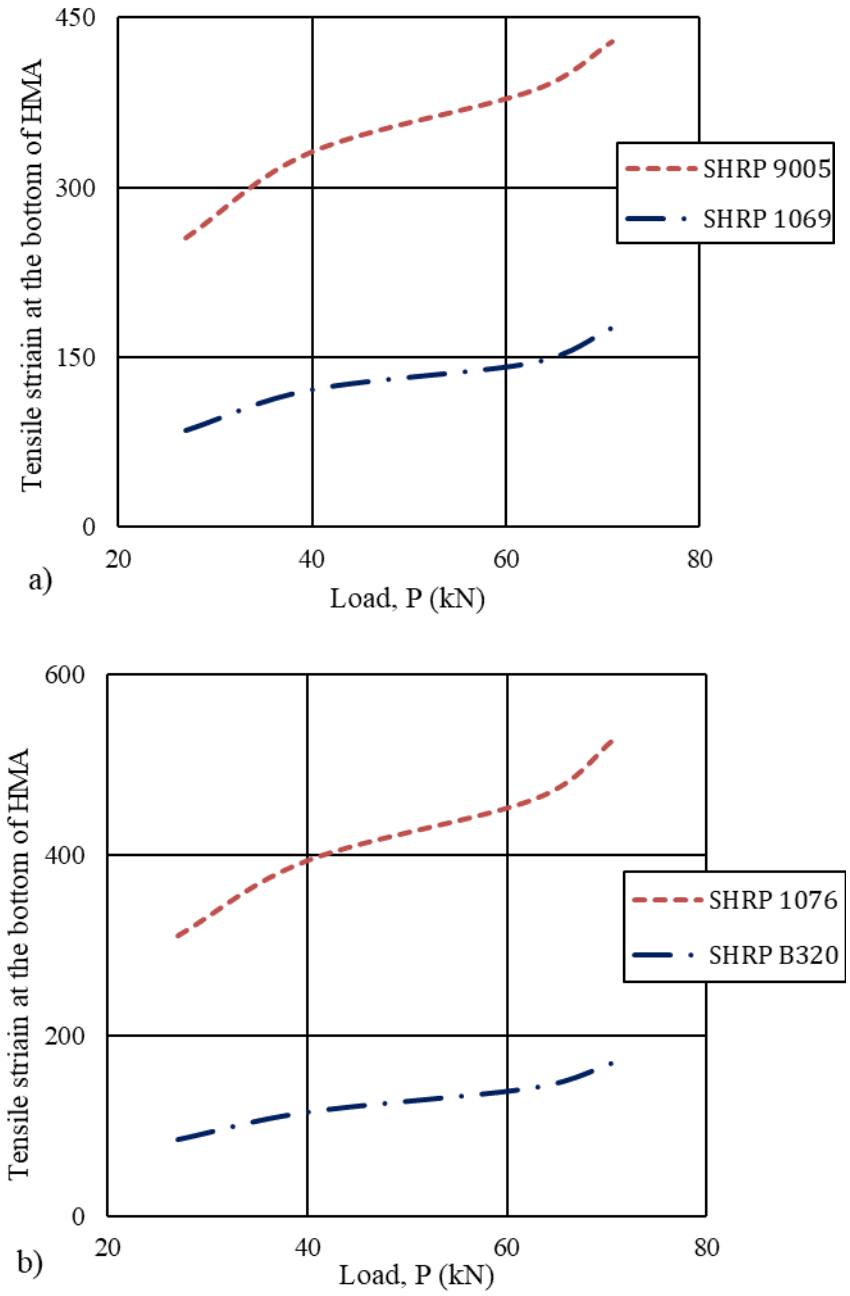


**Figure 25. Variation in tensile strain based on layer thicknesses and stiffness: (a) 9% fatigue sections and (b) 12% fatigue sections.**

## 5.2. Prediction of Remaining Service Life

### *5.2.1. Relationship between Tensile Strain and Developed Parameters*

Tensile strain at the bottom of asphalt layer is a critical attribute as it causes the origin of fatigue crack at the bottom of HMA. Hence, tensile strain developed at the bottom of HMA layers for all 35 SHRP pavement sections were considered. As the developed parameters and the tensile strain at the bottom of HMA are directly related to the targeted load, all four targeted load levels were considered in the relationship. The relationships between the computed tensile strain and $CA_r$' as

well as $CD_r$' were well related, having a coefficient of determination near unity ($R^2$ = 0.95), as shown in Figure 26. The developed equations prove the strong correlation between tensile strain and developed parameters. The relationship between the tensile strain and developed parameter $CA_r$' is:

$$\varepsilon_t = 310.06 * CA_r'^{-1.219} \quad [20]$$

where:
$\varepsilon_t$ = tensile strain developed at the bottom of asphalt layer, and
$CA_r$' = Normalized comprehensive area ratio.

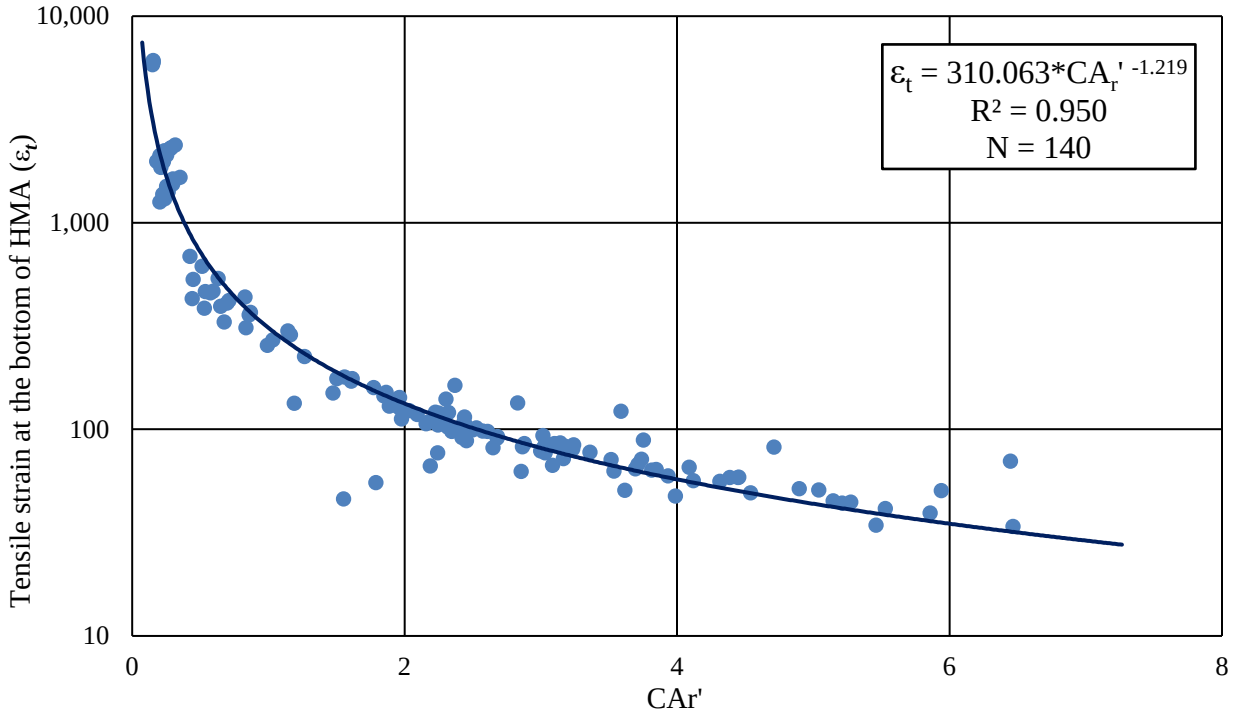


**Figure 26. Relationship between tensile strain at the bottom of HMA and Normalized Comprehensive Area Ratio ($CA_r$').**

### *5.2.2. Prediction of Remaining Service Life based on Fatigue Failure*

The critical responses of pavement sections such as the horizontal tensile strain at the bottom of HMA was found to be in strong correlation with the developed parameters such normalized comprehensive area ratio, $CA_r$', as shown in Figure 26. This relationship could result in prediction of the remaining service life of pavements based on the measured FWD deflections since the tensile strain plays an important role in the fatigue model. The considered 35 SHRP pavement sections were analyzed to determine their remaining service life in terms of number of load repetitions to fatigue cracking failure ($N_f$), The number of load repetitions to failure was calculated based mechanistic empirical pavement design model utilizing the tensile strain at the bottom of HMA and the stiffness of asphalt layer.

The number of load repetitions to fatigue failure is given by:

$$N_f = 0.0795 * (1/\varepsilon)^{3.291} * (1/E)^{0.854} \quad [21]$$

where:
$N_f$ = number of load repetitions to failure,
ε = tensile strain developed at the bottom of HMA, and
E = stiffness (modulus) of the asphalt material.

Based on the above equation, $N_f$ was calculated for the 35 SHRP pavement sections. The number of cycles to fatigue failure was well related to $CA_r$' as shown in Figure 27. The relationship gives a clear indication that remaining service life of a pavement section can be estimated based on $CA_r$' and $CD_r$'.

Based on the relationships observed in the Figure 27, number of load cycles that a pavement section could handle can be calculated based on both $CA_r$' and $CD_r$' utilizing the following equations:

$$N_f = 553{,}694.910 * CA_r'^{\,3.110} \qquad [22]$$

$R^2 = 0.957$

where:
$CA_r$' = normalized comprehensive area ratio.

Hence, this relationship can be utilized by transportation agencies to predict the remaining service life of a pavement section. Though $CD_r$' is effective to assess the structural condition of a pavement section, $CA_r$' is considered as a more reliable parameter as it includes entire deflection bowl rather than deflection only at a single radial offset.

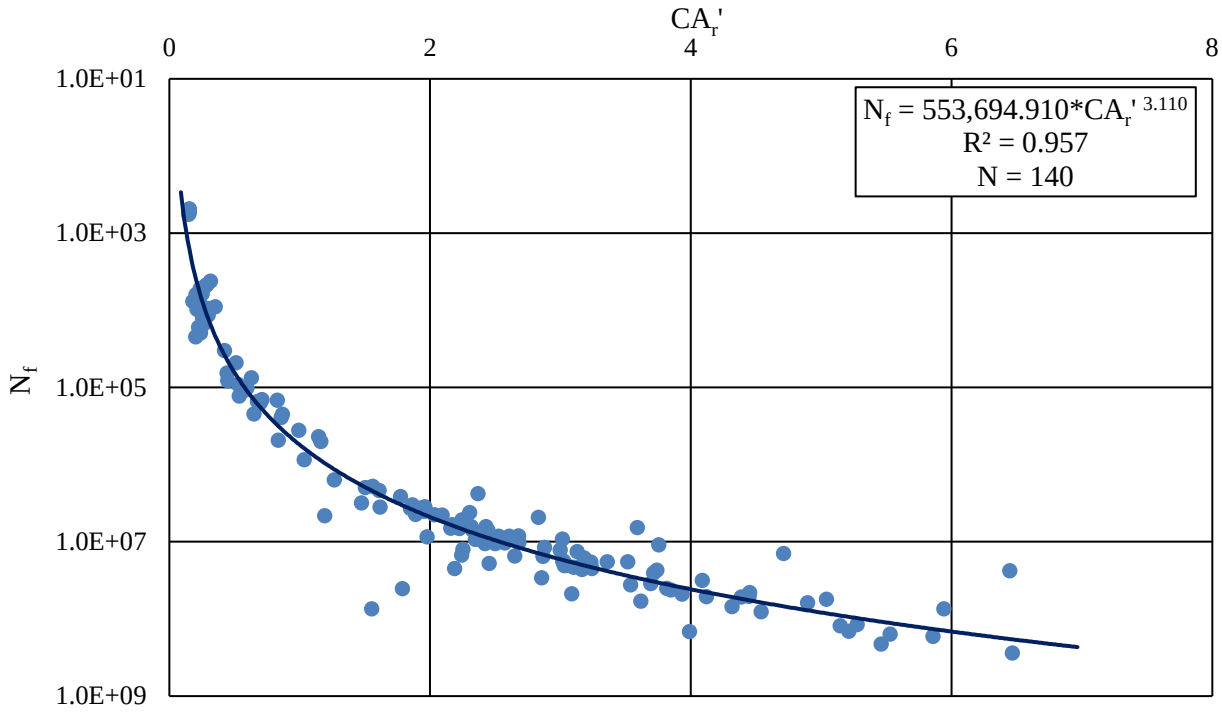


**Figure 27. Relationship between $N_f$ and Normalized Comprehensive Area Ratio ($CA_r$').**

# 6. CONCLUSIONS

Based on the literature search, it was found that there are very few simple procedures employed by agencies to identify structurally weak pavement sections directly from FWD deflection data. A simple method was developed based on pavement critical responses such as surface deflection and tensile strain determined at the bottom of the HMA layer of 35 SHRP pavement sections in Texas for four different load cases. The comprehensive deflection ratio ($CD_r$) parameter was developed based on deflection at 600mm from the center of load plate. Compared to $D_r$, $CD_r$ was found to be in correlation with central deflection, $D_0$. However, both parameters were developed based on single deflection value at a certain distance from the center of load plate, which is more susceptible to errors. To evaluate the entire pavement structure, area ratio parameter was introduced. Area ratio parameter was developed based on the simulated entire 1500mm (center of load plate to 1500mm) FWD deflection bowl. The area of the deflected bowl shape was calculated and compared to an imaginary stiff pavement with uniform deflection equal to the central deflection, which was termed as comprehensive area ratio ($CA_r$).

The concept of normalization was introduced so that the area ratio parameter would reflect the response of pavement structure to load variations, which was achieved by dividing the $CA_r$ by the central deflection ($D_0$), termed as normalized comprehensive area ratio ($CA_r$'). The $CA_r$' was compared to the field measured pavement distress fatigue cracks and a scale was developed to categorize pavement sections based on structural capacity.

The tensile strain developed at the bottom of the asphalt layer ($\varepsilon_t$) was determined in order to estimate the remaining service life of pavement sections (Number of load repititions to fatigue failure, $N_f$). The 3D-Move Analysis software package is capable of predicting the tensile strain at the bottom of the HMA. The normalized comprehensive area ratio ($CA_r$') was found to have a strong relationship with pavement critical response such as $\varepsilon_t$, which can be identified from the equation,

$$\varepsilon_t = 310.06 * CA_r'^{-1.219} \quad [23]$$

$R^2 = 0.95$

Since there was a strong relationship between $CA_r$' and $\varepsilon_t$, it was expected that $CA_r$' must be effective to predict the remaining service life. Remaining service life was calculated in terms of number of load repetitions to failure based on the MEPDG fatigue failure model. Calculated $N_f$ was well related to $CA_r$' as well, which can be seen in the equation:

$$N_f = 553{,}694.91 * CA_r'^{3.110} \quad [24]$$

$R^2 = 0.96$

Hence, based on above findings and discussions, $CA_r$' can be considered as a simple and robust parameter to evaluate the structural capacity of pavement sections at the network level. The developed simple and overall parameter, $CA_r$', would help the South-Central state DOTs and local highway agency officials to make more informed decisions about the most suitable maintenance and rehabilitation strategies.

# 7. RECOMMENDATIONS

As concluded earlier, $CA_r$' can be considered as a simple and robust parameter to evaluate the structural capacity of pavement sections at the network level. The developed simple and overall parameter, $CA_r$', would help the South-Central state DOTs and local highway agency officials to make more informed decisions about the most suitable maintenance and rehabilitation strategies. Furthermore, it may be utilized to predict the remaining service life in terms of number of load repetitions to failure based on the MEPDG fatigue failure model.

Huge amount of FWD data is collected and stored by the transportation agencies in their pavement management system (PMS) databases. Developed parameters are simple enough to be incorporated in the PMS databases and hence, pavement deflection data collected so far can be utilized to validate the developed parameters. It should be noted that the effects of temperature and pavement thicknesses were not included in the development of parameters. Future studies could concentrate on comprehending the temperature correction factors on developed paramters.

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# APPENDIX A: DEFLECTION MEASUREMENTS COLLECTED FOR 35 SHRP PAVEMENT SECTIONS IN TEXAS

**Table A-1. FWD deflection measurements extracted for LTPP pavement section 1046 for FWD test date 17-Dec-98.**

| Point location | Drop height | Drop Load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 417.75 | 136.50 | 104.00 | 95.50 | 83.00 | 73.50 | 57.75 | 35.75 |
| | 2 | 630.75 | 219.25 | 164.25 | 151.75 | 132.50 | 117.50 | 92.75 | 57.75 |
| | 3 | 851.75 | 295.50 | 225.50 | 207.50 | 181.50 | 159.75 | 125.00 | 75.75 |
| | 4 | 1,042.25 | 359.25 | 275.75 | 254.00 | 221.75 | 196.00 | 153.75 | 94.25 |
| 8.20 | 1 | 419.75 | 99.75 | 87.75 | 81.75 | 74.00 | 67.00 | 54.75 | 35.50 |
| | 2 | 634.00 | 159.75 | 137.75 | 127.75 | 116.25 | 105.25 | 85.75 | 54.00 |
| | 3 | 852.25 | 219.75 | 194.75 | 181.50 | 165.00 | 149.75 | 120.75 | 78.25 |
| | 4 | 1,035.50 | 274.75 | 239.25 | 222.25 | 202.00 | 182.50 | 148.25 | 94.75 |
| 15.20 | 1 | 419.25 | 76.75 | 69.50 | 66.25 | 61.25 | 56.75 | 46.75 | 31.00 |
| | 2 | 632.00 | 121.75 | 107.50 | 102.50 | 94.75 | 87.50 | 73.00 | 48.50 |
| | 3 | 854.00 | 167.00 | 150.50 | 143.50 | 133.25 | 123.50 | 103.00 | 69.00 |
| | 4 | 1,041.00 | 204.75 | 184.50 | 176.25 | 163.50 | 152.00 | 126.25 | 85.00 |
| 22.90 | 1 | 420.00 | 110.75 | 92.00 | 85.00 | 75.75 | 68.50 | 54.75 | 35.00 |
| | 2 | 630.75 | 171.50 | 143.50 | 131.75 | 118.25 | 106.75 | 85.25 | 54.75 |
| | 3 | 850.00 | 240.75 | 201.50 | 185.75 | 166.50 | 150.75 | 120.00 | 76.75 |
| | 4 | 1,025.00 | 294.50 | 248.25 | 229.25 | 206.00 | 185.75 | 148.75 | 94.75 |
| 30.50 | 1 | 412.25 | 124.00 | 97.50 | 86.50 | 74.50 | 65.25 | 50.25 | 31.75 |
| | 2 | 620.75 | 197.00 | 153.00 | 136.75 | 119.00 | 101.75 | 79.50 | 49.00 |
| | 3 | 841.00 | 274.00 | 212.50 | 188.75 | 164.00 | 143.75 | 111.00 | 67.75 |
| | 4 | 1,025.75 | 332.25 | 261.00 | 233.00 | 202.25 | 177.00 | 136.50 | 83.50 |
| 38.10 | 1 | 390.25 | 151.00 | 134.00 | 98.00 | 71.25 | 64.00 | 48.25 | 40.50 |
| | 2 | 594.25 | 229.50 | 208.50 | 155.50 | 119.25 | 104.75 | 81.50 | 52.00 |
| | 3 | 786.00 | 312.50 | 287.75 | 222.00 | 174.00 | 152.50 | 118.25 | 72.50 |
| | 4 | 1,033.00 | 383.50 | 351.75 | 277.00 | 220.00 | 192.25 | 148.25 | 91.25 |
| 45.70 | 1 | 406.25 | 152.25 | 153.25 | 146.25 | 83.50 | 73.50 | 56.50 | 35.00 |
| | 2 | 617.00 | 241.50 | 238.75 | 227.75 | 133.25 | 117.00 | 89.50 | 55.75 |
| | 3 | 831.75 | 335.75 | 334.50 | 317.75 | 190.00 | 165.50 | 125.50 | 76.75 |
| | 4 | 1,024.25 | 413.75 | 409.00 | 388.75 | 235.25 | 204.50 | 155.00 | 95.25 |
| 53.30 | 1 | 405.50 | 90.50 | 83.25 | 78.50 | 72.00 | 66.75 | 55.00 | 36.25 |
| | 2 | 615.25 | 147.25 | 129.75 | 122.50 | 112.75 | 103.75 | 86.00 | 56.25 |
| | 3 | 843.25 | 204.25 | 185.25 | 174.75 | 160.75 | 148.50 | 123.00 | 81.00 |
| | 4 | 1,025.75 | 255.00 | 229.25 | 215.50 | 198.50 | 184.00 | 152.50 | 100.25 |
| 61.00 | 1 | 403.25 | 115.25 | 92.25 | 83.75 | 73.25 | 65.75 | 51.75 | 32.50 |
| | 2 | 618.75 | 180.25 | 145.00 | 132.00 | 115.25 | 103.75 | 82.00 | 51.25 |
| | 3 | 847.25 | 250.50 | 206.75 | 187.75 | 165.25 | 147.00 | 116.00 | 72.25 |
| | 4 | 1,039.75 | 311.25 | 254.75 | 231.75 | 204.00 | 181.50 | 143.50 | 89.25 |
| 68.60 | 1 | 410.75 | 89.25 | 80.00 | 76.50 | 70.25 | 65.00 | 53.00 | 34.00 |
| | 2 | 623.25 | 138.25 | 124.50 | 119.25 | 110.50 | 101.50 | 82.50 | 52.50 |
| | 3 | 851.75 | 192.50 | 178.00 | 170.75 | 158.00 | 145.25 | 119.00 | 75.00 |
| | 4 | 1,038.50 | 243.00 | 219.50 | 210.50 | 194.50 | 179.00 | 146.50 | 92.75 |

**Table A-1. FWD deflection measurements extracted for LTPP pavement section 1046 for FWD test date 17-Dec-98 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 76.20 | 1 | 406.00 | 84.00 | 76.25 | 72.50 | 66.00 | 60.50 | 49.00 | 33.00 |
| | 2 | 620.75 | 133.25 | 119.50 | 113.50 | 103.50 | 94.50 | 76.75 | 49.25 |
| | 3 | 848.00 | 187.50 | 169.75 | 161.25 | 147.25 | 134.25 | 109.00 | 70.00 |
| | 4 | 1,036.75 | 233.00 | 209.50 | 199.25 | 182.00 | 166.25 | 134.00 | 86.00 |
| 83.80 | 1 | 406.25 | 99.75 | 88.00 | 83.50 | 76.00 | 69.75 | 57.00 | 34.25 |
| | 2 | 617.75 | 157.25 | 139.75 | 131.75 | 120.75 | 110.25 | 90.25 | 53.75 |
| | 3 | 843.00 | 221.00 | 199.75 | 188.75 | 173.00 | 157.75 | 128.75 | 75.00 |
| | 4 | 1,029.25 | 278.00 | 248.00 | 234.00 | 215.00 | 196.25 | 160.50 | 92.50 |
| 91.40 | 1 | 404.25 | 111.75 | 91.25 | 84.75 | 75.00 | 67.75 | 53.25 | 33.50 |
| | 2 | 618.00 | 171.75 | 144.00 | 132.75 | 117.75 | 106.25 | 83.75 | 51.75 |
| | 3 | 842.00 | 238.75 | 204.50 | 188.00 | 167.75 | 150.25 | 119.00 | 73.00 |
| | 4 | 1,027.00 | 299.50 | 251.50 | 232.75 | 207.25 | 187.25 | 147.00 | 89.75 |
| 99.10 | 1 | 400.25 | 131.50 | 107.50 | 97.00 | 85.00 | 75.00 | 58.75 | 35.00 |
| | 2 | 613.75 | 204.25 | 169.00 | 152.75 | 134.00 | 119.25 | 93.00 | 55.00 |
| | 3 | 840.75 | 283.75 | 239.25 | 216.75 | 191.50 | 170.00 | 132.75 | 78.25 |
| | 4 | 1,031.75 | 353.50 | 295.75 | 268.75 | 237.75 | 211.75 | 164.50 | 97.25 |
| 106.70 | 1 | 401.00 | 87.00 | 75.50 | 72.00 | 66.00 | 60.75 | 49.75 | 32.50 |
| | 2 | 616.00 | 137.00 | 117.75 | 112.75 | 103.75 | 94.75 | 78.00 | 50.50 |
| | 3 | 843.50 | 190.75 | 167.00 | 160.00 | 147.00 | 135.00 | 110.25 | 71.25 |
| | 4 | 1,040.50 | 238.25 | 206.25 | 196.75 | 180.75 | 166.00 | 136.00 | 87.50 |
| 114.30 | 1 | 402.25 | 97.50 | 84.25 | 79.50 | 73.25 | 63.50 | 50.50 | 33.50 |
| | 2 | 617.00 | 153.75 | 133.00 | 126.50 | 116.75 | 101.25 | 81.00 | 53.00 |
| | 3 | 845.00 | 213.25 | 189.25 | 180.25 | 166.50 | 145.00 | 116.25 | 75.50 |
| | 4 | 1,025.75 | 268.25 | 234.00 | 223.00 | 206.50 | 179.25 | 144.25 | 93.00 |
| 121.90 | 1 | 397.75 | 78.00 | 66.50 | 63.75 | 58.50 | 53.75 | 44.00 | 28.75 |
| | 2 | 609.00 | 124.25 | 105.00 | 100.25 | 92.25 | 85.00 | 69.75 | 45.00 |
| | 3 | 834.00 | 176.00 | 148.25 | 141.00 | 130.25 | 120.00 | 98.00 | 63.00 |
| | 4 | 1,006.00 | 217.50 | 182.75 | 174.00 | 160.75 | 147.50 | 121.00 | 77.75 |
| 129.50 | 1 | 406.50 | 83.50 | 65.75 | 60.25 | 54.00 | 48.50 | 39.50 | 25.75 |
| | 2 | 618.00 | 130.25 | 103.50 | 94.75 | 84.75 | 76.50 | 61.75 | 40.00 |
| | 3 | 842.50 | 182.75 | 146.75 | 134.50 | 120.75 | 108.75 | 87.00 | 55.50 |
| | 4 | 1,029.75 | 229.25 | 182.75 | 167.75 | 150.75 | 135.50 | 108.75 | 69.25 |
| 137.20 | 1 | 403.50 | 67.25 | 58.75 | 55.00 | 50.00 | 45.25 | 37.75 | 25.25 |
| | 2 | 616.75 | 105.50 | 92.00 | 85.75 | 78.50 | 71.25 | 58.75 | 39.25 |
| | 3 | 842.75 | 149.00 | 130.00 | 122.00 | 111.25 | 101.25 | 83.25 | 55.75 |
| | 4 | 1,033.50 | 184.50 | 160.50 | 150.75 | 137.50 | 125.75 | 103.25 | 68.50 |
| 144.80 | 1 | 402.50 | 70.75 | 57.50 | 54.25 | 49.50 | 45.25 | 37.25 | 24.50 |
| | 2 | 616.25 | 111.25 | 89.50 | 84.25 | 76.50 | 70.00 | 57.00 | 37.75 |
| | 3 | 845.75 | 154.25 | 127.75 | 119.75 | 109.75 | 99.75 | 81.50 | 53.00 |
| | 4 | 1,039.25 | 193.50 | 158.25 | 148.75 | 136.00 | 124.00 | 101.00 | 66.00 |
| 152.40 | 1 | 406.00 | 88.25 | 67.50 | 63.25 | 56.25 | 50.50 | 40.25 | 25.75 |
| | 2 | 617.00 | 141.50 | 106.50 | 98.50 | 88.50 | 79.50 | 63.00 | 40.75 |
| | 3 | 842.25 | 196.75 | 152.00 | 140.25 | 126.00 | 113.00 | 90.00 | 57.00 |
| | 4 | 1,019.25 | 245.50 | 188.75 | 174.75 | 157.25 | 140.75 | 111.75 | 70.75 |

**Table A-2. Average all point locations FWD deflection measurements extracted for LTPP pavement section 1046.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 406.73 | 102.15 | 87.25 | 80.18 | 68.96 | 62.21 | 49.80 | 32.33 |
| | 2 | 618.90 | 160.76 | 136.76 | 125.76 | 108.99 | 98.00 | 78.61 | 49.89 |
| | 3 | 841.83 | 223.15 | 192.92 | 177.74 | 154.73 | 139.11 | 111.30 | 70.11 |
| | 4 | 1,030.93 | 276.80 | 237.67 | 219.46 | 191.39 | 172.13 | 137.68 | 86.63 |

**Table A-3. FWD deflection measurements extracted for LTPP pavement section 1047 for FWD test date 17-Dec-98.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 414.75 | 116.25 | 95.00 | 87.75 | 76.50 | 66.50 | 49.00 | 27.50 |
| | 2 | 634.75 | 179.25 | 148.00 | 136.25 | 118.50 | 103.25 | 77.00 | 42.50 |
| | 3 | 873.50 | 250.00 | 208.25 | 191.75 | 167.50 | 146.00 | 108.50 | 60.25 |
| | 4 | 1,080.50 | 306.50 | 255.25 | 234.75 | 204.75 | 178.75 | 132.75 | 74.25 |
| 7.60 | 1 | 409.75 | 113.00 | 100.25 | 91.00 | 76.50 | 67.25 | 48.00 | 25.00 |
| | 2 | 622.75 | 175.25 | 156.75 | 141.75 | 120.75 | 104.00 | 74.25 | 38.25 |
| | 3 | 853.50 | 246.25 | 220.75 | 199.75 | 169.75 | 147.00 | 105.00 | 54.50 |
| | 4 | 1,066.50 | 304.50 | 272.00 | 245.25 | 209.00 | 181.00 | 129.25 | 67.25 |
| 15.20 | 1 | 413.50 | 138.00 | 114.00 | 104.00 | 88.75 | 76.00 | 54.75 | 29.50 |
| | 2 | 630.75 | 212.75 | 177.75 | 161.25 | 138.00 | 118.75 | 86.00 | 46.00 |
| | 3 | 872.50 | 296.75 | 249.00 | 226.25 | 194.75 | 167.25 | 121.50 | 65.25 |
| | 4 | 1,074.50 | 365.50 | 306.25 | 278.25 | 239.00 | 206.00 | 150.00 | 79.50 |
| 22.90 | 1 | 418.00 | 102.25 | 86.00 | 79.25 | 68.75 | 61.00 | 45.75 | 27.00 |
| | 2 | 635.50 | 160.00 | 135.00 | 124.00 | 108.00 | 95.75 | 72.75 | 42.00 |
| | 3 | 875.25 | 225.75 | 190.00 | 174.25 | 152.25 | 134.25 | 102.25 | 58.25 |
| | 4 | 1,077.25 | 277.75 | 233.00 | 214.25 | 187.00 | 165.50 | 125.75 | 72.25 |
| 30.50 | 1 | 414.50 | 99.00 | 87.75 | 83.00 | 72.50 | 64.00 | 48.00 | 26.50 |
| | 2 | 624.25 | 155.50 | 138.00 | 129.75 | 114.25 | 100.75 | 75.75 | 41.25 |
| | 3 | 858.00 | 219.75 | 196.00 | 183.75 | 162.25 | 143.00 | 107.25 | 58.50 |
| | 4 | 1,057.75 | 273.25 | 243.00 | 228.00 | 201.25 | 177.25 | 132.75 | 72.25 |
| 38.10 | 1 | 413.75 | 89.00 | 81.50 | 76.50 | 68.00 | 60.25 | 46.00 | 27.00 |
| | 2 | 628.25 | 139.25 | 127.00 | 119.25 | 106.00 | 94.00 | 73.00 | 42.00 |
| | 3 | 859.75 | 194.50 | 179.00 | 168.00 | 150.00 | 133.00 | 102.75 | 59.25 |
| | 4 | 1,062.25 | 241.00 | 220.50 | 206.75 | 183.75 | 164.00 | 126.25 | 73.00 |
| 45.70 | 1 | 415.25 | 93.25 | 83.25 | 78.00 | 69.00 | 61.25 | 47.00 | 28.00 |
| | 2 | 629.75 | 146.00 | 129.75 | 121.00 | 107.50 | 95.50 | 73.25 | 42.75 |
| | 3 | 867.75 | 206.50 | 183.25 | 171.00 | 152.00 | 135.00 | 103.75 | 60.75 |
| | 4 | 1,072.75 | 253.75 | 226.00 | 210.00 | 187.00 | 167.00 | 129.00 | 75.00 |
| 53.30 | 1 | 417.00 | 94.50 | 88.00 | 82.50 | 73.75 | 65.75 | 49.25 | 28.25 |
| | 2 | 630.50 | 148.25 | 137.75 | 128.75 | 115.50 | 102.75 | 78.25 | 45.00 |
| | 3 | 866.75 | 209.00 | 194.50 | 182.50 | 163.75 | 146.25 | 111.00 | 63.25 |
| | 4 | 1,067.50 | 258.25 | 238.25 | 224.25 | 200.75 | 179.25 | 137.25 | 78.00 |
| 61.00 | 1 | 415.50 | 101.00 | 92.00 | 86.25 | 75.75 | 67.00 | 50.00 | 28.50 |
| | 2 | 628.00 | 157.00 | 143.00 | 134.00 | 118.25 | 105.00 | 78.75 | 44.00 |
| | 3 | 867.75 | 221.25 | 201.75 | 188.00 | 167.00 | 147.50 | 111.25 | 62.25 |
| | 4 | 1,069.25 | 273.50 | 248.25 | 232.25 | 205.75 | 182.00 | 137.00 | 76.75 |
| 68.60 | 1 | 415.50 | 101.50 | 96.00 | 92.00 | 84.50 | 78.25 | 65.00 | 23.00 |
| | 2 | 627.00 | 160.50 | 150.00 | 144.00 | 132.75 | 122.75 | 103.50 | 35.00 |
| | 3 | 860.50 | 225.00 | 212.25 | 203.00 | 188.00 | 173.75 | 147.50 | 48.25 |
| | 4 | 1,065.25 | 278.50 | 262.25 | 250.75 | 232.25 | 215.50 | 183.50 | 58.50 |
| 76.20 | 1 | 416.00 | 96.50 | 87.50 | 81.50 | 73.50 | 64.75 | 50.25 | 30.00 |
| | 2 | 631.75 | 149.00 | 136.00 | 127.50 | 114.00 | 101.00 | 78.00 | 45.00 |
| | 3 | 866.75 | 208.75 | 191.00 | 179.00 | 160.50 | 142.75 | 110.00 | 64.00 |
| | 4 | 1,069.25 | 258.25 | 235.25 | 221.25 | 198.25 | 176.00 | 136.00 | 77.75 |

**Table A-3. FWD deflection measurements extracted for LTPP pavement section 1047 for FWD test date 17-Dec-98 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 413.50 | 102.00 | 90.25 | 84.50 | 73.75 | 65.50 | 49.50 | 30.00 |
| | 2 | 631.25 | 159.50 | 141.50 | 131.50 | 115.75 | 102.75 | 78.00 | 45.25 |
| | 3 | 864.50 | 223.00 | 199.25 | 186.00 | 163.50 | 145.00 | 110.00 | 64.50 |
| | 4 | 1,066.25 | 275.25 | 245.00 | 229.00 | 201.75 | 179.00 | 136.00 | 78.25 |
| 91.40 | 1 | 415.75 | 125.00 | 110.50 | 102.50 | 90.50 | 79.25 | 58.75 | 29.75 |
| | 2 | 625.75 | 192.50 | 170.00 | 157.75 | 139.50 | 122.50 | 90.75 | 46.75 |
| | 3 | 860.25 | 267.50 | 237.25 | 220.25 | 194.50 | 171.00 | 126.75 | 67.75 |
| | 4 | 1,064.50 | 328.50 | 291.75 | 270.75 | 239.75 | 210.25 | 156.50 | 84.00 |
| 99.70 | 1 | 406.25 | 99.50 | 88.25 | 81.25 | 70.25 | 61.75 | 45.50 | 26.25 |
| | 2 | 620.25 | 151.25 | 137.75 | 127.50 | 110.50 | 96.50 | 71.75 | 40.75 |
| | 3 | 839.50 | 209.50 | 193.50 | 178.75 | 155.50 | 135.25 | 101.00 | 56.50 |
| | 4 | 1,036.00 | 265.00 | 240.00 | 220.75 | 191.50 | 168.25 | 124.75 | 70.50 |
| 107.30 | 1 | 408.50 | 106.75 | 91.00 | 84.00 | 73.25 | 64.00 | 47.00 | 26.00 |
| | 2 | 624.25 | 164.50 | 144.00 | 132.50 | 115.75 | 100.25 | 74.75 | 41.00 |
| | 3 | 851.50 | 230.25 | 203.25 | 187.00 | 162.25 | 142.00 | 105.00 | 58.00 |
| | 4 | 1,053.25 | 282.75 | 250.50 | 231.00 | 200.75 | 175.00 | 129.00 | 70.00 |
| 114.30 | 1 | 411.00 | 87.25 | 80.00 | 75.00 | 66.00 | 57.50 | 42.50 | 23.75 |
| | 2 | 621.00 | 139.00 | 126.50 | 118.75 | 104.75 | 91.75 | 68.00 | 38.00 |
| | 3 | 849.50 | 197.00 | 179.00 | 167.50 | 147.75 | 129.25 | 96.00 | 53.25 |
| | 4 | 1,050.50 | 242.25 | 221.25 | 207.25 | 182.75 | 159.75 | 118.75 | 65.75 |
| 121.90 | 1 | 410.50 | 93.25 | 85.25 | 79.50 | 69.00 | 60.00 | 44.25 | 24.00 |
| | 2 | 622.75 | 150.00 | 134.50 | 125.00 | 109.25 | 95.00 | 70.00 | 38.00 |
| | 3 | 858.75 | 210.00 | 190.50 | 176.75 | 154.75 | 135.00 | 99.25 | 54.00 |
| | 4 | 1,059.25 | 260.00 | 235.50 | 218.75 | 191.50 | 166.75 | 122.75 | 67.25 |
| 129.50 | 1 | 411.75 | 82.50 | 75.50 | 70.25 | 62.00 | 54.50 | 40.25 | 22.75 |
| | 2 | 627.50 | 131.25 | 118.50 | 110.75 | 97.00 | 85.75 | 64.00 | 35.25 |
| | 3 | 868.50 | 184.75 | 167.75 | 156.75 | 138.00 | 121.50 | 90.75 | 49.75 |
| | 4 | 1,072.00 | 228.75 | 207.00 | 193.75 | 170.75 | 150.75 | 113.00 | 62.50 |
| 137.20 | 1 | 409.25 | 84.75 | 75.00 | 71.00 | 62.00 | 55.00 | 41.00 | 23.00 |
| | 2 | 622.75 | 134.00 | 118.00 | 111.25 | 98.00 | 87.00 | 64.75 | 36.00 |
| | 3 | 861.50 | 187.75 | 167.00 | 157.75 | 139.00 | 123.00 | 91.75 | 51.25 |
| | 4 | 1,067.00 | 233.00 | 206.75 | 194.75 | 171.75 | 152.25 | 113.75 | 64.25 |
| 144.80 | 1 | 414.75 | 85.75 | 78.00 | 72.50 | 63.00 | 55.00 | 41.00 | 22.75 |
| | 2 | 627.25 | 136.00 | 121.00 | 112.75 | 97.75 | 86.00 | 64.00 | 36.25 |
| | 3 | 864.75 | 190.25 | 170.50 | 158.50 | 137.75 | 121.25 | 90.00 | 50.75 |
| | 4 | 1,070.25 | 234.50 | 210.25 | 194.25 | 170.00 | 149.25 | 111.00 | 62.75 |
| 152.40 | 1 | 416.25 | 85.25 | 80.00 | 73.75 | 64.00 | 55.25 | 40.75 | 22.50 |
| | 2 | 632.00 | 140.50 | 125.75 | 115.50 | 100.75 | 87.00 | 63.75 | 35.75 |
| | 3 | 858.50 | 195.25 | 176.00 | 162.25 | 141.00 | 122.50 | 90.00 | 51.00 |
| | 4 | 1,056.75 | 240.00 | 216.50 | 199.50 | 174.25 | 150.75 | 110.25 | 62.75 |

**Table A-4. Average all point locations FWD deflection measurements extracted for LTPP pavement section 1047.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), microns D6 | D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 413.38 | 99.82 | 88.81 | 82.67 | 72.44 | 63.80 | 47.79 | 26.24 |
| | 2 | 627.52 | 156.25 | 138.88 | 129.08 | 113.45 | 99.90 | 75.25 | 40.80 |
| | 3 | 861.87 | 218.99 | 195.70 | 181.85 | 160.08 | 141.02 | 106.25 | 57.68 |
| | 4 | 1,064.69 | 270.51 | 241.17 | 224.07 | 197.31 | 174.01 | 131.20 | 71.07 |

**Table A-5. FWD deflection measurements extracted for LTPP pavement section 1049 for FWD test date 28-Mar-98.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 397.75 | 65.25 | 56.25 | 51.00 | 44.75 | 37.75 | 28.25 | 16.00 |
| | 2 | 595.75 | 100.25 | 85.50 | 77.50 | 68.00 | 58.00 | 42.75 | 24.25 |
| | 3 | 789.25 | 135.50 | 116.75 | 106.00 | 92.00 | 79.25 | 58.25 | 32.75 |
| | 4 | 1,035.25 | 184.00 | 158.25 | 143.75 | 125.00 | 107.50 | 79.25 | 43.75 |
| 7.60 | 1 | 391.50 | 99.25 | 70.00 | 60.50 | 50.75 | 43.50 | 33.00 | 20.50 |
| | 2 | 588.75 | 147.00 | 105.00 | 91.00 | 77.00 | 66.00 | 49.75 | 30.00 |
| | 3 | 784.00 | 198.00 | 143.75 | 125.00 | 105.00 | 90.00 | 67.50 | 40.75 |
| | 4 | 1,035.00 | 265.00 | 193.75 | 169.25 | 142.75 | 123.00 | 92.00 | 55.00 |
| 15.20 | 1 | 392.00 | 96.75 | 77.25 | 67.25 | 55.50 | 45.50 | 34.25 | 21.50 |
| | 2 | 588.75 | 145.25 | 115.25 | 101.00 | 83.25 | 67.75 | 51.00 | 30.75 |
| | 3 | 780.25 | 194.50 | 156.25 | 135.75 | 112.25 | 91.75 | 68.50 | 41.50 |
| | 4 | 1,025.50 | 260.00 | 210.25 | 183.00 | 151.50 | 124.50 | 92.75 | 56.00 |
| 22.90 | 1 | 391.00 | 83.50 | 67.00 | 60.25 | 52.50 | 45.50 | 36.00 | 22.00 |
| | 2 | 589.00 | 126.25 | 102.25 | 91.50 | 79.75 | 70.00 | 54.25 | 33.00 |
| | 3 | 784.25 | 172.25 | 139.75 | 125.50 | 109.25 | 96.00 | 74.00 | 44.25 |
| | 4 | 1,033.25 | 233.75 | 190.25 | 170.75 | 149.25 | 130.75 | 100.75 | 60.00 |
| 30.50 | 1 | 390.50 | 64.75 | 54.25 | 50.00 | 44.75 | 39.75 | 32.00 | 18.50 |
| | 2 | 591.75 | 98.00 | 82.25 | 76.25 | 68.25 | 61.25 | 49.25 | 27.50 |
| | 3 | 788.25 | 133.25 | 112.00 | 103.00 | 93.00 | 83.00 | 67.00 | 37.25 |
| | 4 | 1,043.00 | 179.00 | 150.75 | 139.00 | 125.00 | 112.50 | 90.25 | 49.50 |
| 38.10 | 1 | 389.50 | 59.75 | 51.75 | 48.00 | 43.25 | 38.25 | 29.50 | 18.00 |
| | 2 | 590.00 | 90.25 | 78.25 | 73.00 | 65.25 | 58.00 | 45.00 | 26.50 |
| | 3 | 791.50 | 124.50 | 108.00 | 100.25 | 90.25 | 79.75 | 61.25 | 35.25 |
| | 4 | 1,053.25 | 170.25 | 147.25 | 136.50 | 123.00 | 109.00 | 83.00 | 47.50 |
| 45.70 | 1 | 393.25 | 64.50 | 54.00 | 48.50 | 43.00 | 37.75 | 29.50 | 18.00 |
| | 2 | 592.25 | 97.00 | 81.25 | 73.75 | 64.75 | 57.00 | 44.00 | 26.50 |
| | 3 | 788.25 | 132.00 | 110.00 | 99.75 | 87.50 | 77.00 | 60.00 | 36.00 |
| | 4 | 1,037.00 | 180.00 | 149.00 | 135.50 | 118.25 | 104.50 | 81.25 | 49.00 |
| 53.30 | 1 | 393.00 | 63.00 | 54.00 | 49.75 | 44.75 | 39.00 | 30.50 | 16.75 |
| | 2 | 589.25 | 94.25 | 81.25 | 74.50 | 66.25 | 59.00 | 45.50 | 25.50 |
| | 3 | 791.00 | 130.25 | 110.75 | 102.00 | 91.00 | 80.75 | 62.00 | 34.75 |
| | 4 | 1,050.50 | 177.25 | 151.50 | 140.00 | 124.50 | 110.25 | 85.00 | 47.25 |
| 61.00 | 1 | 391.25 | 66.50 | 54.75 | 49.25 | 43.00 | 38.00 | 29.00 | 15.75 |
| | 2 | 588.75 | 99.25 | 81.50 | 74.25 | 65.25 | 57.75 | 45.00 | 23.50 |
| | 3 | 789.00 | 133.75 | 110.75 | 100.50 | 89.00 | 78.75 | 61.00 | 32.00 |
| | 4 | 1,044.75 | 180.75 | 149.75 | 136.00 | 120.00 | 106.75 | 82.75 | 43.00 |
| 68.60 | 1 | 390.25 | 124.25 | 79.25 | 67.75 | 55.75 | 47.00 | 34.00 | 17.00 |
| | 2 | 582.75 | 180.25 | 116.75 | 100.75 | 83.00 | 70.50 | 50.75 | 26.00 |
| | 3 | 779.75 | 236.00 | 157.50 | 136.25 | 113.00 | 96.00 | 69.00 | 35.75 |
| | 4 | 1,025.00 | 313.00 | 212.00 | 183.50 | 152.75 | 130.00 | 93.75 | 48.25 |
| 76.20 | 1 | 395.75 | 66.00 | 58.25 | 54.75 | 49.25 | 42.25 | 30.25 | 16.00 |
| | 2 | 591.25 | 100.00 | 88.00 | 83.00 | 74.50 | 64.00 | 45.25 | 24.00 |
| | 3 | 792.25 | 137.00 | 120.75 | 112.75 | 102.00 | 87.75 | 62.00 | 32.75 |
| | 4 | 1,042.75 | 184.50 | 162.75 | 152.00 | 137.75 | 119.75 | 84.00 | 44.25 |

**Table A-5. FWD deflection measurements extracted for LTPP pavement section 1049 for FWD test date 28-Mar-98 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 394.50 | 60.25 | 51.25 | 47.00 | 42.00 | 34.25 | 26.00 | 13.50 |
| | 2 | 592.25 | 90.75 | 76.75 | 71.50 | 62.75 | 53.00 | 38.75 | 20.50 |
| | 3 | 794.75 | 125.00 | 106.25 | 98.50 | 86.50 | 73.00 | 53.00 | 27.75 |
| | 4 | 1,045.50 | 171.25 | 145.00 | 134.25 | 118.50 | 100.25 | 73.25 | 38.00 |
| 91.40 | 1 | 390.75 | 63.50 | 51.50 | 45.25 | 39.00 | 33.75 | 25.75 | 14.75 |
| | 2 | 588.50 | 95.00 | 77.50 | 68.00 | 59.00 | 51.00 | 38.00 | 22.00 |
| | 3 | 792.00 | 129.50 | 105.00 | 93.00 | 80.00 | 69.00 | 52.00 | 29.75 |
| | 4 | 1,048.25 | 175.00 | 141.50 | 125.25 | 107.50 | 93.00 | 69.75 | 39.75 |
| 99.10 | 1 | 392.75 | 53.25 | 45.00 | 41.50 | 37.25 | 33.50 | 26.25 | 16.00 |
| | 2 | 589.75 | 79.75 | 67.75 | 62.25 | 56.25 | 49.50 | 39.25 | 24.00 |
| | 3 | 791.50 | 109.25 | 92.00 | 85.00 | 76.75 | 68.00 | 53.75 | 33.00 |
| | 4 | 1,049.25 | 146.50 | 124.00 | 115.00 | 103.00 | 92.50 | 73.00 | 44.00 |
| 106.70 | 1 | 393.00 | 49.25 | 42.25 | 39.00 | 35.25 | 31.75 | 25.25 | 16.75 |
| | 2 | 592.00 | 75.50 | 64.75 | 59.50 | 53.75 | 48.00 | 38.75 | 25.25 |
| | 3 | 793.00 | 102.75 | 88.00 | 81.00 | 73.00 | 66.00 | 52.25 | 34.50 |
| | 4 | 1,046.25 | 139.75 | 119.00 | 110.00 | 99.00 | 89.25 | 71.00 | 47.00 |
| 114.30 | 1 | 393.00 | 71.75 | 62.75 | 58.25 | 52.25 | 47.00 | 37.00 | 20.75 |
| | 2 | 589.75 | 108.25 | 95.50 | 88.75 | 80.00 | 71.75 | 56.00 | 31.50 |
| | 3 | 788.75 | 148.50 | 130.75 | 121.50 | 110.00 | 98.25 | 77.25 | 43.25 |
| | 4 | 1,037.00 | 201.75 | 177.00 | 165.00 | 149.50 | 134.25 | 105.50 | 59.50 |
| 121.90 | 1 | 390.50 | 94.00 | 77.50 | 68.75 | 59.00 | 52.00 | 41.00 | 21.50 |
| | 2 | 587.00 | 140.50 | 117.00 | 104.50 | 91.25 | 80.25 | 63.50 | 33.50 |
| | 3 | 787.75 | 189.00 | 158.75 | 142.00 | 124.00 | 110.00 | 87.75 | 46.00 |
| | 4 | 1,038.50 | 253.25 | 214.00 | 192.75 | 169.00 | 150.75 | 119.50 | 63.00 |
| 129.50 | 1 | 389.00 | 70.00 | 59.00 | 52.50 | 42.75 | 34.75 | 26.50 | 14.50 |
| | 2 | 587.75 | 106.00 | 89.50 | 79.75 | 65.25 | 53.00 | 40.50 | 22.25 |
| | 3 | 790.75 | 144.75 | 122.00 | 109.00 | 90.00 | 73.50 | 56.00 | 31.00 |
| | 4 | 1,043.25 | 196.00 | 165.25 | 148.00 | 122.00 | 100.00 | 76.75 | 42.00 |
| 137.20 | 1 | 390.50 | 54.25 | 45.00 | 40.00 | 34.00 | 30.75 | 25.00 | 15.00 |
| | 2 | 589.50 | 82.50 | 68.50 | 59.75 | 52.00 | 47.00 | 37.75 | 23.25 |
| | 3 | 790.50 | 113.00 | 92.75 | 81.50 | 71.00 | 64.00 | 51.75 | 31.75 |
| | 4 | 1,043.75 | 151.75 | 125.25 | 110.25 | 97.00 | 87.00 | 70.50 | 43.50 |
| 144.80 | 1 | 387.50 | 113.25 | 79.75 | 69.50 | 59.00 | 50.50 | 36.75 | 19.25 |
| | 2 | 586.00 | 167.50 | 119.75 | 105.00 | 89.00 | 76.00 | 55.75 | 29.50 |
| | 3 | 783.00 | 222.50 | 161.00 | 141.00 | 119.75 | 103.00 | 75.25 | 40.75 |
| | 4 | 1,032.50 | 297.25 | 219.50 | 190.50 | 162.75 | 139.50 | 102.50 | 55.50 |
| 152.40 | 1 | 389.00 | 98.25 | 83.75 | 71.25 | 58.00 | 48.25 | 35.00 | 18.25 |
| | 2 | 585.75 | 147.00 | 125.00 | 107.00 | 88.00 | 73.25 | 54.00 | 27.00 |
| | 3 | 788.00 | 198.00 | 168.25 | 144.75 | 119.00 | 100.00 | 73.25 | 37.00 |
| | 4 | 1,043.00 | 264.75 | 225.50 | 194.00 | 160.75 | 136.00 | 100.00 | 50.00 |

**Table A-6. Average all point locations FWD deflection measurements extracted for LTPP pavement section 1049.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 391.73 | 75.30 | 60.69 | 54.29 | 46.94 | 40.51 | 30.99 | 17.63 |
| | 2 | 589.36 | 112.88 | 91.39 | 82.02 | 71.07 | 61.52 | 46.89 | 26.49 |
| | 3 | 788.46 | 152.82 | 124.33 | 111.62 | 96.87 | 84.04 | 63.94 | 36.08 |
| | 4 | 1,040.60 | 205.94 | 168.17 | 151.15 | 131.37 | 114.33 | 86.98 | 48.85 |

**Table A-7. FWD deflection measurements extracted for LTPP pavement section 1056 for FWD test date 21-Nov-02.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 404.75 | 929.25 | 633.75 | 404.50 | 240.50 | 160.25 | 88.25 | 59.75 | 46.50 |
| | 2 | 570.50 | 1,217.75 | 854.00 | 569.75 | 351.50 | 238.00 | 130.00 | 88.75 | 55.75 |
| | 3 | 730.25 | 1,466.50 | 1,054.50 | 723.75 | 461.75 | 319.00 | 175.50 | 118.75 | 77.25 |
| | 4 | 1,014.00 | 1,854.00 | 1,370.00 | 966.25 | 639.25 | 452.25 | 252.00 | 170.75 | 110.50 |
| 7.60 | 1 | 402.50 | 868.00 | 595.25 | 385.50 | 219.25 | 140.50 | 74.25 | 52.00 | 40.50 |
| | 2 | 580.50 | 1,119.00 | 815.00 | 549.00 | 327.50 | 213.00 | 111.75 | 77.00 | 61.75 |
| | 3 | 737.75 | 1,348.50 | 1,004.50 | 695.75 | 432.25 | 285.00 | 150.50 | 103.00 | 81.50 |
| | 4 | 1,027.25 | 1,787.75 | 1,322.25 | 930.75 | 604.50 | 407.75 | 219.25 | 150.25 | 114.50 |
| 15.20 | 1 | 406.00 | 819.50 | 567.25 | 388.25 | 230.75 | 153.50 | 80.75 | 51.75 | 40.00 |
| | 2 | 585.75 | 1,089.25 | 779.50 | 552.25 | 343.50 | 231.50 | 121.00 | 78.00 | 60.25 |
| | 3 | 743.50 | 1,311.00 | 959.50 | 695.50 | 448.75 | 308.50 | 165.50 | 105.00 | 81.25 |
| | 4 | 1,030.50 | 1,665.00 | 1,266.00 | 931.25 | 624.75 | 440.25 | 238.50 | 150.75 | 114.00 |
| 22.90 | 1 | 401.00 | 848.25 | 589.00 | 391.00 | 232.75 | 148.25 | 77.25 | 53.25 | 45.50 |
| | 2 | 577.25 | 1,131.50 | 814.25 | 560.25 | 347.75 | 225.50 | 121.25 | 82.50 | 68.50 |
| | 3 | 739.00 | 1,368.25 | 1,011.00 | 712.25 | 456.00 | 302.50 | 162.50 | 111.25 | 90.75 |
| | 4 | 1,028.00 | 1,718.50 | 1,327.50 | 972.50 | 635.75 | 432.50 | 236.25 | 160.00 | 128.25 |
| 30.50 | 1 | 400.00 | 853.75 | 573.75 | 390.25 | 218.00 | 141.75 | 79.50 | 60.25 | 46.75 |
| | 2 | 576.50 | 1,144.75 | 796.50 | 561.50 | 327.75 | 214.25 | 120.25 | 85.25 | 67.25 |
| | 3 | 739.00 | 1,377.50 | 987.75 | 713.25 | 431.00 | 286.00 | 161.75 | 113.75 | 88.75 |
| | 4 | 1,020.75 | 1,722.00 | 1,329.75 | 959.75 | 605.25 | 411.50 | 232.50 | 164.50 | 128.75 |
| 38.10 | 1 | 400.25 | 945.75 | 683.50 | 472.25 | 277.00 | 180.75 | 101.25 | 70.75 | 52.00 |
| | 2 | 575.25 | 1,265.75 | 944.50 | 674.00 | 412.50 | 274.75 | 153.50 | 107.75 | 78.00 |
| | 3 | 738.50 | 1,535.00 | 1,171.25 | 856.00 | 542.25 | 368.50 | 207.50 | 142.50 | 105.00 |
| | 4 | 1,016.00 | 1,951.00 | 1,519.25 | 1,138.25 | 751.00 | 524.50 | 299.50 | 201.50 | 150.00 |
| 45.70 | 1 | 398.00 | 817.25 | 562.00 | 377.00 | 221.75 | 144.00 | 81.75 | 59.25 | 46.25 |
| | 2 | 573.25 | 1,086.50 | 777.25 | 539.50 | 332.25 | 220.25 | 125.25 | 90.00 | 70.00 |
| | 3 | 733.25 | 1,315.00 | 960.25 | 683.50 | 436.50 | 295.75 | 168.75 | 119.75 | 93.50 |
| | 4 | 1,016.00 | 1,683.25 | 1,249.75 | 913.00 | 607.50 | 423.75 | 243.75 | 170.25 | 133.25 |
| 53.30 | 1 | 404.50 | 927.50 | 657.50 | 470.50 | 287.50 | 193.75 | 107.75 | 72.25 | 58.50 |
| | 2 | 581.50 | 1,232.00 | 907.25 | 659.00 | 424.25 | 288.00 | 160.50 | 108.25 | 83.25 |
| | 3 | 736.25 | 1,490.00 | 1,118.00 | 834.50 | 554.50 | 385.25 | 216.25 | 145.50 | 110.25 |
| | 4 | 1,015.00 | 1,888.75 | 1,454.50 | 1,107.00 | 763.50 | 544.50 | 310.25 | 211.50 | 157.50 |
| 61.00 | 1 | 394.25 | 882.75 | 613.75 | 419.50 | 248.50 | 165.25 | 94.00 | 70.25 | 52.50 |
| | 2 | 571.25 | 1,174.50 | 847.00 | 598.00 | 371.50 | 252.75 | 144.25 | 104.75 | 78.25 |
| | 3 | 732.25 | 1,420.75 | 1,047.75 | 757.50 | 486.75 | 338.25 | 194.25 | 136.75 | 103.50 |
| | 4 | 1,014.25 | 1,783.25 | 1,363.00 | 1,007.50 | 672.25 | 479.00 | 278.00 | 196.50 | 147.50 |
| 68.60 | 1 | 399.75 | 879.75 | 602.75 | 417.00 | 258.00 | 179.75 | 98.00 | 70.00 | 50.00 |
| | 2 | 575.00 | 1,172.25 | 828.75 | 598.00 | 380.75 | 261.50 | 150.25 | 108.50 | 77.50 |
| | 3 | 733.75 | 1,422.00 | 1,030.25 | 755.75 | 495.25 | 349.00 | 202.25 | 141.25 | 101.50 |
| | 4 | 1,018.75 | 1,780.75 | 1,327.00 | 993.50 | 670.50 | 488.25 | 288.25 | 200.75 | 142.75 |
| 76.20 | 1 | 404.75 | 706.75 | 470.25 | 315.00 | 183.75 | 123.75 | 76.50 | 57.25 | 45.25 |
| | 2 | 584.50 | 947.50 | 650.75 | 451.25 | 274.25 | 185.50 | 115.25 | 85.75 | 69.00 |
| | 3 | 748.25 | 1,142.25 | 807.50 | 571.25 | 358.25 | 244.75 | 152.75 | 113.50 | 90.75 |
| | 4 | 1,034.00 | 1,443.50 | 1,048.00 | 758.50 | 493.50 | 343.75 | 216.00 | 160.75 | 125.50 |

**Table A-7. FWD deflection measurements extracted for LTPP pavement section 1056 for FWD test date 21-Nov-02 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 399.00 | 812.25 | 585.00 | 369.50 | 207.00 | 141.25 | 84.50 | 60.50 | 48.25 |
| | 2 | 576.75 | 1,080.50 | 797.25 | 527.25 | 313.25 | 213.50 | 128.50 | 91.00 | 71.00 |
| | 3 | 739.25 | 1,309.00 | 982.50 | 670.50 | 410.50 | 288.50 | 173.25 | 122.75 | 96.25 |
| | 4 | 1,026.75 | 1,665.00 | 1,278.25 | 895.00 | 572.50 | 404.75 | 247.50 | 175.50 | 131.25 |
| 91.40 | 1 | 393.50 | 865.50 | 585.00 | 405.25 | 238.00 | 160.50 | 88.50 | 61.00 | 47.75 |
| | 2 | 568.75 | 1,154.75 | 816.50 | 583.75 | 358.25 | 246.25 | 134.25 | 91.50 | 71.75 |
| | 3 | 732.00 | 1,400.50 | 1,016.00 | 741.75 | 469.00 | 330.75 | 180.75 | 124.50 | 93.00 |
| | 4 | 1,010.75 | 1,784.50 | 1,352.00 | 996.50 | 656.50 | 470.25 | 258.00 | 175.50 | 129.25 |
| 99.10 | 1 | 393.75 | 1,057.50 | 743.50 | 510.25 | 299.25 | 194.00 | 107.50 | 75.50 | 55.00 |
| | 2 | 568.25 | 1,404.50 | 1,024.75 | 726.75 | 446.00 | 296.50 | 165.00 | 114.00 | 82.00 |
| | 3 | 732.50 | 1,696.25 | 1,265.00 | 918.50 | 584.75 | 396.00 | 221.50 | 152.50 | 109.00 |
| | 4 | 1,003.25 | | 1,666.25 | 1,220.75 | 807.00 | 561.50 | 318.25 | 217.25 | 152.00 |
| 106.70 | 1 | 391.75 | 943.00 | 658.75 | 462.25 | 276.50 | 183.25 | 101.75 | 71.25 | 50.00 |
| | 2 | 563.00 | 1,261.00 | 913.25 | 658.75 | 412.50 | 280.75 | 155.00 | 103.50 | 75.50 |
| | 3 | 721.50 | 1,530.50 | 1,135.50 | 831.00 | 542.25 | 375.75 | 209.00 | 139.75 | 101.50 |
| | 4 | 1,002.00 | 1,950.75 | 1,495.25 | 1,109.00 | 751.25 | 534.75 | 300.00 | 200.25 | 137.25 |
| 114.30 | 1 | 390.00 | 929.75 | 665.25 | 449.25 | 262.00 | 172.00 | 95.25 | 63.00 | 47.75 |
| | 2 | 564.00 | 1,243.50 | 918.00 | 640.75 | 392.75 | 261.75 | 143.75 | 95.50 | 69.50 |
| | 3 | 724.50 | 1,510.00 | 1,138.25 | 815.25 | 514.75 | 351.25 | 194.25 | 128.25 | 90.75 |
| | 4 | 1,005.00 | 1,906.75 | 1,484.25 | 1,085.00 | 711.50 | 497.75 | 278.00 | 183.25 | 131.00 |
| 121.90 | 1 | 394.00 | 994.50 | 702.75 | 456.75 | 252.75 | 167.50 | 96.75 | 67.00 | 52.75 |
| | 2 | 569.00 | 1,324.75 | 965.50 | 654.50 | 384.00 | 259.25 | 148.75 | 102.00 | 81.00 |
| | 3 | 732.50 | 1,606.25 | 1,194.25 | 832.25 | 509.00 | 350.00 | 201.00 | 137.50 | 109.25 |
| | 4 | 1,000.25 | 2,030.00 | 1,559.50 | 1,110.25 | 712.50 | 502.50 | 292.00 | 199.00 | 148.25 |
| 129.50 | 1 | 396.50 | 922.00 | 625.75 | 421.75 | 248.25 | 158.00 | 83.50 | 57.25 | 42.75 |
| | 2 | 571.25 | 1,227.00 | 864.75 | 605.00 | 370.50 | 240.75 | 127.50 | 86.50 | 66.50 |
| | 3 | 736.25 | 1,479.75 | 1,069.00 | 767.75 | 486.25 | 322.25 | 172.00 | 116.25 | 89.50 |
| | 4 | 1,003.75 | 1,861.00 | 1,396.50 | 1,029.00 | 679.25 | 462.00 | 250.50 | 168.25 | 122.00 |
| 137.20 | 1 | 392.25 | 799.00 | 523.25 | 347.25 | 200.75 | 130.75 | 73.00 | 50.00 | 42.25 |
| | 2 | 565.25 | 1,082.50 | 738.75 | 506.00 | 300.50 | 197.75 | 108.75 | 73.25 | 62.25 |
| | 3 | 728.00 | 1,310.75 | 927.00 | 651.75 | 399.75 | 266.75 | 148.25 | 98.25 | 83.75 |
| | 4 | 1,000.75 | 1,647.25 | 1,229.00 | 885.50 | 565.50 | 387.00 | 219.00 | 143.00 | 137.00 |
| 144.80 | 1 | 391.00 | 966.00 | 651.00 | 440.50 | 255.25 | 162.25 | 85.25 | 58.00 | 43.50 |
| | 2 | 567.25 | 1,306.50 | 920.50 | 643.75 | 389.25 | 252.75 | 132.00 | 88.75 | 65.50 |
| | 3 | 730.75 | 1,591.00 | 1,152.50 | 827.50 | 514.50 | 340.00 | 179.00 | 119.75 | 85.00 |
| | 4 | 991.75 | | 1,522.25 | 1,121.50 | 722.00 | 489.00 | 261.50 | 175.00 | 112.50 |
| 152.40 | 1 | 395.25 | 953.25 | 692.75 | 477.50 | 281.00 | 173.00 | 86.25 | 58.00 | 46.50 |
| | 2 | 572.50 | 1,283.50 | 967.00 | 685.75 | 419.50 | 263.50 | 131.25 | 87.50 | 68.50 |
| | 3 | 734.25 | 1,569.50 | 1,203.00 | 870.25 | 548.25 | 355.25 | 177.25 | 117.25 | 90.50 |
| | 4 | 999.00 | 1,993.25 | 1,580.25 | 1,164.75 | 759.00 | 506.50 | 257.00 | 171.50 | 130.00 |

**Table A-8. Average all point locations FWD deflection measurements extracted for LTPP pavement section 1056.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 397.75 | 891.49 | 618.18 | 417.67 | 244.69 | 160.67 | 88.64 | 61.82 | 47.63 |
| | 2 | 573.20 | 1,188.06 | 854.33 | 597.37 | 365.71 | 243.70 | 134.67 | 92.86 | 70.62 |
| | 3 | 734.44 | 1,438.11 | 1,058.82 | 758.36 | 480.11 | 326.62 | 181.61 | 124.18 | 93.93 |
| | 4 | 1,013.23 | 1,785.96 | 1,387.64 | 1,014.07 | 666.89 | 464.95 | 261.71 | 178.38 | 132.52 |

**Table A-9. FWD deflection measurements extracted for LTPP pavement section 1068 for FWD test date 3-Jul-97.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| -9.10 | 1 | 355.50 | 166.25 | 136.75 | 121.75 | 98.25 | 79.25 | 51.00 | 24.00 |
| | 2 | 563.75 | 267.25 | 217.25 | 193.25 | 157.25 | 127.25 | 82.00 | 40.00 |
| | 3 | 782.00 | 370.00 | 300.00 | 267.00 | 217.00 | 176.75 | 114.75 | 56.00 |
| | 4 | 1,017.75 | 483.00 | 389.75 | 346.75 | 282.50 | 230.25 | 150.00 | 73.75 |
| 0.00 | 1 | 351.00 | 267.25 | 217.25 | 193.25 | 157.25 | 127.25 | 82.00 | 40.00 |
| | 2 | 560.00 | 370.00 | 300.00 | 267.00 | 217.00 | 176.75 | 114.75 | 56.00 |
| | 3 | 781.00 | 483.00 | 389.75 | 346.75 | 282.50 | 230.25 | 150.00 | 73.75 |
| | 4 | 1,021.50 | 171.00 | 121.25 | 107.25 | 87.00 | 71.00 | 47.00 | 23.25 |
| 7.60 | 1 | 351.00 | 171.75 | 137.00 | 118.00 | 95.00 | 77.25 | 50.00 | 23.25 |
| | 2 | 560.00 | 275.50 | 219.25 | 190.00 | 153.75 | 125.75 | 82.00 | 39.00 |
| | 3 | 779.50 | 379.00 | 302.75 | 262.75 | 213.00 | 175.00 | 115.00 | 54.50 |
| | 4 | 1,015.00 | 495.25 | 395.00 | 341.75 | 277.75 | 228.75 | 150.75 | 71.00 |
| 15.20 | 1 | 354.00 | 178.25 | 141.75 | 123.25 | 100.75 | 82.00 | 53.25 | 23.75 |
| | 2 | 562.75 | 286.75 | 228.50 | 197.75 | 164.00 | 134.00 | 89.00 | 40.00 |
| | 3 | 780.75 | 398.00 | 316.25 | 275.00 | 227.75 | 186.75 | 124.75 | 56.75 |
| | 4 | 1,011.50 | 517.75 | 411.00 | 356.50 | 297.25 | 243.75 | 164.00 | 75.00 |
| 22.90 | 1 | 350.00 | 191.50 | 146.25 | 127.00 | 101.75 | 82.50 | 52.25 | 23.25 |
| | 2 | 559.50 | 304.50 | 234.50 | 203.50 | 164.50 | 133.75 | 86.50 | 39.75 |
| | 3 | 777.75 | 420.75 | 325.00 | 282.50 | 228.25 | 187.50 | 121.50 | 56.00 |
| | 4 | 1,010.00 | 546.00 | 423.00 | 367.75 | 298.00 | 244.25 | 160.00 | 74.00 |
| 30.80 | 1 | 346.50 | 194.75 | 151.00 | 127.00 | 100.75 | 80.75 | 51.50 | 23.25 |
| | 2 | 558.00 | 313.00 | 243.25 | 205.75 | 165.00 | 132.50 | 85.25 | 40.25 |
| | 3 | 776.00 | 432.25 | 337.00 | 285.25 | 229.75 | 185.50 | 120.25 | 56.50 |
| | 4 | 1,010.00 | 564.25 | 440.00 | 373.00 | 301.25 | 243.50 | 158.75 | 75.75 |
| 38.10 | 1 | 350.50 | 203.25 | 153.25 | 130.00 | 105.00 | 83.00 | 51.00 | 22.75 |
| | 2 | 557.25 | 321.50 | 245.75 | 209.75 | 169.75 | 135.00 | 85.00 | 39.00 |
| | 3 | 775.25 | 439.00 | 339.75 | 290.50 | 236.25 | 188.25 | 120.00 | 55.25 |
| | 4 | 1,007.75 | 569.25 | 442.00 | 379.00 | 308.50 | 246.25 | 158.25 | 73.50 |
| 45.70 | 1 | 350.50 | 186.75 | 135.75 | 113.50 | 89.00 | 70.00 | 45.00 | 22.25 |
| | 2 | 559.00 | 296.50 | 217.75 | 183.00 | 144.75 | 115.75 | 74.75 | 36.00 |
| | 3 | 776.50 | 407.75 | 301.00 | 253.25 | 201.75 | 162.00 | 106.00 | 51.75 |
| | 4 | 1,006.75 | 529.50 | 391.00 | 329.25 | 263.75 | 212.75 | 140.75 | 70.00 |
| 53.30 | 1 | 350.00 | 164.25 | 126.75 | 110.00 | 90.00 | 74.75 | 50.75 | 24.75 |
| | 2 | 560.25 | 263.00 | 204.75 | 178.25 | 147.75 | 122.50 | 83.50 | 41.00 |
| | 3 | 778.50 | 363.25 | 284.25 | 247.25 | 205.75 | 171.75 | 117.75 | 57.75 |
| | 4 | 1,016.50 | 470.25 | 369.00 | 321.25 | 268.00 | 224.50 | 155.75 | 77.75 |
| 61.00 | 1 | 348.75 | 172.00 | 133.00 | 115.00 | 91.00 | 73.75 | 48.00 | 23.25 |
| | 2 | 556.75 | 274.00 | 214.25 | 185.25 | 148.50 | 120.25 | 79.00 | 39.00 |
| | 3 | 778.25 | 378.25 | 297.00 | 256.75 | 207.00 | 169.00 | 111.00 | 55.25 |
| | 4 | 1,018.75 | 492.50 | 387.50 | 334.25 | 270.75 | 221.50 | 146.25 | 73.25 |

**Table A-10. Average all point locations FWD deflection measurements extracted for LTPP pavement section 1068.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 397.75 | 362.59 | 208.60 | 154.09 | 130.58 | 103.44 | 82.05 | 51.71 |
| | 2 | 573.20 | 566.81 | 323.41 | 241.21 | 205.59 | 164.37 | 131.18 | 83.53 |
| | 3 | 734.44 | 780.36 | 441.80 | 331.08 | 283.03 | 227.13 | 182.28 | 116.94 |
| | 4 | 1,013.23 | 1,002.90 | 567.73 | 426.03 | 364.44 | 293.19 | 235.93 | 152.18 |

**Table A-11. FWD deflection measurements extracted for LTPP pavement section 1069 for FWD test date 2-Apr-02.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 395.00 | 118.25 | 59.75 | 41.25 | 37.50 | 36.00 | 33.75 | 30.00 | 24.75 |
| | 2 | 600.50 | 169.00 | 86.75 | 62.75 | 55.50 | 56.00 | 52.75 | 44.50 | 37.25 |
| | 3 | 748.50 | 211.50 | 108.75 | 78.00 | 69.50 | 69.00 | 64.00 | 54.50 | 46.75 |
| | 4 | 976.25 | 268.25 | 139.50 | 100.50 | 89.75 | 88.75 | 81.75 | 69.75 | 59.75 |
| 7.60 | 1 | 388.50 | 169.00 | 86.75 | 62.75 | 55.50 | 56.00 | 52.75 | 44.50 | 37.25 |
| | 2 | 592.00 | 211.50 | 108.75 | 78.00 | 69.50 | 69.00 | 64.00 | 54.50 | 46.75 |
| | 3 | 737.00 | 268.25 | 139.50 | 100.50 | 89.75 | 88.75 | 81.75 | 69.75 | 59.75 |
| | 4 | 970.00 | 134.00 | 53.25 | 44.50 | 42.75 | 40.50 | 34.50 | 29.25 | 24.25 |
| 15.20 | 1 | 388.50 | 134.75 | 62.50 | 46.50 | 44.25 | 42.75 | 38.00 | 32.25 | 27.00 |
| | 2 | 591.00 | 191.25 | 91.00 | 68.75 | 64.75 | 63.00 | 56.50 | 47.50 | 38.75 |
| | 3 | 743.50 | 242.25 | 117.25 | 87.50 | 83.25 | 79.00 | 69.75 | 60.50 | 50.50 |
| | 4 | 965.50 | 306.00 | 151.25 | 114.00 | 108.00 | 103.25 | 90.75 | 78.75 | 65.75 |
| 22.90 | 1 | 393.00 | 75.75 | 51.25 | 44.50 | 42.25 | 39.25 | 34.25 | 28.75 | 25.75 |
| | 2 | 592.50 | 108.75 | 78.75 | 67.25 | 60.75 | 56.25 | 50.00 | 43.50 | 37.50 |
| | 3 | 739.50 | 141.00 | 101.25 | 86.00 | 77.50 | 72.25 | 63.25 | 55.75 | 46.75 |
| | 4 | 976.25 | 180.75 | 132.00 | 111.00 | 100.50 | 93.75 | 81.75 | 70.75 | 60.00 |
| 30.50 | 1 | 393.25 | 112.50 | 55.75 | 40.25 | 37.00 | 34.75 | 31.00 | 26.50 | 23.50 |
| | 2 | 597.25 | 155.25 | 78.00 | 59.25 | 54.00 | 51.50 | 45.50 | 39.75 | 34.75 |
| | 3 | 755.00 | 194.50 | 98.00 | 75.25 | 69.75 | 66.00 | 58.25 | 50.50 | 43.75 |
| | 4 | 963.75 | 244.50 | 124.00 | 96.00 | 89.00 | 84.00 | 74.75 | 64.50 | 56.00 |
| 38.10 | 1 | 393.00 | 89.75 | 52.00 | 40.50 | 35.25 | 34.00 | 30.50 | 27.75 | 24.00 |
| | 2 | 594.25 | 122.50 | 75.75 | 58.75 | 52.25 | 50.00 | 45.75 | 40.00 | 35.00 |
| | 3 | 748.25 | 161.50 | 97.00 | 75.00 | 67.25 | 64.00 | 58.00 | 51.00 | 43.75 |
| | 4 | 967.50 | 207.50 | 124.50 | 96.00 | 87.25 | 82.50 | 75.25 | 65.50 | 56.50 |
| 45.70 | 1 | 389.00 | 126.50 | 55.75 | 39.25 | 37.25 | 36.75 | 33.50 | 30.75 | 25.50 |
| | 2 | 591.25 | 178.50 | 79.75 | 59.25 | 55.00 | 54.75 | 49.75 | 45.25 | 37.75 |
| | 3 | 740.75 | 216.00 | 100.50 | 73.50 | 70.50 | 67.75 | 63.50 | 54.75 | 48.00 |
| | 4 | 980.00 | 277.75 | 126.00 | 95.00 | 89.75 | 88.50 | 80.75 | 72.00 | 60.50 |
| 53.30 | 1 | 388.00 | 99.25 | 51.50 | 39.75 | 36.00 | 34.75 | 31.75 | 27.00 | 23.75 |
| | 2 | 590.75 | 142.00 | 76.00 | 59.00 | 54.00 | 52.50 | 47.50 | 41.50 | 35.50 |
| | 3 | 744.25 | 181.50 | 97.25 | 75.50 | 68.75 | 66.75 | 60.00 | 52.00 | 45.00 |
| | 4 | 956.50 | 231.50 | 125.25 | 97.25 | 88.25 | 85.50 | 76.75 | 66.50 | 56.75 |
| 61.00 | 1 | 388.00 | 69.25 | 50.25 | 42.75 | 36.75 | 36.25 | 32.75 | 29.50 | 24.75 |
| | 2 | 591.00 | 103.75 | 75.00 | 64.25 | 56.25 | 54.50 | 48.75 | 44.25 | 36.75 |
| | 3 | 733.50 | 133.50 | 95.75 | 81.25 | 71.50 | 68.50 | 62.25 | 55.25 | 46.75 |
| | 4 | 970.25 | 169.25 | 122.50 | 103.75 | 91.50 | 87.00 | 79.50 | 68.75 | 58.75 |
| 68.60 | 1 | 383.50 | 82.75 | 53.75 | 42.00 | 38.25 | 33.25 | 32.00 | 28.25 | 24.00 |
| | 2 | 584.50 | 122.25 | 76.75 | 63.25 | 55.75 | 51.00 | 46.25 | 38.00 | 35.75 |
| | 3 | 736.00 | 163.25 | 99.00 | 81.25 | 72.00 | 67.25 | 61.25 | 53.75 | 46.00 |
| | 4 | 955.00 | 211.50 | 128.25 | 105.25 | 93.75 | 88.25 | 79.50 | 69.75 | 61.00 |
| 76.20 | 1 | 382.25 | 105.25 | 62.25 | 43.50 | 36.75 | 33.50 | 30.75 | 27.25 | 23.75 |
| | 2 | 585.00 | 153.25 | 88.25 | 63.75 | 53.25 | 50.00 | 45.50 | 40.50 | 35.50 |
| | 3 | 736.25 | 196.25 | 111.25 | 81.00 | 68.50 | 64.00 | 58.00 | 51.50 | 45.00 |
| | 4 | 960.75 | 249.50 | 141.25 | 103.75 | 88.25 | 83.50 | 75.50 | 66.25 | 57.25 |

**Table A-11. FWD deflection measurements extracted for LTPP pavement section 1069 for FWD test date 2-Apr-02 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 383.25 | 117.00 | 50.50 | 38.75 | 36.00 | 31.50 | 30.25 | 27.00 | 25.25 |
| | 2 | 588.50 | 161.50 | 74.50 | 55.25 | 52.00 | 48.25 | 45.00 | 40.50 | 35.25 |
| | 3 | 745.25 | 205.25 | 93.50 | 69.00 | 64.75 | 61.75 | 56.75 | 51.25 | 44.50 |
| | 4 | 944.00 | 259.75 | 120.75 | 88.25 | 83.75 | 79.00 | 72.75 | 64.25 | 57.00 |
| 91.40 | 1 | 381.75 | 124.25 | 59.75 | 37.25 | 39.50 | 37.25 | 34.75 | 27.75 | 23.75 |
| | 2 | 585.25 | 173.00 | 81.50 | 58.50 | 55.75 | 52.75 | 48.75 | 42.00 | 37.00 |
| | 3 | 738.75 | 218.25 | 100.75 | 73.25 | 69.25 | 65.50 | 60.50 | 51.50 | 44.75 |
| | 4 | 940.75 | 279.50 | 129.00 | 94.50 | 89.25 | 84.75 | 77.00 | 66.25 | 57.25 |
| 99.10 | 1 | 382.50 | 115.50 | 44.75 | 34.00 | 33.25 | 34.00 | 30.50 | 27.75 | 22.75 |
| | 2 | 585.00 | 163.00 | 66.50 | 49.75 | 49.00 | 48.50 | 44.50 | 39.00 | 34.00 |
| | 3 | 736.75 | 206.50 | 85.00 | 63.50 | 62.50 | 62.00 | 56.00 | 50.00 | 43.25 |
| | 4 | 938.25 | 261.00 | 111.00 | 82.75 | 81.25 | 80.00 | 72.50 | 64.00 | 55.00 |
| 106.70 | 1 | 382.50 | 128.50 | 55.25 | 39.50 | 38.00 | 36.75 | 33.50 | 29.50 | 25.50 |
| | 2 | 586.00 | 173.75 | 79.00 | 57.25 | 55.00 | 52.75 | 47.75 | 41.25 | 35.50 |
| | 3 | 738.75 | 217.50 | 100.25 | 72.50 | 69.25 | 66.25 | 59.75 | 52.25 | 45.00 |
| | 4 | 938.25 | 273.50 | 128.50 | 94.25 | 89.75 | 85.50 | 76.50 | 66.00 | 56.25 |
| 114.30 | 1 | 381.75 | 144.75 | 53.00 | 34.50 | 33.50 | 32.25 | 30.50 | 27.00 | 23.25 |
| | 2 | 583.50 | 201.25 | 79.25 | 52.75 | 51.50 | 50.25 | 47.00 | 42.00 | 36.75 |
| | 3 | 737.75 | 245.25 | 96.25 | 65.50 | 63.00 | 60.50 | 57.75 | 49.75 | 43.25 |
| | 4 | 936.50 | 306.25 | 120.75 | 85.75 | 83.00 | 77.50 | 75.25 | 64.00 | 55.25 |
| 121.90 | 1 | 375.25 | 105.75 | 46.00 | 35.50 | 33.00 | 32.50 | 31.50 | 27.50 | 23.25 |
| | 2 | 581.50 | 154.50 | 68.25 | 52.00 | 49.50 | 48.25 | 45.75 | 40.00 | 34.75 |
| | 3 | 744.75 | 193.50 | 87.00 | 65.75 | 63.75 | 61.00 | 57.00 | 50.25 | 44.00 |
| | 4 | 963.25 | 246.00 | 112.75 | 84.75 | 81.50 | 78.50 | 72.75 | 63.50 | 56.00 |
| 129.50 | 1 | 378.75 | 108.25 | 51.00 | 41.25 | 39.00 | 38.00 | 34.25 | 29.00 | 25.00 |
| | 2 | 584.00 | 157.50 | 75.25 | 60.00 | 56.75 | 55.25 | 49.00 | 42.25 | 36.00 |
| | 3 | 736.50 | 201.00 | 97.75 | 77.50 | 73.75 | 71.50 | 64.00 | 55.00 | 47.75 |
| | 4 | 934.00 | 257.00 | 125.50 | 98.50 | 94.25 | 91.00 | 81.25 | 69.00 | 59.75 |
| 137.20 | 1 | 379.00 | 107.50 | 54.75 | 40.00 | 39.50 | 37.50 | 32.25 | 28.00 | 24.50 |
| | 2 | 583.00 | 147.75 | 79.00 | 58.50 | 58.00 | 55.00 | 47.75 | 41.25 | 36.25 |
| | 3 | 736.50 | 187.00 | 98.75 | 74.00 | 73.00 | 69.00 | 59.75 | 52.00 | 45.00 |
| | 4 | 935.75 | 236.00 | 127.50 | 95.75 | 96.00 | 90.25 | 76.25 | 66.50 | 56.75 |
| 144.80 | 1 | 375.50 | 130.25 | 63.75 | 43.75 | 40.50 | 36.75 | 32.25 | 27.50 | 23.50 |
| | 2 | 582.75 | 185.75 | 95.75 | 68.50 | 62.50 | 58.00 | 51.50 | 44.00 | 38.00 |
| | 3 | 746.25 | 234.50 | 122.00 | 87.50 | 80.50 | 74.25 | 65.25 | 55.75 | 48.25 |
| | 4 | 961.00 | 295.25 | 153.00 | 109.50 | 101.50 | 93.50 | 82.75 | 69.50 | 60.00 |
| 152.40 | 1 | 378.25 | 111.50 | 60.75 | 47.50 | 41.25 | 39.00 | 33.50 | 29.50 | 24.75 |
| | 2 | 584.25 | 159.00 | 88.00 | 69.00 | 61.25 | 57.00 | 49.75 | 43.00 | 37.25 |
| | 3 | 742.50 | 195.50 | 108.50 | 85.25 | 75.50 | 70.50 | 61.50 | 53.25 | 45.50 |
| | 4 | 949.00 | 246.75 | 138.25 | 108.75 | 97.50 | 91.25 | 79.75 | 69.25 | 59.50 |

**Table A-12. Average all point locations FWD deflection measurements extracted for LTPP pavement section 1069.**

| Point location | Drop height | Drop load (kPa) | Average all point locations peak deflections (peak_defl), microns | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| All Point Locations | 1 | 384.79 | 111.49 | 54.64 | 40.80 | 37.98 | 36.06 | 32.67 | 28.46 | 24.40 |
| | 2 | 588.27 | 157.90 | 79.76 | 60.80 | 56.15 | 53.71 | 48.51 | 42.15 | 36.39 |
| | 3 | 741.25 | 199.46 | 101.02 | 76.96 | 71.37 | 67.93 | 61.19 | 53.20 | 45.79 |
| | 4 | 956.31 | 253.14 | 129.49 | 99.04 | 92.11 | 87.60 | 78.67 | 68.01 | 58.42 |

**Table A-13. FWD deflection measurements extracted for LTPP pavement section 1076 for FWD test date 14-Feb-13.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 385.50 | 434.25 | 268.75 | 192.75 | 121.00 | 73.00 | 36.00 | 21.75 | 20.50 |
| | 2 | 576.00 | 631.75 | 400.50 | 291.00 | 186.50 | 113.25 | 57.50 | 37.00 | 30.75 |
| | 3 | 785.50 | 828.25 | 535.25 | 393.75 | 255.75 | 159.25 | 80.75 | 52.75 | 44.75 |
| | 4 | 1,059.00 | 1,045.75 | 688.75 | 510.00 | 332.50 | 214.75 | 108.25 | 73.00 | 61.75 |
| 7.60 | 1 | 403.75 | 631.75 | 400.50 | 291.00 | 186.50 | 113.25 | 57.50 | 37.00 | 30.75 |
| | 2 | 597.50 | 828.25 | 535.25 | 393.75 | 255.75 | 159.25 | 80.75 | 52.75 | 44.75 |
| | 3 | 808.25 | 1,045.75 | 688.75 | 510.00 | 332.50 | 214.75 | 108.25 | 73.00 | 61.75 |
| | 4 | 1,076.25 | 274.00 | 193.75 | 146.25 | 99.50 | 68.75 | 40.00 | 28.00 | 21.75 |
| 15.20 | 1 | 407.75 | 189.25 | 156.75 | 128.25 | 95.00 | 69.25 | 41.75 | 28.75 | 21.50 |
| | 2 | 607.25 | 295.25 | 239.25 | 196.50 | 145.50 | 107.25 | 64.75 | 43.75 | 33.25 |
| | 3 | 820.75 | 404.25 | 328.50 | 270.25 | 200.50 | 149.50 | 90.00 | 61.75 | 47.25 |
| | 4 | 1,086.00 | 537.75 | 436.25 | 359.00 | 268.25 | 200.75 | 122.50 | 84.00 | 63.75 |
| 22.90 | 1 | 409.50 | 192.00 | 149.00 | 120.00 | 88.00 | 63.25 | 38.75 | 26.25 | 20.50 |
| | 2 | 605.00 | 298.25 | 232.25 | 187.25 | 136.00 | 100.25 | 59.00 | 41.00 | 31.50 |
| | 3 | 815.50 | 410.75 | 320.75 | 258.75 | 189.75 | 138.25 | 83.75 | 56.25 | 42.50 |
| | 4 | 1,072.75 | 551.50 | 429.50 | 347.00 | 255.25 | 187.25 | 113.00 | 77.00 | 58.75 |
| 30.50 | 1 | 402.00 | 326.75 | 248.25 | 190.50 | 131.25 | 91.75 | 49.00 | 31.75 | 23.50 |
| | 2 | 592.00 | 487.25 | 369.25 | 285.25 | 199.00 | 140.00 | 75.75 | 47.50 | 35.75 |
| | 3 | 803.25 | 655.00 | 500.00 | 388.50 | 273.50 | 195.50 | 106.75 | 67.75 | 52.00 |
| | 4 | 1,063.75 | 857.00 | 653.25 | 509.00 | 362.75 | 262.25 | 145.50 | 92.75 | 69.00 |
| 38.10 | 1 | 405.00 | 220.00 | 190.75 | 159.50 | 120.50 | 87.50 | 44.75 | 29.75 | 21.75 |
| | 2 | 597.75 | 336.00 | 287.25 | 240.75 | 185.00 | 134.75 | 71.00 | 44.75 | 32.25 |
| | 3 | 808.25 | 456.50 | 392.50 | 329.75 | 253.25 | 186.50 | 98.00 | 62.50 | 45.75 |
| | 4 | 1,069.75 | 610.00 | 522.00 | 437.50 | 338.50 | 250.75 | 132.75 | 85.50 | 61.75 |
| 45.70 | 1 | 407.75 | 169.00 | 133.00 | 111.50 | 87.25 | 67.75 | 44.00 | 30.25 | 22.75 |
| | 2 | 606.50 | 257.25 | 203.25 | 170.25 | 133.25 | 104.25 | 67.00 | 45.75 | 34.75 |
| | 3 | 822.00 | 354.50 | 280.75 | 235.75 | 184.50 | 145.00 | 93.50 | 64.50 | 47.75 |
| | 4 | 1,093.50 | 478.50 | 378.25 | 317.00 | 249.00 | 196.00 | 127.25 | 88.00 | 66.00 |
| 53.30 | 1 | 398.50 | 165.75 | 131.00 | 114.25 | 90.00 | 71.75 | 44.75 | 28.00 | 20.75 |
| | 2 | 593.00 | 249.50 | 207.50 | 175.00 | 139.75 | 110.50 | 70.25 | 43.50 | 32.00 |
| | 3 | 794.25 | 344.25 | 283.25 | 241.25 | 193.75 | 153.00 | 98.25 | 61.25 | 44.25 |
| | 4 | 1,061.00 | 461.75 | 383.50 | 328.00 | 259.50 | 209.00 | 131.75 | 83.25 | 61.25 |
| 61.00 | 1 | 410.00 | 187.00 | 147.00 | 120.00 | 91.75 | 69.25 | 42.75 | 29.00 | 22.00 |
| | 2 | 603.25 | 281.50 | 223.50 | 182.75 | 139.25 | 105.75 | 65.25 | 44.25 | 33.75 |
| | 3 | 812.00 | 385.50 | 308.00 | 253.25 | 193.25 | 147.00 | 90.75 | 62.25 | 46.75 |
| | 4 | 1,077.50 | 521.00 | 412.50 | 339.50 | 260.00 | 198.75 | 123.25 | 84.25 | 63.00 |
| 68.60 | 1 | 396.50 | 226.75 | 170.75 | 134.75 | 98.00 | 72.00 | 42.00 | 28.00 | 21.00 |
| | 2 | 594.25 | 337.25 | 261.25 | 206.75 | 150.50 | 111.50 | 65.00 | 43.50 | 33.00 |
| | 3 | 800.50 | 461.25 | 355.50 | 282.25 | 206.75 | 153.75 | 90.25 | 60.50 | 46.00 |
| | 4 | 1,065.25 | 614.50 | 473.50 | 376.00 | 277.00 | 206.50 | 122.25 | 82.25 | 62.75 |
| 76.20 | 1 | 403.75 | 168.50 | 132.25 | 107.50 | 81.25 | 61.00 | 39.50 | 27.00 | 21.00 |
| | 2 | 602.50 | 259.50 | 203.75 | 165.50 | 124.50 | 95.50 | 60.25 | 41.25 | 31.75 |
| | 3 | 814.75 | 355.75 | 280.25 | 227.50 | 171.75 | 132.00 | 83.50 | 58.00 | 44.00 |
| | 4 | 1,082.50 | 476.50 | 375.00 | 304.50 | 230.25 | 177.75 | 113.00 | 79.00 | 60.25 |

**Table A-13. FWD deflection measurements extracted for LTPP pavement section 1076 for FWD test date 14-Feb-13 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), microns D6 | D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 407.75 | 180.75 | 146.50 | 118.25 | 88.25 | 65.75 | 40.50 | 28.00 | 20.75 |
| | 2 | 604.50 | 278.75 | 222.00 | 179.75 | 134.00 | 101.00 | 62.50 | 42.75 | 32.25 |
| | 3 | 811.25 | 380.25 | 304.00 | 245.75 | 183.50 | 138.75 | 86.00 | 59.00 | 44.75 |
| | 4 | 1,066.75 | 507.50 | 405.00 | 328.00 | 245.50 | 186.00 | 115.50 | 79.75 | 60.00 |
| 91.40 | 1 | 394.75 | 331.50 | 293.25 | 136.75 | 95.75 | 68.25 | 39.25 | 26.75 | 20.50 |
| | 2 | 588.00 | 488.75 | 428.50 | 215.75 | 150.25 | 107.25 | 61.00 | 41.00 | 31.25 |
| | 3 | 797.50 | 657.25 | 573.25 | 300.75 | 209.25 | 149.75 | 85.75 | 57.75 | 44.00 |
| | 4 | 1,060.00 | 866.50 | 746.75 | 404.25 | 283.50 | 203.00 | 115.75 | 78.50 | 59.50 |
| 99.10 | 1 | 392.00 | 307.50 | 218.50 | 163.75 | 110.00 | 75.50 | 42.50 | 28.50 | 22.25 |
| | 2 | 581.00 | 454.00 | 332.75 | 250.75 | 170.00 | 117.75 | 66.00 | 44.75 | 33.50 |
| | 3 | 785.75 | 616.25 | 456.50 | 343.25 | 237.00 | 164.75 | 92.75 | 62.75 | 48.00 |
| | 4 | 1,051.75 | 824.00 | 611.25 | 460.25 | 322.75 | 226.75 | 128.00 | 86.75 | 65.75 |
| 106.70 | 1 | 378.50 | 419.75 | 296.25 | 218.25 | 143.25 | 85.25 | 47.00 | 31.00 | 22.75 |
| | 2 | 565.25 | 606.50 | 437.50 | 325.00 | 216.00 | 132.75 | 74.75 | 47.75 | 36.00 |
| | 3 | 764.75 | 797.75 | 582.00 | 436.00 | 294.25 | 185.00 | 104.00 | 67.75 | 50.75 |
| | 4 | 1,031.00 | 1,039.50 | 757.50 | 572.25 | 392.00 | 251.75 | 142.00 | 92.75 | 69.25 |
| 114.30 | 1 | 381.25 | 440.00 | 288.25 | 214.25 | 142.00 | 92.50 | 46.00 | 29.50 | 21.75 |
| | 2 | 569.50 | 638.00 | 433.25 | 322.50 | 214.50 | 144.50 | 72.00 | 46.50 | 34.75 |
| | 3 | 770.50 | 845.50 | 583.75 | 439.25 | 296.75 | 201.50 | 102.50 | 66.75 | 49.75 |
| | 4 | 1,031.75 | 1,099.50 | 768.50 | 580.00 | 396.25 | 273.50 | 140.25 | 91.75 | 68.75 |
| 121.90 | 1 | 405.00 | 173.75 | 130.50 | 106.25 | 81.25 | 61.50 | 41.50 | 28.50 | 22.00 |
| | 2 | 604.25 | 264.75 | 201.25 | 164.25 | 124.50 | 94.75 | 63.75 | 44.00 | 34.25 |
| | 3 | 816.00 | 365.00 | 279.00 | 227.00 | 172.75 | 131.75 | 88.25 | 61.75 | 48.25 |
| | 4 | 1,076.25 | 490.25 | 376.00 | 305.50 | 233.00 | 178.75 | 119.75 | 83.75 | 65.50 |
| 129.50 | 1 | 383.25 | 590.25 | 414.00 | 265.50 | 146.75 | 97.75 | 48.75 | 31.75 | 24.00 |
| | 2 | 566.50 | 821.75 | 584.50 | 389.50 | 222.25 | 151.00 | 76.50 | 49.50 | 37.25 |
| | 3 | 772.75 | 1,045.50 | 757.00 | 515.25 | 300.00 | 208.00 | 107.50 | 70.75 | 53.00 |
| | 4 | 1,035.00 | 1,293.50 | 951.75 | 657.25 | 391.75 | 273.75 | 144.75 | 97.00 | 72.25 |
| 137.20 | 1 | 384.75 | 480.25 | 280.50 | 198.50 | 124.25 | 79.25 | 41.00 | 26.50 | 20.50 |
| | 2 | 569.00 | 666.00 | 410.50 | 294.25 | 185.25 | 120.75 | 63.00 | 41.00 | 31.50 |
| | 3 | 773.25 | 857.75 | 546.00 | 393.50 | 250.50 | 165.25 | 87.75 | 57.75 | 44.75 |
| | 4 | 1,033.25 | 1,082.50 | 705.00 | 510.00 | 328.50 | 218.25 | 117.75 | 77.75 | 60.50 |
| 144.80 | 1 | 402.00 | 214.00 | 161.25 | 130.00 | 96.25 | 71.00 | 43.00 | 30.00 | 23.00 |
| | 2 | 593.50 | 319.75 | 245.25 | 198.00 | 146.25 | 109.50 | 66.00 | 46.25 | 35.25 |
| | 3 | 800.50 | 436.25 | 336.75 | 271.75 | 200.75 | 150.75 | 91.50 | 64.25 | 48.75 |
| | 4 | 1,054.25 | 582.75 | 447.25 | 361.25 | 268.25 | 201.75 | 123.75 | 87.00 | 66.75 |
| 152.40 | 1 | 388.75 | 454.75 | 326.00 | 235.75 | 148.50 | 97.75 | 46.00 | 31.25 | 23.00 |
| | 2 | 575.75 | 647.25 | 474.50 | 347.00 | 222.75 | 148.25 | 71.50 | 48.25 | 36.00 |
| | 3 | 783.50 | 847.75 | 627.50 | 459.75 | 302.25 | 203.00 | 102.25 | 67.25 | 52.50 |
| | 4 | 1,041.00 | 1,081.25 | 801.25 | 591.75 | 394.50 | 268.50 | 137.25 | 95.50 | 71.25 |

**Table A-14. Average all point locations FWD deflection measurements extracted for LTPP pavement section 1076.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 397.52 | 292.65 | 213.15 | 157.74 | 108.56 | 75.70 | 42.80 | 28.58 | 21.79 |
| | 2 | 590.11 | 430.05 | 318.38 | 238.49 | 165.57 | 117.01 | 66.45 | 44.13 | 33.52 |
| | 3 | 798.13 | 574.14 | 429.42 | 324.37 | 227.51 | 162.18 | 92.94 | 62.05 | 47.23 |
| | 4 | 1,061.35 | 749.77 | 563.45 | 428.13 | 303.06 | 218.20 | 125.80 | 84.79 | 64.32 |

**Table A-15. FWD deflection measurements extracted for LTPP pavement section 1093 for FWD test date 5-Feb-04.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 382.00 | 399.25 | 318.25 | 258.75 | 186.00 | 132.25 | 64.00 | 38.25 | 27.75 |
| | 2 | 564.50 | 546.00 | 439.00 | 360.00 | 263.00 | 189.00 | 95.50 | 57.25 | 42.75 |
| | 3 | 752.75 | 682.00 | 551.00 | 454.50 | 334.50 | 243.50 | 125.75 | 77.25 | 58.00 |
| | 4 | 990.50 | 845.25 | 683.75 | 565.75 | 420.00 | 308.50 | 163.00 | 101.75 | 76.00 |
| 7.60 | 1 | 387.75 | 546.00 | 439.00 | 360.00 | 263.00 | 189.00 | 95.50 | 57.25 | 42.75 |
| | 2 | 569.00 | 682.00 | 551.00 | 454.50 | 334.50 | 243.50 | 125.75 | 77.25 | 58.00 |
| | 3 | 762.00 | 845.25 | 683.75 | 565.75 | 420.00 | 308.50 | 163.00 | 101.75 | 76.00 |
| | 4 | 1,002.50 | 404.50 | 327.00 | 270.75 | 197.75 | 140.75 | 74.25 | 45.00 | 33.00 |
| 15.20 | 1 | 386.50 | 438.50 | 359.25 | 299.00 | 220.50 | 160.50 | 83.75 | 49.25 | 35.25 |
| | 2 | 564.25 | 592.25 | 488.50 | 410.50 | 306.50 | 227.25 | 121.75 | 74.00 | 55.00 |
| | 3 | 755.25 | 741.75 | 612.25 | 518.50 | 389.75 | 292.50 | 159.50 | 98.75 | 73.25 |
| | 4 | 991.25 | 918.75 | 758.50 | 644.25 | 488.75 | 371.00 | 205.75 | 127.75 | 96.50 |
| 22.90 | 1 | 385.00 | 420.75 | 336.50 | 277.50 | 206.00 | 149.25 | 76.25 | 47.50 | 31.00 |
| | 2 | 564.50 | 566.75 | 457.25 | 382.50 | 284.25 | 207.25 | 114.25 | 67.75 | 49.50 |
| | 3 | 756.50 | 707.50 | 574.25 | 482.75 | 363.00 | 268.75 | 149.25 | 90.50 | 66.75 |
| | 4 | 993.00 | 876.00 | 713.50 | 604.50 | 457.75 | 344.25 | 194.25 | 119.75 | 88.00 |
| 30.50 | 1 | 382.75 | 367.25 | 300.00 | 241.50 | 173.00 | 124.25 | 62.50 | 37.00 | 27.00 |
| | 2 | 564.25 | 498.50 | 408.00 | 332.00 | 241.25 | 175.75 | 91.50 | 55.50 | 42.00 |
| | 3 | 755.50 | 622.00 | 508.25 | 417.00 | 306.25 | 223.75 | 120.25 | 73.50 | 56.75 |
| | 4 | 990.75 | 767.00 | 627.50 | 517.50 | 383.50 | 285.00 | 154.75 | 96.75 | 75.25 |
| 38.10 | 1 | 384.50 | 361.50 | 302.75 | 249.75 | 183.75 | 132.50 | 69.25 | 42.75 | 30.00 |
| | 2 | 564.75 | 494.75 | 415.00 | 347.00 | 257.75 | 189.50 | 101.25 | 63.75 | 45.25 |
| | 3 | 753.50 | 617.75 | 521.25 | 438.25 | 328.50 | 244.50 | 134.00 | 84.25 | 62.00 |
| | 4 | 987.25 | 764.25 | 648.75 | 548.00 | 414.00 | 311.75 | 174.25 | 110.75 | 82.00 |
| 45.70 | 1 | 385.75 | 367.25 | 291.50 | 231.75 | 165.75 | 114.25 | 55.00 | 35.50 | 26.25 |
| | 2 | 564.75 | 490.50 | 390.75 | 314.00 | 229.25 | 160.75 | 80.50 | 53.25 | 40.25 |
| | 3 | 761.25 | 606.00 | 483.50 | 392.00 | 289.00 | 204.00 | 106.00 | 70.50 | 53.75 |
| | 4 | 1,003.50 | 745.50 | 598.50 | 489.75 | 362.75 | 260.25 | 139.75 | 91.25 | 72.00 |
| 53.30 | 1 | 374.00 | 319.75 | 257.50 | 208.75 | 149.50 | 106.50 | 55.25 | 34.25 | 25.50 |
| | 2 | 549.75 | 427.25 | 342.50 | 281.75 | 205.00 | 148.75 | 81.25 | 51.00 | 40.25 |
| | 3 | 742.00 | 530.75 | 421.00 | 349.75 | 256.25 | 189.50 | 108.25 | 67.50 | 54.25 |
| | 4 | 989.00 | 646.25 | 514.25 | 427.75 | 317.75 | 236.25 | 135.25 | 88.50 | 70.25 |
| 61.00 | 1 | 382.75 | 346.00 | 278.00 | 224.25 | 163.00 | 115.25 | 60.25 | 38.50 | 29.25 |
| | 2 | 562.50 | 456.00 | 372.00 | 302.50 | 224.00 | 161.25 | 87.75 | 56.50 | 44.00 |
| | 3 | 756.75 | 562.75 | 460.00 | 377.00 | 281.50 | 206.75 | 115.25 | 76.00 | 58.25 |
| | 4 | 994.75 | 689.75 | 563.25 | 466.25 | 350.75 | 260.50 | 148.50 | 99.25 | 76.50 |
| 68.60 | 1 | 383.75 | 362.25 | 297.75 | 242.25 | 175.75 | 126.25 | 64.75 | 41.00 | 30.25 |
| | 2 | 561.25 | 482.75 | 400.00 | 328.25 | 241.75 | 177.75 | 94.25 | 60.75 | 46.00 |
| | 3 | 758.75 | 597.25 | 496.00 | 411.00 | 305.75 | 227.50 | 123.75 | 80.75 | 61.50 |
| | 4 | 1,003.75 | 734.25 | 609.75 | 509.50 | 382.00 | 287.75 | 159.75 | 105.50 | 81.00 |
| 76.20 | 1 | 380.25 | 338.50 | 275.50 | 224.50 | 164.75 | 118.75 | 60.50 | 36.25 | 27.50 |
| | 2 | 559.25 | 456.00 | 376.25 | 310.00 | 229.25 | 168.00 | 88.00 | 55.25 | 42.25 |
| | 3 | 756.50 | 569.00 | 468.00 | 388.00 | 289.75 | 214.25 | 117.00 | 73.25 | 56.25 |
| | 4 | 1,005.00 | 702.75 | 578.25 | 482.00 | 362.50 | 270.25 | 151.25 | 96.00 | 73.25 |

**Table A-15. FWD deflection measurements extracted for LTPP pavement section 1093 for FWD test date 5-Feb-04 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), microns D6 | D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 383.25 | 361.00 | 288.75 | 231.50 | 165.50 | 117.25 | 57.00 | 34.25 | 26.75 |
| | 2 | 561.00 | 485.25 | 393.25 | 319.00 | 230.25 | 167.25 | 83.75 | 51.25 | 41.25 |
| | 3 | 758.25 | 605.00 | 491.25 | 402.50 | 293.75 | 214.25 | 111.75 | 70.00 | 54.50 |
| | 4 | 1,008.00 | 750.00 | 611.25 | 504.25 | 371.75 | 274.25 | 147.25 | 94.00 | 72.75 |
| 91.40 | 1 | 376.75 | 366.50 | 301.50 | 249.00 | 183.00 | 132.50 | 71.25 | 43.00 | 31.25 |
| | 2 | 559.50 | 511.25 | 421.75 | 352.75 | 262.25 | 194.00 | 107.50 | 66.75 | 50.75 |
| | 3 | 751.50 | 643.00 | 532.00 | 447.50 | 336.50 | 251.50 | 142.00 | 89.75 | 67.50 |
| | 4 | 986.00 | 800.25 | 663.50 | 560.50 | 425.00 | 321.75 | 185.75 | 118.75 | 89.50 |
| 99.10 | 1 | 379.50 | 356.50 | 283.75 | 230.00 | 166.00 | 118.00 | 61.25 | 38.50 | 28.75 |
| | 2 | 559.00 | 485.50 | 387.75 | 317.50 | 232.25 | 168.25 | 90.00 | 57.75 | 43.75 |
| | 3 | 748.25 | 608.50 | 484.75 | 399.75 | 295.50 | 216.50 | 119.00 | 77.50 | 59.00 |
| | 4 | 982.25 | 753.00 | 600.50 | 497.25 | 371.25 | 275.50 | 155.25 | 102.50 | 78.00 |
| 106.70 | 1 | 382.25 | 375.75 | 310.00 | 251.00 | 182.75 | 129.50 | 67.00 | 39.75 | 28.75 |
| | 2 | 564.50 | 511.50 | 423.75 | 347.75 | 256.25 | 185.25 | 97.75 | 59.00 | 43.75 |
| | 3 | 757.25 | 639.50 | 529.50 | 439.00 | 326.25 | 239.25 | 128.75 | 80.25 | 60.25 |
| | 4 | 994.25 | 796.25 | 660.00 | 549.50 | 412.25 | 305.75 | 167.75 | 107.00 | 80.50 |
| 114.30 | 1 | 381.50 | 407.00 | 322.00 | 257.25 | 184.00 | 129.50 | 66.50 | 41.50 | 31.00 |
| | 2 | 559.75 | 546.50 | 435.00 | 351.00 | 255.25 | 183.75 | 98.00 | 63.00 | 47.25 |
| | 3 | 756.00 | 680.50 | 542.50 | 441.50 | 324.00 | 237.25 | 129.75 | 84.75 | 64.25 |
| | 4 | 998.25 | 844.50 | 674.50 | 551.75 | 409.50 | 301.25 | 170.50 | 112.75 | 86.75 |
| 121.90 | 1 | 374.50 | 404.00 | 319.50 | 249.75 | 174.75 | 120.25 | 63.50 | 41.75 | 31.00 |
| | 2 | 554.75 | 544.25 | 434.00 | 343.50 | 243.75 | 171.75 | 93.50 | 62.00 | 47.25 |
| | 3 | 751.00 | 677.75 | 540.00 | 431.00 | 309.25 | 221.75 | 123.75 | 83.75 | 64.00 |
| | 4 | 1,000.00 | 832.75 | 663.50 | 532.25 | 386.25 | 280.25 | 160.50 | 110.00 | 85.25 |
| 129.50 | 1 | 378.00 | 362.75 | 282.50 | 226.25 | 157.50 | 108.50 | 55.00 | 34.75 | 26.25 |
| | 2 | 556.25 | 483.25 | 378.50 | 306.75 | 217.00 | 151.00 | 78.75 | 51.50 | 39.50 |
| | 3 | 753.50 | 596.50 | 466.75 | 379.50 | 271.50 | 193.75 | 104.75 | 68.25 | 53.50 |
| | 4 | 999.25 | 731.25 | 572.50 | 467.75 | 338.00 | 245.00 | 136.75 | 90.00 | 71.00 |
| 137.20 | 1 | 374.75 | 388.75 | 297.00 | 237.25 | 168.75 | 118.00 | 59.00 | 36.50 | 28.00 |
| | 2 | 554.00 | 522.50 | 402.75 | 325.00 | 234.50 | 166.25 | 85.75 | 54.25 | 41.00 |
| | 3 | 751.25 | 648.25 | 501.00 | 407.25 | 297.00 | 213.50 | 114.75 | 74.00 | 57.00 |
| | 4 | 1,004.00 | 798.25 | 618.25 | 505.75 | 372.50 | 271.25 | 149.75 | 99.75 | 77.25 |
| 144.80 | 1 | 377.25 | 351.25 | 283.00 | 230.50 | 168.25 | 119.75 | 64.00 | 40.50 | 29.75 |
| | 2 | 555.50 | 476.00 | 384.25 | 317.00 | 234.00 | 170.00 | 93.75 | 61.25 | 47.25 |
| | 3 | 751.25 | 591.75 | 477.75 | 396.50 | 295.75 | 218.00 | 123.25 | 81.75 | 63.00 |
| | 4 | 992.25 | 730.75 | 589.00 | 492.00 | 369.75 | 276.25 | 159.25 | 106.75 | 83.50 |
| 152.40 | 1 | 375.75 | 342.50 | 282.75 | 238.75 | 184.00 | 140.25 | 84.75 | 53.00 | 38.25 |
| | 2 | 552.75 | 472.25 | 394.75 | 336.25 | 261.75 | 201.25 | 122.25 | 78.50 | 57.00 |
| | 3 | 717.75 | 596.50 | 498.25 | 426.50 | 334.50 | 260.50 | 160.75 | 104.75 | 77.75 |
| | 4 | 962.75 | 741.50 | 621.25 | 534.50 | 422.25 | 331.50 | 208.00 | 137.50 | 102.75 |

**Table A-16. Average all point locations FWD deflection measurements extracted for LTPP pavement section 1093.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 380.88 | 373.40 | 300.70 | 244.29 | 177.15 | 126.38 | 65.48 | 40.42 | 29.64 |
| | 2 | 560.27 | 504.51 | 408.95 | 336.00 | 246.82 | 179.15 | 95.94 | 60.36 | 45.51 |
| | 3 | 752.70 | 628.65 | 510.07 | 422.12 | 313.08 | 230.20 | 126.56 | 80.73 | 61.30 |
| | 4 | 994.20 | 776.32 | 630.94 | 524.98 | 392.82 | 292.15 | 164.07 | 106.27 | 81.15 |

**Table A-17. FWD deflection measurements extracted for LTPP pavement section 1113 for FWD test date 13-May-04.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 361.00 | 223.00 | 193.50 | 129.50 | 77.50 | 51.00 | 25.25 | 17.00 | 13.00 |
| | 2 | 543.25 | 333.00 | 286.00 | 200.25 | 122.75 | 80.25 | 39.75 | 26.00 | 21.00 |
| | 3 | 729.75 | 451.25 | 381.75 | 272.00 | 170.75 | 113.75 | 57.00 | 35.00 | 29.00 |
| | 4 | 958.25 | 605.75 | 498.50 | 362.50 | 232.75 | 158.00 | 79.75 | 47.00 | 38.50 |
| 7.60 | 1 | 374.75 | 333.00 | 286.00 | 200.25 | 122.75 | 80.25 | 39.75 | 26.00 | 21.00 |
| | 2 | 554.75 | 451.25 | 381.75 | 272.00 | 170.75 | 113.75 | 57.00 | 35.00 | 29.00 |
| | 3 | 739.00 | 605.75 | 498.50 | 362.50 | 232.75 | 158.00 | 79.75 | 47.00 | 38.50 |
| | 4 | 973.00 | 243.25 | 176.50 | 113.00 | 70.50 | 44.00 | 24.50 | 15.25 | 13.50 |
| 15.20 | 1 | 367.75 | 245.25 | 175.75 | 116.25 | 70.50 | 50.75 | 26.00 | 19.75 | 10.25 |
| | 2 | 549.75 | 351.25 | 269.75 | 183.00 | 113.00 | 72.50 | 36.50 | 25.00 | 18.75 |
| | 3 | 736.25 | 475.00 | 360.00 | 250.00 | 157.75 | 103.50 | 51.75 | 35.25 | 25.50 |
| | 4 | 969.25 | 624.00 | 475.75 | 335.75 | 216.25 | 141.50 | 71.25 | 47.25 | 36.25 |
| 22.90 | 1 | 366.25 | 229.00 | 158.75 | 101.25 | 64.25 | 39.75 | 21.25 | 15.00 | 12.50 |
| | 2 | 547.50 | 323.50 | 239.25 | 161.00 | 100.00 | 63.50 | 33.75 | 22.75 | 18.50 |
| | 3 | 733.25 | 428.75 | 319.25 | 221.25 | 139.50 | 91.00 | 48.25 | 32.00 | 25.75 |
| | 4 | 962.75 | 550.50 | 419.00 | 296.75 | 190.25 | 127.25 | 68.50 | 45.25 | 35.75 |
| 30.50 | 1 | 365.75 | 268.25 | 198.75 | 134.25 | 80.50 | 51.50 | 25.00 | 16.25 | 12.25 |
| | 2 | 547.25 | 384.75 | 298.50 | 207.50 | 127.50 | 82.00 | 38.75 | 25.00 | 19.50 |
| | 3 | 733.75 | 524.00 | 397.25 | 281.50 | 176.75 | 115.75 | 55.75 | 35.75 | 27.50 |
| | 4 | 967.50 | 679.25 | 521.50 | 375.50 | 241.25 | 161.25 | 78.00 | 49.75 | 38.00 |
| 38.10 | 1 | 369.00 | 261.00 | 199.00 | 133.00 | 79.75 | 49.75 | 26.50 | 16.25 | 13.50 |
| | 2 | 548.25 | 372.25 | 294.75 | 204.75 | 125.00 | 79.50 | 38.75 | 26.00 | 20.25 |
| | 3 | 735.50 | 508.75 | 389.00 | 276.25 | 172.75 | 112.00 | 55.00 | 36.25 | 28.25 |
| | 4 | 967.50 | 660.50 | 509.00 | 365.75 | 234.75 | 155.00 | 75.50 | 50.75 | 39.00 |
| 45.70 | 1 | 363.50 | 281.50 | 199.50 | 132.25 | 79.00 | 49.00 | 25.25 | 17.25 | 13.75 |
| | 2 | 543.50 | 413.00 | 296.50 | 203.00 | 124.00 | 79.25 | 39.75 | 26.50 | 21.25 |
| | 3 | 731.75 | 534.00 | 390.25 | 273.50 | 172.00 | 111.00 | 56.75 | 38.00 | 30.00 |
| | 4 | 967.75 | 692.75 | 508.00 | 362.00 | 233.00 | 152.75 | 78.75 | 52.75 | 41.00 |
| 53.30 | 1 | 364.00 | 261.00 | 203.50 | 137.50 | 81.00 | 50.00 | 25.00 | 17.50 | 13.25 |
| | 2 | 544.50 | 370.75 | 300.75 | 210.25 | 126.50 | 79.75 | 39.00 | 27.00 | 20.25 |
| | 3 | 734.50 | 507.00 | 395.50 | 282.75 | 174.75 | 112.00 | 55.00 | 38.00 | 28.50 |
| | 4 | 969.50 | 675.75 | 515.00 | 373.50 | 236.00 | 154.75 | 77.00 | 53.00 | 40.25 |
| 61.00 | 1 | 367.00 | 238.50 | 165.50 | 106.50 | 65.75 | 42.75 | 24.00 | 17.00 | 14.00 |
| | 2 | 548.25 | 336.00 | 246.25 | 164.25 | 103.00 | 68.00 | 37.25 | 26.00 | 21.00 |
| | 3 | 737.00 | 461.00 | 326.00 | 223.00 | 143.00 | 95.75 | 52.00 | 36.00 | 29.00 |
| | 4 | 966.50 | 599.25 | 423.50 | 295.00 | 193.00 | 131.00 | 72.00 | 49.00 | 38.75 |
| 68.60 | 1 | 365.75 | 238.75 | 159.00 | 103.25 | 63.25 | 41.00 | 22.00 | 15.00 | 12.25 |
| | 2 | 548.00 | 322.50 | 238.00 | 159.50 | 99.75 | 65.00 | 34.25 | 23.00 | 18.25 |
| | 3 | 735.00 | 437.00 | 314.75 | 216.00 | 137.75 | 91.00 | 48.00 | 32.25 | 25.00 |
| | 4 | 967.75 | 576.75 | 409.50 | 287.00 | 186.50 | 125.00 | 66.00 | 44.00 | 34.50 |
| 76.20 | 1 | 364.75 | 225.00 | 151.00 | 94.75 | 57.00 | 36.25 | 20.25 | 14.00 | 10.75 |
| | 2 | 546.50 | 312.00 | 225.75 | 146.75 | 89.00 | 57.25 | 31.00 | 22.00 | 17.00 |
| | 3 | 733.25 | 415.00 | 298.50 | 198.25 | 122.75 | 79.50 | 43.00 | 30.00 | 23.00 |
| | 4 | 968.50 | 545.50 | 390.25 | 263.50 | 166.75 | 109.75 | 58.25 | 40.25 | 31.00 |

**Table A-17. FWD deflection measurements extracted for LTPP pavement section 1113 for FWD test date 13-May-04 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 364.00 | 218.75 | 156.75 | 98.75 | 59.50 | 38.00 | 20.50 | 14.00 | 11.00 |
| | 2 | 544.50 | 294.25 | 233.75 | 153.00 | 92.50 | 59.00 | 31.50 | 22.00 | 17.00 |
| | 3 | 734.00 | 412.25 | 309.75 | 207.75 | 127.75 | 82.00 | 43.00 | 30.00 | 24.00 |
| | 4 | 965.50 | 558.25 | 402.75 | 275.75 | 173.75 | 113.00 | 59.75 | 40.25 | 32.00 |
| 91.40 | 1 | 363.75 | 202.25 | 155.25 | 100.75 | 56.50 | 37.25 | 20.25 | 14.00 | 11.00 |
| | 2 | 542.25 | 290.50 | 230.75 | 154.00 | 88.75 | 59.00 | 32.00 | 22.00 | 17.75 |
| | 3 | 733.25 | 415.00 | 307.25 | 210.00 | 123.75 | 83.00 | 44.25 | 30.00 | 24.00 |
| | 4 | 963.75 | 551.25 | 402.25 | 279.75 | 169.00 | 115.00 | 61.00 | 41.00 | 33.00 |
| 99.10 | 1 | 360.25 | 216.50 | 164.50 | 110.25 | 64.25 | 41.25 | 21.75 | 15.00 | 12.25 |
| | 2 | 540.75 | 306.00 | 247.25 | 170.25 | 101.50 | 64.75 | 33.00 | 23.00 | 19.50 |
| | 3 | 730.75 | 414.00 | 330.00 | 232.00 | 141.00 | 91.00 | 46.50 | 32.00 | 25.00 |
| | 4 | 961.00 | 565.75 | 432.75 | 308.75 | 192.75 | 127.00 | 65.00 | 44.00 | 35.00 |
| 106.70 | 1 | 358.00 | 244.75 | 181.75 | 120.50 | 71.00 | 42.75 | 23.00 | 15.00 | 12.00 |
| | 2 | 539.75 | 351.50 | 271.50 | 185.75 | 111.00 | 67.75 | 36.25 | 23.75 | 19.00 |
| | 3 | 732.75 | 468.25 | 360.00 | 252.25 | 154.00 | 95.75 | 51.00 | 33.00 | 26.00 |
| | 4 | 964.00 | 620.50 | 468.00 | 335.50 | 209.75 | 132.75 | 69.25 | 46.25 | 36.50 |
| 114.30 | 1 | 361.00 | 213.25 | 152.00 | 96.50 | 59.25 | 37.50 | 21.00 | 14.75 | 11.25 |
| | 2 | 540.75 | 306.75 | 228.50 | 149.25 | 93.25 | 58.75 | 32.00 | 22.50 | 18.00 |
| | 3 | 735.25 | 402.00 | 306.00 | 204.50 | 129.75 | 83.00 | 44.50 | 31.00 | 24.00 |
| | 4 | 968.75 | 540.50 | 400.75 | 275.00 | 176.75 | 115.00 | 61.00 | 42.50 | 33.00 |
| 121.90 | 1 | 371.25 | 216.25 | 150.75 | 94.75 | 55.25 | 35.50 | 19.00 | 14.25 | 11.25 |
| | 2 | 548.75 | 314.00 | 223.25 | 144.50 | 86.00 | 54.00 | 29.75 | 21.00 | 17.25 |
| | 3 | 739.25 | 390.25 | 294.50 | 194.25 | 117.00 | 75.00 | 40.00 | 28.75 | 23.25 |
| | 4 | 968.00 | 528.50 | 383.75 | 256.75 | 158.50 | 102.75 | 54.25 | 39.00 | 32.00 |
| 129.50 | 1 | 368.75 | 237.50 | 168.75 | 110.25 | 65.50 | 40.50 | 21.00 | 15.00 | 11.50 |
| | 2 | 546.00 | 330.75 | 243.00 | 163.75 | 99.75 | 62.50 | 31.00 | 22.00 | 16.75 |
| | 3 | 740.00 | 416.25 | 318.50 | 217.75 | 134.25 | 84.75 | 43.00 | 30.25 | 24.50 |
| | 4 | 971.50 | 535.75 | 411.75 | 286.00 | 179.75 | 115.50 | 58.00 | 41.00 | 33.00 |
| 137.20 | 1 | 367.25 | 193.75 | 141.25 | 94.00 | 57.75 | 37.00 | 20.00 | 14.75 | 11.25 |
| | 2 | 549.00 | 271.50 | 207.75 | 142.50 | 88.50 | 57.00 | 31.00 | 22.00 | 18.25 |
| | 3 | 742.00 | 349.25 | 272.25 | 190.75 | 120.25 | 78.50 | 42.25 | 30.00 | 24.75 |
| | 4 | 971.00 | 468.75 | 353.50 | 252.00 | 161.75 | 106.50 | 57.25 | 41.00 | 34.00 |
| 144.80 | 1 | 368.75 | 210.00 | 144.50 | 95.50 | 58.25 | 38.50 | 21.25 | 15.25 | 12.00 |
| | 2 | 546.25 | 290.50 | 212.75 | 145.00 | 89.75 | 59.50 | 31.75 | 22.50 | 18.25 |
| | 3 | 738.75 | 378.00 | 281.25 | 195.75 | 122.50 | 82.00 | 42.50 | 30.00 | 25.25 |
| | 4 | 970.00 | 508.75 | 365.50 | 259.00 | 164.75 | 112.00 | 58.75 | 41.50 | 34.00 |
| 152.40 | 1 | 361.00 | 219.00 | 164.75 | 109.00 | 66.50 | 40.00 | 20.00 | 13.25 | 10.25 |
| | 2 | 540.75 | 318.75 | 243.00 | 165.50 | 102.00 | 63.00 | 30.75 | 20.50 | 16.00 |
| | 3 | 732.00 | 431.00 | 322.25 | 223.25 | 140.50 | 88.00 | 42.50 | 28.75 | 23.00 |
| | 4 | 962.25 | 560.75 | 419.75 | 296.25 | 189.25 | 121.75 | 59.00 | 39.00 | 31.25 |

**Table A-18. Average all point locations FWD deflection measurements extracted for LTPP pavement section 1113.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 365.40 | 232.69 | 169.57 | 111.04 | 66.80 | 42.57 | 22.51 | 15.50 | 12.04 |
| | 2 | 545.73 | 330.04 | 252.26 | 170.90 | 104.40 | 66.76 | 34.50 | 23.60 | 18.74 |
| | 3 | 735.10 | 441.36 | 334.24 | 231.44 | 144.27 | 93.64 | 48.26 | 32.73 | 25.86 |
| | 4 | 966.86 | 582.95 | 436.42 | 307.54 | 195.93 | 129.29 | 66.68 | 44.87 | 35.48 |

**Table A-19. FWD deflection measurements extracted for LTPP pavement section 1116 for FWD test date 28-Apr-98.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 396.25 | 288.00 | 201.25 | 149.75 | 98.00 | 67.75 | 38.75 | 21.00 |
| | 2 | 596.75 | 428.00 | 306.00 | 231.50 | 155.00 | 107.00 | 61.50 | 33.00 |
| | 3 | 783.75 | 555.75 | 401.75 | 308.75 | 209.75 | 147.75 | 84.50 | 45.25 |
| | 4 | 1,026.25 | 710.00 | 518.75 | 404.25 | 279.75 | 198.75 | 114.50 | 62.00 |
| 7.60 | 1 | 403.75 | 428.00 | 306.00 | 231.50 | 155.00 | 107.00 | 61.50 | 33.00 |
| | 2 | 600.25 | 555.75 | 401.75 | 308.75 | 209.75 | 147.75 | 84.50 | 45.25 |
| | 3 | 789.25 | 710.00 | 518.75 | 404.25 | 279.75 | 198.75 | 114.50 | 62.00 |
| | 4 | 1,030.50 | 236.25 | 169.50 | 128.50 | 85.25 | 58.25 | 35.25 | 18.25 |
| 15.20 | 1 | 398.25 | 279.50 | 195.50 | 144.00 | 92.50 | 62.00 | 36.50 | 20.00 |
| | 2 | 593.00 | 410.75 | 293.50 | 221.50 | 144.50 | 99.00 | 54.75 | 32.00 |
| | 3 | 782.00 | 536.50 | 389.00 | 298.00 | 198.75 | 137.75 | 76.75 | 43.25 |
| | 4 | 1,020.75 | 688.50 | 505.00 | 393.50 | 268.00 | 188.50 | 105.75 | 59.50 |
| 22.90 | 1 | 396.50 | 256.25 | 185.50 | 136.50 | 89.50 | 61.25 | 35.75 | 20.25 |
| | 2 | 592.50 | 381.50 | 279.75 | 210.50 | 140.75 | 96.75 | 56.00 | 32.00 |
| | 3 | 780.50 | 499.50 | 370.50 | 283.00 | 192.25 | 133.75 | 77.75 | 43.25 |
| | 4 | 1,019.50 | 644.00 | 482.25 | 373.75 | 258.50 | 183.00 | 106.25 | 59.00 |
| 30.50 | 1 | 399.50 | 237.25 | 168.50 | 123.50 | 84.00 | 56.25 | 38.50 | 20.50 |
| | 2 | 595.00 | 353.00 | 256.75 | 191.50 | 131.75 | 90.50 | 58.75 | 32.25 |
| | 3 | 783.00 | 465.00 | 341.75 | 258.75 | 180.75 | 127.00 | 81.00 | 44.00 |
| | 4 | 1,017.75 | 602.25 | 447.00 | 344.25 | 245.00 | 173.25 | 110.00 | 59.50 |
| 45.70 | 1 | 396.50 | 269.75 | 187.00 | 139.50 | 90.75 | 62.00 | 37.00 | 21.75 |
| | 2 | 589.00 | 398.50 | 283.50 | 214.75 | 142.00 | 97.75 | 58.50 | 34.50 |
| | 3 | 777.00 | 519.00 | 375.00 | 288.50 | 194.00 | 134.75 | 80.00 | 46.50 |
| | 4 | 1,015.50 | 667.00 | 490.00 | 380.25 | 260.00 | 183.25 | 109.75 | 63.25 |
| 53.30 | 1 | 395.00 | 275.25 | 206.25 | 155.00 | 96.00 | 65.75 | 34.75 | 21.25 |
| | 2 | 595.00 | 411.50 | 311.75 | 236.75 | 151.75 | 104.75 | 55.25 | 33.00 |
| | 3 | 778.75 | 529.25 | 402.25 | 309.00 | 203.25 | 141.00 | 75.50 | 44.25 |
| | 4 | 1,013.75 | 678.25 | 518.25 | 403.50 | 271.00 | 189.75 | 103.25 | 58.25 |
| 61.00 | 1 | 392.75 | 269.75 | 185.50 | 136.75 | 87.25 | 59.75 | 36.00 | 21.25 |
| | 2 | 587.25 | 395.50 | 279.00 | 209.50 | 136.50 | 93.50 | 55.75 | 32.50 |
| | 3 | 775.25 | 514.50 | 370.50 | 281.25 | 185.75 | 128.75 | 77.25 | 44.75 |
| | 4 | 1,011.75 | 659.00 | 479.25 | 369.75 | 250.75 | 176.75 | 105.75 | 60.75 |
| 68.60 | 1 | 393.50 | 253.75 | 180.50 | 130.75 | 84.50 | 58.00 | 35.00 | 19.00 |
| | 2 | 587.50 | 374.50 | 270.75 | 201.00 | 131.75 | 92.25 | 54.75 | 30.50 |
| | 3 | 774.75 | 487.00 | 357.75 | 269.50 | 180.75 | 126.50 | 76.25 | 41.50 |
| | 4 | 1,009.75 | 626.75 | 466.75 | 357.75 | 244.50 | 173.75 | 104.75 | 57.25 |
| 76.20 | 1 | 394.25 | 243.00 | 163.00 | 121.75 | 79.25 | 56.00 | 34.00 | 19.75 |
| | 2 | 588.75 | 363.00 | 250.25 | 189.00 | 124.50 | 88.25 | 52.25 | 30.50 |
| | 3 | 777.75 | 477.75 | 334.75 | 255.75 | 171.50 | 122.50 | 73.25 | 42.25 |
| | 4 | 1,006.00 | 614.75 | 438.00 | 340.00 | 232.50 | 168.75 | 101.00 | 57.75 |
| 83.80 | 1 | 391.75 | 235.25 | 172.50 | 128.00 | 84.50 | 56.00 | 32.75 | 20.00 |
| | 2 | 585.50 | 348.50 | 261.25 | 197.75 | 132.75 | 89.00 | 51.00 | 29.75 |
| | 3 | 776.00 | 457.00 | 345.75 | 266.00 | 182.00 | 124.25 | 71.25 | 41.00 |
| | 4 | 1,010.00 | 590.25 | 451.75 | 352.75 | 246.25 | 170.00 | 98.25 | 55.75 |

**Table A-19. FWD deflection measurements extracted for LTPP pavement section 1116 for FWD test date 28-Apr-98 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), microns D6 | D7 |
|---|---|---|---|---|---|---|---|---|---|
| 91.40 | 1 | 390.00 | 293.00 | 204.75 | 147.75 | 94.50 | 64.00 | 37.75 | 21.25 |
| | 2 | 582.50 | 425.50 | 305.25 | 226.25 | 148.75 | 102.00 | 59.25 | 33.25 |
| | 3 | 773.50 | 551.75 | 401.75 | 302.25 | 203.50 | 141.00 | 83.75 | 47.75 |
| | 4 | 1,009.75 | 703.25 | 519.50 | 397.50 | 274.50 | 193.25 | 115.50 | 64.25 |
| 99.10 | 1 | 387.00 | 317.25 | 221.75 | 161.00 | 102.00 | 68.00 | 38.00 | 21.50 |
| | 2 | 579.50 | 464.25 | 334.50 | 249.00 | 161.75 | 109.50 | 60.25 | 33.00 |
| | 3 | 769.25 | 602.75 | 440.75 | 334.50 | 222.75 | 152.50 | 84.75 | 47.00 |
| | 4 | 1,003.00 | 768.25 | 570.00 | 440.00 | 300.25 | 208.00 | 118.00 | 63.75 |
| 106.70 | 1 | 383.25 | 346.00 | 251.00 | 181.50 | 113.00 | 75.00 | 41.00 | 22.50 |
| | 2 | 575.25 | 492.00 | 365.25 | 272.00 | 176.00 | 119.25 | 64.75 | 35.75 |
| | 3 | 765.25 | 629.75 | 474.75 | 359.50 | 238.75 | 164.25 | 91.75 | 49.75 |
| | 4 | 995.50 | 784.00 | 599.00 | 462.25 | 315.25 | 222.25 | 125.00 | 69.50 |
| 114.30 | 1 | 385.00 | 303.50 | 220.75 | 164.75 | 103.00 | 69.75 | 40.50 | 23.00 |
| | 2 | 580.00 | 445.25 | 329.50 | 252.00 | 161.50 | 110.00 | 60.75 | 33.50 |
| | 3 | 771.00 | 577.50 | 431.25 | 334.25 | 219.50 | 152.00 | 84.25 | 46.50 |
| | 4 | 1,003.50 | 731.50 | 552.25 | 433.25 | 290.50 | 204.50 | 114.25 | 63.00 |
| 121.90 | 1 | 386.50 | 290.75 | 209.50 | 151.75 | 95.25 | 61.25 | 34.75 | 20.25 |
| | 2 | 579.00 | 431.50 | 316.00 | 234.25 | 150.50 | 97.75 | 54.75 | 30.75 |
| | 3 | 770.00 | 563.00 | 416.25 | 313.75 | 206.50 | 136.50 | 75.75 | 42.75 |
| | 4 | 1,001.75 | 718.00 | 535.75 | 410.75 | 277.00 | 186.50 | 104.00 | 57.50 |
| 129.50 | 1 | 387.25 | 263.75 | 180.75 | 131.50 | 84.25 | 58.00 | 33.75 | 20.00 |
| | 2 | 582.25 | 390.25 | 274.50 | 204.00 | 134.25 | 91.00 | 53.00 | 30.50 |
| | 3 | 772.50 | 510.75 | 365.25 | 274.75 | 183.25 | 127.00 | 72.50 | 41.00 |
| | 4 | 1,002.25 | 653.50 | 474.75 | 363.50 | 245.75 | 173.25 | 99.00 | 55.75 |
| 137.20 | 1 | 385.75 | 270.00 | 192.50 | 144.00 | 90.25 | 61.75 | 35.00 | 21.00 |
| | 2 | 578.50 | 401.00 | 292.25 | 223.25 | 142.75 | 97.50 | 55.00 | 32.50 |
| | 3 | 768.00 | 527.00 | 388.00 | 300.75 | 196.50 | 135.75 | 76.25 | 44.25 |
| | 4 | 994.50 | 677.50 | 505.25 | 398.00 | 266.00 | 187.00 | 105.50 | 60.75 |
| 144.80 | 1 | 385.75 | 258.25 | 178.50 | 133.75 | 85.75 | 60.00 | 34.75 | 20.25 |
| | 2 | 580.75 | 387.00 | 275.25 | 208.50 | 135.75 | 94.25 | 55.75 | 31.50 |
| | 3 | 770.75 | 510.25 | 367.00 | 282.50 | 186.75 | 131.00 | 77.00 | 43.50 |
| | 4 | 997.25 | 656.75 | 478.00 | 373.00 | 252.25 | 180.25 | 104.00 | 58.75 |
| 152.40 | 1 | 386.50 | 259.25 | 186.25 | 139.00 | 89.75 | 59.00 | 36.50 | 19.75 |
| | 2 | 579.75 | 392.25 | 286.00 | 218.50 | 143.25 | 95.75 | 55.25 | 30.00 |
| | 3 | 770.75 | 520.75 | 384.50 | 296.50 | 197.75 | 132.75 | 77.50 | 41.50 |
| | 4 | 998.00 | 674.25 | 500.50 | 392.75 | 267.25 | 184.00 | 104.75 | 56.00 |

**Table A-20. Average all point locations FWD deflection measurements extracted for LTPP pavement section 1116.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 391.75 | 272.29 | 193.04 | 142.45 | 91.46 | 61.99 | 36.31 | 20.63 |
| | 2 | 586.40 | 402.39 | 291.49 | 219.54 | 143.98 | 98.41 | 56.59 | 31.96 |
| | 3 | 775.45 | 525.10 | 385.14 | 294.25 | 196.84 | 136.29 | 78.51 | 43.95 |
| | 4 | 1,009.35 | 672.66 | 499.18 | 387.31 | 264.56 | 186.01 | 107.55 | 59.80 |

**Table A-21. FWD deflection measurements extracted for LTPP pavement section 2172 for FWD test date 20-Aug-91.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 388.00 | 92.75 | 73.00 | 65.75 | 57.75 | 49.75 | 39.50 | 26.75 |
| | 2 | 594.75 | 147.50 | 115.00 | 104.00 | 90.50 | 78.50 | 62.00 | 41.50 |
| | 3 | 797.25 | 201.25 | 158.00 | 141.25 | 123.50 | 106.75 | 85.00 | 55.25 |
| | 4 | 1,097.00 | 261.00 | 202.75 | 182.75 | 159.50 | 139.50 | 109.50 | 72.50 |
| 30.50 | 1 | 390.75 | 147.50 | 115.00 | 104.00 | 90.50 | 78.50 | 62.00 | 41.50 |
| | 2 | 594.75 | 201.25 | 158.00 | 141.25 | 123.50 | 106.75 | 85.00 | 55.25 |
| | 3 | 797.75 | 261.00 | 202.75 | 182.75 | 159.50 | 139.50 | 109.50 | 72.50 |
| | 4 | 1,104.50 | 78.50 | 58.50 | 51.50 | 43.75 | 37.00 | 29.50 | 20.25 |
| 61.00 | 1 | 386.75 | 89.25 | 72.75 | 67.00 | 60.25 | 53.50 | 42.50 | 27.75 |
| | 2 | 592.00 | 145.50 | 115.75 | 106.00 | 93.75 | 82.25 | 66.00 | 44.25 |
| | 3 | 797.25 | 199.50 | 158.75 | 144.50 | 128.25 | 113.25 | 90.00 | 60.25 |
| | 4 | 1,093.75 | 255.25 | 204.25 | 187.00 | 165.00 | 145.00 | 115.25 | 76.75 |
| 91.40 | 1 | 388.75 | 91.75 | 72.75 | 64.25 | 59.50 | 50.25 | 41.50 | 28.00 |
| | 2 | 593.50 | 145.50 | 114.00 | 102.75 | 91.75 | 80.00 | 64.25 | 43.00 |
| | 3 | 795.00 | 200.50 | 155.50 | 140.00 | 125.25 | 109.25 | 88.00 | 57.50 |
| | 4 | 1,104.00 | 260.50 | 201.75 | 181.50 | 160.75 | 142.00 | 113.00 | 73.00 |
| 121.90 | 1 | 388.50 | 93.75 | 76.00 | 68.50 | 60.00 | 51.75 | 40.50 | 26.25 |
| | 2 | 595.25 | 150.25 | 117.75 | 106.75 | 93.25 | 80.75 | 63.25 | 39.75 |
| | 3 | 799.75 | 207.25 | 162.50 | 146.50 | 128.50 | 112.50 | 86.50 | 54.75 |
| | 4 | 1,104.00 | 261.00 | 209.25 | 189.50 | 164.75 | 143.75 | 111.75 | 70.00 |
| 152.40 | 1 | 389.00 | 81.50 | 62.50 | 55.00 | 47.75 | 41.50 | 32.75 | 21.25 |
| | 2 | 594.50 | 124.25 | 96.00 | 85.00 | 74.00 | 63.50 | 50.00 | 33.50 |
| | 3 | 798.50 | 171.75 | 131.50 | 115.00 | 100.00 | 86.25 | 68.25 | 45.25 |
| | 4 | 1,109.00 | 220.75 | 168.25 | 147.75 | 128.25 | 111.50 | 87.75 | 58.00 |

**Table A-22. Average all point locations FWD deflection measurements extracted for LTPP pavement section 2172.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 388.63 | 87.92 | 69.25 | 62.00 | 54.83 | 47.29 | 37.71 | 25.04 |
| | 2 | 594.13 | 139.04 | 108.17 | 97.46 | 85.21 | 73.88 | 58.50 | 39.04 |
| | 3 | 797.58 | 191.46 | 148.46 | 132.92 | 116.54 | 101.42 | 80.04 | 52.63 |
| | 4 | 1,102.04 | 245.58 | 191.17 | 171.83 | 150.00 | 130.96 | 102.92 | 67.42 |

**Table A-23. FWD deflection measurements extracted for LTPP pavement section 2176 for FWD test date 23-Jul-97.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 400.75 | 113.75 | 103.00 | 99.25 | 88.75 | 78.75 | 65.25 | 37.50 |
| | 2 | 586.25 | 185.75 | 161.75 | 155.75 | 141.50 | 125.75 | 102.50 | 59.00 |
| | 3 | 748.75 | 257.25 | 219.25 | 212.75 | 194.00 | 173.00 | 139.75 | 80.00 |
| | 4 | 1,065.75 | 333.50 | 285.25 | 276.50 | 254.00 | 227.75 | 180.75 | 102.00 |
| 7.60 | 1 | 385.50 | 185.75 | 161.75 | 155.75 | 141.50 | 125.75 | 102.50 | 59.00 |
| | 2 | 588.00 | 257.25 | 219.25 | 212.75 | 194.00 | 173.00 | 139.75 | 80.00 |
| | 3 | 749.00 | 333.50 | 285.25 | 276.50 | 254.00 | 227.75 | 180.75 | 102.00 |
| | 4 | 1,061.25 | 101.75 | 96.50 | 91.25 | 83.25 | 75.00 | 59.25 | 35.25 |
| 15.20 | 1 | 386.25 | 121.50 | 107.00 | 100.00 | 90.00 | 79.00 | 61.00 | 34.00 |
| | 2 | 592.50 | 202.25 | 175.25 | 163.25 | 147.25 | 130.00 | 101.00 | 56.00 |
| | 3 | 749.75 | 275.75 | 238.75 | 223.00 | 201.00 | 178.75 | 138.50 | 77.00 |
| | 4 | 1,048.25 | 360.50 | 310.75 | 290.50 | 262.00 | 232.75 | 181.00 | 100.00 |
| 22.90 | 1 | 370.00 | 197.75 | 160.00 | 143.00 | 118.75 | 94.75 | 58.75 | 30.00 |
| | 2 | 567.00 | 310.00 | 258.25 | 232.25 | 194.25 | 156.75 | 97.75 | 50.25 |
| | 3 | 737.25 | 419.25 | 348.25 | 314.25 | 265.25 | 215.00 | 135.50 | 70.75 |
| | 4 | 1,029.25 | 542.50 | 450.00 | 407.50 | 343.25 | 278.25 | 176.50 | 91.00 |
| 30.50 | 1 | 368.00 | 176.75 | 129.75 | 121.25 | 110.00 | 98.50 | 76.00 | 39.25 |
| | 2 | 570.25 | 275.50 | 214.75 | 200.25 | 182.25 | 163.25 | 126.75 | 66.75 |
| | 3 | 742.25 | 375.50 | 294.75 | 276.25 | 251.75 | 224.75 | 174.25 | 91.25 |
| | 4 | 1,036.25 | 487.50 | 385.25 | 362.00 | 329.75 | 294.00 | 227.00 | 118.75 |
| 38.10 | 1 | 362.00 | 194.75 | 135.50 | 123.50 | 108.00 | 93.75 | 69.75 | 35.00 |
| | 2 | 562.25 | 298.75 | 223.50 | 204.50 | 179.00 | 156.00 | 118.00 | 61.75 |
| | 3 | 738.00 | 402.25 | 304.50 | 279.75 | 245.25 | 214.75 | 162.00 | 84.75 |
| | 4 | 1,030.75 | 513.75 | 392.25 | 361.75 | 317.75 | 277.75 | 209.75 | 108.75 |
| 45.70 | 1 | 359.25 | 193.75 | 157.25 | 144.25 | 125.50 | 107.75 | 73.00 | 36.25 |
| | 2 | 556.50 | 309.50 | 253.50 | 233.75 | 204.50 | 176.75 | 121.50 | 60.75 |
| | 3 | 743.75 | 419.00 | 344.75 | 318.75 | 280.75 | 244.00 | 170.75 | 85.25 |
| | 4 | 1,029.50 | 539.25 | 450.25 | 416.00 | 367.25 | 320.25 | 225.50 | 112.25 |
| 53.30 | 1 | 355.00 | 195.75 | 132.75 | 121.75 | 104.25 | 87.00 | 58.25 | 28.25 |
| | 2 | 553.25 | 304.00 | 219.00 | 201.25 | 172.25 | 144.75 | 97.75 | 47.00 |
| | 3 | 741.25 | 413.00 | 302.50 | 278.25 | 238.00 | 200.25 | 136.25 | 66.00 |
| | 4 | 1,018.00 | 538.75 | 401.25 | 369.50 | 316.25 | 266.25 | 182.50 | 87.75 |
| 61.00 | 1 | 355.75 | 133.00 | 104.50 | 96.00 | 83.00 | 71.00 | 50.00 | 26.00 |
| | 2 | 556.25 | 213.00 | 170.25 | 157.00 | 135.50 | 117.00 | 83.50 | 43.25 |
| | 3 | 737.50 | 293.75 | 234.00 | 215.75 | 186.00 | 161.00 | 116.00 | 61.00 |
| | 4 | 1,023.00 | 383.75 | 305.00 | 281.50 | 243.75 | 210.50 | 152.00 | 79.50 |
| 68.60 | 1 | 364.25 | 103.50 | 82.00 | 78.75 | 72.00 | 65.75 | 51.75 | 30.25 |
| | 2 | 562.00 | 163.50 | 136.00 | 131.00 | 119.75 | 108.75 | 85.75 | 50.00 |
| | 3 | 745.25 | 224.50 | 187.50 | 182.75 | 166.75 | 150.50 | 119.50 | 69.00 |
| | 4 | 1,032.00 | 296.75 | 247.75 | 238.00 | 218.75 | 198.00 | 156.50 | 90.25 |
| 76.20 | 1 | 357.00 | 128.50 | 107.75 | 102.50 | 91.25 | 81.00 | 63.25 | 34.75 |
| | 2 | 556.50 | 207.00 | 175.75 | 167.00 | 149.50 | 134.00 | 102.00 | 57.00 |
| | 3 | 743.25 | 283.00 | 241.75 | 230.00 | 206.00 | 185.00 | 141.25 | 79.00 |
| | 4 | 1,027.50 | 368.50 | 317.25 | 302.00 | 270.50 | 243.00 | 186.00 | 102.00 |

**Table A-23. FWD deflection measurements extracted for LTPP pavement section 2176 for FWD test date 23-Jul-97 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 358.00 | 155.75 | 137.50 | 126.50 | 110.75 | 94.25 | 67.50 | 35.00 |
| | 2 | 551.50 | 261.75 | 229.50 | 211.75 | 185.50 | 159.25 | 115.75 | 58.75 |
| | 3 | 735.25 | 361.25 | 317.00 | 294.00 | 258.50 | 222.25 | 162.00 | 83.25 |
| | 4 | 1,022.00 | 479.00 | 421.25 | 389.75 | 342.25 | 294.25 | 214.75 | 110.75 |
| 91.40 | 1 | 353.25 | 151.50 | 135.50 | 125.25 | 109.25 | 95.50 | 68.00 | 32.00 |
| | 2 | 556.25 | 245.00 | 225.25 | 208.00 | 182.50 | 159.00 | 114.00 | 54.00 |
| | 3 | 743.75 | 336.75 | 311.25 | 288.50 | 253.50 | 221.50 | 159.25 | 76.00 |
| | 4 | 1,021.25 | 448.00 | 413.00 | 383.00 | 337.00 | 294.50 | 212.25 | 100.75 |
| 99.10 | 1 | 339.50 | 218.50 | 161.50 | 146.25 | 122.25 | 103.00 | 69.50 | 31.75 |
| | 2 | 543.75 | 338.50 | 261.75 | 237.75 | 200.75 | 170.00 | 117.00 | 53.25 |
| | 3 | 736.50 | 448.75 | 353.25 | 322.25 | 274.25 | 234.25 | 163.50 | 77.50 |
| | 4 | 1,009.00 | 574.25 | 455.25 | 416.25 | 355.25 | 305.75 | 214.75 | 102.50 |
| 106.70 | 1 | 341.00 | 160.00 | 132.50 | 123.75 | 110.75 | 97.25 | 72.25 | 35.75 |
| | 2 | 551.75 | 262.75 | 220.00 | 206.50 | 185.00 | 163.50 | 121.75 | 58.75 |
| | 3 | 741.00 | 354.50 | 302.00 | 284.00 | 253.75 | 225.75 | 169.25 | 84.50 |
| | 4 | 1,012.75 | 457.50 | 391.25 | 369.00 | 331.50 | 294.50 | 221.50 | 103.75 |
| 114.30 | 1 | 346.25 | 190.75 | 137.75 | 127.75 | 111.75 | 95.50 | 67.75 | 34.25 |
| | 2 | 553.50 | 302.50 | 227.75 | 211.00 | 185.25 | 158.50 | 113.75 | 56.75 |
| | 3 | 743.00 | 412.00 | 313.75 | 291.00 | 256.00 | 220.00 | 158.25 | 79.25 |
| | 4 | 1,009.50 | 534.00 | 410.00 | 381.50 | 335.25 | 288.00 | 208.50 | 103.75 |
| 121.90 | 1 | 342.25 | 162.75 | 136.75 | 125.00 | 107.25 | 92.50 | 66.00 | 32.00 |
| | 2 | 552.75 | 263.75 | 224.50 | 206.25 | 177.75 | 153.75 | 110.50 | 53.75 |
| | 3 | 741.75 | 359.75 | 308.25 | 284.00 | 246.50 | 214.00 | 154.00 | 75.50 |
| | 4 | 1,006.75 | 466.00 | 401.25 | 370.00 | 322.75 | 279.75 | 201.75 | 98.50 |
| 129.50 | 1 | 351.00 | 150.25 | 132.50 | 123.25 | 105.25 | 89.00 | 60.00 | 29.00 |
| | 2 | 556.25 | 244.25 | 217.50 | 202.00 | 172.75 | 147.00 | 101.00 | 48.50 |
| | 3 | 745.75 | 331.50 | 297.75 | 277.75 | 239.25 | 204.50 | 142.00 | 68.50 |
| | 4 | 1,016.00 | 434.00 | 391.25 | 365.00 | 315.75 | 269.50 | 186.50 | 91.00 |
| 137.20 | 1 | 346.25 | 152.50 | 114.50 | 105.00 | 88.00 | 77.75 | 57.00 | 26.00 |
| | 2 | 556.50 | 244.25 | 187.25 | 171.75 | 146.00 | 129.00 | 96.00 | 44.00 |
| | 3 | 745.25 | 329.75 | 256.25 | 235.75 | 202.75 | 179.00 | 133.00 | 63.00 |
| | 4 | 1,006.75 | 425.75 | 334.25 | 308.00 | 266.25 | 235.25 | 175.00 | 82.75 |
| 144.80 | 1 | 349.75 | 183.50 | 158.00 | 141.25 | 117.50 | 97.50 | 63.00 | 26.00 |
| | 2 | 551.00 | 292.00 | 250.50 | 225.00 | 189.75 | 158.00 | 104.75 | 44.00 |
| | 3 | 740.25 | 388.75 | 334.00 | 302.00 | 257.50 | 216.50 | 146.00 | 63.25 |
| | 4 | 1,005.50 | 493.75 | 424.75 | 385.75 | 331.00 | 279.25 | 191.50 | 85.00 |
| 152.40 | 1 | 345.25 | 181.25 | 150.75 | 136.75 | 109.00 | 86.00 | 54.25 | 25.75 |
| | 2 | 549.00 | 289.50 | 243.25 | 222.25 | 180.00 | 141.25 | 91.00 | 43.00 |
| | 3 | 742.50 | 390.25 | 328.25 | 301.00 | 245.50 | 195.00 | 127.25 | 61.25 |
| | 4 | 1,005.25 | 494.00 | 418.50 | 384.75 | 315.50 | 251.50 | 166.75 | 81.75 |

**Table A-24. Average all point locations FWD deflection measurements extracted for LTPP pavement section 2176.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), microns D6 | D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 358.87 | 160.36 | 129.20 | 119.15 | 103.17 | 88.60 | 63.40 | 32.10 |
| | 2 | 560.62 | 256.21 | 211.05 | 195.17 | 169.93 | 146.50 | 105.67 | 53.46 |
| | 3 | 742.43 | 347.92 | 288.23 | 267.55 | 233.89 | 202.44 | 146.71 | 74.93 |
| | 4 | 1,024.58 | 451.08 | 375.67 | 349.00 | 305.86 | 264.93 | 192.62 | 97.81 |

**Table A-25. FWD deflection measurements extracted for LTPP pavement section 3669 for FWD test date 9-Mar-00.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 438.00 | 125.75 | 111.75 | 105.00 | 93.00 | 83.00 | 65.75 | 52.75 | 44.75 |
| | 2 | 611.75 | 183.25 | 162.25 | 152.00 | 135.25 | 120.75 | 97.50 | 78.75 | 63.25 |
| | 3 | 813.00 | 247.00 | 217.25 | 203.00 | 182.50 | 162.75 | 132.25 | 106.75 | 86.00 |
| | 4 | 1,007.25 | 305.50 | 269.00 | 252.00 | 225.75 | 202.00 | 164.25 | 132.50 | 107.50 |
| 7.60 | 1 | 428.25 | 183.25 | 162.25 | 152.00 | 135.25 | 120.75 | 97.50 | 78.75 | 63.25 |
| | 2 | 607.25 | 247.00 | 217.25 | 203.00 | 182.50 | 162.75 | 132.25 | 106.75 | 86.00 |
| | 3 | 813.50 | 305.50 | 269.00 | 252.00 | 225.75 | 202.00 | 164.25 | 132.50 | 107.50 |
| | 4 | 1,024.75 | 134.25 | 114.00 | 103.75 | 90.50 | 81.00 | 61.25 | 46.75 | 35.75 |
| 15.20 | 1 | 422.25 | 140.25 | 114.00 | 105.75 | 90.25 | 77.75 | 61.00 | 48.25 | 38.00 |
| | 2 | 597.00 | 195.00 | 165.75 | 152.75 | 133.50 | 115.50 | 89.00 | 68.75 | 58.00 |
| | 3 | 799.75 | 264.75 | 220.25 | 204.75 | 179.75 | 156.75 | 121.50 | 95.50 | 77.50 |
| | 4 | 997.50 | 328.00 | 276.75 | 255.50 | 221.25 | 194.50 | 152.75 | 120.00 | 94.50 |
| 22.90 | 1 | 413.50 | 196.50 | 121.00 | 101.75 | 85.25 | 73.75 | 56.00 | 42.50 | 32.00 |
| | 2 | 594.50 | 278.75 | 176.50 | 151.25 | 126.75 | 109.75 | 84.75 | 62.75 | 48.00 |
| | 3 | 798.75 | 363.25 | 235.00 | 208.25 | 171.00 | 149.75 | 115.50 | 87.75 | 65.25 |
| | 4 | 1,002.50 | 443.25 | 290.75 | 257.25 | 214.00 | 186.75 | 143.50 | 108.75 | 81.25 |
| 30.50 | 1 | 417.50 | 106.25 | 62.50 | 54.00 | 49.50 | 46.00 | 38.00 | 30.00 | 24.75 |
| | 2 | 596.25 | 152.50 | 92.75 | 80.75 | 74.75 | 68.75 | 57.25 | 46.75 | 36.25 |
| | 3 | 803.50 | 202.25 | 126.75 | 111.25 | 102.75 | 95.00 | 79.25 | 64.00 | 50.00 |
| | 4 | 1,010.00 | 251.50 | 159.50 | 140.75 | 131.00 | 121.00 | 100.00 | 80.50 | 65.00 |
| 38.10 | 1 | 416.50 | 119.25 | 92.00 | 74.75 | 56.75 | 46.00 | 32.50 | 23.00 | 17.00 |
| | 2 | 595.75 | 169.00 | 132.75 | 108.00 | 84.75 | 68.75 | 49.00 | 35.25 | 25.50 |
| | 3 | 801.25 | 227.25 | 179.00 | 146.50 | 114.00 | 94.75 | 68.25 | 49.00 | 35.00 |
| | 4 | 1,002.00 | 286.75 | 222.00 | 183.75 | 147.50 | 120.75 | 85.25 | 62.25 | 46.00 |
| 45.70 | 1 | 416.75 | 97.75 | 71.50 | 63.00 | 54.00 | 47.00 | 36.25 | 28.00 | 21.50 |
| | 2 | 595.25 | 137.00 | 105.50 | 93.75 | 80.75 | 70.25 | 54.75 | 41.75 | 32.50 |
| | 3 | 802.00 | 184.00 | 142.75 | 127.75 | 110.75 | 97.00 | 75.25 | 58.25 | 44.25 |
| | 4 | 1,009.50 | 233.75 | 179.75 | 161.25 | 140.25 | 122.75 | 95.50 | 73.00 | 56.25 |
| 53.30 | 1 | 416.75 | 87.25 | 67.00 | 60.00 | 51.50 | 46.00 | 35.00 | 27.00 | 19.25 |
| | 2 | 595.25 | 129.25 | 99.50 | 88.75 | 77.75 | 69.25 | 53.75 | 40.50 | 29.75 |
| | 3 | 806.50 | 175.75 | 135.50 | 122.25 | 105.75 | 95.50 | 74.00 | 56.00 | 41.50 |
| | 4 | 1,018.25 | 222.25 | 172.50 | 154.00 | 135.50 | 121.50 | 94.00 | 71.25 | 52.25 |
| 61.00 | 1 | 413.00 | 96.25 | 70.75 | 65.00 | 58.00 | 52.00 | 41.25 | 32.75 | 25.25 |
| | 2 | 594.00 | 139.75 | 105.00 | 96.50 | 87.25 | 77.50 | 61.75 | 48.25 | 37.75 |
| | 3 | 800.50 | 191.50 | 144.50 | 132.75 | 120.00 | 107.25 | 85.75 | 67.00 | 52.00 |
| | 4 | 1,013.25 | 241.75 | 182.50 | 168.00 | 151.75 | 135.75 | 108.00 | 84.00 | 65.25 |
| 68.60 | 1 | 407.75 | 147.75 | 100.50 | 84.50 | 68.00 | 57.25 | 43.00 | 32.00 | 24.75 |
| | 2 | 587.75 | 213.50 | 148.25 | 125.00 | 101.50 | 86.25 | 64.75 | 48.50 | 36.25 |
| | 3 | 795.50 | 285.25 | 199.00 | 170.50 | 140.25 | 120.50 | 88.00 | 66.00 | 50.75 |
| | 4 | 1,005.00 | 357.25 | 251.75 | 215.00 | 177.00 | 151.50 | 113.25 | 85.00 | 62.50 |
| 76.20 | 1 | 411.00 | 108.75 | 80.25 | 72.50 | 63.00 | 56.00 | 43.00 | 33.75 | 27.00 |
| | 2 | 591.50 | 160.50 | 119.25 | 107.50 | 93.75 | 83.25 | 65.25 | 50.25 | 38.75 |
| | 3 | 800.75 | 219.75 | 165.00 | 148.75 | 130.25 | 116.00 | 91.25 | 70.00 | 53.50 |
| | 4 | 1,013.50 | 277.00 | 209.75 | 189.50 | 165.75 | 147.75 | 115.50 | 88.75 | 69.25 |

**Table A-25. FWD deflection measurements extracted for LTPP pavement section 3669 for FWD test date 9-Mar-00 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), microns D6 | D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 407.50 | 132.50 | 101.50 | 96.25 | 83.50 | 73.75 | 61.00 | 46.75 | 34.00 |
| | 2 | 588.50 | 191.75 | 149.75 | 139.50 | 124.50 | 112.50 | 90.50 | 69.25 | 51.50 |
| | 3 | 798.00 | 258.50 | 203.25 | 190.00 | 170.50 | 154.00 | 123.75 | 94.00 | 70.25 |
| | 4 | 1,009.25 | 322.50 | 255.75 | 238.50 | 213.50 | 193.00 | 154.25 | 117.25 | 88.50 |
| 91.40 | 1 | 411.50 | 105.50 | 83.75 | 76.50 | 65.25 | 60.00 | 49.00 | 38.50 | 30.25 |
| | 2 | 588.25 | 154.75 | 124.50 | 113.25 | 99.25 | 90.75 | 74.00 | 57.75 | 46.75 |
| | 3 | 798.75 | 213.50 | 170.25 | 154.75 | 138.50 | 127.00 | 103.25 | 82.50 | 63.50 |
| | 4 | 1,008.75 | 268.25 | 216.25 | 198.00 | 174.25 | 160.25 | 132.25 | 105.25 | 80.00 |
| 99.10 | 1 | 408.25 | 116.00 | 76.00 | 68.75 | 59.25 | 52.25 | 41.25 | 31.25 | 24.00 |
| | 2 | 588.50 | 170.25 | 115.00 | 104.25 | 91.50 | 80.75 | 63.50 | 48.75 | 36.75 |
| | 3 | 797.50 | 231.25 | 161.00 | 146.75 | 128.75 | 113.75 | 90.00 | 68.75 | 52.75 |
| | 4 | 1,010.75 | 291.50 | 205.00 | 186.50 | 165.25 | 146.25 | 115.50 | 89.00 | 68.00 |
| 106.70 | 1 | 412.75 | 97.00 | 62.75 | 56.25 | 49.00 | 44.00 | 35.00 | 27.25 | 20.50 |
| | 2 | 587.00 | 140.25 | 95.50 | 84.75 | 75.50 | 68.00 | 53.75 | 42.00 | 31.75 |
| | 3 | 795.75 | 194.75 | 132.75 | 119.00 | 106.00 | 95.50 | 76.00 | 59.25 | 45.50 |
| | 4 | 1,001.00 | 248.75 | 171.50 | 153.75 | 136.75 | 122.75 | 97.50 | 77.00 | 58.25 |
| 114.30 | 1 | 409.75 | 87.75 | 68.75 | 62.75 | 54.00 | 47.50 | 37.50 | 29.25 | 22.00 |
| | 2 | 588.50 | 131.25 | 102.75 | 94.50 | 81.50 | 72.00 | 57.00 | 44.00 | 33.75 |
| | 3 | 796.75 | 182.25 | 144.50 | 132.75 | 115.50 | 101.00 | 80.75 | 63.00 | 48.00 |
| | 4 | 1,015.50 | 232.75 | 185.50 | 170.50 | 149.00 | 132.25 | 104.75 | 81.00 | 62.25 |
| 121.90 | 1 | 410.50 | 100.00 | 84.25 | 76.75 | 67.00 | 59.00 | 44.50 | 33.50 | 25.50 |
| | 2 | 586.50 | 152.00 | 127.50 | 116.25 | 101.75 | 89.75 | 68.50 | 51.75 | 39.00 |
| | 3 | 796.50 | 210.50 | 177.25 | 161.25 | 142.25 | 125.75 | 95.75 | 72.75 | 54.00 |
| | 4 | 1,008.50 | 270.25 | 226.25 | 206.25 | 182.00 | 160.75 | 122.75 | 92.75 | 69.50 |
| 129.50 | 1 | 403.75 | 127.75 | 88.25 | 78.25 | 66.75 | 58.00 | 44.00 | 33.75 | 25.00 |
| | 2 | 586.50 | 186.25 | 132.25 | 116.50 | 100.50 | 87.25 | 66.50 | 49.25 | 37.00 |
| | 3 | 794.00 | 252.25 | 181.50 | 160.75 | 139.25 | 121.25 | 92.75 | 69.00 | 51.25 |
| | 4 | 1,009.50 | 318.50 | 230.25 | 205.00 | 176.50 | 154.50 | 117.50 | 88.25 | 64.00 |
| 137.20 | 1 | 404.75 | 144.50 | 103.25 | 92.25 | 78.75 | 68.50 | 51.25 | 37.25 | 27.75 |
| | 2 | 581.75 | 211.25 | 153.25 | 137.50 | 118.50 | 103.00 | 76.75 | 56.50 | 41.00 |
| | 3 | 792.50 | 284.25 | 209.75 | 188.50 | 162.50 | 141.75 | 105.75 | 77.75 | 57.25 |
| | 4 | 1,003.75 | 355.75 | 263.00 | 236.25 | 203.75 | 177.50 | 132.75 | 97.50 | 72.00 |
| 144.80 | 1 | 404.50 | 124.50 | 88.00 | 77.00 | 63.00 | 54.00 | 40.00 | 30.00 | 23.00 |
| | 2 | 583.50 | 178.00 | 128.00 | 112.50 | 94.25 | 80.50 | 59.75 | 44.75 | 34.75 |
| | 3 | 795.75 | 242.00 | 174.75 | 155.25 | 130.75 | 112.75 | 84.50 | 63.00 | 48.75 |
| | 4 | 1,010.75 | 304.50 | 222.00 | 198.25 | 167.75 | 144.25 | 108.50 | 81.00 | 63.25 |
| 152.40 | 1 | 404.75 | 118.00 | 81.25 | 70.50 | 59.75 | 52.50 | 40.25 | 31.00 | 25.00 |
| | 2 | 582.50 | 171.75 | 120.00 | 105.00 | 90.00 | 79.75 | 60.75 | 46.75 | 36.75 |
| | 3 | 795.00 | 234.50 | 166.50 | 146.75 | 125.75 | 111.50 | 85.00 | 64.75 | 51.75 |
| | 4 | 1,007.25 | 294.25 | 211.50 | 186.75 | 160.75 | 141.75 | 108.75 | 83.00 | 65.75 |

**Table A-26. Average all point locations FWD deflection measurements extracted for LTPP pavement section 3669.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 413.30 | 119.69 | 87.76 | 78.35 | 66.95 | 58.82 | 45.56 | 35.01 | 27.00 |
| | 2 | 591.80 | 173.32 | 129.56 | 115.80 | 100.17 | 88.30 | 68.46 | 52.46 | 40.32 |
| | 3 | 799.79 | 234.55 | 176.61 | 158.83 | 137.96 | 121.94 | 94.86 | 72.75 | 55.74 |
| | 4 | 1,008.98 | 294.14 | 222.70 | 200.52 | 174.46 | 154.23 | 120.00 | 92.08 | 70.46 |

**Table A-27. FWD deflection measurements extracted for LTPP pavement section 3679 for FWD test date 27-Mar-90.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 401.75 | 207.00 | 212.25 | 213.25 | 214.50 | 217.00 | 221.50 | 33.00 |
| | 2 | 619.75 | 311.00 | 320.50 | 321.00 | 322.50 | 326.50 | 332.50 | 51.75 |
| | 3 | 814.00 | 391.75 | 397.75 | 397.75 | 397.25 | 401.00 | 406.25 | 66.75 |
| | 4 | 969.25 | 459.00 | 462.00 | 461.50 | 459.25 | 461.25 | 465.50 | 80.25 |
| 7.60 | 1 | 396.75 | 311.00 | 320.50 | 321.00 | 322.50 | 326.50 | 332.50 | 51.75 |
| | 2 | 610.50 | 391.75 | 397.75 | 397.75 | 397.25 | 401.00 | 406.25 | 66.75 |
| | 3 | 805.00 | 459.00 | 462.00 | 461.50 | 459.25 | 461.25 | 465.50 | 80.25 |
| | 4 | 962.00 | 120.75 | 109.75 | 102.00 | 92.00 | 80.75 | 62.00 | 36.50 |
| 16.80 | 1 | 393.25 | 175.00 | 149.25 | 137.25 | 119.00 | 102.75 | 77.00 | 40.00 |
| | 2 | 607.00 | 273.00 | 230.00 | 212.50 | 185.25 | 159.50 | 117.50 | 62.50 |
| | 3 | 795.50 | 346.50 | 294.25 | 270.75 | 236.50 | 203.50 | 150.50 | 78.25 |
| | 4 | 956.00 | 415.00 | 354.75 | 326.00 | 285.00 | 245.75 | 180.50 | 93.75 |
| 23.80 | 1 | 399.25 | 175.00 | 149.00 | 135.50 | 115.25 | 98.50 | 69.75 | 36.25 |
| | 2 | 619.25 | 273.00 | 233.75 | 213.25 | 183.50 | 155.25 | 111.00 | 57.00 |
| | 3 | 807.00 | 350.50 | 299.25 | 273.00 | 234.50 | 199.00 | 142.00 | 72.25 |
| | 4 | 999.75 | 424.25 | 362.75 | 330.75 | 284.25 | 242.00 | 172.50 | 88.00 |
| 32.00 | 1 | 390.25 | 157.25 | 135.75 | 120.50 | 107.50 | 94.25 | 71.00 | 37.75 |
| | 2 | 605.75 | 247.75 | 213.50 | 192.75 | 171.25 | 149.75 | 112.75 | 61.75 |
| | 3 | 801.00 | 323.25 | 276.75 | 250.50 | 222.00 | 193.50 | 145.50 | 78.75 |
| | 4 | 958.00 | 391.00 | 338.25 | 309.50 | 273.25 | 237.50 | 174.50 | 95.25 |
| 40.20 | 1 | 386.25 | 134.75 | 119.50 | 109.50 | 98.00 | 87.50 | 67.25 | 38.00 |
| | 2 | 597.50 | 207.50 | 186.00 | 170.75 | 154.75 | 136.25 | 105.50 | 60.75 |
| | 3 | 795.75 | 271.00 | 241.00 | 221.75 | 199.25 | 176.75 | 136.50 | 78.00 |
| | 4 | 948.75 | 326.75 | 291.25 | 268.25 | 241.25 | 213.50 | 164.75 | 94.00 |
| 45.70 | 1 | 373.75 | 194.25 | 156.25 | 140.00 | 119.50 | 100.75 | 70.00 | 35.75 |
| | 2 | 590.00 | 274.75 | 224.00 | 202.00 | 173.75 | 147.50 | 104.50 | 54.25 |
| | 3 | 781.75 | 340.50 | 278.00 | 251.75 | 216.50 | 185.50 | 132.00 | 68.00 |
| | 4 | 952.75 | 399.50 | 327.75 | 298.50 | 256.75 | 219.50 | 158.25 | 82.50 |
| 53.30 | 1 | 378.75 | 103.75 | 93.25 | 86.25 | 78.00 | 69.25 | 55.00 | 33.25 |
| | 2 | 589.75 | 163.00 | 145.00 | 135.50 | 122.50 | 109.00 | 85.00 | 52.50 |
| | 3 | 788.50 | 212.75 | 189.25 | 176.75 | 158.75 | 141.75 | 111.00 | 67.50 |
| | 4 | 944.25 | 262.25 | 231.25 | 216.25 | 194.25 | 172.00 | 135.25 | 83.25 |
| 63.10 | 1 | 369.50 | 345.25 | 271.25 | 239.50 | 198.00 | 163.25 | 110.00 | 52.00 |
| | 2 | 580.75 | 525.25 | 415.50 | 368.75 | 306.25 | 253.75 | 172.25 | 83.00 |
| | 3 | 766.50 | 665.25 | 526.75 | 468.75 | 391.00 | 324.00 | 222.50 | 108.25 |
| | 4 | 948.75 | 776.50 | 618.00 | 551.75 | 460.50 | 383.50 | 264.75 | 130.25 |
| 69.50 | 1 | 371.25 | 173.25 | 149.25 | 139.25 | 121.25 | 109.25 | 84.00 | 43.00 |
| | 2 | 583.25 | 273.75 | 237.50 | 221.75 | 193.75 | 174.00 | 135.00 | 68.25 |
| | 3 | 780.50 | 360.25 | 311.50 | 290.50 | 254.25 | 228.50 | 176.50 | 90.00 |
| | 4 | 945.25 | 436.50 | 385.75 | 359.50 | 319.50 | 281.00 | 214.25 | 114.50 |
| 76.20 | 1 | 370.50 | 128.75 | 117.50 | 108.50 | 97.50 | 85.00 | 67.25 | 35.50 |
| | 2 | 584.00 | 210.50 | 191.75 | 176.50 | 159.75 | 138.75 | 110.25 | 60.25 |
| | 3 | 777.00 | 279.00 | 254.75 | 235.25 | 212.00 | 185.25 | 146.50 | 80.75 |
| | 4 | 953.50 | 347.75 | 315.75 | 293.00 | 264.25 | 231.75 | 177.50 | 101.25 |

**Table A-27. FWD deflection measurements extracted for LTPP pavement section 3679 for FWD test date 27-Mar-90 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 369.50 | 123.50 | 105.50 | 98.00 | 85.25 | 80.00 | 65.00 | 36.75 |
| | 2 | 581.75 | 192.75 | 167.75 | 158.00 | 139.75 | 126.75 | 100.75 | 56.25 |
| | 3 | 778.25 | 255.25 | 222.50 | 208.00 | 186.00 | 166.50 | 128.25 | 71.75 |
| | 4 | 953.50 | 311.50 | 273.25 | 256.00 | 227.50 | 204.25 | 158.25 | 87.50 |
| 91.40 | 1 | 366.00 | 339.25 | 99.25 | 89.25 | 80.25 | 70.00 | 54.25 | 33.50 |
| | 2 | 578.00 | 508.75 | 192.00 | 165.00 | 145.75 | 125.25 | 93.75 | 54.50 |
| | 3 | 764.75 | 635.75 | 282.75 | 242.75 | 210.25 | 179.50 | 130.25 | 73.75 |
| | 4 | 944.50 | 752.50 | 373.00 | 321.00 | 275.50 | 234.25 | 167.25 | 90.00 |
| 99.10 | 1 | 368.50 | 147.50 | 124.00 | 115.00 | 105.50 | 97.25 | 81.50 | 35.25 |
| | 2 | 582.00 | 231.25 | 197.25 | 184.25 | 169.25 | 156.00 | 132.50 | 56.25 |
| | 3 | 774.00 | 301.50 | 258.75 | 242.75 | 222.75 | 204.25 | 174.25 | 72.75 |
| | 4 | 955.50 | 369.25 | 318.00 | 299.00 | 273.50 | 252.75 | 215.25 | 87.25 |
| 106.70 | 1 | 371.50 | 153.00 | 131.00 | 120.75 | 108.75 | 96.75 | 75.25 | 41.25 |
| | 2 | 583.50 | 239.25 | 207.75 | 192.25 | 173.25 | 154.50 | 119.00 | 66.50 |
| | 3 | 778.00 | 316.50 | 272.75 | 251.75 | 226.25 | 201.50 | 156.75 | 84.50 |
| | 4 | 954.00 | 385.00 | 334.00 | 309.25 | 277.75 | 246.75 | 190.75 | 102.00 |
| 114.60 | 1 | 366.75 | 155.50 | 129.00 | 117.25 | 105.25 | 91.50 | 69.25 | 37.00 |
| | 2 | 580.50 | 242.25 | 205.00 | 188.75 | 167.75 | 146.75 | 111.75 | 61.25 |
| | 3 | 772.75 | 319.50 | 269.00 | 247.50 | 219.50 | 192.25 | 146.25 | 78.50 |
| | 4 | 954.75 | 391.25 | 329.75 | 304.25 | 270.00 | 236.50 | 178.75 | 95.00 |
| 121.90 | 1 | 365.25 | 218.00 | 173.50 | 154.25 | 130.25 | 109.25 | 75.75 | 37.75 |
| | 2 | 576.00 | 335.25 | 273.25 | 244.75 | 207.50 | 175.00 | 122.75 | 61.75 |
| | 3 | 766.50 | 429.25 | 350.00 | 314.25 | 267.75 | 225.25 | 157.75 | 79.00 |
| | 4 | 946.75 | 517.50 | 426.00 | 384.50 | 328.50 | 277.00 | 194.75 | 96.75 |
| 130.50 | 1 | 367.25 | 209.00 | 161.00 | 143.75 | 122.25 | 101.75 | 72.50 | 38.50 |
| | 2 | 576.50 | 327.50 | 256.00 | 226.50 | 192.75 | 161.75 | 115.25 | 62.00 |
| | 3 | 769.75 | 428.50 | 334.25 | 297.00 | 253.00 | 211.00 | 150.75 | 79.50 |
| | 4 | 946.00 | 521.50 | 409.00 | 362.00 | 309.00 | 257.50 | 184.25 | 96.00 |
| 137.20 | 1 | 364.25 | 214.25 | 174.25 | 159.50 | 137.25 | 118.75 | 82.75 | 46.00 |
| | 2 | 573.50 | 325.00 | 267.50 | 246.50 | 212.25 | 185.50 | 130.50 | 69.50 |
| | 3 | 766.75 | 414.50 | 346.00 | 318.25 | 275.00 | 241.00 | 171.75 | 90.25 |
| | 4 | 944.75 | 498.75 | 422.50 | 387.75 | 336.50 | 291.50 | 210.00 | 107.25 |
| 144.80 | 1 | 365.50 | 134.75 | 115.75 | 107.00 | 94.75 | 82.50 | 61.75 | 32.00 |
| | 2 | 576.75 | 211.75 | 182.50 | 169.25 | 150.25 | 131.50 | 99.75 | 52.50 |
| | 3 | 771.75 | 278.25 | 240.00 | 222.00 | 196.25 | 171.50 | 129.25 | 67.50 |
| | 4 | 954.25 | 341.75 | 293.50 | 272.25 | 240.25 | 211.00 | 159.25 | 83.50 |
| 149.70 | 1 | 368.75 | 129.50 | 119.25 | 110.75 | 105.75 | 98.25 | 65.25 | 36.00 |
| | 2 | 578.00 | 204.25 | 190.25 | 174.50 | 166.75 | 156.75 | 103.25 | 57.25 |
| | 3 | 777.75 | 268.00 | 247.50 | 229.75 | 218.25 | 204.50 | 133.00 | 73.25 |
| | 4 | 954.75 | 329.50 | 305.00 | 284.50 | 268.75 | 251.75 | 161.75 | 89.25 |

**Table A-28. Average all point locations FWD deflection measurements extracted for LTPP pavement section 3679.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 376.40 | 178.06 | 142.64 | 130.81 | 115.99 | 102.58 | 78.95 | 37.86 |
| | 2 | 589.24 | 274.51 | 224.15 | 205.90 | 182.98 | 161.75 | 124.55 | 60.44 |
| | 3 | 782.51 | 353.95 | 291.17 | 267.49 | 237.33 | 209.63 | 160.81 | 77.93 |
| | 4 | 954.62 | 426.46 | 354.37 | 326.07 | 289.19 | 254.89 | 194.60 | 94.92 |

**Table A-29. FWD deflection measurements extracted for LTPP pavement section 3729 for FWD test date 16-Feb-02.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 427.00 | 107.25 | 102.75 | 98.50 | 91.25 | 83.75 | 69.25 | 57.25 | 45.00 |
| | 2 | 641.50 | 164.25 | 154.25 | 147.50 | 135.25 | 124.75 | 103.00 | 83.75 | 69.50 |
| | 3 | 798.00 | 209.50 | 198.50 | 189.75 | 173.75 | 161.00 | 133.00 | 107.50 | 89.00 |
| | 4 | 1,017.25 | 272.00 | 256.25 | 245.00 | 224.00 | 207.75 | 171.00 | 138.75 | 114.00 |
| 7.60 | 1 | 420.00 | 164.25 | 154.25 | 147.50 | 135.25 | 124.75 | 103.00 | 83.75 | 69.50 |
| | 2 | 634.00 | 209.50 | 198.50 | 189.75 | 173.75 | 161.00 | 133.00 | 107.50 | 89.00 |
| | 3 | 794.50 | 272.00 | 256.25 | 245.00 | 224.00 | 207.75 | 171.00 | 138.75 | 114.00 |
| | 4 | 1,013.25 | 105.75 | 90.25 | 85.75 | 78.00 | 70.75 | 58.25 | 47.00 | 38.50 |
| 15.20 | 1 | 412.25 | 121.25 | 108.50 | 102.75 | 93.50 | 84.25 | 67.75 | 54.25 | 43.00 |
| | 2 | 626.25 | 182.25 | 162.75 | 154.75 | 140.00 | 126.25 | 101.50 | 80.75 | 65.50 |
| | 3 | 789.75 | 234.75 | 209.75 | 199.75 | 180.00 | 162.25 | 129.75 | 102.75 | 81.75 |
| | 4 | 1,008.25 | 306.00 | 273.00 | 259.25 | 234.25 | 211.00 | 168.25 | 133.00 | 106.00 |
| 22.90 | 1 | 411.00 | 106.00 | 94.00 | 88.25 | 82.50 | 75.25 | 62.25 | 51.00 | 41.25 |
| | 2 | 624.00 | 158.75 | 138.75 | 132.50 | 123.00 | 111.25 | 92.50 | 76.00 | 62.75 |
| | 3 | 788.50 | 203.75 | 179.25 | 171.00 | 157.75 | 143.50 | 119.00 | 97.00 | 79.00 |
| | 4 | 1,005.50 | 264.00 | 233.00 | 221.25 | 205.00 | 186.25 | 154.25 | 125.25 | 102.00 |
| 30.50 | 1 | 407.50 | 91.50 | 81.00 | 77.75 | 71.00 | 64.75 | 53.75 | 44.75 | 37.25 |
| | 2 | 620.75 | 137.75 | 121.50 | 116.00 | 106.00 | 97.00 | 81.00 | 67.00 | 55.50 |
| | 3 | 784.75 | 178.00 | 156.75 | 150.00 | 136.00 | 124.75 | 104.00 | 85.00 | 71.75 |
| | 4 | 998.00 | 232.25 | 203.75 | 195.00 | 177.75 | 162.50 | 135.00 | 111.00 | 91.75 |
| 38.10 | 1 | 405.75 | 96.50 | 82.00 | 78.25 | 71.00 | 64.50 | 54.75 | 45.75 | 37.75 |
| | 2 | 619.50 | 142.75 | 122.25 | 116.75 | 105.75 | 96.25 | 81.00 | 67.75 | 57.00 |
| | 3 | 787.00 | 185.00 | 159.00 | 151.50 | 137.50 | 125.25 | 104.75 | 87.00 | 72.50 |
| | 4 | 1,004.75 | 240.50 | 207.00 | 197.25 | 178.75 | 162.75 | 136.75 | 113.25 | 94.25 |
| 45.70 | 1 | 404.25 | 87.00 | 73.50 | 71.00 | 64.75 | 59.25 | 51.00 | 42.50 | 36.25 |
| | 2 | 619.00 | 129.25 | 111.50 | 106.50 | 97.00 | 89.25 | 75.50 | 62.75 | 54.50 |
| | 3 | 787.75 | 166.75 | 144.00 | 137.00 | 125.00 | 114.25 | 96.25 | 80.00 | 68.00 |
| | 4 | 1,004.50 | 217.00 | 186.75 | 178.50 | 162.50 | 149.00 | 125.00 | 103.75 | 88.25 |
| 53.30 | 1 | 399.50 | 87.00 | 78.00 | 73.75 | 67.00 | 61.00 | 51.25 | 42.00 | 35.25 |
| | 2 | 614.50 | 129.75 | 116.75 | 110.75 | 100.25 | 91.00 | 76.00 | 62.50 | 54.00 |
| | 3 | 784.75 | 168.25 | 151.50 | 143.50 | 129.50 | 118.00 | 97.00 | 80.00 | 66.50 |
| | 4 | 1,003.00 | 219.00 | 197.00 | 186.50 | 167.75 | 153.00 | 126.50 | 102.75 | 86.75 |
| 61.00 | 1 | 396.75 | 93.75 | 83.75 | 79.75 | 72.75 | 66.25 | 54.00 | 43.75 | 37.00 |
| | 2 | 612.50 | 139.75 | 124.50 | 119.00 | 109.25 | 99.00 | 81.25 | 65.25 | 54.75 |
| | 3 | 780.25 | 180.25 | 160.25 | 154.00 | 140.75 | 127.50 | 104.00 | 83.00 | 70.00 |
| | 4 | 1,000.50 | 235.25 | 209.75 | 200.75 | 183.50 | 166.50 | 136.00 | 108.25 | 89.75 |
| 68.60 | 1 | 395.25 | 110.25 | 94.00 | 88.25 | 80.25 | 72.00 | 58.00 | 47.00 | 37.00 |
| | 2 | 607.50 | 164.50 | 140.25 | 134.25 | 120.50 | 108.25 | 86.25 | 69.50 | 56.50 |
| | 3 | 774.25 | 214.00 | 183.00 | 174.00 | 156.75 | 140.50 | 112.25 | 89.25 | 71.75 |
| | 4 | 989.50 | 279.50 | 239.75 | 227.25 | 204.50 | 183.50 | 146.75 | 116.00 | 93.75 |
| 76.20 | 1 | 395.00 | 86.75 | 83.25 | 79.00 | 71.50 | 65.00 | 54.00 | 44.25 | 36.75 |
| | 2 | 602.25 | 131.00 | 124.00 | 118.00 | 106.50 | 96.75 | 80.00 | 65.25 | 54.75 |
| | 3 | 766.00 | 171.50 | 161.25 | 154.00 | 139.75 | 126.50 | 103.75 | 85.00 | 70.25 |
| | 4 | 969.75 | 223.25 | 210.25 | 200.75 | 182.00 | 165.00 | 135.00 | 110.00 | 91.00 |

**Table A-29. FWD deflection measurements extracted for LTPP pavement section 3729 for FWD test date 16-Feb-02 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 394.75 | 97.00 | 83.00 | 79.25 | 71.50 | 64.75 | 53.00 | 43.00 | 36.25 |
| | 2 | 609.00 | 146.00 | 124.50 | 119.25 | 107.50 | 97.75 | 80.00 | 65.25 | 54.25 |
| | 3 | 778.25 | 187.75 | 161.25 | 154.50 | 139.00 | 125.50 | 102.75 | 83.50 | 69.50 |
| | 4 | 995.75 | 244.75 | 210.75 | 201.00 | 181.50 | 164.00 | 133.00 | 108.25 | 89.00 |
| 91.40 | 1 | 393.00 | 97.75 | 84.00 | 79.25 | 71.50 | 63.75 | 53.00 | 41.25 | 33.75 |
| | 2 | 608.50 | 147.50 | 125.75 | 119.50 | 107.50 | 97.00 | 79.00 | 63.25 | 52.00 |
| | 3 | 776.00 | 189.75 | 162.50 | 154.50 | 138.00 | 124.50 | 99.75 | 80.25 | 66.00 |
| | 4 | 989.75 | 247.25 | 212.50 | 201.75 | 181.00 | 162.75 | 130.50 | 104.75 | 85.50 |
| 99.10 | 1 | 393.00 | 112.75 | 97.50 | 93.00 | 83.00 | 74.00 | 59.00 | 47.25 | 39.50 |
| | 2 | 604.75 | 168.00 | 146.00 | 139.75 | 125.00 | 111.75 | 89.50 | 71.00 | 58.50 |
| | 3 | 772.50 | 218.00 | 189.75 | 180.50 | 161.75 | 144.25 | 114.50 | 90.75 | 73.75 |
| | 4 | 989.00 | 285.00 | 249.50 | 236.00 | 212.75 | 189.75 | 149.25 | 117.50 | 94.50 |
| 106.70 | 1 | 395.50 | 110.50 | 97.00 | 89.50 | 80.50 | 71.50 | 58.25 | 46.25 | 38.00 |
| | 2 | 606.00 | 165.75 | 143.75 | 134.25 | 120.25 | 108.00 | 86.50 | 70.00 | 58.00 |
| | 3 | 773.75 | 213.75 | 185.25 | 173.50 | 155.50 | 138.75 | 110.75 | 89.00 | 73.75 |
| | 4 | 987.50 | 279.00 | 242.75 | 226.75 | 202.75 | 181.75 | 144.25 | 116.00 | 95.00 |
| 114.30 | 1 | 392.75 | 96.00 | 80.25 | 77.25 | 68.50 | 62.25 | 51.00 | 41.00 | 34.00 |
| | 2 | 604.50 | 143.00 | 120.75 | 115.00 | 103.25 | 93.00 | 75.75 | 61.00 | 52.00 |
| | 3 | 773.25 | 185.50 | 157.00 | 149.50 | 134.00 | 120.50 | 96.75 | 78.25 | 65.50 |
| | 4 | 989.25 | 242.25 | 205.50 | 195.25 | 175.50 | 158.25 | 126.25 | 102.25 | 85.00 |
| 121.90 | 1 | 391.25 | 107.00 | 93.25 | 89.50 | 79.25 | 71.25 | 57.75 | 47.00 | 38.00 |
| | 2 | 600.50 | 158.00 | 139.50 | 132.50 | 118.00 | 105.00 | 84.50 | 68.75 | 56.25 |
| | 3 | 770.00 | 206.50 | 181.00 | 172.75 | 153.00 | 137.25 | 109.75 | 88.75 | 72.75 |
| | 4 | 988.25 | 270.00 | 237.25 | 225.25 | 200.75 | 179.50 | 143.50 | 115.25 | 94.75 |
| 129.50 | 1 | 392.50 | 109.25 | 94.25 | 90.75 | 82.25 | 74.00 | 59.75 | 49.00 | 37.75 |
| | 2 | 600.25 | 161.25 | 139.75 | 134.00 | 121.00 | 109.75 | 89.25 | 70.25 | 60.00 |
| | 3 | 771.75 | 209.00 | 180.75 | 174.50 | 157.50 | 142.00 | 114.50 | 92.00 | 74.50 |
| | 4 | 983.00 | 272.25 | 237.50 | 226.75 | 204.50 | 185.50 | 149.75 | 119.25 | 97.25 |
| 137.20 | 1 | 389.50 | 117.50 | 107.25 | 102.75 | 92.50 | 83.00 | 66.25 | 52.50 | 42.50 |
| | 2 | 598.50 | 176.75 | 162.00 | 153.25 | 139.25 | 125.00 | 99.75 | 79.00 | 65.50 |
| | 3 | 765.50 | 230.00 | 209.25 | 199.25 | 180.25 | 162.00 | 128.25 | 101.50 | 82.75 |
| | 4 | 978.00 | 302.75 | 274.00 | 260.75 | 235.50 | 211.75 | 167.25 | 131.75 | 105.75 |
| 144.80 | 1 | 388.50 | 102.75 | 92.25 | 90.00 | 82.50 | 76.25 | 64.75 | 53.75 | 43.50 |
| | 2 | 600.75 | 155.75 | 138.00 | 133.25 | 123.25 | 114.75 | 96.75 | 80.75 | 67.00 |
| | 3 | 769.75 | 198.50 | 177.25 | 171.50 | 158.25 | 146.50 | 123.50 | 102.25 | 84.00 |
| | 4 | 985.75 | 259.75 | 232.25 | 224.00 | 207.00 | 191.25 | 160.75 | 132.75 | 109.00 |
| 152.40 | 1 | 387.75 | 112.75 | 106.00 | 103.00 | 96.00 | 90.00 | 76.50 | 64.75 | 52.50 |
| | 2 | 599.50 | 174.00 | 160.75 | 155.75 | 145.50 | 135.50 | 116.25 | 97.25 | 82.00 |
| | 3 | 769.75 | 221.75 | 206.25 | 199.50 | 186.25 | 173.75 | 149.00 | 124.25 | 100.50 |
| | 4 | 988.00 | 289.75 | 269.75 | 261.50 | 244.00 | 227.50 | 194.00 | 162.00 | 132.25 |

**Table A-30. Average all point locations FWD deflection measurements extracted for LTPP pavement section 3729.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 399.65 | 102.68 | 90.75 | 86.54 | 78.62 | 71.31 | 58.74 | 47.87 | 39.08 |
| | 2 | 612.10 | 153.92 | 135.76 | 129.51 | 117.61 | 106.76 | 87.63 | 71.24 | 59.42 |
| | 3 | 778.86 | 198.71 | 175.55 | 167.56 | 151.87 | 137.75 | 112.45 | 91.14 | 74.99 |
| | 4 | 994.69 | 259.01 | 229.13 | 218.23 | 197.98 | 179.67 | 146.32 | 118.29 | 97.07 |

**Table A-31. FWD deflection measurements extracted for LTPP pavement section 3835 for FWD test date 19-Feb-99.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 434.25 | 107.75 | 99.75 | 94.25 | 85.00 | 76.25 | 61.00 | 39.50 |
| | 2 | 644.00 | 167.25 | 154.50 | 146.75 | 132.50 | 120.00 | 96.50 | 61.00 |
| | 3 | 865.25 | 233.75 | 218.50 | 207.00 | 187.50 | 169.75 | 136.00 | 85.75 |
| | 4 | 1,062.75 | 288.75 | 267.25 | 253.75 | 229.75 | 208.50 | 167.75 | 105.00 |
| 7.60 | 1 | 429.75 | 167.25 | 154.50 | 146.75 | 132.50 | 120.00 | 96.50 | 61.00 |
| | 2 | 640.25 | 233.75 | 218.50 | 207.00 | 187.50 | 169.75 | 136.00 | 85.75 |
| | 3 | 862.75 | 288.75 | 267.25 | 253.75 | 229.75 | 208.50 | 167.75 | 105.00 |
| | 4 | 1,054.25 | 82.50 | 75.00 | 70.50 | 63.00 | 56.75 | 46.00 | 32.75 |
| 15.20 | 1 | 424.25 | 128.25 | 114.00 | 107.00 | 95.00 | 85.00 | 67.50 | 45.00 |
| | 2 | 637.00 | 196.00 | 175.00 | 164.25 | 147.00 | 131.50 | 104.50 | 69.25 |
| | 3 | 864.50 | 270.25 | 243.25 | 228.75 | 204.25 | 183.25 | 145.75 | 96.50 |
| | 4 | 1,054.50 | 330.50 | 295.75 | 277.75 | 248.25 | 223.00 | 178.00 | 117.00 |
| 22.90 | 1 | 420.75 | 119.25 | 109.50 | 103.75 | 92.75 | 83.50 | 66.75 | 44.25 |
| | 2 | 634.50 | 188.25 | 172.25 | 162.75 | 145.75 | 132.00 | 105.75 | 70.00 |
| | 3 | 860.00 | 262.50 | 243.00 | 230.50 | 207.00 | 187.75 | 150.00 | 98.75 |
| | 4 | 1,053.00 | 324.75 | 297.25 | 282.25 | 253.25 | 230.25 | 183.75 | 120.25 |
| 30.50 | 1 | 417.25 | 114.75 | 108.75 | 105.25 | 100.00 | 96.00 | 51.00 | 38.00 |
| | 2 | 632.25 | 180.50 | 171.25 | 166.00 | 158.00 | 151.50 | 80.00 | 59.75 |
| | 3 | 860.25 | 248.50 | 240.50 | 233.00 | 221.75 | 213.00 | 114.25 | 84.50 |
| | 4 | 1,054.00 | 305.25 | 291.75 | 283.25 | 270.25 | 260.50 | 142.75 | 103.75 |
| 38.10 | 1 | 416.75 | 98.25 | 91.50 | 87.75 | 78.75 | 72.75 | 60.25 | 44.75 |
| | 2 | 631.00 | 156.75 | 144.25 | 137.25 | 124.25 | 114.75 | 95.50 | 69.50 |
| | 3 | 860.75 | 216.75 | 202.50 | 193.00 | 174.75 | 161.00 | 134.75 | 98.50 |
| | 4 | 1,058.25 | 266.75 | 247.00 | 236.25 | 214.00 | 197.25 | 165.00 | 121.75 |
| 45.70 | 1 | 409.50 | 94.75 | 86.00 | 81.25 | 73.00 | 66.25 | 54.00 | 37.00 |
| | 2 | 625.75 | 152.00 | 137.25 | 129.25 | 117.25 | 106.00 | 86.25 | 58.50 |
| | 3 | 860.00 | 211.00 | 195.00 | 184.50 | 167.00 | 152.25 | 124.00 | 83.00 |
| | 4 | 1,054.25 | 261.00 | 238.25 | 226.25 | 205.00 | 188.00 | 153.00 | 102.25 |
| 53.30 | 1 | 411.25 | 80.75 | 72.00 | 68.25 | 60.75 | 55.25 | 45.25 | 32.00 |
| | 2 | 628.25 | 127.50 | 114.50 | 108.00 | 97.00 | 88.25 | 71.75 | 50.50 |
| | 3 | 858.75 | 179.50 | 163.00 | 153.75 | 138.00 | 125.00 | 102.00 | 71.00 |
| | 4 | 1,052.00 | 221.75 | 199.75 | 188.75 | 169.75 | 154.00 | 125.25 | 86.50 |
| 61.00 | 1 | 411.00 | 77.25 | 69.00 | 65.50 | 57.75 | 52.00 | 41.75 | 29.75 |
| | 2 | 625.75 | 125.00 | 111.00 | 104.50 | 93.25 | 83.50 | 68.00 | 47.00 |
| | 3 | 858.00 | 176.25 | 159.25 | 150.50 | 134.50 | 120.75 | 97.75 | 66.75 |
| | 4 | 1,047.75 | 218.75 | 196.50 | 186.00 | 166.50 | 149.75 | 121.50 | 83.00 |
| 68.60 | 1 | 408.25 | 87.25 | 80.50 | 76.25 | 69.00 | 62.75 | 51.00 | 35.75 |
| | 2 | 625.75 | 140.00 | 128.75 | 122.00 | 110.00 | 100.00 | 82.00 | 56.25 |
| | 3 | 855.75 | 197.75 | 183.75 | 174.00 | 157.25 | 143.00 | 116.75 | 80.25 |
| | 4 | 1,041.75 | 244.75 | 226.00 | 213.75 | 194.00 | 176.00 | 143.75 | 98.25 |
| 76.20 | 1 | 408.75 | 188.75 | 177.50 | 170.25 | 157.25 | 144.50 | 118.25 | 76.25 |
| | 2 | 624.75 | 268.50 | 254.00 | 243.75 | 225.75 | 207.75 | 170.75 | 110.25 |
| | 3 | 857.00 | 347.00 | 327.25 | 314.25 | 290.25 | 268.00 | 220.50 | 143.25 |
| | 4 | 1,042.75 | 406.75 | 381.75 | 366.00 | 337.75 | 311.75 | 257.25 | 168.50 |

**Table A-31. FWD deflection measurements extracted for LTPP pavement section 3835 for FWD test date 19-Feb-99 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 408.25 | 104.50 | 96.00 | 91.00 | 81.75 | 74.00 | 59.00 | 39.25 |
| | 2 | 621.25 | 166.50 | 153.25 | 144.75 | 130.25 | 117.25 | 94.25 | 62.00 |
| | 3 | 851.00 | 234.50 | 217.75 | 205.75 | 185.75 | 167.75 | 135.00 | 88.00 |
| | 4 | 1,039.50 | 289.50 | 266.75 | 252.50 | 227.75 | 206.00 | 166.00 | 108.75 |
| 91.40 | 1 | 405.75 | 98.25 | 91.75 | 86.75 | 77.75 | 70.75 | 57.25 | 39.00 |
| | 2 | 622.25 | 159.25 | 144.50 | 136.75 | 123.00 | 111.75 | 90.75 | 61.00 |
| | 3 | 858.50 | 221.25 | 203.25 | 192.50 | 173.75 | 157.75 | 128.00 | 86.75 |
| | 4 | 1,048.25 | 273.50 | 248.25 | 235.50 | 212.50 | 193.25 | 158.00 | 106.00 |
| 99.10 | 1 | 406.00 | 115.25 | 106.75 | 101.50 | 92.50 | 84.50 | 70.00 | 48.00 |
| | 2 | 622.25 | 181.75 | 168.75 | 160.25 | 146.00 | 133.25 | 110.00 | 75.75 |
| | 3 | 854.25 | 256.75 | 237.25 | 226.00 | 206.25 | 188.50 | 155.75 | 107.00 |
| | 4 | 1,042.50 | 311.75 | 289.25 | 275.00 | 251.75 | 230.25 | 190.50 | 131.50 |
| 106.70 | 1 | 407.25 | 120.75 | 111.25 | 105.00 | 94.75 | 85.75 | 70.00 | 47.75 |
| | 2 | 621.00 | 190.75 | 174.75 | 165.75 | 149.25 | 135.00 | 109.75 | 74.25 |
| | 3 | 850.25 | 262.50 | 244.00 | 231.50 | 209.25 | 189.50 | 154.75 | 105.25 |
| | 4 | 1,038.50 | 319.75 | 296.00 | 280.50 | 254.75 | 231.25 | 189.75 | 129.50 |
| 114.30 | 1 | 404.50 | 164.50 | 152.75 | 143.75 | 128.75 | 111.75 | 84.00 | 48.25 |
| | 2 | 615.00 | 240.25 | 223.25 | 210.75 | 189.75 | 166.50 | 127.50 | 75.25 |
| | 3 | 837.75 | 319.50 | 296.75 | 281.25 | 253.00 | 224.50 | 173.75 | 104.50 |
| | 4 | 1,024.00 | 379.50 | 352.75 | 334.50 | 301.75 | 267.75 | 209.25 | 126.75 |
| 121.90 | 1 | 404.25 | 119.25 | 106.75 | 100.75 | 90.75 | 81.75 | 66.00 | 44.00 |
| | 2 | 620.00 | 185.25 | 168.00 | 158.50 | 143.25 | 129.25 | 104.00 | 69.25 |
| | 3 | 848.50 | 258.75 | 235.75 | 222.75 | 201.50 | 182.50 | 147.00 | 97.25 |
| | 4 | 1,038.00 | 316.00 | 288.00 | 272.75 | 246.75 | 223.75 | 180.50 | 119.75 |
| 129.50 | 1 | 404.00 | 125.00 | 111.25 | 104.50 | 93.00 | 83.50 | 66.75 | 44.25 |
| | 2 | 620.75 | 192.25 | 174.50 | 164.25 | 147.00 | 132.00 | 105.50 | 69.75 |
| | 3 | 852.75 | 271.00 | 244.50 | 230.25 | 206.50 | 185.75 | 148.50 | 97.25 |
| | 4 | 1,040.25 | 329.25 | 298.25 | 281.00 | 252.25 | 228.25 | 181.25 | 119.00 |
| 137.20 | 1 | 404.50 | 122.50 | 111.25 | 106.00 | 95.00 | 86.25 | 68.75 | 44.75 |
| | 2 | 620.50 | 191.75 | 176.00 | 167.00 | 150.50 | 136.00 | 109.25 | 71.25 |
| | 3 | 851.50 | 269.00 | 247.50 | 235.25 | 212.25 | 192.50 | 154.50 | 100.50 |
| | 4 | 1,043.00 | 328.00 | 301.50 | 287.25 | 259.00 | 235.75 | 189.50 | 123.75 |
| 144.80 | 1 | 406.50 | 118.50 | 110.00 | 102.25 | 90.00 | 80.00 | 62.75 | 40.50 |
| | 2 | 617.50 | 185.25 | 173.00 | 160.75 | 141.75 | 126.75 | 99.50 | 64.75 |
| | 3 | 845.50 | 259.00 | 242.50 | 225.50 | 199.75 | 178.50 | 140.25 | 91.00 |
| | 4 | 1,036.25 | 314.50 | 295.00 | 274.50 | 242.75 | 217.50 | 171.00 | 111.00 |
| 152.40 | 1 | 399.50 | 115.00 | 103.75 | 97.75 | 87.25 | 78.00 | 62.25 | 41.25 |
| | 2 | 615.75 | 178.50 | 162.00 | 153.25 | 137.25 | 124.00 | 98.50 | 64.50 |
| | 3 | 847.00 | 247.25 | 225.50 | 212.75 | 191.00 | 171.50 | 136.50 | 89.00 |
| | 4 | 1,044.00 | 300.50 | 273.00 | 258.50 | 231.75 | 210.75 | 167.50 | 107.75 |

**Table A-32. Average all point locations FWD deflection measurements extracted for LTPP pavement section 3835.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 411.54 | 113.48 | 104.05 | 98.54 | 88.75 | 80.35 | 63.31 | 42.48 |
| | 2 | 625.98 | 176.38 | 161.86 | 153.21 | 138.49 | 125.54 | 99.14 | 66.18 |
| | 3 | 855.24 | 244.11 | 225.64 | 213.81 | 193.45 | 175.69 | 138.96 | 92.62 |
| | 4 | 1,046.17 | 298.06 | 274.07 | 260.00 | 235.36 | 214.31 | 169.88 | 113.14 |

**Table A-33. FWD deflection measurements extracted for LTPP pavement section 6079 for FWD test date 6-Nov-91.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 407.00 | 165.25 | 148.00 | 138.75 | 126.75 | 112.25 | 86.25 | 50.75 |
| | 2 | 608.25 | 256.25 | 230.00 | 215.25 | 196.50 | 173.25 | 134.75 | 81.25 |
| | 3 | 820.25 | 349.25 | 312.50 | 293.00 | 267.75 | 236.25 | 183.00 | 109.25 |
| | 4 | 1,058.50 | 455.50 | 409.00 | 382.00 | 350.50 | 308.75 | 240.75 | 143.25 |
| 8.20 | 1 | 400.75 | 256.25 | 230.00 | 215.25 | 196.50 | 173.25 | 134.75 | 81.25 |
| | 2 | 601.75 | 349.25 | 312.50 | 293.00 | 267.75 | 236.25 | 183.00 | 109.25 |
| | 3 | 815.50 | 455.50 | 409.00 | 382.00 | 350.50 | 308.75 | 240.75 | 143.25 |
| | 4 | 1,057.50 | 102.75 | 96.50 | 91.00 | 85.00 | 77.00 | 61.00 | 39.00 |
| 15.20 | 1 | 399.00 | 88.00 | 81.25 | 74.75 | 74.00 | 62.75 | 53.75 | 35.50 |
| | 2 | 598.50 | 134.50 | 125.75 | 116.00 | 112.50 | 97.75 | 82.50 | 55.25 |
| | 3 | 815.75 | 188.00 | 174.25 | 162.25 | 156.00 | 137.25 | 115.00 | 77.25 |
| | 4 | 1,057.75 | 248.25 | 230.00 | 212.75 | 206.75 | 178.00 | 151.50 | 102.25 |
| 22.90 | 1 | 394.25 | 101.00 | 94.75 | 89.75 | 84.25 | 78.25 | 65.50 | 42.75 |
| | 2 | 591.25 | 156.25 | 146.75 | 140.25 | 131.75 | 121.75 | 102.50 | 68.00 |
| | 3 | 806.00 | 216.75 | 202.75 | 194.75 | 183.50 | 168.25 | 142.75 | 95.25 |
| | 4 | 1,047.50 | 286.25 | 268.50 | 256.75 | 242.25 | 223.75 | 189.00 | 127.00 |
| 30.50 | 1 | 384.25 | 114.00 | 108.50 | 106.25 | 100.50 | 96.75 | 88.00 | 39.25 |
| | 2 | 583.25 | 180.50 | 172.00 | 168.50 | 162.00 | 155.00 | 143.00 | 64.00 |
| | 3 | 795.00 | 252.00 | 242.50 | 237.50 | 228.75 | 220.75 | 204.50 | 89.00 |
| | 4 | 1,035.00 | 336.00 | 324.75 | 319.25 | 308.25 | 297.75 | 279.75 | 117.50 |
| 38.10 | 1 | 378.50 | 236.25 | 204.75 | 189.00 | 170.75 | 149.25 | 114.25 | 65.25 |
| | 2 | 573.25 | 359.75 | 315.00 | 291.50 | 264.25 | 232.00 | 180.00 | 102.50 |
| | 3 | 788.00 | 463.75 | 408.50 | 378.50 | 344.25 | 304.00 | 238.25 | 136.75 |
| | 4 | 1,034.75 | 580.50 | 513.00 | 479.00 | 436.75 | 387.50 | 307.00 | 177.25 |
| 45.70 | 1 | 383.50 | 171.00 | 162.00 | 154.50 | 145.25 | 131.50 | 107.00 | 68.00 |
| | 2 | 580.50 | 264.50 | 248.00 | 238.50 | 224.00 | 202.75 | 166.25 | 105.50 |
| | 3 | 794.75 | 355.00 | 336.50 | 322.75 | 302.25 | 275.75 | 227.00 | 145.00 |
| | 4 | 1,031.75 | 456.50 | 433.00 | 415.25 | 390.50 | 355.75 | 294.00 | 188.75 |
| 54.60 | 1 | 376.75 | 229.25 | 197.25 | 182.25 | 163.25 | 143.50 | 112.50 | 66.00 |
| | 2 | 574.50 | 357.75 | 306.50 | 283.50 | 254.75 | 224.50 | 176.50 | 103.25 |
| | 3 | 790.50 | 479.25 | 412.75 | 383.25 | 345.75 | 305.25 | 239.75 | 143.75 |
| | 4 | 1,025.75 | 614.75 | 529.00 | 491.75 | 443.25 | 393.50 | 308.75 | 187.00 |
| 61.60 | 1 | 380.75 | 228.25 | 199.00 | 184.75 | 166.50 | 147.50 | 116.25 | 59.25 |
| | 2 | 574.50 | 346.25 | 298.50 | 276.50 | 248.75 | 219.00 | 171.00 | 85.25 |
| | 3 | 787.25 | 468.25 | 404.25 | 374.00 | 335.25 | 295.25 | 232.00 | 115.25 |
| | 4 | 1,022.25 | 601.50 | 517.00 | 474.50 | 429.75 | 377.25 | 296.00 | 149.25 |
| 68.20 | 1 | 376.25 | 179.00 | 154.25 | 138.75 | 126.50 | 110.75 | 87.50 | 53.50 |
| | 2 | 566.75 | 279.75 | 242.50 | 220.25 | 198.75 | 174.50 | 137.50 | 84.75 |
| | 3 | 784.00 | 390.75 | 339.50 | 308.25 | 278.75 | 245.50 | 193.00 | 117.25 |
| | 4 | 1,024.50 | 520.25 | 450.75 | 414.75 | 370.00 | 328.50 | 259.50 | 158.25 |
| 76.20 | 1 | 375.00 | 219.00 | 199.25 | 188.50 | 170.50 | 152.00 | 115.50 | 67.00 |
| | 2 | 567.00 | 346.00 | 313.00 | 296.00 | 268.00 | 238.00 | 181.75 | 106.50 |
| | 3 | 781.75 | 472.50 | 428.75 | 405.50 | 366.00 | 326.75 | 250.00 | 146.75 |
| | 4 | 1,028.00 | 607.75 | 550.25 | 519.00 | 470.00 | 418.50 | 322.00 | 189.75 |

**Table A-33. FWD deflection measurements extracted for LTPP pavement section 6079 for FWD test date 6-Nov-91 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 375.00 | 114.50 | 104.75 | 100.25 | 92.50 | 83.00 | 67.75 | 43.75 |
| | 2 | 570.00 | 180.75 | 165.50 | 157.25 | 145.25 | 131.50 | 108.25 | 70.00 |
| | 3 | 787.25 | 250.75 | 231.00 | 219.50 | 202.75 | 184.25 | 150.25 | 97.25 |
| | 4 | 1,047.75 | 335.50 | 310.00 | 294.50 | 272.50 | 247.50 | 203.00 | 132.25 |
| 91.40 | 1 | 377.25 | 108.75 | 101.50 | 98.75 | 90.00 | 82.50 | 69.50 | 44.75 |
| | 2 | 569.50 | 170.25 | 160.25 | 154.50 | 142.00 | 130.00 | 109.50 | 71.00 |
| | 3 | 786.50 | 236.75 | 222.25 | 214.75 | 199.00 | 180.75 | 151.75 | 98.75 |
| | 4 | 1,038.00 | 314.25 | 296.00 | 284.00 | 264.75 | 242.50 | 201.00 | 131.75 |
| 99.10 | 1 | 374.00 | 114.00 | 107.25 | 103.00 | 95.50 | 86.50 | 71.00 | 45.75 |
| | 2 | 566.50 | 183.00 | 170.25 | 163.50 | 152.75 | 138.75 | 113.75 | 72.25 |
| | 3 | 784.00 | 255.75 | 239.00 | 229.00 | 214.00 | 195.25 | 160.00 | 102.25 |
| | 4 | 1,039.00 | 344.25 | 321.00 | 307.25 | 286.75 | 262.25 | 216.00 | 137.75 |
| 106.70 | 1 | 372.75 | 127.00 | 117.75 | 111.50 | 107.00 | 97.25 | 79.25 | 50.50 |
| | 2 | 566.75 | 198.50 | 185.00 | 176.75 | 167.50 | 153.75 | 127.00 | 81.25 |
| | 3 | 783.25 | 274.75 | 257.00 | 245.25 | 232.50 | 213.50 | 177.00 | 112.25 |
| | 4 | 1,041.25 | 365.00 | 342.00 | 325.75 | 310.75 | 285.25 | 236.25 | 149.25 |
| 114.30 | 1 | 373.25 | 230.50 | 202.75 | 189.75 | 170.50 | 151.25 | 117.25 | 69.25 |
| | 2 | 566.25 | 370.00 | 324.75 | 303.00 | 273.00 | 241.75 | 189.75 | 114.00 |
| | 3 | 781.75 | 503.75 | 444.00 | 413.75 | 374.25 | 331.00 | 258.75 | 152.50 |
| | 4 | 1,027.00 | 654.00 | 579.25 | 540.75 | 488.50 | 433.75 | 340.25 | 200.50 |
| 122.50 | 1 | 379.00 | 109.50 | 101.50 | 96.00 | 89.25 | 80.75 | 66.00 | 42.75 |
| | 2 | 571.25 | 172.50 | 159.75 | 153.00 | 141.00 | 128.75 | 105.75 | 69.50 |
| | 3 | 788.00 | 239.50 | 222.75 | 212.25 | 196.25 | 179.25 | 147.75 | 97.00 |
| | 4 | 1,042.50 | 318.00 | 296.25 | 281.75 | 262.50 | 238.00 | 197.00 | 128.50 |
| 129.50 | 1 | 380.75 | 101.25 | 96.25 | 89.25 | 82.75 | 77.25 | 60.75 | 39.25 |
| | 2 | 571.25 | 159.50 | 149.75 | 141.25 | 131.50 | 120.75 | 99.25 | 64.75 |
| | 3 | 786.75 | 218.00 | 206.25 | 194.00 | 180.50 | 166.00 | 135.50 | 87.00 |
| | 4 | 1,042.75 | 291.75 | 275.00 | 261.75 | 244.50 | 223.25 | 184.75 | 119.00 |
| 137.20 | 1 | 383.75 | 91.25 | 85.50 | 81.25 | 76.00 | 69.00 | 57.00 | 37.50 |
| | 2 | 575.00 | 145.50 | 134.00 | 127.50 | 118.50 | 108.00 | 90.00 | 60.75 |
| | 3 | 790.00 | 198.00 | 184.25 | 174.50 | 162.50 | 149.50 | 124.25 | 82.75 |
| | 4 | 1,040.25 | 262.75 | 244.50 | 232.25 | 216.50 | 197.75 | 164.75 | 110.00 |
| 145.40 | 1 | 379.75 | 90.00 | 85.25 | 78.25 | 72.75 | 67.50 | 55.50 | 36.25 |
| | 2 | 569.25 | 139.50 | 131.00 | 123.00 | 113.00 | 104.50 | 87.00 | 58.00 |
| | 3 | 784.75 | 193.75 | 181.00 | 169.75 | 157.75 | 144.75 | 120.75 | 80.00 |
| | 4 | 1,039.25 | 256.75 | 240.00 | 226.75 | 210.75 | 192.75 | 160.25 | 104.75 |
| 152.40 | 1 | 375.00 | 85.25 | 79.25 | 75.75 | 69.25 | 62.50 | 52.00 | 33.50 |
| | 2 | 568.25 | 133.00 | 123.25 | 117.25 | 109.00 | 98.25 | 81.00 | 53.25 |
| | 3 | 783.00 | 183.50 | 170.00 | 162.25 | 149.50 | 137.00 | 112.25 | 73.00 |
| | 4 | 1,042.25 | 243.00 | 225.75 | 214.25 | 199.50 | 180.25 | 148.50 | 97.25 |

**Table A-34. Average all point locations FWD deflection measurements extracted for LTPP pavement section 6079.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 382.21 | 143.13 | 129.87 | 122.00 | 112.32 | 100.90 | 81.12 | 49.02 |
| | 2 | 576.83 | 223.54 | 202.36 | 190.68 | 175.50 | 157.73 | 127.76 | 77.76 |
| | 3 | 792.10 | 305.11 | 277.25 | 261.32 | 240.80 | 217.08 | 175.98 | 106.80 |
| | 4 | 1,039.20 | 398.94 | 362.90 | 342.20 | 316.30 | 285.01 | 232.05 | 141.14 |

**Table A-35. FWD deflection measurements extracted for LTPP pavement section 9005 for FWD test date 13-Aug-09.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 377.00 | 151.25 | 109.75 | 81.00 | 59.50 | 47.25 | 28.75 | 18.00 | 11.75 |
| | 2 | 605.25 | 258.75 | 191.00 | 140.75 | 104.25 | 80.75 | 47.50 | 29.00 | 18.25 |
| | 3 | 812.25 | 368.50 | 272.00 | 202.00 | 151.00 | 116.75 | 68.25 | 41.00 | 24.75 |
| | 4 | 1,028.50 | 498.75 | 368.50 | 275.25 | 205.75 | 160.50 | 93.00 | 55.00 | 33.75 |
| 7.60 | 1 | 375.50 | 258.75 | 191.00 | 140.75 | 104.25 | 80.75 | 47.50 | 29.00 | 18.25 |
| | 2 | 597.75 | 368.50 | 272.00 | 202.00 | 151.00 | 116.75 | 68.25 | 41.00 | 24.75 |
| | 3 | 813.25 | 498.75 | 368.50 | 275.25 | 205.75 | 160.50 | 93.00 | 55.00 | 33.75 |
| | 4 | 1,027.75 | 137.00 | 93.50 | 66.25 | 46.50 | 38.00 | 21.25 | 15.00 | 10.75 |
| 15.20 | 1 | 373.75 | 136.50 | 92.00 | 63.25 | 43.75 | 34.00 | 19.75 | 12.75 | 8.00 |
| | 2 | 593.25 | 226.75 | 154.00 | 105.75 | 72.00 | 53.50 | 30.00 | 18.00 | 11.50 |
| | 3 | 810.25 | 325.00 | 221.00 | 151.50 | 103.00 | 76.00 | 42.00 | 24.25 | 15.00 |
| | 4 | 1,025.00 | 441.25 | 303.25 | 210.50 | 144.50 | 103.25 | 55.00 | 30.50 | 18.75 |
| 22.90 | 1 | 372.50 | 136.50 | 88.75 | 62.50 | 46.00 | 35.00 | 20.50 | 12.25 | 7.75 |
| | 2 | 595.75 | 228.00 | 150.50 | 105.50 | 77.25 | 56.25 | 33.00 | 20.50 | 13.00 |
| | 3 | 808.50 | 322.25 | 215.00 | 153.00 | 109.00 | 80.00 | 46.00 | 27.00 | 17.25 |
| | 4 | 1,026.00 | 434.00 | 294.75 | 212.25 | 153.25 | 111.00 | 61.00 | 35.00 | 22.25 |
| 30.50 | 1 | 367.50 | 154.75 | 104.25 | 68.75 | 49.75 | 35.75 | 21.00 | 12.25 | 10.00 |
| | 2 | 591.25 | 259.25 | 175.00 | 115.25 | 81.00 | 59.25 | 34.00 | 20.75 | 13.75 |
| | 3 | 804.50 | 362.25 | 246.50 | 166.00 | 115.00 | 84.00 | 47.00 | 28.00 | 18.00 |
| | 4 | 1,023.00 | 485.75 | 335.50 | 231.75 | 160.75 | 114.25 | 62.00 | 35.00 | 22.75 |
| 38.10 | 1 | 368.25 | 141.00 | 96.50 | 67.25 | 51.50 | 39.75 | 25.25 | 16.25 | 10.75 |
| | 2 | 595.25 | 246.00 | 167.25 | 119.75 | 88.50 | 67.00 | 42.00 | 26.75 | 16.75 |
| | 3 | 805.25 | 349.50 | 242.50 | 175.00 | 130.00 | 98.25 | 60.00 | 37.00 | 23.00 |
| | 4 | 1,020.00 | 472.75 | 331.25 | 241.75 | 180.50 | 137.50 | 81.75 | 49.75 | 30.25 |
| 45.70 | 1 | 368.50 | 131.00 | 87.25 | 58.50 | 42.00 | 32.25 | 19.00 | 10.00 | 8.75 |
| | 2 | 591.00 | 221.25 | 147.75 | 101.25 | 71.50 | 53.75 | 30.50 | 17.50 | 12.25 |
| | 3 | 811.50 | 316.25 | 212.25 | 146.75 | 103.50 | 77.00 | 43.25 | 23.75 | 15.50 |
| | 4 | 1,026.25 | 425.75 | 290.00 | 203.25 | 145.75 | 108.00 | 57.75 | 31.75 | 19.50 |
| 53.30 | 1 | 369.75 | 152.00 | 98.50 | 63.50 | 45.50 | 38.00 | 24.00 | 15.00 | 9.50 |
| | 2 | 592.75 | 259.50 | 168.75 | 113.50 | 80.50 | 63.25 | 39.00 | 24.00 | 14.50 |
| | 3 | 806.75 | 370.00 | 242.75 | 164.25 | 118.50 | 87.50 | 52.75 | 32.00 | 20.00 |
| | 4 | 1,020.25 | 496.50 | 330.75 | 227.50 | 164.50 | 123.50 | 72.75 | 44.00 | 27.00 |
| 61.00 | 1 | 370.25 | 158.00 | 111.75 | 75.25 | 55.50 | 40.25 | 27.00 | 21.50 | 12.75 |
| | 2 | 593.00 | 270.50 | 189.00 | 133.00 | 98.25 | 79.00 | 49.25 | 31.50 | 21.25 |
| | 3 | 807.25 | 385.75 | 272.00 | 192.75 | 142.75 | 112.75 | 71.25 | 46.50 | 31.00 |
| | 4 | 1,018.00 | 519.25 | 367.50 | 263.00 | 194.00 | 153.25 | 98.00 | 63.00 | 43.25 |
| 68.60 | 1 | 365.00 | 228.00 | 155.00 | 122.00 | 90.00 | 79.25 | 54.75 | 41.75 | 31.75 |
| | 2 | 584.75 | 381.25 | 269.00 | 198.00 | 156.75 | 130.00 | 94.50 | 68.25 | 52.50 |
| | 3 | 800.50 | 534.75 | 369.25 | 287.50 | 212.00 | 182.50 | 124.00 | 94.75 | 70.00 |
| | 4 | 1,013.75 | 706.00 | 497.00 | 377.50 | 284.75 | 238.75 | 167.25 | 124.50 | 95.25 |
| 76.20 | 1 | 370.25 | 181.50 | 140.25 | 115.00 | 95.75 | 80.75 | 59.00 | 43.00 | 31.75 |
| | 2 | 592.00 | 307.25 | 238.25 | 193.75 | 160.00 | 134.50 | 97.00 | 69.75 | 50.75 |
| | 3 | 793.75 | 440.25 | 340.00 | 275.75 | 225.50 | 188.75 | 135.50 | 97.50 | 71.50 |
| | 4 | 1,001.25 | 591.00 | 456.50 | 367.75 | 298.25 | 247.75 | 177.00 | 127.00 | 93.25 |

**Table A-35. FWD deflection measurements extracted for LTPP pavement section 9005 for FWD test date 13-Aug-09 (Cont.).**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), microns D6 | D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 83.80 | 1 | 366.25 | 215.50 | 167.00 | 141.00 | 117.25 | 98.00 | 68.75 | 48.50 | 34.25 |
| | 2 | 588.25 | 366.50 | 285.25 | 242.00 | 200.25 | 166.00 | 115.50 | 80.00 | 57.00 |
| | 3 | 801.50 | 518.75 | 406.50 | 345.75 | 285.00 | 236.00 | 163.25 | 113.25 | 80.00 |
| | 4 | 1,005.50 | 697.25 | 548.75 | 464.75 | 381.50 | 315.25 | 216.50 | 149.50 | 105.25 |
| 91.40 | 1 | 364.00 | 211.00 | 152.75 | 122.50 | 98.50 | 78.00 | 51.50 | 34.25 | 24.00 |
| | 2 | 586.50 | 360.00 | 259.75 | 209.75 | 167.75 | 132.75 | 86.25 | 58.00 | 40.00 |
| | 3 | 796.75 | 504.25 | 369.25 | 298.75 | 238.00 | 189.00 | 122.00 | 81.00 | 57.00 |
| | 4 | 1,002.50 | 673.50 | 495.25 | 401.25 | 318.50 | 252.50 | 162.25 | 107.00 | 75.00 |
| 99.10 | 1 | 364.50 | 220.00 | 163.75 | 133.75 | 108.25 | 97.00 | 63.50 | 42.50 | 34.75 |
| | 2 | 586.00 | 372.75 | 280.75 | 227.50 | 181.75 | 150.25 | 102.25 | 72.25 | 52.75 |
| | 3 | 799.75 | 530.00 | 399.50 | 323.50 | 257.50 | 210.25 | 143.75 | 101.00 | 74.25 |
| | 4 | 1,008.00 | 707.00 | 536.00 | 432.75 | 342.25 | 278.25 | 187.75 | 131.75 | 96.25 |
| 106.70 | 1 | 362.00 | 196.75 | 144.75 | 116.00 | 89.25 | 73.75 | 53.00 | 39.00 | 29.00 |
| | 2 | 583.75 | 331.00 | 244.50 | 194.00 | 151.25 | 123.75 | 87.25 | 64.00 | 48.25 |
| | 3 | 798.00 | 470.50 | 349.25 | 273.25 | 214.75 | 175.25 | 124.75 | 90.50 | 67.00 |
| | 4 | 1,006.25 | 632.50 | 470.75 | 367.25 | 287.75 | 233.25 | 164.00 | 118.50 | 88.50 |
| 114.30 | 1 | 362.25 | 241.75 | 174.50 | 139.25 | 101.00 | 91.50 | 61.75 | 44.00 | 35.25 |
| | 2 | 581.00 | 403.00 | 294.00 | 236.75 | 167.00 | 155.00 | 98.25 | 68.75 | 60.25 |
| | 3 | 795.00 | 564.00 | 416.25 | 329.50 | 243.75 | 212.75 | 141.25 | 101.75 | 79.25 |
| | 4 | 1,005.00 | 751.50 | 556.50 | 435.25 | 334.25 | 276.25 | 189.75 | 136.75 | 103.00 |
| 121.90 | 1 | 358.00 | 274.50 | 195.75 | 141.75 | 109.50 | 89.50 | 64.00 | 47.00 | 36.00 |
| | 2 | 574.50 | 458.25 | 325.25 | 239.00 | 182.00 | 147.75 | 104.25 | 76.00 | 57.50 |
| | 3 | 791.25 | 636.25 | 460.75 | 341.50 | 257.50 | 207.75 | 145.00 | 106.00 | 80.25 |
| | 4 | 1,003.75 | 843.00 | 616.00 | 458.00 | 343.00 | 274.50 | 189.25 | 136.25 | 104.75 |
| 129.50 | 1 | 349.75 | 304.75 | 214.50 | 153.50 | 110.25 | 93.50 | 62.25 | 49.00 | 38.50 |
| | 2 | 566.00 | 510.00 | 360.75 | 261.50 | 187.25 | 153.50 | 103.25 | 80.00 | 61.75 |
| | 3 | 779.75 | 714.00 | 508.50 | 369.75 | 268.25 | 213.50 | 148.00 | 110.75 | 85.25 |
| | 4 | 990.00 | 948.00 | 680.00 | 496.50 | 359.00 | 282.00 | 194.50 | 144.00 | 111.50 |
| 137.20 | 1 | 347.25 | 481.50 | 355.25 | 264.25 | 201.25 | 164.25 | 113.00 | 76.50 | 54.75 |
| | 2 | 559.25 | 786.50 | 583.50 | 444.50 | 339.00 | 274.25 | 185.75 | 126.00 | 91.50 |
| | 3 | 773.50 | 1,084.00 | 812.75 | 621.50 | 477.25 | 384.00 | 257.75 | 176.25 | 128.75 |
| | 4 | 980.50 | 1,407.00 | 1,066.50 | 817.00 | 629.75 | 504.50 | 335.00 | 230.00 | 168.25 |
| 144.80 | 1 | 361.00 | 269.00 | 222.00 | 181.25 | 147.75 | 118.75 | 77.50 | 51.25 | 37.25 |
| | 2 | 580.75 | 455.50 | 374.75 | 310.75 | 252.00 | 205.25 | 130.25 | 85.00 | 58.50 |
| | 3 | 800.50 | 650.75 | 536.00 | 445.25 | 359.75 | 293.50 | 185.00 | 120.50 | 82.00 |
| | 4 | 1,019.75 | 875.25 | 715.50 | 592.50 | 474.50 | 393.00 | 245.00 | 157.25 | 108.25 |
| 152.40 | 1 | 353.00 | 354.00 | 264.00 | 210.00 | 166.25 | 130.50 | 84.50 | 56.75 | 41.25 |
| | 2 | 572.25 | 603.00 | 449.25 | 360.50 | 283.75 | 222.25 | 139.75 | 93.25 | 66.75 |
| | 3 | 781.25 | 843.75 | 632.75 | 511.00 | 400.50 | 315.50 | 196.75 | 131.75 | 94.00 |
| | 4 | 984.75 | 1,122.00 | 846.75 | 685.25 | 535.75 | 422.25 | 260.00 | 172.25 | 123.75 |

**Table A-36. Average all point locations FWD deflection measurements extracted for LTPP pavement section 9005.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 365.06 | 213.15 | 153.89 | 116.50 | 89.29 | 73.10 | 48.57 | 33.64 | 24.69 |
| | 2 | 586.20 | 358.93 | 260.19 | 198.51 | 151.36 | 122.32 | 80.15 | 54.73 | 39.55 |
| | 3 | 799.57 | 505.82 | 369.19 | 282.79 | 215.54 | 172.64 | 112.67 | 76.76 | 54.85 |
| | 4 | 1,011.23 | 675.20 | 496.25 | 380.51 | 290.36 | 230.87 | 149.32 | 100.65 | 72.04 |

**Table A-37. FWD deflection measurements extracted for LTPP pavement section A502 for FWD test date 29-Apr-91.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 426.50 | 71.75 | 45.75 | 40.75 | 38.75 | 37.00 | 33.00 | 27.00 |
| | 2 | 595.00 | 101.00 | 65.25 | 59.25 | 57.50 | 54.75 | 48.25 | 38.50 |
| | 3 | 801.50 | 134.00 | 86.75 | 78.50 | 76.00 | 72.50 | 64.25 | 51.00 |
| | 4 | 1,035.50 | 169.50 | 109.75 | 99.75 | 95.75 | 91.25 | 80.00 | 63.75 |
| 15.20 | 1 | 427.25 | 101.00 | 65.25 | 59.25 | 57.50 | 54.75 | 48.25 | 38.50 |
| | 2 | 596.00 | 134.00 | 86.75 | 78.50 | 76.00 | 72.50 | 64.25 | 51.00 |
| | 3 | 796.75 | 169.50 | 109.75 | 99.75 | 95.75 | 91.25 | 80.00 | 63.75 |
| | 4 | 1,022.25 | 87.00 | 50.00 | 45.25 | 44.25 | 43.25 | 37.25 | 29.00 |
| 30.50 | 1 | 423.75 | 116.25 | 50.75 | 42.00 | 40.50 | 38.00 | 35.25 | 28.00 |
| | 2 | 591.25 | 154.00 | 71.00 | 60.00 | 57.75 | 55.00 | 49.50 | 39.00 |
| | 3 | 788.25 | 200.25 | 95.00 | 79.75 | 76.00 | 73.50 | 66.00 | 51.25 |
| | 4 | 1,008.50 | 253.25 | 119.25 | 101.25 | 96.25 | 92.00 | 81.50 | 63.50 |
| 45.70 | 1 | 426.00 | 104.25 | 64.50 | 54.75 | 50.75 | 45.75 | 39.25 | 29.75 |
| | 2 | 595.75 | 144.75 | 92.50 | 79.25 | 74.50 | 67.50 | 57.00 | 43.75 |
| | 3 | 791.75 | 194.00 | 121.75 | 105.00 | 98.25 | 89.25 | 75.25 | 55.75 |
| | 4 | 1,005.75 | 252.25 | 153.50 | 134.75 | 126.75 | 114.50 | 95.00 | 71.00 |
| 61.00 | 1 | 426.50 | 74.25 | 56.50 | 47.50 | 46.25 | 44.00 | 38.00 | 29.75 |
| | 2 | 594.50 | 106.75 | 80.00 | 67.00 | 66.00 | 63.50 | 55.00 | 42.50 |
| | 3 | 796.25 | 143.75 | 106.50 | 90.00 | 89.00 | 84.25 | 72.50 | 56.00 |
| | 4 | 1,029.75 | 185.75 | 134.25 | 114.00 | 112.50 | 107.00 | 92.00 | 69.75 |
| 76.20 | 1 | 417.50 | 102.75 | 67.75 | 58.75 | 53.25 | 50.50 | 40.50 | 30.25 |
| | 2 | 585.25 | 144.50 | 97.25 | 84.50 | 77.25 | 70.25 | 58.50 | 42.75 |
| | 3 | 790.25 | 192.50 | 129.25 | 112.25 | 102.25 | 94.00 | 78.00 | 56.00 |
| | 4 | 1,026.00 | 250.75 | 165.50 | 144.25 | 131.25 | 121.75 | 99.75 | 71.00 |
| 91.40 | 1 | 424.00 | 73.25 | 55.50 | 48.50 | 45.25 | 43.00 | 38.00 | 30.25 |
| | 2 | 592.25 | 108.00 | 78.50 | 68.00 | 64.00 | 61.25 | 54.75 | 43.00 |
| | 3 | 795.25 | 139.00 | 102.75 | 90.25 | 84.25 | 79.75 | 71.25 | 55.25 |
| | 4 | 1,036.00 | 178.25 | 131.50 | 115.25 | 108.00 | 102.25 | 91.00 | 70.25 |
| 121.90 | 1 | 406.00 | 161.25 | 75.75 | 56.00 | 50.25 | 48.25 | 42.75 | 32.25 |
| | 2 | 569.50 | 213.50 | 105.25 | 79.00 | 71.75 | 67.50 | 60.50 | 46.00 |
| | 3 | 784.25 | 278.75 | 138.00 | 104.75 | 95.00 | 89.75 | 80.25 | 60.00 |
| | 4 | 1,035.75 | 350.50 | 175.25 | 133.00 | 121.25 | 115.00 | 102.25 | 76.25 |
| 137.20 | 1 | 419.00 | 126.75 | 70.50 | 53.50 | 47.50 | 45.75 | 41.75 | 32.50 |
| | 2 | 587.25 | 174.25 | 99.00 | 76.25 | 68.00 | 65.75 | 59.25 | 46.50 |
| | 3 | 789.50 | 228.00 | 129.00 | 100.75 | 90.75 | 86.75 | 78.25 | 60.25 |
| | 4 | 1,017.25 | 290.50 | 161.75 | 126.00 | 114.25 | 111.00 | 99.75 | 78.50 |
| 152.40 | 1 | 412.75 | 163.00 | 77.50 | 62.25 | 60.25 | 57.25 | 47.75 | 34.75 |
| | 2 | 582.25 | 224.75 | 111.00 | 90.50 | 86.25 | 81.25 | 69.00 | 51.50 |
| | 3 | 785.75 | 296.00 | 147.00 | 120.50 | 114.25 | 107.50 | 91.00 | 66.50 |
| | 4 | 1,007.75 | 378.75 | 188.75 | 155.00 | 146.50 | 138.75 | 115.50 | 84.25 |

**Table A-38. Average all point locations FWD deflection measurements extracted for LTPP pavement section A502.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 420.93 | 108.05 | 61.45 | 50.93 | 47.70 | 45.28 | 39.35 | 30.35 |
| | 2 | 588.90 | 149.18 | 86.85 | 72.60 | 68.48 | 64.73 | 56.33 | 43.33 |
| | 3 | 791.95 | 196.43 | 114.98 | 96.55 | 90.68 | 85.60 | 74.53 | 56.48 |
| | 4 | 1,022.45 | 251.18 | 145.73 | 123.00 | 115.68 | 109.48 | 94.40 | 71.53 |

**Table A-39. FWD deflection measurements extracted for LTPP pavement section A504 for FWD test date 25-Apr-02.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 395.75 | 101.75 | 57.00 | 47.25 | 42.25 | 39.00 | 34.25 | 29.75 | 26.25 |
| | 2 | 578.00 | 144.75 | 82.50 | 68.50 | 61.25 | 56.75 | 50.00 | 43.00 | 37.50 |
| | 3 | 793.75 | 189.50 | 107.50 | 89.25 | 79.75 | 73.50 | 64.75 | 56.00 | 48.25 |
| | 4 | 1,056.75 | 239.50 | 136.00 | 113.00 | 100.50 | 93.00 | 81.75 | 70.75 | 60.75 |
| 15.20 | 1 | 405.00 | 144.75 | 82.50 | 68.50 | 61.25 | 56.75 | 50.00 | 43.00 | 37.50 |
| | 2 | 588.25 | 189.50 | 107.50 | 89.25 | 79.75 | 73.50 | 64.75 | 56.00 | 48.25 |
| | 3 | 798.50 | 239.50 | 136.00 | 113.00 | 100.50 | 93.00 | 81.75 | 70.75 | 60.75 |
| | 4 | 1,056.00 | 93.00 | 64.50 | 55.75 | 49.50 | 44.00 | 37.75 | 32.75 | 28.00 |
| 30.50 | 1 | 397.25 | 144.00 | 94.50 | 75.25 | 59.00 | 49.25 | 39.75 | 33.25 | 28.50 |
| | 2 | 581.00 | 207.00 | 137.50 | 110.50 | 86.25 | 72.50 | 58.25 | 49.25 | 41.75 |
| | 3 | 796.75 | 273.00 | 182.25 | 146.75 | 114.75 | 96.50 | 77.75 | 65.00 | 54.75 |
| | 4 | 1,053.50 | 349.50 | 232.25 | 187.50 | 146.75 | 124.00 | 98.75 | 82.75 | 69.50 |
| 45.70 | 1 | 399.50 | 161.50 | 127.25 | 109.25 | 85.50 | 68.25 | 49.25 | 38.50 | 31.25 |
| | 2 | 584.25 | 235.75 | 186.00 | 159.50 | 124.75 | 100.50 | 73.00 | 56.75 | 46.00 |
| | 3 | 795.75 | 312.25 | 245.75 | 211.00 | 165.75 | 133.50 | 97.00 | 76.00 | 61.25 |
| | 4 | 1,038.50 | 398.25 | 311.25 | 266.75 | 210.00 | 169.25 | 123.00 | 96.25 | 77.00 |
| 61.00 | 1 | 401.25 | 129.75 | 87.50 | 68.75 | 56.75 | 48.00 | 39.75 | 33.75 | 28.75 |
| | 2 | 583.00 | 185.75 | 124.25 | 99.00 | 81.50 | 69.75 | 57.00 | 49.00 | 41.25 |
| | 3 | 796.50 | 243.00 | 163.50 | 130.50 | 107.50 | 92.50 | 76.25 | 64.50 | 54.25 |
| | 4 | 1,055.50 | 309.00 | 206.50 | 165.50 | 136.50 | 117.75 | 96.75 | 81.75 | 68.25 |
| 76.20 | 1 | 403.00 | 97.50 | 62.75 | 52.75 | 47.75 | 43.25 | 36.75 | 31.25 | 27.25 |
| | 2 | 586.25 | 140.75 | 90.50 | 76.75 | 69.00 | 63.00 | 53.25 | 45.50 | 38.75 |
| | 3 | 797.25 | 186.25 | 118.75 | 101.50 | 91.00 | 82.75 | 70.00 | 60.00 | 50.75 |
| | 4 | 1,055.50 | 237.25 | 149.75 | 128.00 | 115.00 | 104.75 | 88.25 | 74.75 | 62.75 |
| 91.40 | 1 | 394.75 | 114.00 | 65.50 | 56.00 | 50.75 | 45.75 | 39.25 | 33.25 | 28.75 |
| | 2 | 575.50 | 158.25 | 94.50 | 81.00 | 73.25 | 66.50 | 56.75 | 48.25 | 41.25 |
| | 3 | 791.25 | 210.00 | 124.75 | 107.75 | 97.75 | 88.00 | 74.50 | 63.75 | 53.75 |
| | 4 | 1,059.25 | 260.00 | 158.75 | 137.25 | 123.75 | 111.75 | 94.75 | 80.00 | 67.75 |
| 106.70 | 1 | 397.75 | 98.00 | 65.75 | 56.25 | 51.00 | 46.50 | 39.75 | 34.50 | 29.75 |
| | 2 | 579.25 | 142.75 | 94.75 | 81.75 | 73.75 | 67.75 | 57.75 | 50.00 | 42.75 |
| | 3 | 795.50 | 189.00 | 126.00 | 108.00 | 97.25 | 89.25 | 77.00 | 66.25 | 56.25 |
| | 4 | 1,057.50 | 242.50 | 159.50 | 135.75 | 122.75 | 112.75 | 96.50 | 82.75 | 69.75 |
| 121.90 | 1 | 397.25 | 113.50 | 68.00 | 58.00 | 52.50 | 48.00 | 41.00 | 35.75 | 31.00 |
| | 2 | 579.00 | 160.50 | 97.00 | 84.00 | 76.00 | 69.00 | 59.50 | 51.50 | 44.00 |
| | 3 | 793.75 | 210.50 | 129.00 | 113.00 | 101.00 | 92.50 | 79.75 | 68.75 | 58.75 |
| | 4 | 1,057.50 | 263.50 | 162.50 | 142.00 | 127.00 | 116.00 | 99.50 | 85.00 | 72.50 |
| 137.20 | 1 | 394.75 | 90.25 | 62.25 | 56.00 | 51.00 | 46.00 | 40.25 | 35.00 | 30.25 |
| | 2 | 573.75 | 128.75 | 89.00 | 80.50 | 72.75 | 66.25 | 57.75 | 49.50 | 42.50 |
| | 3 | 791.25 | 173.25 | 117.75 | 106.25 | 95.75 | 88.00 | 76.25 | 65.50 | 57.00 |
| | 4 | 1,059.50 | 217.75 | 149.50 | 134.25 | 120.75 | 110.75 | 96.00 | 82.25 | 71.25 |
| 152.40 | 1 | 392.50 | 92.25 | 57.50 | 50.25 | 45.50 | 41.25 | 36.25 | 32.00 | 28.25 |
| | 2 | 571.25 | 133.00 | 83.75 | 72.50 | 65.50 | 60.00 | 52.50 | 46.25 | 40.50 |
| | 3 | 790.00 | 175.50 | 110.50 | 95.25 | 86.00 | 78.75 | 68.50 | 60.00 | 52.00 |
| | 4 | 1,061.00 | 225.00 | 140.75 | 121.50 | 109.00 | 99.75 | 86.75 | 75.75 | 65.75 |

**Table A-40. Average all point locations FWD deflection measurements extracted for LTPP pavement section A504.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 398.07 | 112.32 | 73.86 | 62.32 | 53.77 | 47.20 | 39.45 | 33.61 | 28.91 |
| | 2 | 579.95 | 161.02 | 106.61 | 90.45 | 77.73 | 68.73 | 57.32 | 48.75 | 41.55 |
| | 3 | 794.57 | 212.91 | 140.73 | 119.61 | 102.68 | 90.84 | 75.80 | 64.34 | 54.55 |
| | 4 | 1,055.50 | 270.07 | 178.30 | 151.48 | 129.98 | 115.11 | 95.75 | 80.93 | 68.36 |

**Table A-41. FWD deflection measurements extracted for LTPP pavement section A505 for FWD test date 15-Jul-93.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 402.75 | 89.50 | 64.75 | 57.00 | 49.75 | 44.75 | 36.25 | 24.50 |
| | 2 | 591.00 | 127.00 | 94.75 | 83.50 | 73.00 | 65.25 | 53.25 | 36.00 |
| | 3 | 790.00 | 167.50 | 123.25 | 109.75 | 95.75 | 85.75 | 68.75 | 46.25 |
| | 4 | 1,036.25 | 213.00 | 157.75 | 139.50 | 122.75 | 109.75 | 89.75 | 58.75 |
| 15.20 | 1 | 399.75 | 127.00 | 94.75 | 83.50 | 73.00 | 65.25 | 53.25 | 36.00 |
| | 2 | 590.75 | 167.50 | 123.25 | 109.75 | 95.75 | 85.75 | 68.75 | 46.25 |
| | 3 | 788.75 | 213.00 | 157.75 | 139.50 | 122.75 | 109.75 | 89.75 | 58.75 |
| | 4 | 1,043.50 | 75.25 | 51.75 | 43.75 | 38.75 | 36.00 | 30.75 | 23.50 |
| 30.50 | 1 | 399.00 | 71.50 | 47.00 | 41.50 | 37.00 | 34.50 | 29.25 | 21.75 |
| | 2 | 589.75 | 102.75 | 70.00 | 62.75 | 55.50 | 51.50 | 44.25 | 33.25 |
| | 3 | 789.25 | 134.75 | 90.50 | 80.25 | 72.25 | 66.50 | 56.75 | 41.75 |
| | 4 | 1,043.00 | 171.25 | 116.25 | 103.50 | 92.25 | 84.75 | 73.25 | 53.50 |
| 45.70 | 1 | 399.00 | 126.75 | 69.25 | 50.75 | 39.50 | 36.00 | 31.00 | 24.00 |
| | 2 | 592.00 | 184.75 | 100.50 | 74.50 | 58.75 | 53.50 | 46.75 | 35.00 |
| | 3 | 793.75 | 238.50 | 130.50 | 95.75 | 75.75 | 68.50 | 61.50 | 44.75 |
| | 4 | 1,045.75 | 303.00 | 165.75 | 121.50 | 96.75 | 88.00 | 77.00 | 56.00 |
| 61.00 | 1 | 402.75 | 74.25 | 55.00 | 47.75 | 40.75 | 37.75 | 33.50 | 24.75 |
| | 2 | 593.50 | 110.00 | 81.75 | 69.75 | 61.50 | 56.25 | 49.25 | 37.00 |
| | 3 | 795.50 | 147.00 | 106.75 | 92.00 | 81.00 | 74.75 | 65.50 | 48.75 |
| | 4 | 1,042.00 | 189.00 | 136.75 | 118.50 | 103.00 | 95.50 | 83.75 | 62.00 |
| 76.20 | 1 | 403.00 | 161.50 | 97.50 | 75.00 | 59.00 | 52.25 | 45.00 | 32.00 |
| | 2 | 594.50 | 229.25 | 144.00 | 110.50 | 89.25 | 79.75 | 68.00 | 45.25 |
| | 3 | 794.75 | 294.75 | 183.50 | 142.75 | 114.75 | 102.50 | 87.50 | 58.25 |
| | 4 | 1,041.00 | 373.50 | 234.50 | 182.75 | 148.75 | 132.50 | 113.00 | 74.75 |
| 91.40 | 1 | 403.25 | 86.25 | 68.00 | 61.00 | 54.50 | 52.50 | 45.25 | 33.50 |
| | 2 | 593.50 | 124.75 | 98.50 | 89.00 | 80.50 | 75.50 | 65.50 | 47.75 |
| | 3 | 795.25 | 164.00 | 128.75 | 116.25 | 105.75 | 99.00 | 85.75 | 62.25 |
| | 4 | 1,043.25 | 209.75 | 163.50 | 148.00 | 134.50 | 126.75 | 110.00 | 79.00 |
| 106.70 | 1 | 404.75 | 76.50 | 62.00 | 57.50 | 52.75 | 49.75 | 44.25 | 33.25 |
| | 2 | 597.25 | 111.50 | 91.75 | 84.50 | 78.00 | 73.75 | 65.00 | 48.50 |
| | 3 | 799.25 | 145.75 | 118.00 | 109.75 | 100.75 | 94.75 | 83.75 | 62.75 |
| | 4 | 1,051.50 | 185.25 | 149.00 | 138.50 | 129.50 | 121.00 | 106.00 | 79.25 |
| 121.90 | 1 | 401.00 | 76.50 | 62.00 | 57.00 | 53.00 | 49.00 | 44.00 | 33.00 |
| | 2 | 591.00 | 111.75 | 90.75 | 83.75 | 77.75 | 73.25 | 65.00 | 48.25 |
| | 3 | 794.50 | 146.25 | 117.75 | 108.00 | 100.00 | 93.75 | 83.75 | 61.00 |
| | 4 | 1,043.25 | 185.50 | 149.00 | 137.50 | 126.75 | 119.75 | 105.75 | 77.75 |
| 137.20 | 1 | 401.75 | 80.00 | 61.00 | 57.00 | 53.00 | 50.00 | 45.75 | 36.00 |
| | 2 | 595.50 | 118.25 | 90.25 | 83.75 | 78.25 | 75.00 | 67.25 | 52.25 |
| | 3 | 796.50 | 154.75 | 117.25 | 109.00 | 102.00 | 97.00 | 86.75 | 67.50 |
| | 4 | 1,045.00 | 199.75 | 149.25 | 139.25 | 131.00 | 124.25 | 111.50 | 86.75 |
| 152.40 | 1 | 403.75 | 85.25 | 68.00 | 64.00 | 59.25 | 56.00 | 49.00 | 38.00 |
| | 2 | 593.25 | 127.00 | 100.25 | 94.00 | 88.00 | 83.00 | 73.25 | 56.00 |
| | 3 | 794.25 | 165.25 | 130.00 | 121.25 | 113.00 | 107.50 | 94.00 | 72.25 |
| | 4 | 1,041.75 | 212.75 | 164.25 | 154.00 | 144.50 | 136.50 | 120.00 | 90.50 |

**Table A-42. Average all point locations FWD deflection measurements extracted for LTPP pavement section A505.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 401.89 | 91.20 | 64.20 | 55.66 | 48.84 | 45.32 | 39.45 | 29.48 |
| | 2 | 592.91 | 132.34 | 94.39 | 81.95 | 72.52 | 67.25 | 58.48 | 43.05 |
| | 3 | 793.80 | 172.64 | 122.18 | 106.30 | 94.07 | 87.07 | 75.70 | 55.41 |
| | 4 | 1,043.30 | 220.16 | 155.52 | 135.52 | 120.41 | 111.41 | 96.86 | 70.43 |

**Table A-43. FWD deflection measurements extracted for LTPP pavement section A507 for FWD test date 1-May-91.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 452.50 | 63.00 | 51.50 | 49.25 | 46.00 | 43.00 | 35.00 | 27.50 |
| | 2 | 616.25 | 85.00 | 71.75 | 68.00 | 64.00 | 62.25 | 48.75 | 38.00 |
| | 3 | 824.00 | 114.75 | 97.00 | 91.00 | 85.00 | 81.00 | 65.50 | 50.50 |
| | 4 | 1,049.75 | 144.75 | 123.75 | 115.50 | 108.00 | 101.00 | 84.00 | 64.50 |
| 15.20 | 1 | 440.25 | 85.00 | 71.75 | 68.00 | 64.00 | 62.25 | 48.75 | 38.00 |
| | 2 | 602.75 | 114.75 | 97.00 | 91.00 | 85.00 | 81.00 | 65.50 | 50.50 |
| | 3 | 805.75 | 144.75 | 123.75 | 115.50 | 108.00 | 101.00 | 84.00 | 64.50 |
| | 4 | 1,039.75 | 55.25 | 45.50 | 41.25 | 38.00 | 36.25 | 33.25 | 26.75 |
| 30.50 | 1 | 441.75 | 78.00 | 55.00 | 48.25 | 43.50 | 41.50 | 37.00 | 28.75 |
| | 2 | 602.25 | 106.00 | 75.75 | 63.50 | 61.25 | 57.25 | 50.50 | 39.00 |
| | 3 | 800.00 | 142.75 | 99.75 | 86.25 | 80.75 | 76.50 | 68.75 | 52.75 |
| | 4 | 1,040.00 | 180.25 | 126.75 | 109.50 | 103.75 | 98.25 | 87.00 | 66.50 |
| 45.70 | 1 | 437.75 | 64.00 | 54.75 | 50.25 | 46.25 | 43.25 | 36.25 | 28.75 |
| | 2 | 601.75 | 86.75 | 76.75 | 70.50 | 63.75 | 60.00 | 50.75 | 39.00 |
| | 3 | 803.50 | 118.50 | 102.00 | 93.50 | 85.50 | 80.00 | 68.00 | 52.00 |
| | 4 | 1,028.25 | 150.50 | 129.25 | 119.00 | 108.75 | 103.75 | 85.25 | 71.25 |
| 61.00 | 1 | 430.25 | 75.25 | 64.50 | 60.00 | 57.00 | 51.00 | 42.00 | 29.75 |
| | 2 | 593.25 | 102.00 | 87.50 | 82.50 | 78.50 | 69.50 | 56.50 | 40.25 |
| | 3 | 795.00 | 135.75 | 119.00 | 111.00 | 105.50 | 93.00 | 76.25 | 53.50 |
| | 4 | 1,018.25 | 175.25 | 151.25 | 141.75 | 135.00 | 120.00 | 95.75 | 67.75 |
| 76.20 | 1 | 429.00 | 103.00 | 81.00 | 72.00 | 64.50 | 59.50 | 47.75 | 33.25 |
| | 2 | 593.25 | 137.75 | 111.50 | 99.00 | 89.50 | 81.75 | 66.00 | 45.75 |
| | 3 | 790.00 | 186.50 | 148.75 | 132.00 | 120.50 | 110.75 | 88.75 | 62.00 |
| | 4 | 1,005.00 | 239.00 | 191.00 | 169.00 | 153.50 | 142.50 | 113.00 | 78.25 |
| 91.40 | 1 | 426.25 | 89.25 | 58.75 | 54.75 | 51.00 | 48.00 | 39.25 | 30.75 |
| | 2 | 587.50 | 116.75 | 80.50 | 74.50 | 68.75 | 64.25 | 55.50 | 39.00 |
| | 3 | 792.25 | 157.25 | 108.50 | 100.50 | 93.00 | 87.00 | 73.25 | 54.00 |
| | 4 | 1,017.00 | 198.75 | 137.00 | 128.00 | 118.00 | 110.75 | 93.00 | 71.00 |
| 106.70 | 1 | 427.00 | 151.50 | 121.50 | 100.75 | 83.75 | 71.75 | 51.00 | 36.25 |
| | 2 | 587.25 | 206.75 | 166.50 | 139.25 | 116.00 | 98.50 | 71.75 | 49.00 |
| | 3 | 792.50 | 277.75 | 224.25 | 187.75 | 156.25 | 131.75 | 96.75 | 66.25 |
| | 4 | 1,007.75 | 353.25 | 285.75 | 239.25 | 200.75 | 170.50 | 125.75 | 86.75 |
| 121.90 | 1 | 422.75 | 187.75 | 126.25 | 95.25 | 76.00 | 64.75 | 47.75 | 36.75 |
| | 2 | 586.50 | 253.25 | 173.25 | 132.50 | 105.75 | 87.50 | 68.25 | 47.75 |
| | 3 | 786.75 | 337.75 | 228.50 | 175.75 | 140.25 | 119.00 | 91.50 | 64.25 |
| | 4 | 998.50 | 428.50 | 290.50 | 224.00 | 178.50 | 157.00 | 115.50 | 90.00 |
| 137.20 | 1 | 412.00 | 257.50 | 166.50 | 130.75 | 107.50 | 90.50 | 68.50 | 39.75 |
| | 2 | 570.50 | 343.50 | 226.25 | 177.75 | 146.75 | 125.50 | 93.50 | 56.00 |
| | 3 | 784.00 | 447.50 | 298.25 | 236.25 | 195.75 | 167.75 | 125.75 | 76.00 |
| | 4 | 1,017.25 | 556.25 | 374.50 | 298.00 | 248.50 | 212.50 | 158.75 | 95.75 |
| 152.40 | 1 | 422.50 | 151.25 | 92.75 | 73.25 | 62.25 | 54.00 | 43.00 | 30.25 |
| | 2 | 579.25 | 197.00 | 125.25 | 100.25 | 83.00 | 73.00 | 58.00 | 39.75 |
| | 3 | 791.25 | 255.50 | 164.50 | 131.25 | 111.50 | 97.50 | 78.00 | 54.25 |
| | 4 | 1,023.75 | 320.50 | 207.75 | 166.00 | 141.75 | 123.75 | 98.25 | 67.25 |

**Table A-44. Average all point locations FWD deflection measurements extracted for LTPP pavement section A507.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 431.09 | 115.98 | 83.45 | 70.52 | 61.43 | 54.86 | 43.70 | 31.68 |
| | 2 | 592.77 | 155.45 | 114.32 | 96.82 | 84.57 | 75.48 | 60.48 | 42.70 |
| | 3 | 796.82 | 206.84 | 152.14 | 129.27 | 113.23 | 101.05 | 81.25 | 57.68 |
| | 4 | 1,022.30 | 261.61 | 193.05 | 164.30 | 144.32 | 129.64 | 103.14 | 74.66 |

**Table A-45. FWD deflection measurements extracted for LTPP pavement section A508 for FWD test date 30-Apr-91.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 441.75 | 90.25 | 83.25 | 75.00 | 67.75 | 57.75 | 47.75 | 33.25 |
| | 2 | 603.00 | 127.25 | 113.75 | 103.50 | 92.75 | 80.00 | 65.00 | 46.50 |
| | 3 | 792.00 | 170.25 | 150.00 | 136.50 | 122.75 | 106.00 | 84.75 | 60.75 |
| | 4 | 1,060.00 | 210.50 | 191.25 | 172.75 | 156.50 | 134.50 | 109.00 | 76.00 |
| 15.20 | 1 | 439.75 | 127.25 | 113.75 | 103.50 | 92.75 | 80.00 | 65.00 | 46.50 |
| | 2 | 607.00 | 170.25 | 150.00 | 136.50 | 122.75 | 106.00 | 84.75 | 60.75 |
| | 3 | 804.25 | 210.50 | 191.25 | 172.75 | 156.50 | 134.50 | 109.00 | 76.00 |
| | 4 | 1,019.00 | 121.25 | 101.00 | 86.00 | 76.00 | 66.75 | 55.50 | 37.50 |
| 30.50 | 1 | 441.00 | 98.00 | 80.25 | 73.25 | 65.25 | 58.00 | 49.50 | 35.75 |
| | 2 | 604.00 | 133.50 | 111.50 | 101.00 | 91.50 | 79.50 | 69.75 | 50.25 |
| | 3 | 799.50 | 176.00 | 146.50 | 132.75 | 120.00 | 105.25 | 91.50 | 65.00 |
| | 4 | 1,023.00 | 224.50 | 184.75 | 167.75 | 152.75 | 133.00 | 118.75 | 83.50 |
| 46.30 | 1 | 430.50 | 71.25 | 60.25 | 53.25 | 48.50 | 45.25 | 37.25 | 28.00 |
| | 2 | 595.75 | 100.25 | 83.00 | 76.50 | 68.75 | 63.75 | 54.75 | 40.50 |
| | 3 | 801.50 | 132.00 | 110.75 | 100.50 | 92.25 | 85.50 | 72.00 | 53.50 |
| | 4 | 1,023.75 | 167.50 | 138.25 | 127.00 | 116.00 | 107.50 | 90.00 | 65.50 |
| 61.00 | 1 | 428.50 | 97.25 | 75.50 | 66.50 | 59.50 | 53.25 | 43.75 | 30.75 |
| | 2 | 593.25 | 133.50 | 104.50 | 93.25 | 82.00 | 73.25 | 60.00 | 42.00 |
| | 3 | 796.75 | 177.25 | 139.75 | 124.25 | 110.00 | 99.25 | 81.50 | 57.50 |
| | 4 | 1,014.50 | 224.50 | 178.00 | 159.50 | 141.25 | 126.50 | 104.50 | 74.00 |
| 76.20 | 1 | 426.00 | 93.75 | 86.25 | 79.75 | 71.75 | 64.50 | 54.25 | 37.00 |
| | 2 | 592.75 | 131.75 | 120.00 | 111.50 | 100.25 | 90.00 | 75.50 | 52.50 |
| | 3 | 796.25 | 176.75 | 161.00 | 148.00 | 135.50 | 121.00 | 100.25 | 70.00 |
| | 4 | 1,014.25 | 222.50 | 206.00 | 190.25 | 172.25 | 154.75 | 127.75 | 88.00 |
| 91.40 | 1 | 427.75 | 83.75 | 75.75 | 67.75 | 62.00 | 56.25 | 47.00 | 33.75 |
| | 2 | 592.25 | 118.50 | 106.00 | 96.00 | 87.50 | 79.00 | 66.25 | 47.25 |
| | 3 | 796.50 | 159.50 | 144.75 | 131.25 | 118.25 | 107.75 | 89.50 | 63.50 |
| | 4 | 1,016.75 | 203.25 | 184.75 | 168.00 | 151.00 | 136.25 | 113.25 | 78.75 |
| 106.70 | 1 | 417.50 | 151.25 | 115.25 | 95.00 | 75.50 | 63.75 | 49.25 | 32.50 |
| | 2 | 581.00 | 207.00 | 157.75 | 132.00 | 105.50 | 89.25 | 69.00 | 46.50 |
| | 3 | 784.75 | 277.50 | 211.25 | 178.00 | 143.25 | 121.75 | 94.25 | 63.00 |
| | 4 | 994.50 | 353.75 | 258.75 | 220.75 | 179.00 | 154.50 | 118.75 | 80.25 |
| 121.90 | 1 | 427.50 | 114.25 | 98.25 | 89.25 | 80.00 | 72.00 | 58.00 | 39.00 |
| | 2 | 588.00 | 157.50 | 136.00 | 125.00 | 112.00 | 100.50 | 80.75 | 53.75 |
| | 3 | 790.50 | 210.00 | 183.25 | 166.75 | 151.00 | 134.75 | 108.00 | 72.00 |
| | 4 | 1,004.00 | 266.25 | 232.50 | 213.75 | 191.25 | 171.25 | 138.50 | 89.00 |
| 137.20 | 1 | 419.00 | 137.25 | 120.00 | 110.25 | 97.25 | 86.00 | 69.25 | 45.50 |
| | 2 | 579.75 | 188.75 | 167.25 | 151.75 | 134.50 | 117.50 | 96.75 | 64.50 |
| | 3 | 789.75 | 256.50 | 225.25 | 204.50 | 181.00 | 158.75 | 129.25 | 84.50 |
| | 4 | 1,015.25 | 325.25 | 286.00 | 261.00 | 231.00 | 202.25 | 164.50 | 107.50 |
| 152.40 | 1 | 423.25 | 104.25 | 89.00 | 79.00 | 72.00 | 64.50 | 53.50 | 36.25 |
| | 2 | 587.25 | 146.75 | 125.50 | 111.50 | 100.75 | 90.75 | 75.50 | 52.75 |
| | 3 | 791.00 | 197.50 | 166.75 | 148.75 | 136.25 | 122.25 | 100.75 | 69.00 |
| | 4 | 1,009.50 | 253.50 | 213.50 | 190.25 | 174.75 | 155.75 | 127.00 | 86.25 |

**Table A-46. Average all point locations FWD deflection measurements extracted for LTPP pavement section A508.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 429.32 | 105.68 | 89.52 | 79.55 | 70.50 | 62.55 | 51.36 | 35.39 |
| | 2 | 593.09 | 146.52 | 124.02 | 110.93 | 98.18 | 86.93 | 71.82 | 49.95 |
| | 3 | 794.80 | 195.98 | 165.64 | 148.02 | 131.66 | 116.89 | 95.68 | 66.18 |
| | 4 | 1,017.68 | 248.55 | 209.66 | 188.25 | 167.41 | 148.48 | 121.91 | 83.34 |

**Table A-47. FWD deflection measurements extracted for LTPP pavement section B310 for FWD test date 24-Apr-02.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 408.25 | 123.75 | 67.75 | 57.50 | 51.00 | 46.25 | 40.00 | 34.75 |
| | 2 | 589.50 | 174.25 | 97.75 | 82.75 | 73.00 | 67.50 | 58.50 | 50.25 |
| | 3 | 799.00 | 229.25 | 128.50 | 109.75 | 96.25 | 88.50 | 76.75 | 65.00 |
| | 4 | 1,033.75 | 290.25 | 162.75 | 138.75 | 121.75 | 111.00 | 96.50 | 82.25 |
| 30.50 | 1 | 410.75 | 174.25 | 97.75 | 82.75 | 73.00 | 67.50 | 58.50 | 50.25 |
| | 2 | 597.25 | 229.25 | 128.50 | 109.75 | 96.25 | 88.50 | 76.75 | 65.00 |
| | 3 | 794.00 | 290.25 | 162.75 | 138.75 | 121.75 | 111.00 | 96.50 | 82.25 |
| | 4 | 1,016.75 | 105.75 | 64.50 | 50.50 | 42.75 | 38.00 | 32.25 | 28.50 |
| 61.00 | 1 | 408.00 | 109.50 | 67.50 | 54.00 | 48.00 | 44.25 | 37.50 | 32.75 |
| | 2 | 595.50 | 154.75 | 97.50 | 78.50 | 69.25 | 65.25 | 54.25 | 46.75 |
| | 3 | 793.75 | 205.00 | 127.25 | 103.25 | 91.00 | 85.75 | 71.25 | 61.00 |
| | 4 | 1,016.75 | 260.00 | 163.25 | 131.75 | 116.25 | 109.50 | 90.50 | 77.25 |
| 91.40 | 1 | 407.50 | 122.25 | 69.00 | 60.50 | 54.25 | 50.00 | 43.00 | 36.25 |
| | 2 | 592.50 | 167.75 | 98.25 | 86.50 | 77.50 | 71.00 | 61.00 | 51.50 |
| | 3 | 798.50 | 221.75 | 130.00 | 114.75 | 102.50 | 94.25 | 81.00 | 67.75 |
| | 4 | 1,030.75 | 279.00 | 165.00 | 145.75 | 130.50 | 119.50 | 102.50 | 86.00 |
| 121.90 | 1 | 410.50 | 58.50 | 44.25 | 40.75 | 37.00 | 34.00 | 29.75 | 24.75 |
| | 2 | 596.25 | 82.50 | 63.75 | 58.25 | 53.00 | 48.75 | 42.50 | 36.75 |
| | 3 | 802.25 | 110.50 | 84.25 | 77.50 | 71.00 | 65.25 | 56.25 | 48.75 |
| | 4 | 1,041.50 | 142.00 | 107.75 | 98.75 | 90.00 | 82.75 | 71.25 | 61.75 |
| 152.40 | 1 | 407.00 | 81.75 | 51.50 | 41.25 | 36.75 | 33.75 | 29.75 | 26.25 |
| | 2 | 593.00 | 116.75 | 74.75 | 60.25 | 53.00 | 49.50 | 43.50 | 38.00 |
| | 3 | 799.75 | 155.25 | 99.50 | 80.25 | 70.00 | 65.75 | 58.25 | 50.50 |
| | 4 | 1,042.50 | 199.75 | 127.75 | 101.75 | 89.00 | 84.00 | 74.00 | 64.00 |

**Table A-48. Average all point locations FWD deflection measurements extracted for LTPP pavement section B310.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 408.67 | 100.25 | 60.75 | 50.75 | 44.96 | 41.04 | 35.38 | 30.54 |
| | 2 | 594.00 | 140.79 | 87.33 | 73.13 | 64.54 | 59.54 | 51.17 | 44.13 |
| | 3 | 797.88 | 185.92 | 114.88 | 96.67 | 85.21 | 78.54 | 67.50 | 57.67 |
| | 4 | 1,030.33 | 236.54 | 146.42 | 122.75 | 108.08 | 99.63 | 85.46 | 73.00 |

**Table A-49. FWD deflection measurements extracted for LTPP pavement section B320 for FWD test date 24-Apr-02.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 408.25 | 123.75 | 67.75 | 57.50 | 51.00 | 46.25 | 40.00 | 34.75 | 27.75 |
| | 2 | 589.50 | 174.25 | 97.75 | 82.75 | 73.00 | 67.50 | 58.50 | 50.25 | 39.25 |
| | 3 | 799.00 | 229.25 | 128.50 | 109.75 | 96.25 | 88.50 | 76.75 | 65.00 | 51.75 |
| | 4 | 1,033.75 | 290.25 | 162.75 | 138.75 | 121.75 | 111.00 | 96.50 | 82.25 | 65.50 |
| 30.50 | 1 | 410.75 | 174.25 | 97.75 | 82.75 | 73.00 | 67.50 | 58.50 | 50.25 | 39.25 |
| | 2 | 597.25 | 229.25 | 128.50 | 109.75 | 96.25 | 88.50 | 76.75 | 65.00 | 51.75 |
| | 3 | 794.00 | 290.25 | 162.75 | 138.75 | 121.75 | 111.00 | 96.50 | 82.25 | 65.50 |
| | 4 | 1,016.75 | 105.75 | 64.50 | 50.50 | 42.75 | 38.00 | 32.25 | 28.50 | 31.00 |
| 61.00 | 1 | 408.00 | 109.50 | 67.50 | 54.00 | 48.00 | 44.25 | 37.50 | 32.75 | 34.00 |
| | 2 | 595.50 | 154.75 | 97.50 | 78.50 | 69.25 | 65.25 | 54.25 | 46.75 | 48.50 |
| | 3 | 793.75 | 205.00 | 127.25 | 103.25 | 91.00 | 85.75 | 71.25 | 61.00 | 64.25 |
| | 4 | 1,016.75 | 260.00 | 163.25 | 131.75 | 116.25 | 109.50 | 90.50 | 77.25 | 81.00 |
| 91.40 | 1 | 407.50 | 122.25 | 69.00 | 60.50 | 54.25 | 50.00 | 43.00 | 36.25 | 35.50 |
| | 2 | 592.50 | 167.75 | 98.25 | 86.50 | 77.50 | 71.00 | 61.00 | 51.50 | 50.50 |
| | 3 | 798.50 | 221.75 | 130.00 | 114.75 | 102.50 | 94.25 | 81.00 | 67.75 | 65.75 |
| | 4 | 1,030.75 | 279.00 | 165.00 | 145.75 | 130.50 | 119.50 | 102.50 | 86.00 | 82.25 |
| 121.90 | 1 | 410.50 | 58.50 | 44.25 | 40.75 | 37.00 | 34.00 | 29.75 | 24.75 | 36.25 |
| | 2 | 596.25 | 82.50 | 63.75 | 58.25 | 53.00 | 48.75 | 42.50 | 36.75 | 50.50 |
| | 3 | 802.25 | 110.50 | 84.25 | 77.50 | 71.00 | 65.25 | 56.25 | 48.75 | 65.75 |
| | 4 | 1,041.50 | 142.00 | 107.75 | 98.75 | 90.00 | 82.75 | 71.25 | 61.75 | 82.75 |
| 152.40 | 1 | 407.00 | 81.75 | 51.50 | 41.25 | 36.75 | 33.75 | 29.75 | 26.25 | 31.25 |
| | 2 | 593.00 | 116.75 | 74.75 | 60.25 | 53.00 | 49.50 | 43.50 | 38.00 | 45.25 |
| | 3 | 799.75 | 155.25 | 99.50 | 80.25 | 70.00 | 65.75 | 58.25 | 50.50 | 57.75 |
| | 4 | 1,042.50 | 199.75 | 127.75 | 101.75 | 89.00 | 84.00 | 74.00 | 64.00 | 73.25 |

**Table A-50. Average all point locations FWD deflection measurements extracted for LTPP pavement section B320.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 409.88 | 117.04 | 68.25 | 57.83 | 54.08 | 50.83 | 43.92 | 37.63 | 32.63 |
| | 2 | 596.50 | 166.75 | 98.83 | 83.58 | 78.54 | 72.46 | 64.00 | 54.58 | 46.42 |
| | 3 | 787.71 | 218.63 | 131.00 | 110.38 | 103.71 | 96.21 | 83.71 | 71.29 | 60.92 |
| | 4 | 1,011.50 | 279.58 | 167.04 | 141.54 | 131.58 | 122.79 | 106.50 | 90.58 | 76.04 |

**Table A-51. FWD deflection measurements extracted for LTPP pavement section D310 for FWD test date 20-Aug-91.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 407.00 | 80.75 | 54.75 | 48.00 | 41.00 | 35.00 | 26.75 | 18.75 |
| | 2 | 605.25 | 124.50 | 84.75 | 73.75 | 62.75 | 53.50 | 41.75 | 27.75 |
| | 3 | 822.25 | 170.75 | 116.75 | 101.00 | 86.00 | 73.00 | 56.00 | 37.00 |
| | 4 | 1,097.50 | 216.50 | 148.75 | 129.25 | 110.00 | 93.75 | 70.75 | 47.50 |
| 30.50 | 1 | 402.75 | 124.50 | 84.75 | 73.75 | 62.75 | 53.50 | 41.75 | 27.75 |
| | 2 | 606.00 | 170.75 | 116.75 | 101.00 | 86.00 | 73.00 | 56.00 | 37.00 |
| | 3 | 820.25 | 216.50 | 148.75 | 129.25 | 110.00 | 93.75 | 70.75 | 47.50 |
| | 4 | 1,099.50 | 80.25 | 59.75 | 51.75 | 45.00 | 38.50 | 31.25 | 21.00 |
| 61.00 | 1 | 403.75 | 81.00 | 58.25 | 51.50 | 44.50 | 38.50 | 30.75 | 20.75 |
| | 2 | 603.50 | 126.00 | 89.75 | 79.25 | 68.25 | 60.00 | 47.00 | 33.00 |
| | 3 | 817.75 | 170.50 | 122.75 | 108.00 | 93.75 | 81.25 | 64.50 | 45.00 |
| | 4 | 1,093.00 | 217.00 | 158.50 | 138.50 | 119.50 | 104.25 | 81.25 | 57.00 |
| 91.40 | 1 | 400.00 | 92.50 | 66.75 | 58.50 | 50.50 | 43.75 | 33.50 | 21.75 |
| | 2 | 601.00 | 144.25 | 104.00 | 91.25 | 78.75 | 68.00 | 53.00 | 34.50 |
| | 3 | 816.00 | 198.50 | 143.75 | 126.00 | 108.00 | 93.25 | 71.25 | 47.00 |
| | 4 | 1,094.25 | 249.75 | 184.25 | 160.75 | 139.25 | 119.00 | 91.25 | 59.75 |
| 121.90 | 1 | 399.25 | 77.75 | 60.00 | 53.25 | 46.00 | 38.75 | 32.75 | 23.00 |
| | 2 | 603.25 | 122.00 | 94.00 | 83.00 | 72.00 | 62.00 | 48.50 | 32.75 |
| | 3 | 817.00 | 168.25 | 128.25 | 113.25 | 98.25 | 84.75 | 67.00 | 45.25 |
| | 4 | 1,094.75 | 215.75 | 164.00 | 144.75 | 125.50 | 107.75 | 85.00 | 56.50 |
| 152.40 | 1 | 397.25 | 89.50 | 64.00 | 54.00 | 47.75 | 39.25 | 32.00 | 20.75 |
| | 2 | 603.25 | 139.75 | 97.75 | 84.75 | 74.00 | 63.00 | 49.00 | 32.75 |
| | 3 | 815.00 | 190.75 | 133.75 | 115.50 | 100.00 | 85.25 | 67.00 | 45.00 |
| | 4 | 1,102.50 | 243.00 | 171.25 | 148.25 | 128.25 | 110.25 | 86.25 | 56.75 |

**Table A-52. Average all point locations FWD deflection measurements extracted for LTPP pavement section D310.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 401.67 | 83.63 | 60.58 | 52.83 | 45.79 | 38.96 | 31.17 | 21.00 |
| | 2 | 603.71 | 130.54 | 93.79 | 82.00 | 70.79 | 61.08 | 47.83 | 32.17 |
| | 3 | 818.04 | 178.63 | 128.54 | 112.13 | 96.83 | 83.25 | 65.13 | 43.88 |
| | 4 | 1,096.92 | 226.58 | 164.46 | 143.29 | 123.92 | 106.46 | 82.67 | 55.42 |

**Table A-53. FWD deflection measurements extracted for LTPP pavement section D320 for FWD test date 20-Aug-91.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 389.75 | 93.50 | 66.25 | 56.75 | 48.50 | 40.50 | 31.50 | 20.75 |
| | 2 | 591.75 | 139.00 | 104.00 | 89.00 | 76.00 | 63.25 | 49.00 | 33.00 |
| | 3 | 809.75 | 197.75 | 141.75 | 122.50 | 104.25 | 88.25 | 67.00 | 45.50 |
| | 4 | 1,087.75 | 250.00 | 181.50 | 159.25 | 134.00 | 114.75 | 86.50 | 59.00 |
| 30.50 | 1 | 394.00 | 139.00 | 104.00 | 89.00 | 76.00 | 63.25 | 49.00 | 33.00 |
| | 2 | 596.50 | 197.75 | 141.75 | 122.50 | 104.25 | 88.25 | 67.00 | 45.50 |
| | 3 | 813.00 | 250.00 | 181.50 | 159.25 | 134.00 | 114.75 | 86.50 | 59.00 |
| | 4 | 1,100.75 | 81.50 | 63.00 | 54.75 | 46.50 | 39.00 | 31.00 | 20.00 |
| 61.00 | 1 | 392.75 | 103.00 | 83.25 | 74.25 | 64.75 | 56.25 | 44.50 | 29.75 |
| | 2 | 595.75 | 160.75 | 131.50 | 116.75 | 101.75 | 88.50 | 69.50 | 46.00 |
| | 3 | 809.75 | 225.00 | 179.75 | 160.75 | 140.75 | 121.50 | 95.50 | 62.75 |
| | 4 | 1,098.00 | 286.00 | 232.50 | 207.75 | 180.50 | 156.25 | 123.00 | 80.25 |
| 91.40 | 1 | 395.00 | 88.50 | 74.75 | 65.25 | 56.50 | 48.00 | 36.50 | 24.00 |
| | 2 | 601.25 | 145.75 | 118.25 | 104.50 | 89.00 | 76.50 | 57.75 | 38.00 |
| | 3 | 812.75 | 199.50 | 161.25 | 143.00 | 123.50 | 104.25 | 79.75 | 51.50 |
| | 4 | 1,103.00 | 262.50 | 210.00 | 186.75 | 159.50 | 136.00 | 103.00 | 66.50 |
| 121.90 | 1 | 393.00 | 82.00 | 69.25 | 61.50 | 52.75 | 45.75 | 35.75 | 23.50 |
| | 2 | 599.75 | 132.75 | 110.50 | 98.50 | 84.00 | 72.50 | 56.50 | 37.00 |
| | 3 | 813.00 | 186.00 | 151.00 | 134.50 | 115.75 | 100.50 | 78.00 | 51.25 |
| | 4 | 1,108.25 | 240.25 | 196.25 | 174.25 | 150.00 | 129.50 | 100.25 | 66.00 |
| 152.40 | 1 | 394.50 | 83.25 | 68.75 | 60.75 | 52.00 | 44.75 | 34.00 | 22.00 |
| | 2 | 602.50 | 129.50 | 108.75 | 95.50 | 82.00 | 70.00 | 54.00 | 35.00 |
| | 3 | 811.75 | 186.00 | 148.75 | 131.75 | 112.75 | 95.75 | 74.00 | 47.25 |
| | 4 | 1,109.00 | 235.50 | 191.25 | 168.50 | 145.00 | 123.00 | 94.00 | 61.00 |

**Table A-54. Average all point locations FWD deflection measurements extracted for LTPP pavement section D320.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 393.17 | 88.63 | 70.88 | 62.21 | 53.50 | 45.71 | 35.54 | 23.33 |
| | 2 | 597.92 | 139.33 | 111.96 | 98.29 | 84.38 | 72.04 | 55.67 | 36.67 |
| | 3 | 811.67 | 195.38 | 152.92 | 134.88 | 116.13 | 99.13 | 76.54 | 50.21 |
| | 4 | 1,101.13 | 250.25 | 197.79 | 174.79 | 149.63 | 128.08 | 98.21 | 64.42 |

**Table A-55. FWD deflection measurements extracted for LTPP pavement section D330 for FWD test date 20-Aug-91.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 391.25 | 86.00 | 64.50 | 57.00 | 51.00 | 45.50 | 38.00 | 28.00 |
| | 2 | 597.25 | 134.00 | 99.25 | 88.75 | 79.00 | 70.75 | 59.00 | 43.25 |
| | 3 | 798.00 | 181.25 | 134.50 | 119.50 | 107.00 | 95.25 | 80.00 | 57.00 |
| | 4 | 1,108.00 | 233.25 | 171.75 | 154.75 | 137.25 | 124.50 | 102.25 | 73.50 |
| 30.50 | 1 | 389.25 | 134.00 | 99.25 | 88.75 | 79.00 | 70.75 | 59.00 | 43.25 |
| | 2 | 593.75 | 181.25 | 134.50 | 119.50 | 107.00 | 95.25 | 80.00 | 57.00 |
| | 3 | 793.75 | 233.25 | 171.75 | 154.75 | 137.25 | 124.50 | 102.25 | 73.50 |
| | 4 | 1,106.00 | 86.25 | 63.00 | 55.25 | 48.25 | 43.25 | 35.25 | 26.00 |
| 61.00 | 1 | 386.00 | 97.25 | 77.25 | 69.00 | 60.00 | 52.50 | 42.00 | 29.00 |
| | 2 | 591.50 | 151.75 | 118.25 | 106.00 | 92.00 | 80.50 | 64.00 | 43.00 |
| | 3 | 794.00 | 211.25 | 161.75 | 144.00 | 124.75 | 109.25 | 87.00 | 57.50 |
| | 4 | 1,102.25 | 269.00 | 209.25 | 186.00 | 160.50 | 140.50 | 110.75 | 73.00 |
| 91.40 | 1 | 385.50 | 99.75 | 76.25 | 66.25 | 58.25 | 49.50 | 39.50 | 27.00 |
| | 2 | 590.50 | 154.00 | 117.50 | 102.75 | 88.75 | 75.75 | 58.75 | 39.25 |
| | 3 | 792.75 | 213.50 | 160.50 | 140.25 | 121.00 | 103.50 | 80.00 | 53.00 |
| | 4 | 1,099.50 | 272.00 | 209.25 | 181.00 | 155.25 | 131.75 | 101.75 | 67.75 |
| 121.90 | 1 | 388.50 | 99.25 | 74.00 | 64.25 | 56.25 | 48.00 | 37.00 | 26.00 |
| | 2 | 594.00 | 156.75 | 113.75 | 100.25 | 85.75 | 73.75 | 57.75 | 38.75 |
| | 3 | 792.50 | 210.50 | 153.75 | 135.00 | 115.75 | 98.75 | 77.00 | 51.50 |
| | 4 | 1,103.00 | 269.50 | 198.50 | 173.00 | 150.00 | 127.50 | 98.75 | 66.50 |
| 152.40 | 1 | 390.25 | 85.25 | 65.75 | 59.75 | 51.75 | 45.50 | 36.00 | 23.75 |
| | 2 | 596.25 | 132.50 | 101.75 | 91.00 | 80.75 | 70.25 | 56.00 | 37.75 |
| | 3 | 793.50 | 185.75 | 138.50 | 125.00 | 110.00 | 95.00 | 75.50 | 50.50 |
| | 4 | 1,105.50 | 232.50 | 179.00 | 160.50 | 142.25 | 124.00 | 97.00 | 65.25 |

**Table A-56. Average all point locations FWD deflection measurements extracted for LTPP pavement section D330.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 388.46 | 92.29 | 70.13 | 61.92 | 54.25 | 47.38 | 37.96 | 26.63 |
| | 2 | 593.88 | 143.83 | 108.04 | 95.63 | 83.50 | 72.96 | 58.38 | 40.04 |
| | 3 | 794.08 | 197.79 | 146.92 | 129.88 | 113.33 | 98.67 | 78.92 | 53.50 |
| | 4 | 1,104.04 | 251.71 | 189.58 | 167.38 | 145.88 | 127.38 | 100.83 | 68.54 |

**Table A-57. FWD deflection measurements extracted for LTPP pavement section D350 for FWD test date 20-Aug-91.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 405.75 | 101.75 | 81.75 | 74.75 | 64.25 | 56.75 | 44.75 | 30.75 |
| | 2 | 611.75 | 159.75 | 124.00 | 112.75 | 97.75 | 86.00 | 68.00 | 45.75 |
| | 3 | 776.00 | 212.75 | 169.25 | 153.00 | 133.00 | 117.00 | 91.50 | 62.00 |
| | 4 | 1,076.50 | 283.75 | 214.00 | 196.25 | 169.00 | 150.00 | 116.50 | 78.00 |
| 31.10 | 1 | 391.00 | 159.75 | 124.00 | 112.75 | 97.75 | 86.00 | 68.00 | 45.75 |
| | 2 | 605.00 | 212.75 | 169.25 | 153.00 | 133.00 | 117.00 | 91.50 | 62.00 |
| | 3 | 768.50 | 283.75 | 214.00 | 196.25 | 169.00 | 150.00 | 116.50 | 78.00 |
| | 4 | 1,073.75 | 111.00 | 87.75 | 80.25 | 69.25 | 60.50 | 46.00 | 30.25 |
| 61.00 | 1 | 390.75 | 120.00 | 102.75 | 97.00 | 85.25 | 74.75 | 59.50 | 37.50 |
| | 2 | 605.50 | 191.50 | 161.00 | 150.00 | 133.50 | 116.25 | 93.00 | 57.50 |
| | 3 | 768.25 | 261.00 | 219.25 | 206.00 | 183.25 | 161.50 | 126.00 | 76.50 |
| | 4 | 1,076.25 | 346.00 | 282.00 | 265.50 | 235.50 | 208.50 | 162.25 | 98.00 |
| 92.00 | 1 | 392.50 | 114.50 | 86.50 | 78.75 | 68.25 | 58.50 | 44.50 | 28.50 |
| | 2 | 603.50 | 181.50 | 134.25 | 121.00 | 105.75 | 90.00 | 68.50 | 43.75 |
| | 3 | 766.50 | 240.75 | 183.50 | 164.75 | 143.00 | 122.50 | 93.00 | 59.00 |
| | 4 | 1,070.25 | 323.25 | 236.75 | 210.75 | 183.75 | 157.00 | 121.00 | 76.75 |
| 121.90 | 1 | 390.00 | 105.25 | 85.50 | 78.00 | 68.75 | 59.25 | 46.25 | 30.00 |
| | 2 | 608.75 | 163.25 | 131.75 | 120.75 | 106.75 | 93.00 | 72.00 | 46.75 |
| | 3 | 772.50 | 226.75 | 180.50 | 164.00 | 145.50 | 126.25 | 98.25 | 63.25 |
| | 4 | 1,081.75 | 287.75 | 229.50 | 211.25 | 185.25 | 163.00 | 125.25 | 81.25 |
| 152.40 | 1 | 393.75 | 109.75 | 79.25 | 71.00 | 63.00 | 54.00 | 42.75 | 28.25 |
| | 2 | 608.25 | 166.75 | 120.75 | 109.50 | 95.75 | 84.00 | 65.75 | 42.25 |
| | 3 | 775.50 | 227.50 | 165.75 | 148.25 | 131.50 | 115.00 | 89.50 | 56.25 |
| | 4 | 1,080.75 | 295.25 | 211.50 | 190.75 | 168.50 | 146.00 | 114.25 | 72.25 |

**Table A-58. Average all point locations FWD deflection measurements extracted for LTPP pavement section D350.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 393.96 | 110.38 | 87.25 | 79.96 | 69.79 | 60.63 | 47.29 | 30.88 |
| | 2 | 607.13 | 171.58 | 134.58 | 123.04 | 107.88 | 93.71 | 73.13 | 47.04 |
| | 3 | 771.21 | 233.29 | 183.75 | 167.33 | 146.92 | 128.08 | 99.25 | 63.21 |
| | 4 | 1,076.54 | 305.71 | 235.08 | 215.00 | 188.17 | 164.38 | 127.42 | 81.04 |

**Table A-59. FWD deflection measurements extracted for LTPP pavement section M310 for FWD test date 29-Mar-97.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 331.75 | 1,246.25 | 1,010.25 | 836.50 | 581.00 | 401.00 | 181.25 | 47.00 |
| | 2 | 544.50 | 1,809.75 | 1,486.00 | 1,244.25 | 884.25 | 625.00 | 301.50 | 87.75 |
| | 3 | | | | | | | | |
| | 4 | | | | | | | | |
| 30.50 | 1 | 338.25 | 1,809.75 | 1,486.00 | 1,244.25 | 884.25 | 625.00 | 301.50 | 87.75 |
| | 2 | 551.75 | | | | | | | |
| | 3 | 767.50 | | | | | | | |
| | 4 | 981.25 | 526.00 | 399.75 | 315.25 | 210.25 | 146.50 | 76.25 | 28.75 |
| 61.00 | 1 | 334.75 | 501.00 | 385.50 | 304.75 | 206.00 | 140.00 | 73.00 | 31.00 |
| | 2 | 545.50 | 798.50 | 619.25 | 493.50 | 339.25 | 233.00 | 121.75 | 54.00 |
| | 3 | 762.50 | 1,071.50 | 835.00 | 671.75 | 467.25 | 325.50 | 173.75 | 78.75 |
| | 4 | 981.75 | 1,318.50 | 1,028.25 | 829.50 | 580.75 | 406.75 | 220.75 | 101.25 |
| 91.40 | 1 | 330.75 | 1,021.25 | 810.00 | 655.75 | 442.00 | 295.25 | 138.00 | 53.00 |
| | 2 | 543.50 | 1,471.00 | 1,171.75 | 961.50 | 664.75 | 459.25 | 227.50 | 92.75 |
| | 3 | 756.00 | 1,828.00 | 1,466.75 | 1,213.50 | 851.50 | 602.75 | 312.25 | 131.25 |
| | 4 | | | | | | | | |
| 121.90 | 1 | 335.25 | 825.00 | 667.50 | 550.00 | 399.00 | 286.50 | 149.00 | 52.00 |
| | 2 | 547.25 | 1,226.25 | 1,005.50 | 838.75 | 621.25 | 455.75 | 247.50 | 90.25 |
| | 3 | 759.50 | 1,555.75 | 1,284.25 | 1,079.50 | 810.50 | 603.00 | 338.25 | 128.50 |
| | 4 | 976.50 | 1,860.00 | 1,537.00 | 1,296.00 | 977.50 | 732.25 | 415.75 | 160.75 |
| 152.40 | 1 | 329.25 | 1,183.25 | 920.75 | 737.25 | 477.25 | 317.75 | 147.00 | 62.00 |
| | 2 | 539.00 | 1,660.00 | 1,319.25 | 1,075.75 | 722.00 | 498.50 | 244.00 | 107.25 |
| | 3 | 749.00 | 2,028.50 | 1,631.50 | 1,343.00 | 921.00 | 652.00 | 332.50 | 149.00 |
| | 4 | | | | | | | | |

**Table A-60. Average all point locations FWD deflection measurements extracted for LTPP pavement section M310.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 333.33 | 883.79 | 698.96 | 566.58 | 385.92 | 264.50 | 127.42 | 45.63 |
| | 2 | 545.25 | 1,304.42 | 1,044.17 | 857.08 | 598.54 | 420.29 | 212.38 | 80.54 |
| | 3 | 760.00 | 1,473.44 | 1,178.33 | 969.28 | 686.89 | 491.50 | 262.33 | 108.39 |
| | 4 | 979.83 | 1,539.58 | 1,227.75 | 1,010.42 | 729.75 | 529.50 | 293.33 | 120.08 |

**Table A-61. FWD deflection measurements extracted for LTPP pavement section M320 for FWD test date 28-Mar-97.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 327.75 | 980.25 | 715.25 | 515.50 | 298.25 | 195.00 | 102.50 | 48.00 |
| | 2 | 530.25 | 1,387.50 | 1,028.75 | 754.75 | 457.50 | 305.00 | 166.00 | 80.00 |
| | 3 | 750.50 | 1,732.00 | 1,311.00 | 977.00 | 610.50 | 416.75 | 230.50 | 112.25 |
| | 4 | 950.50 | 2,022.50 | 1,551.00 | 1,168.00 | 749.50 | 521.00 | 296.50 | 143.00 |
| 30.50 | 1 | 318.75 | 1,387.50 | 1,028.75 | 754.75 | 457.50 | 305.00 | 166.00 | 80.00 |
| | 2 | 525.75 | 1,732.00 | 1,311.00 | 977.00 | 610.50 | 416.75 | 230.50 | 112.25 |
| | 3 | 733.50 | 2,022.50 | 1,551.00 | 1,168.00 | 749.50 | 521.00 | 296.50 | 143.00 |
| | 4 | 947.00 | 678.00 | 481.50 | 355.50 | 232.50 | 156.75 | 82.75 | 36.50 |
| 61.00 | 1 | 327.25 | 807.75 | 622.00 | 445.00 | 267.50 | 179.75 | 93.00 | 37.25 |
| | 2 | 524.25 | 1,179.25 | 914.75 | 665.50 | 413.00 | 283.75 | 150.00 | 62.25 |
| | 3 | 744.50 | 1,514.75 | 1,195.50 | 899.25 | 567.00 | 391.75 | 209.75 | 91.25 |
| | 4 | 951.25 | 1,793.75 | 1,449.00 | 1,077.25 | 703.00 | 494.25 | 271.50 | 120.00 |
| 91.40 | 1 | 330.50 | 605.75 | 404.50 | 278.50 | 160.50 | 106.00 | 60.25 | 30.00 |
| | 2 | 543.75 | 881.25 | 610.00 | 440.25 | 270.75 | 183.25 | 105.00 | 50.50 |
| | 3 | 742.75 | 1,112.50 | 785.75 | 583.25 | 376.00 | 262.00 | 152.25 | 74.75 |
| | 4 | 959.75 | 1,323.50 | 942.75 | 711.00 | 472.50 | 336.00 | 197.50 | 97.25 |
| 121.90 | 1 | 336.50 | 478.50 | 295.50 | 196.25 | 114.50 | 77.75 | 47.00 | 25.00 |
| | 2 | 556.75 | 714.00 | 455.75 | 315.75 | 194.75 | 135.25 | 82.50 | 43.00 |
| | 3 | 752.50 | 897.75 | 584.50 | 418.25 | 268.00 | 190.25 | 117.75 | 62.00 |
| | 4 | 970.00 | 1,067.50 | 708.75 | 513.75 | 338.00 | 244.25 | 151.25 | 80.25 |
| 152.40 | 1 | 332.25 | 482.00 | 312.75 | 217.00 | 125.50 | 85.25 | 52.00 | 23.75 |
| | 2 | 547.75 | 726.75 | 491.00 | 351.75 | 216.00 | 150.75 | 92.25 | 42.00 |
| | 3 | 748.25 | 927.25 | 641.00 | 472.25 | 300.75 | 213.50 | 130.75 | 60.75 |
| | 4 | 964.50 | 1,112.50 | 774.25 | 578.50 | 377.75 | 272.50 | 168.75 | 81.25 |

**Table A-62. Average all point locations FWD deflection measurements extracted for LTPP pavement section M320.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 328.83 | 672.04 | 471.92 | 334.63 | 199.79 | 133.42 | 72.92 | 33.42 |
| | 2 | 538.08 | 986.38 | 708.88 | 516.58 | 322.96 | 220.25 | 123.13 | 57.08 |
| | 3 | 745.33 | 1,254.71 | 919.46 | 686.46 | 441.96 | 307.04 | 174.13 | 82.58 |
| | 4 | 957.77 | 1,441.41 | 1,070.27 | 805.00 | 532.68 | 376.73 | 218.14 | 104.05 |

**Table A-63. FWD deflection measurements extracted for LTPP pavement section M330 for FWD test date 28-Mar-97.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 333.50 | 589.75 | 383.00 | 258.75 | 148.00 | 98.50 | 56.50 | 29.50 |
| | 2 | 544.25 | 851.00 | 575.75 | 406.00 | 247.25 | 165.50 | 97.25 | 49.75 |
| | 3 | 742.00 | 1,071.50 | 735.25 | 534.25 | 339.75 | 234.25 | 140.00 | 71.25 |
| | 4 | 962.25 | 1,266.25 | 881.50 | 648.75 | 423.50 | 298.25 | 182.00 | 94.00 |
| 30.50 | 1 | 327.25 | 851.00 | 575.75 | 406.00 | 247.25 | 165.50 | 97.25 | 49.75 |
| | 2 | 525.75 | 1,071.50 | 735.25 | 534.25 | 339.75 | 234.25 | 140.00 | 71.25 |
| | 3 | 739.00 | 1,266.25 | 881.50 | 648.75 | 423.50 | 298.25 | 182.00 | 94.00 |
| | 4 | 949.00 | 790.75 | 544.00 | 375.50 | 209.25 | 137.25 | 78.50 | 39.50 |
| 61.00 | 1 | 326.25 | 754.00 | 510.50 | 360.25 | 206.50 | 129.00 | 69.00 | 34.75 |
| | 2 | 525.25 | 1,074.00 | 733.25 | 530.75 | 318.25 | 205.25 | 112.50 | 58.00 |
| | 3 | 740.75 | 1,408.75 | 939.75 | 688.00 | 423.00 | 280.50 | 159.50 | 86.25 |
| | 4 | 950.00 | 1,694.00 | 1,124.50 | 836.00 | 529.25 | 358.25 | 207.75 | 114.25 |
| 91.40 | 1 | 324.75 | 1,131.00 | 828.75 | 602.50 | 360.25 | 234.25 | 114.00 | 51.50 |
| | 2 | 535.25 | 1,606.50 | 1,200.75 | 895.75 | 560.00 | 375.25 | 188.25 | 87.25 |
| | 3 | 749.75 | 1,971.25 | 1,497.75 | 1,132.25 | 726.00 | 498.50 | 258.25 | 121.75 |
| | 4 | | | | | | | | |
| 121.90 | 1 | 323.75 | 813.50 | 564.50 | 396.25 | 212.25 | 131.00 | 74.25 | 33.25 |
| | 2 | 520.50 | 1,135.00 | 806.25 | 584.00 | 334.25 | 216.00 | 120.50 | 56.50 |
| | 3 | 740.50 | 1,419.50 | 1,027.75 | 752.50 | 447.75 | 296.50 | 166.25 | 80.00 |
| | 4 | 958.00 | 1,658.00 | 1,224.75 | 908.50 | 553.25 | 369.75 | 211.50 | 101.00 |
| 152.40 | 1 | 345.50 | 671.75 | 461.50 | 297.75 | 148.00 | 91.50 | 59.00 | 30.75 |
| | 2 | 552.50 | 948.25 | 673.25 | 456.00 | 250.00 | 163.50 | 102.75 | 51.00 |
| | 3 | 742.75 | 1,151.25 | 848.25 | 591.75 | 344.25 | 234.25 | 149.50 | 74.25 |
| | 4 | 972.50 | 1,358.00 | 1,021.00 | 722.00 | 434.00 | 303.25 | 194.75 | 98.00 |

**Table A-64. Average all point locations FWD deflection measurements extracted for LTPP pavement section M330.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 328.83 | 672.04 | 471.92 | 334.63 | 199.79 | 133.42 | 72.92 | 33.42 |
| | 2 | 538.08 | 986.38 | 708.88 | 516.58 | 322.96 | 220.25 | 123.13 | 57.08 |
| | 3 | 745.33 | 1,254.71 | 919.46 | 686.46 | 441.96 | 307.04 | 174.13 | 82.58 |
| | 4 | 957.77 | 1,441.41 | 1,070.27 | 805.00 | 532.68 | 376.73 | 218.14 | 104.05 |

**Table A-65. FWD deflection measurements extracted for LTPP pavement section M340 for FWD test date 28-Mar-97.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 362.50 | 617.00 | 406.00 | 253.00 | 134.50 | 91.00 | 60.75 | 32.25 |
| | 2 | 576.25 | 871.00 | 593.25 | 390.00 | 227.25 | 160.50 | 107.00 | 56.25 |
| | 3 | 769.00 | 1,059.50 | 743.25 | 508.25 | 314.00 | 228.00 | 152.75 | 82.50 |
| | 4 | 977.75 | 1,232.25 | 878.25 | 611.00 | 391.75 | 291.50 | 197.25 | 108.25 |
| 30.50 | 1 | 347.25 | 871.00 | 593.25 | 390.00 | 227.25 | 160.50 | 107.00 | 56.25 |
| | 2 | 552.75 | 1,059.50 | 743.25 | 508.25 | 314.00 | 228.00 | 152.75 | 82.50 |
| | 3 | 758.00 | 1,232.25 | 878.25 | 611.00 | 391.75 | 291.50 | 197.25 | 108.25 |
| | 4 | 951.75 | 718.25 | 470.75 | 302.25 | 152.75 | 96.75 | 61.75 | 29.75 |
| 61.00 | 1 | 336.50 | 1,211.50 | 776.75 | 522.00 | 271.75 | 163.50 | 93.25 | 48.75 |
| | 2 | 541.00 | 1,707.25 | 1,135.75 | 792.50 | 439.00 | 274.75 | 157.00 | 84.25 |
| | 3 | | | | | | | | |
| | 4 | | | | | | | | |
| 91.40 | 1 | 332.75 | 631.75 | 401.75 | 269.50 | 146.75 | 96.25 | 57.25 | 29.75 |
| | 2 | 532.75 | 959.25 | 616.75 | 424.25 | 242.25 | 161.00 | 96.25 | 49.00 |
| | 3 | 740.50 | 1,243.25 | 817.00 | 577.75 | 346.00 | 236.00 | 140.50 | 71.50 |
| | 4 | 961.75 | 1,530.00 | 1,004.25 | 720.75 | 444.25 | 309.75 | 186.00 | 94.25 |
| 121.90 | 1 | 336.25 | 538.25 | 351.75 | 248.75 | 144.50 | 90.00 | 53.75 | 29.00 |
| | 2 | 538.25 | 818.75 | 543.75 | 394.00 | 239.25 | 156.75 | 89.75 | 49.25 |
| | 3 | 738.25 | 1,062.50 | 720.75 | 534.50 | 336.25 | 225.00 | 131.75 | 72.00 |
| | 4 | 959.75 | 1,280.75 | 885.25 | 663.25 | 426.50 | 290.50 | 174.75 | 95.00 |
| 152.40 | 1 | 329.00 | 902.75 | 595.25 | 395.00 | 213.00 | 131.25 | 72.00 | 34.25 |
| | 2 | 525.25 | 1,275.50 | 866.50 | 596.25 | 338.50 | 216.50 | 116.75 | 57.50 |
| | 3 | 750.75 | 1,611.50 | 1,106.50 | 779.00 | 457.50 | 299.75 | 163.00 | 81.50 |
| | 4 | 973.25 | 1,883.00 | 1,340.25 | 949.00 | 568.75 | 378.00 | 206.25 | 104.50 |

**Table A-66. Average all point locations FWD deflection measurements extracted for LTPP pavement section M340.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 340.71 | 769.92 | 500.38 | 331.75 | 177.21 | 111.46 | 66.46 | 33.96 |
| | 2 | 544.38 | 1,105.38 | 738.00 | 508.08 | 288.96 | 188.79 | 110.92 | 57.58 |
| | 3 | 751.30 | 1,244.50 | 848.65 | 598.55 | 359.80 | 244.80 | 146.05 | 75.45 |
| | 4 | 964.85 | 1,476.45 | 1,025.90 | 733.10 | 453.55 | 314.70 | 190.40 | 98.25 |

**Table A-67. FWD deflection measurements extracted for LTPP pavement section M350 for FWD test date 28-Mar-97.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 1 | 363.50 | 659.00 | 423.50 | 289.25 | 153.25 | 95.75 | 59.50 | 32.50 |
| | 2 | 568.75 | 913.75 | 616.75 | 433.75 | 247.00 | 159.50 | 96.00 | 54.00 |
| | 3 | 771.50 | 1,158.25 | 801.50 | 577.25 | 346.00 | 230.25 | 139.00 | 76.25 |
| | 4 | 985.50 | 1,387.50 | 970.75 | 711.25 | 440.25 | 299.00 | 181.50 | 98.00 |
| 30.50 | 1 | 370.50 | 913.75 | 616.75 | 433.75 | 247.00 | 159.50 | 96.00 | 54.00 |
| | 2 | 578.50 | 1,158.25 | 801.50 | 577.25 | 346.00 | 230.25 | 139.00 | 76.25 |
| | 3 | 750.75 | 1,387.50 | 970.75 | 711.25 | 440.25 | 299.00 | 181.50 | 98.00 |
| | 4 | 984.25 | 433.00 | 263.25 | 169.75 | 97.25 | 66.75 | 43.00 | 23.00 |
| 61.00 | 1 | 338.75 | 994.00 | 673.00 | 474.00 | 273.25 | 167.50 | 86.50 | 44.25 |
| | 2 | 536.75 | 1,438.25 | 1,007.25 | 731.50 | 444.50 | 283.00 | 145.75 | 74.50 |
| | 3 | 759.50 | 1,846.75 | 1,313.75 | 967.50 | 609.25 | 399.50 | 209.50 | 106.00 |
| | 4 | | | | | | | | |
| 91.40 | 1 | 343.25 | 770.50 | 546.25 | 383.25 | 214.00 | 139.00 | 79.25 | 38.75 |
| | 2 | 539.00 | 1,117.00 | 812.50 | 587.00 | 347.75 | 233.00 | 132.25 | 64.75 |
| | 3 | 750.50 | 1,429.50 | 1,072.50 | 788.75 | 487.00 | 333.75 | 189.50 | 92.75 |
| | 4 | 979.00 | 1,714.00 | 1,312.00 | 976.00 | 616.75 | 431.50 | 242.00 | 120.25 |
| 121.90 | 1 | 351.75 | 866.50 | 611.25 | 420.00 | 239.75 | 150.00 | 82.50 | 40.00 |
| | 2 | 553.75 | 1,248.75 | 904.75 | 644.00 | 388.50 | 252.00 | 136.75 | 68.25 |
| | 3 | 763.75 | 1,594.25 | 1,167.50 | 845.00 | 526.25 | 349.75 | 190.25 | 95.00 |
| | 4 | 982.25 | 1,941.00 | 1,417.75 | 1,030.75 | 651.75 | 439.00 | 239.50 | 116.75 |
| 152.40 | 1 | 330.25 | 1,295.00 | 849.50 | 583.00 | 314.00 | 183.75 | 95.75 | 40.25 |
| | 2 | 533.00 | 1,847.75 | 1,270.75 | 902.75 | 519.00 | 317.75 | 162.75 | 69.75 |
| | 3 | | | | | | | | |
| | 4 | | | | | | | | |

**Table A-68. Average all point locations FWD deflection measurements extracted for LTPP pavement section M350.**

| Point location | Drop height | Drop load (kPa) | Average D1 | all point D2 | locations D3 | peak D4 | deflections D5 | (peak_defl), D6 | microns D7 |
|---|---|---|---|---|---|---|---|---|---|
| All Point Locations | 1 | 349.67 | 836.33 | 561.13 | 386.54 | 215.25 | 133.79 | 74.42 | 36.46 |
| | 2 | 548.96 | 1,292.43 | 897.86 | 638.82 | 375.68 | 239.68 | 129.86 | 63.04 |
| | 3 | 759.20 | 1,366.20 | 976.05 | 708.75 | 439.45 | 295.30 | 166.40 | 85.55 |
| | 4 | 982.75 | 1,504.63 | 1,086.75 | 794.13 | 501.00 | 344.81 | 199.00 | 102.44 |

# APPENDIX B: SIMULATED DEFLECTIONS BY 3D-MOVE ANALYSIS FOR SHRP PAVEMENT SECTIONS

**Table B-1. Simulated deflections for SHRP section 1046 based on FWD test conducted on 17-Dec-1998.**

| Sensor Offset | Predicted Deflections (micrometers, μm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 90.33 | 68.11 | 61.68 | 53.16 | 45.24 | 31.76 | 13.80 |
| Drop Height 2 | 131.47 | 105.45 | 95.69 | 82.93 | 71.03 | 50.71 | 23.27 |
| Drop Height 3 | 175.50 | 146.71 | 133.23 | 115.93 | 99.79 | 72.13 | 34.57 |
| Drop Height 4 | 212.49 | 182.18 | 165.39 | 144.27 | 124.56 | 90.71 | 44.63 |

**Table B-2. Simulated deflections for SHRP section 1047 based on FWD test conducted on 17-Dec-1998.**

| Sensor Offset | Predicted Deflections (micrometers, μm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 95.84 | 76.09 | 68.77 | 58.63 | 49.29 | 33.95 | 14.80 |
| Drop Height 2 | 142.49 | 118.56 | 107.44 | 92.10 | 77.93 | 54.53 | 24.88 |
| Drop Height 3 | 193.39 | 166.11 | 150.77 | 129.83 | 110.43 | 78.27 | 37.26 |
| Drop Height 4 | 237.14 | 207.76 | 188.68 | 162.96 | 139.07 | 99.38 | 48.59 |

**Table B-3. Simulated deflections for SHRP section 1049 based on FWD test conducted on 28-Mar-1996.**

| Sensor Offset | Predicted Deflections (micrometers, μm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 70.72 | 51.66 | 45.27 | 38.38 | 32.90 | 24.11 | 12.04 |
| Drop Height 2 | 104.07 | 80.74 | 71.15 | 60.75 | 52.45 | 39.07 | 20.29 |
| Drop Height 3 | 137.37 | 110.94 | 98.12 | 84.19 | 73.06 | 55.11 | 29.71 |
| Drop Height 4 | 178.87 | 149.82 | 132.90 | 114.51 | 99.83 | 76.11 | 42.42 |

**Table B-4. Simulated deflections for SHRP section 1056 based on FWD test conducted on 29-Sep-2010.**

| Sensor Offset | Predicted Deflections (micrometers, μm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 1034.54 | 279.08 | 199.57 | 137.68 | 99.56 | 55.10 | 31.51 | 18.06 |
| Drop Height 2 | 1225.98 | 411.83 | 294.09 | 204.12 | 149.01 | 84.64 | 50.24 | 30.33 |
| Drop Height 3 | 1384.68 | 538.53 | 382.64 | 266.46 | 195.70 | 113.04 | 68.74 | 42.97 |
| Drop Height 4 | 1633.30 | 774.18 | 538.41 | 375.90 | 277.96 | 163.64 | 102.23 | 66.38 |

**Table B-5. Simulated deflections for SHRP section 1068 based on FWD test conducted on 17-Sep-1997.**

| Sensor Offset | Predicted Deflections (micrometers, μm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 202.55 | 143.67 | 127.80 | 108.48 | 92.30 | 67.09 | 34.35 |
| Drop Height 2 | 304.90 | 234.12 | 209.13 | 178.91 | 153.44 | 113.35 | 59.63 |
| Drop Height 3 | 411.99 | 332.68 | 297.98 | 256.48 | 221.40 | 165.94 | 90.84 |
| Drop Height 4 | 522.73 | 437.70 | 392.39 | 339.29 | 294.26 | 222.92 | 125.83 |

**Table B-6. Simulated deflections for SHRP section 1069 based on FWD test conducted on 02-Apr-2002.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 144.64 | 110.88 | 98.88 | 82.65 | 68.20 | 45.37 | 29.32 | 18.42 |
| Drop Height 2 | 215.07 | 173.90 | 155.55 | 130.84 | 108.76 | 73.68 | 48.80 | 31.63 |
| Drop Height 3 | 267.64 | 222.13 | 199.01 | 168.00 | 140.22 | 95.99 | 64.52 | 42.70 |
| Drop Height 4 | 340.89 | 290.69 | 260.70 | 220.96 | 185.23 | 128.20 | 87.50 | 59.19 |

**Table B-7. Simulated deflections for SHRP section 1076 based on FWD test conducted on 14-Feb-2013.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 257.86 | 165.84 | 125.97 | 83.22 | 55.78 | 27.65 | 15.27 | 8.77 |
| Drop Height 2 | 363.83 | 248.27 | 189.97 | 126.88 | 86.11 | 44.12 | 25.47 | 15.52 |
| Drop Height 3 | 472.80 | 337.39 | 259.77 | 175.02 | 119.89 | 62.86 | 37.44 | 23.81 |
| Drop Height 4 | 603.73 | 449.83 | 348.41 | 236.72 | 163.46 | 87.31 | 53.30 | 35.03 |

**Table B-8. Simulated deflections for SHRP section 1093 based on FWD test conducted on 05-Feb-2004.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 337.21 | 211.40 | 157.69 | 105.24 | 73.82 | 41.02 | 24.32 | 14.46 |
| Drop Height 2 | 473.51 | 314.29 | 236.37 | 159.38 | 112.99 | 64.39 | 39.46 | 24.51 |
| Drop Height 3 | 612.22 | 425.13 | 322.04 | 218.95 | 156.46 | 90.84 | 57.12 | 36.77 |
| Drop Height 4 | 777.11 | 564.10 | 430.51 | 294.99 | 212.22 | 125.14 | 80.38 | 53.31 |

**Table B-9. Simulated deflections for SHRP section 1111 based on FWD test conducted on 14-Mar-2012.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 126.68 | 92.29 | 80.48 | 65.00 | 51.71 | 31.85 | 18.99 | 10.94 |
| Drop Height 2 | 184.33 | 142.81 | 124.93 | 101.62 | 81.52 | 51.36 | 31.65 | 19.16 |
| Drop Height 3 | 240.61 | 193.82 | 169.84 | 138.84 | 112.03 | 71.66 | 45.20 | 28.33 |
| Drop Height 4 | 297.92 | 247.16 | 216.71 | 177.83 | 144.12 | 93.22 | 59.77 | 38.39 |

**Table B-10. Simulated deflections for SHRP section 1113 based on FWD test conducted on 13-May-2004.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 219.09 | 130.11 | 93.51 | 58.83 | 39.07 | 20.05 | 11.35 | 6.53 |
| Drop Height 2 | 309.58 | 196.05 | 142.17 | 90.49 | 60.84 | 32.20 | 19.00 | 11.55 |
| Drop Height 3 | 399.01 | 265.42 | 194.00 | 124.59 | 84.51 | 45.72 | 27.80 | 17.62 |
| Drop Height 4 | 502.01 | 350.19 | 257.99 | 167.06 | 114.15 | 62.83 | 39.12 | 25.62 |

**Table B-11. Simulated deflections for SHRP section 1116 based on FWD test conducted on 28-Apr-1998.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 310.95 | 198.17 | 152.92 | 107.27 | 77.75 | 43.65 | 14.62 |
| Drop Height 2 | 442.42 | 300.65 | 233.78 | 165.60 | 121.31 | 69.97 | 25.71 |
| Drop Height 3 | 564.08 | 400.82 | 313.47 | 223.55 | 164.91 | 96.82 | 37.85 |
| Drop Height 4 | 707.72 | 524.85 | 412.77 | 296.24 | 219.80 | 130.96 | 53.85 |

**Table B-12. Simulated deflections for SHRP section 2172 based on FWD test conducted on 20-Aug-1991.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 99.36 | 80.44 | 73.98 | 64.89 | 56.18 | 40.92 | 19.39 |
| Drop Height 2 | 150.63 | 127.73 | 117.79 | 103.91 | 90.57 | 67.03 | 33.21 |
| Drop Height 3 | 201.70 | 175.90 | 162.47 | 143.90 | 126.02 | 94.36 | 48.57 |
| Drop Height 4 | 277.95 | 249.29 | 230.37 | 204.88 | 180.28 | 136.58 | 73.05 |

**Table B-13. Simulated deflections for SHRP section 2176 based on FWD test conducted on 23-Jul-1997.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 141.28 | 89.04 | 74.20 | 58.15 | 45.46 | 27.48 | 9.19 |
| Drop Height 2 | 207.43 | 142.71 | 119.26 | 94.18 | 74.35 | 46.13 | 16.97 |
| Drop Height 3 | 264.29 | 192.01 | 160.64 | 127.43 | 101.22 | 63.81 | 24.94 |
| Drop Height 4 | 348.69 | 269.44 | 225.49 | 179.70 | 143.64 | 92.03 | 38.16 |

**Table B-14. Simulated deflections for SHRP section 3669 based on FWD test conducted on 09-Mar-2000.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 110.42 | 74.41 | 64.12 | 52.94 | 43.89 | 29.91 | 19.84 | 12.70 |
| Drop Height 2 | 151.34 | 109.42 | 94.60 | 78.57 | 65.59 | 45.47 | 30.88 | 20.39 |
| Drop Height 3 | 197.77 | 151.11 | 130.91 | 109.23 | 91.70 | 64.47 | 44.65 | 30.33 |
| Drop Height 4 | 243.28 | 193.66 | 167.87 | 140.51 | 118.43 | 84.09 | 59.03 | 40.88 |

**Table B-15. Simulated deflections for SHRP section 3679 based on FWD test conducted on 27-Mar-1990.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 120.82 | 82.20 | 69.68 | 55.10 | 43.28 | 26.29 | 8.81 |
| Drop Height 2 | 180.16 | 131.98 | 112.19 | 89.43 | 70.94 | 44.24 | 16.35 |
| Drop Height 3 | 232.00 | 177.97 | 151.43 | 121.30 | 96.80 | 61.32 | 24.07 |
| Drop Height 4 | 276.86 | 219.26 | 186.61 | 149.96 | 120.14 | 76.87 | 31.31 |

**Table B-16. Simulated deflections for SHRP section 3729 based on FWD test conducted on 16-Feb-2002.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 118.23 | 103.69 | 98.47 | 90.64 | 82.56 | 66.79 | 52.40 | 40.06 |
| Drop Height 2 | 186.18 | 168.52 | 160.43 | 148.32 | 135.73 | 110.91 | 87.81 | 67.44 |
| Drop Height 3 | 241.66 | 222.13 | 211.74 | 196.33 | 180.27 | 148.49 | 118.74 | 92.31 |
| Drop Height 4 | 314.63 | 293.26 | 279.83 | 260.18 | 239.68 | 198.98 | 160.76 | 126.66 |

**Table B-17. Simulated deflections for SHRP section 3835 based on FWD test conducted on 19-Feb-1999.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 97.66 | 80.54 | 72.84 | 61.84 | 51.69 | 35.02 | 14.40 |
| Drop Height 2 | 147.20 | 125.82 | 114.17 | 97.53 | 82.09 | 56.64 | 24.72 |
| Drop Height 3 | 200.06 | 175.10 | 159.24 | 136.66 | 115.64 | 80.87 | 37.00 |
| Drop Height 4 | 243.78 | 216.46 | 197.08 | 169.64 | 144.01 | 101.52 | 47.74 |

**Table B-18. Simulated deflections for SHRP section 6079 based on FWD test conducted on 06-Nov-1991.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 103.13 | 81.68 | 73.27 | 61.44 | 50.61 | 33.07 | 12.20 |
| Drop Height 2 | 152.80 | 126.51 | 113.86 | 96.08 | 79.75 | 53.18 | 21.14 |
| Drop Height 3 | 207.42 | 176.92 | 159.59 | 135.35 | 112.98 | 76.49 | 32.22 |
| Drop Height 4 | 269.42 | 235.29 | 212.50 | 180.94 | 151.73 | 103.93 | 45.69 |

**Table B-19. Simulated deflections for SHRP section 9005 based on FWD test conducted on 13-Aug-2009.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 304.98 | 214.50 | 164.73 | 110.64 | 75.69 | 38.80 | 21.54 | 12.22 |
| Drop Height 2 | 475.11 | 348.07 | 269.90 | 183.65 | 127.44 | 67.78 | 39.59 | 24.03 |
| Drop Height 3 | 631.90 | 476.81 | 372.60 | 255.82 | 179.14 | 97.44 | 58.71 | 37.20 |
| Drop Height 4 | 781.02 | 603.54 | 474.84 | 328.30 | 231.35 | 127.70 | 78.50 | 51.12 |

**Table B-20. Simulated deflections for SHRP section A502 based on FWD test conducted on 29-Apr-1991.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 111.98 | 90.77 | 82.19 | 70.21 | 59.30 | 41.57 | 19.48 |
| Drop Height 2 | 155.13 | 130.12 | 118.13 | 101.43 | 86.13 | 61.17 | 29.57 |
| Drop Height 3 | 207.60 | 178.96 | 162.84 | 140.50 | 119.97 | 86.32 | 43.37 |
| Drop Height 4 | 267.08 | 235.31 | 214.42 | 185.78 | 159.36 | 115.93 | 60.21 |

**Table B-21. Simulated deflections for SHRP section A504 based on FWD test conducted on 25-Apr-2002.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 118.03 | 84.33 | 77.01 | 67.62 | 58.72 | 43.04 | 30.37 | 20.64 |
| Drop Height 2 | 165.28 | 127.14 | 116.24 | 102.54 | 89.55 | 66.53 | 47.75 | 33.12 |
| Drop Height 3 | 220.72 | 179.26 | 163.89 | 145.14 | 127.36 | 95.76 | 69.87 | 49.57 |
| Drop Height 4 | 287.53 | 244.16 | 222.81 | 197.93 | 174.38 | 132.43 | 97.96 | 70.83 |

**Table B-22. Simulated deflections for SHRP section A505 based on FWD test conducted on 15-Jul-1993.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 104.78 | 82.55 | 75.92 | 66.59 | 57.65 | 41.96 | 20.00 |
| Drop Height 2 | 145.17 | 119.62 | 110.23 | 97.08 | 84.43 | 62.15 | 30.45 |
| Drop Height 3 | 204.21 | 175.07 | 161.60 | 142.96 | 125.00 | 93.22 | 47.61 |
| Drop Height 4 | 261.24 | 229.73 | 212.11 | 188.24 | 165.19 | 124.31 | 65.38 |

**Table B-23. Simulated deflections for SHRP section A507 based on FWD test conducted on 01-May-1991.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 119.90 | 97.37 | 87.69 | 74.24 | 62.14 | 42.91 | 19.79 |
| Drop Height 2 | 163.33 | 136.84 | 123.58 | 105.14 | 88.49 | 61.90 | 29.46 |
| Drop Height 3 | 218.36 | 187.84 | 170.06 | 145.43 | 123.08 | 87.27 | 43.21 |
| Drop Height 4 | 278.99 | 245.04 | 222.21 | 190.83 | 162.27 | 116.34 | 59.53 |

**Table B-24. Simulated deflections for SHRP section A508 based on FWD test conducted on 30-Apr-1991.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 105.94 | 87.30 | 79.66 | 68.85 | 58.79 | 42.02 | 20.19 |
| Drop Height 2 | 145.53 | 123.69 | 113.15 | 98.25 | 84.33 | 61.01 | 30.19 |
| Drop Height 3 | 194.71 | 169.75 | 155.61 | 135.74 | 117.12 | 85.79 | 44.04 |
| Drop Height 4 | 249.11 | 221.51 | 203.33 | 178.05 | 154.28 | 114.17 | 60.46 |

**Table B-25. Simulated deflections for SHRP section B310 based on FWD test conducted on 24-Apr-2002.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 111.81 | 88.84 | 80.40 | 68.77 | 58.16 | 40.83 | 28.10 | 19.04 |
| Drop Height 2 | 160.07 | 132.76 | 120.48 | 103.62 | 88.17 | 62.80 | 43.97 | 30.32 |
| Drop Height 3 | 213.39 | 182.42 | 165.88 | 143.35 | 122.63 | 88.49 | 63.01 | 44.42 |
| Drop Height 4 | 273.99 | 239.98 | 218.47 | 189.55 | 162.89 | 118.81 | 85.82 | 61.64 |

**Table B-26. Simulated deflections for SHRP section B320 based on FWD test conducted on 24-Apr-2002.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 | D8 |
| Drop Height 1 | 136.14 | 102.40 | 90.69 | 75.32 | 62.01 | 41.71 | 27.88 | 18.53 |
| Drop Height 2 | 192.64 | 152.71 | 135.66 | 113.37 | 93.99 | 64.26 | 43.80 | 29.72 |
| Drop Height 3 | 250.19 | 205.47 | 182.90 | 153.61 | 128.07 | 88.75 | 61.55 | 42.71 |
| Drop Height 4 | 316.89 | 268.12 | 238.92 | 201.55 | 168.87 | 118.38 | 83.34 | 58.99 |

**Table B-27. Simulated deflections for SHRP section D310 based on FWD test conducted on 20-Aug-1991.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 96.24 | 77.51 | 71.44 | 63.10 | 55.11 | 40.89 | 20.20 |
| Drop Height 2 | 143.55 | 121.20 | 111.98 | 99.44 | 87.38 | 65.82 | 33.84 |
| Drop Height 3 | 194.05 | 168.99 | 156.34 | 139.40 | 123.08 | 93.79 | 50.07 |
| Drop Height 4 | 259.61 | 232.33 | 215.01 | 192.41 | 170.60 | 131.35 | 72.48 |

**Table B-28. Simulated deflections for SHRP section D320 based on FWD test conducted on 20-Aug-1991.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 90.82 | 73.21 | 67.40 | 59.41 | 51.84 | 38.53 | 19.23 |
| Drop Height 2 | 137.27 | 116.09 | 107.20 | 95.05 | 83.49 | 63.02 | 32.73 |
| Drop Height 3 | 186.19 | 162.34 | 150.15 | 133.71 | 118.03 | 90.18 | 48.65 |
| Drop Height 4 | 252.38 | 226.21 | 209.35 | 187.16 | 165.96 | 128.19 | 71.60 |

**Table B-29. Simulated deflections for SHRP section D330 based on FWD test conducted on 20-Aug-1991.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 83.37 | 66.64 | 61.59 | 54.71 | 48.15 | 36.41 | 18.88 |
| Drop Height 2 | 126.63 | 106.64 | 98.82 | 88.29 | 78.19 | 60.00 | 32.19 |
| Drop Height 3 | 169.30 | 147.07 | 136.49 | 122.44 | 108.93 | 84.52 | 46.93 |
| Drop Height 4 | 235.43 | 211.12 | 195.99 | 176.54 | 157.82 | 123.89 | 71.33 |

**Table B-30. Simulated deflections for SHRP section D350 based on FWD test conducted on 20-Aug-1991.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 114.49 | 89.96 | 81.89 | 70.84 | 60.51 | 42.97 | 19.42 |
| Drop Height 2 | 173.22 | 143.59 | 131.08 | 114.08 | 98.15 | 70.91 | 33.75 |
| Drop Height 3 | 218.42 | 185.88 | 169.90 | 148.37 | 128.15 | 93.52 | 46.02 |
| Drop Height 4 | 302.01 | 265.86 | 243.10 | 213.24 | 185.16 | 136.85 | 70.25 |

**Table B-31. Simulated deflections for SHRP section M310 based on FWD test conducted on 28-Mar-1997.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 906.96 | 431.28 | 347.09 | 265.82 | 206.73 | 126.51 | 33.35 |
| Drop Height 2 | 1295.78 | 727.40 | 586.26 | 452.91 | 356.00 | 223.84 | 62.12 |
| Drop Height 3 | 1659.43 | 1037.27 | 834.80 | 648.48 | 513.36 | 328.78 | 95.94 |
| Drop Height 4 | 2010.94 | 1363.55 | 1092.51 | 851.65 | 677.55 | 439.43 | 135.53 |

**Table B-32. Simulated deflections for SHRP section M320 based on FWD test conducted on 28-Mar-1997.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 713.66 | 302.71 | 243.19 | 193.76 | 157.03 | 102.22 | 39.41 |
| Drop Height 2 | 1006.22 | 516.08 | 413.88 | 331.97 | 271.60 | 181.16 | 75.21 |
| Drop Height 3 | 1267.23 | 737.28 | 588.41 | 473.61 | 389.88 | 264.40 | 116.31 |
| Drop Height 4 | 1516.48 | 972.67 | 770.57 | 621.17 | 513.53 | 352.26 | 161.28 |

**Table B-33. Simulated deflections for SHRP section M330 based on FWD test conducted on 28-Mar-1997.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 764.31 | 306.51 | 247.17 | 197.03 | 159.60 | 103.55 | 39.42 |
| Drop Height 2 | 1048.41 | 515.39 | 415.08 | 333.05 | 272.28 | 180.93 | 74.16 |
| Drop Height 3 | 1311.66 | 738.89 | 592.37 | 477.02 | 392.41 | 265.17 | 115.36 |
| Drop Height 4 | 1566.09 | 980.03 | 779.14 | 628.54 | 519.26 | 355.00 | 160.93 |

**Table B-34. Simulated deflections for SHRP section M340 based on FWD test conducted on 28-Mar-1997.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 753.97 | 319.49 | 244.40 | 179.54 | 135.88 | 80.24 | 27.54 |
| Drop Height 2 | 1044.32 | 526.10 | 402.13 | 297.86 | 227.88 | 138.36 | 51.96 |
| Drop Height 3 | 1308.84 | 743.78 | 566.40 | 421.66 | 324.92 | 201.08 | 80.77 |
| Drop Height 4 | 1561.36 | 976.01 | 738.53 | 551.34 | 426.99 | 267.76 | 112.62 |

**Table B-35. Simulated deflections for SHRP section M350 based on FWD test conducted on 28-Mar-1997.**

| Sensor Offset | Predicted Deflections (micrometers, µm) | | | | | | |
|---|---|---|---|---|---|---|---|
| (mm) | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
| Drop Height 1 | 775.97 | 299.27 | 232.30 | 175.96 | 136.76 | 83.49 | 29.40 |
| Drop Height 2 | 1037.31 | 487.89 | 378.09 | 288.42 | 226.38 | 141.81 | 54.42 |
| Drop Height 3 | 1278.59 | 689.97 | 531.86 | 407.36 | 321.87 | 205.28 | 84.02 |
| Drop Height 4 | 1519.07 | 917.19 | 700.18 | 537.41 | 426.65 | 275.63 | 118.07 |

# APPENDIX C: COMPUTER SIMULATION FOR FWD FOR THE 35 SHRP PAVMENT SECTIONS

Note: Y-axis range is considered constant to distinguish the difference in deflection between four drop heights.

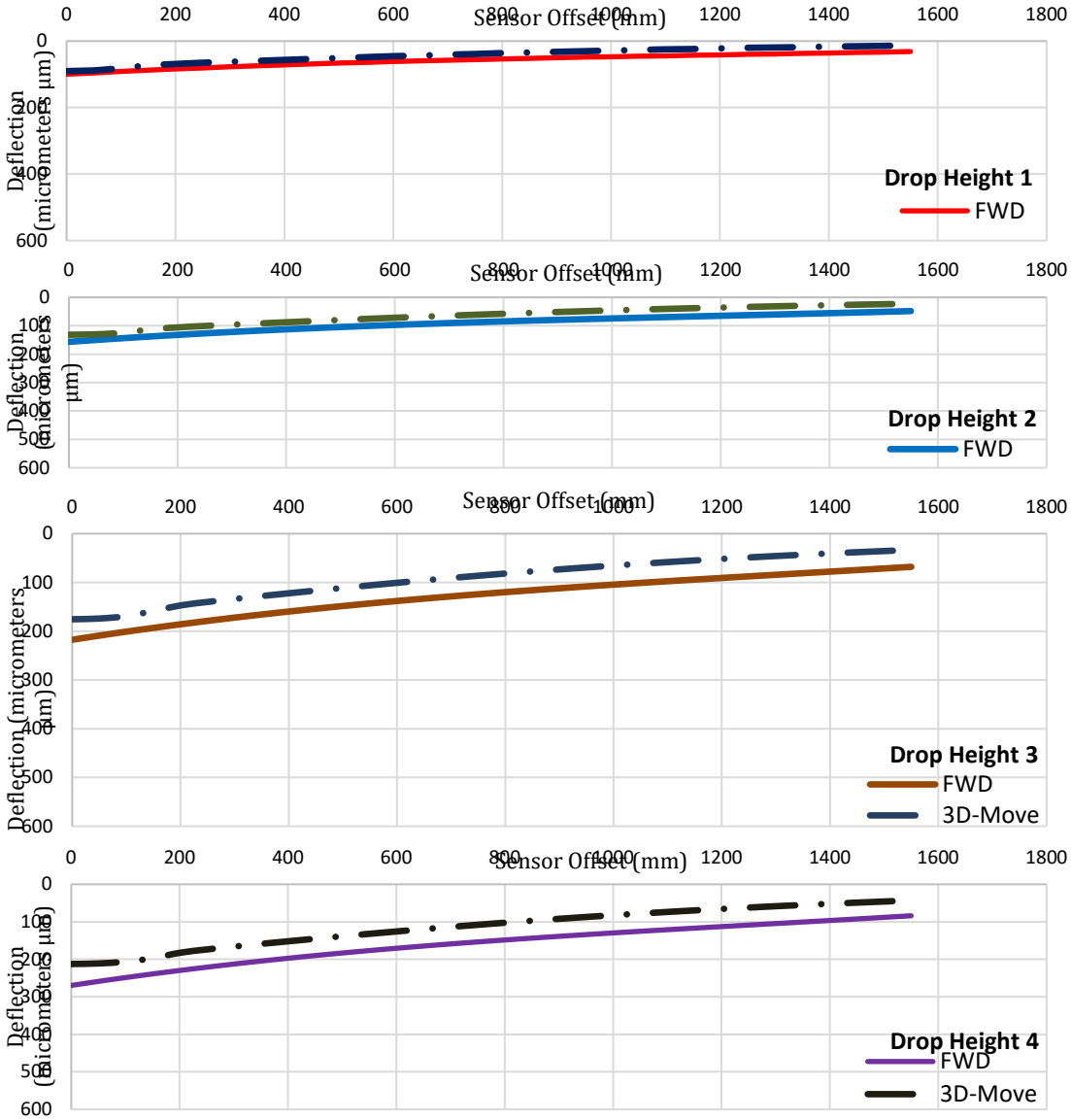


**Figure C-1. Simulated Deflection Bowl for the SHRP section 1046.**

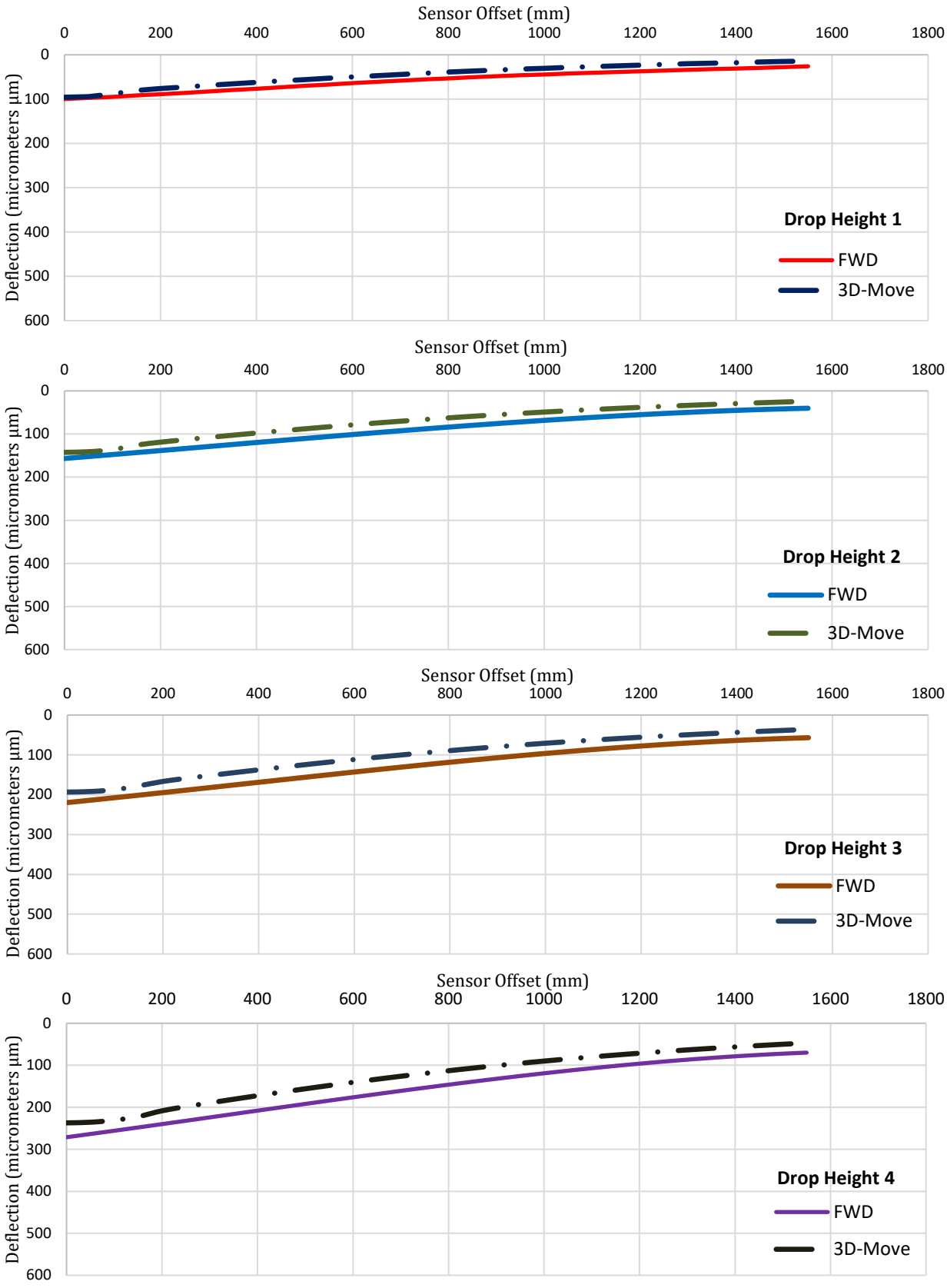


**Figure C-2. Simulated Deflection Bowl for the SHRP section 1047.**

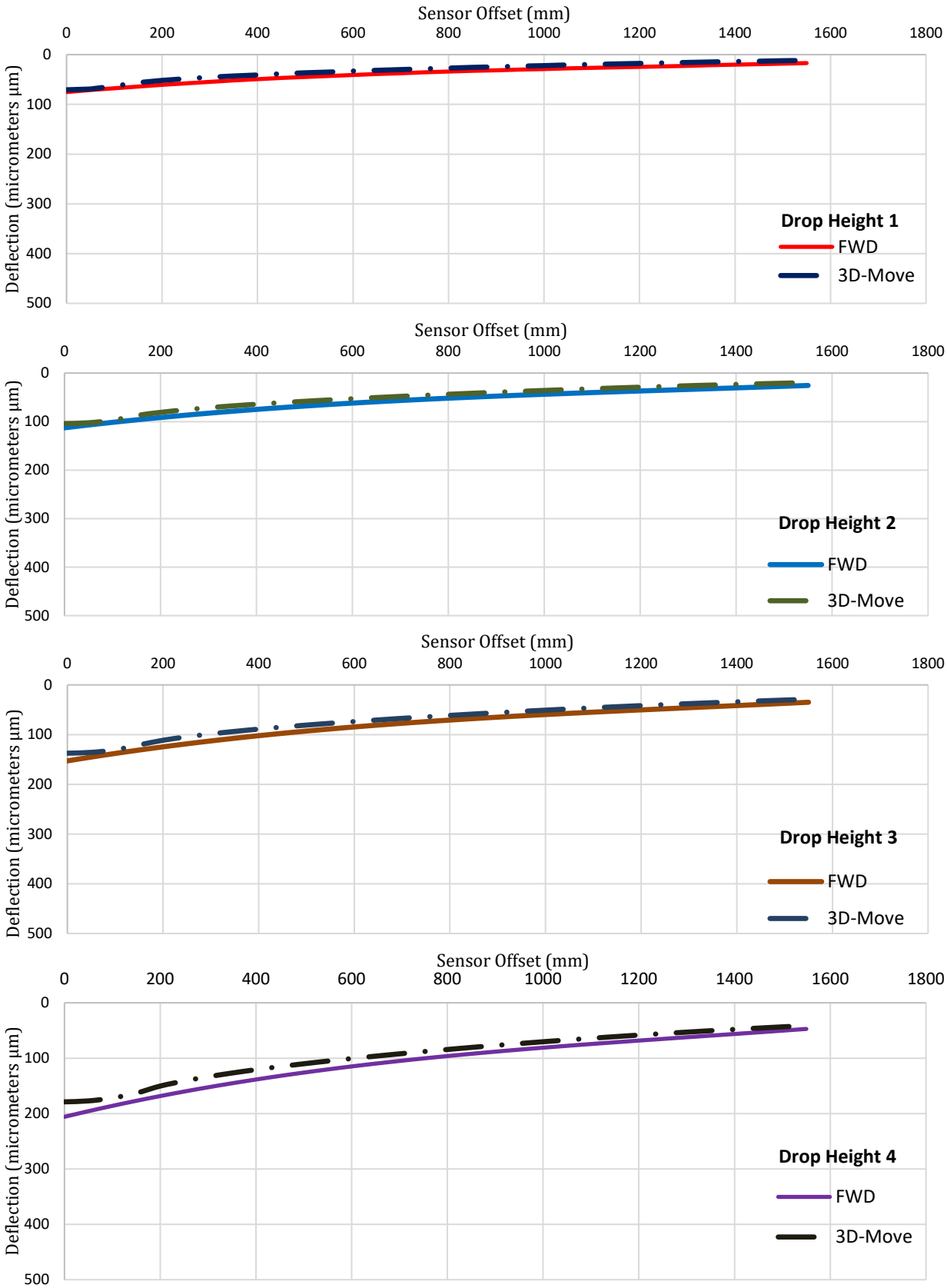


**Figure C-3. Simulated Deflection Bowl for the SHRP section 1049.**

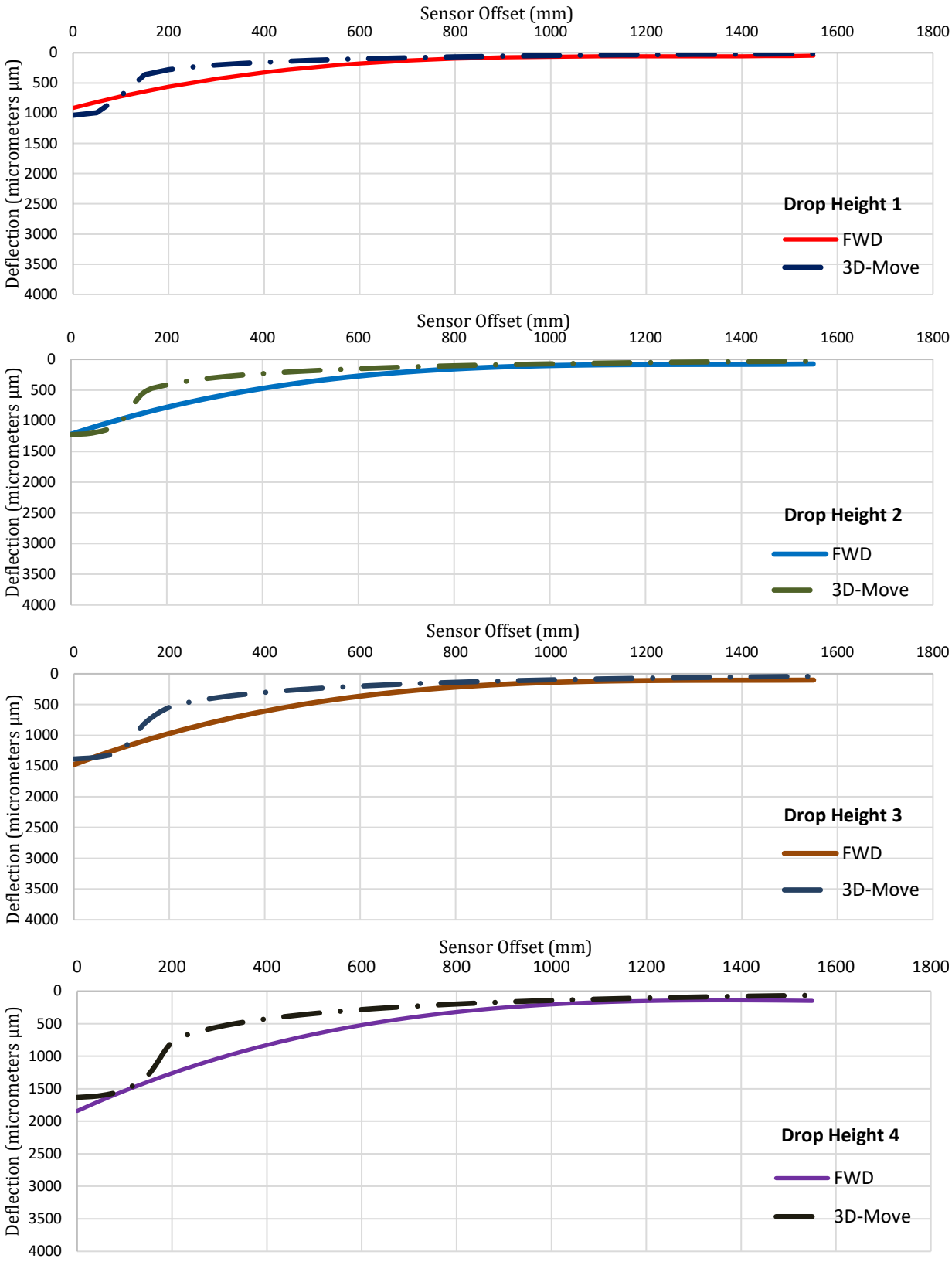


**Figure C-4. Simulated Deflection Bowl for the SHRP section 1056.**

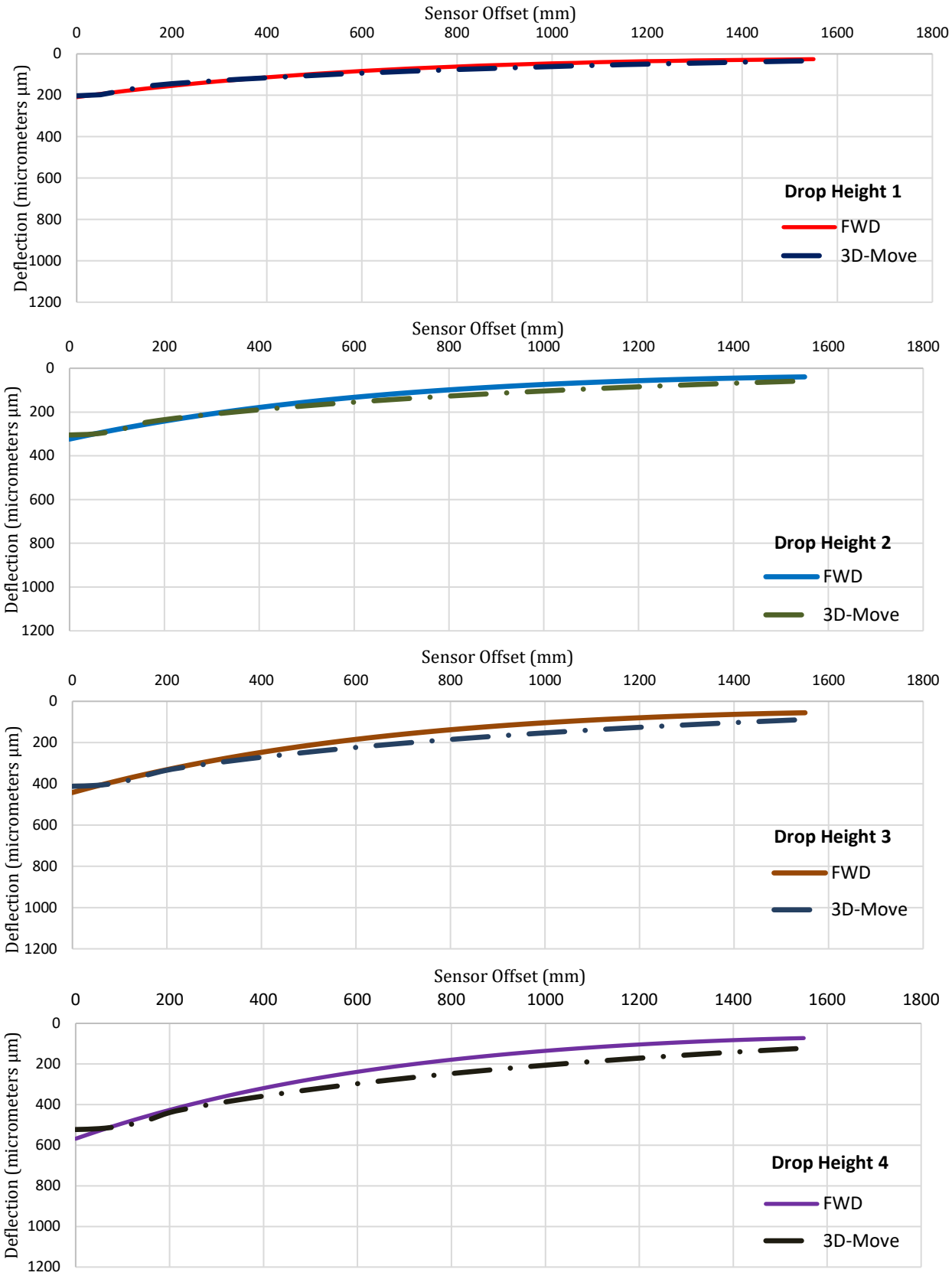


**Figure C-5. Simulated Deflection Bowl for the SHRP section 1068.**

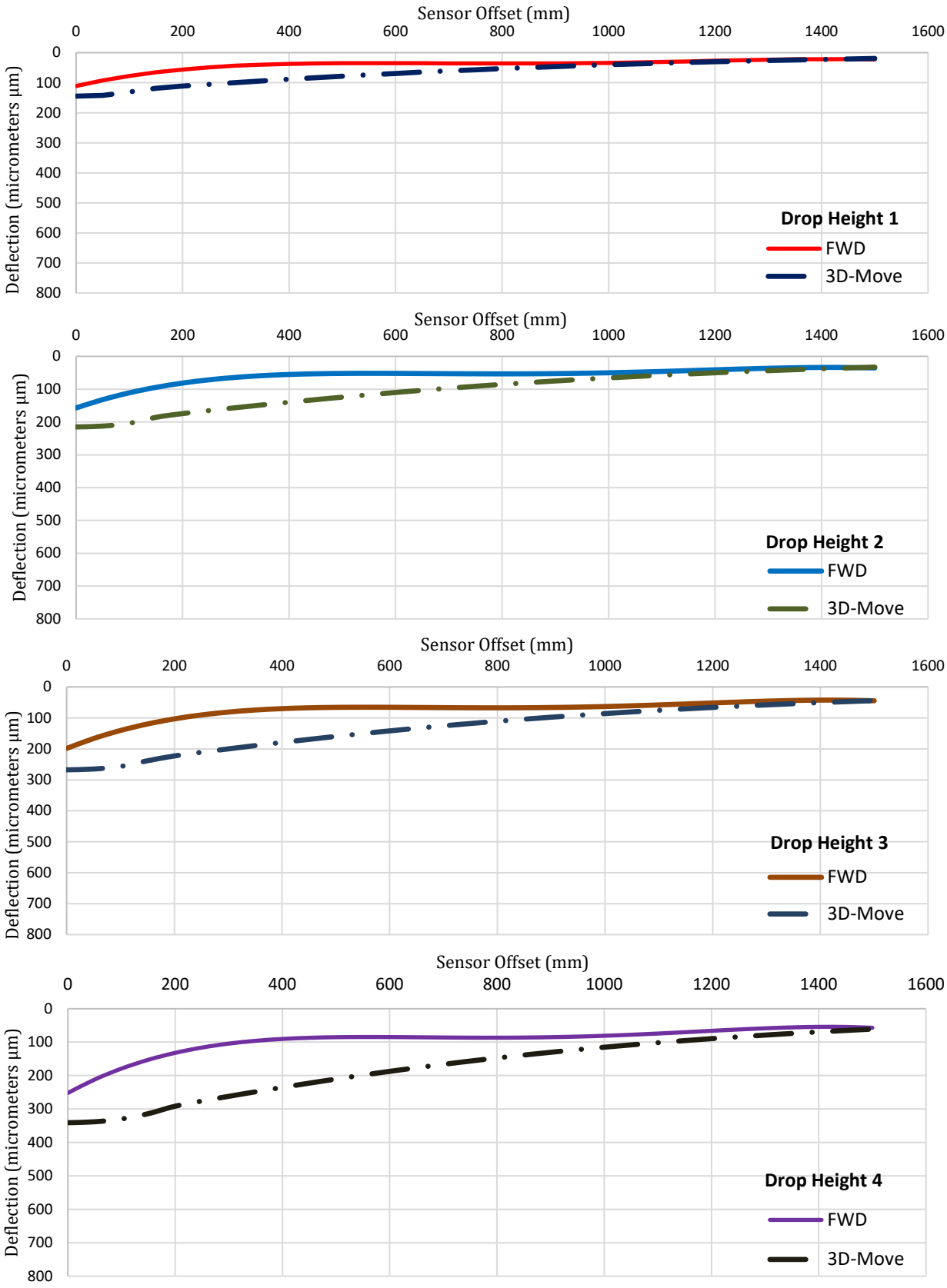


**Figure C-6. Simulated Deflection Bowl for the SHRP section 1069.**

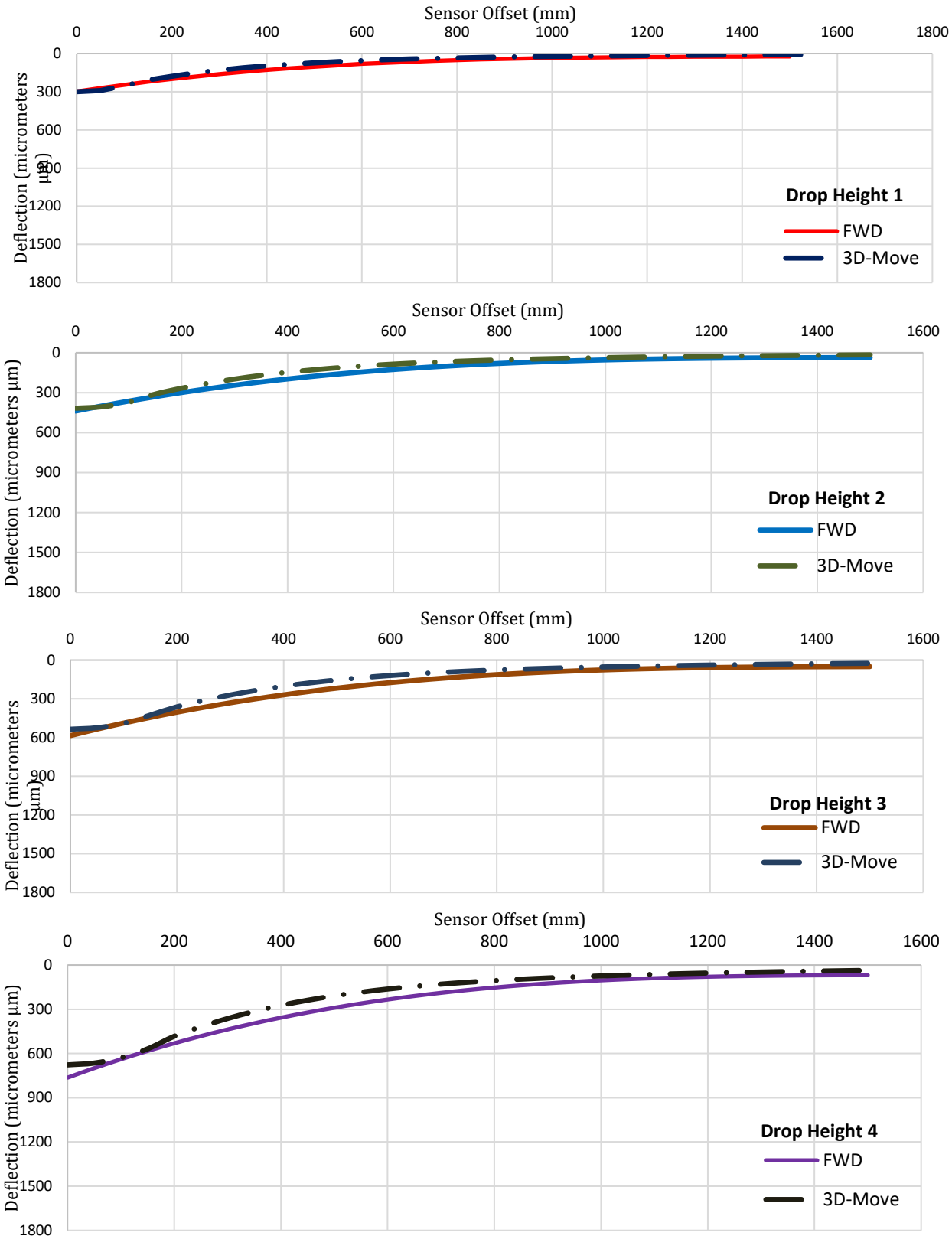


**Figure C-7. Simulated Deflection Bowl for the SHRP section 1076.**

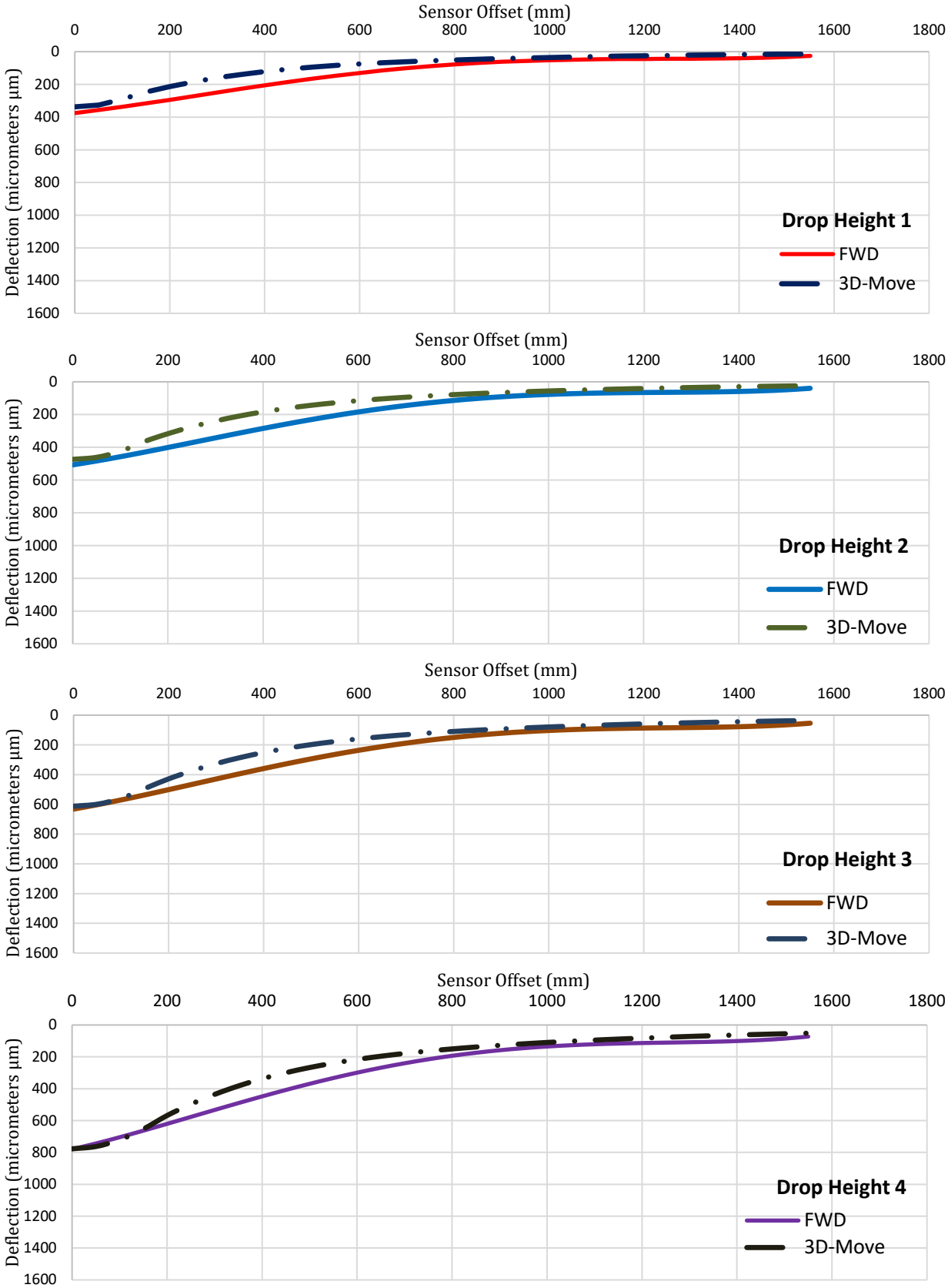


**Figure C-8. Simulated Deflection Bowl for the SHRP section 1093.**

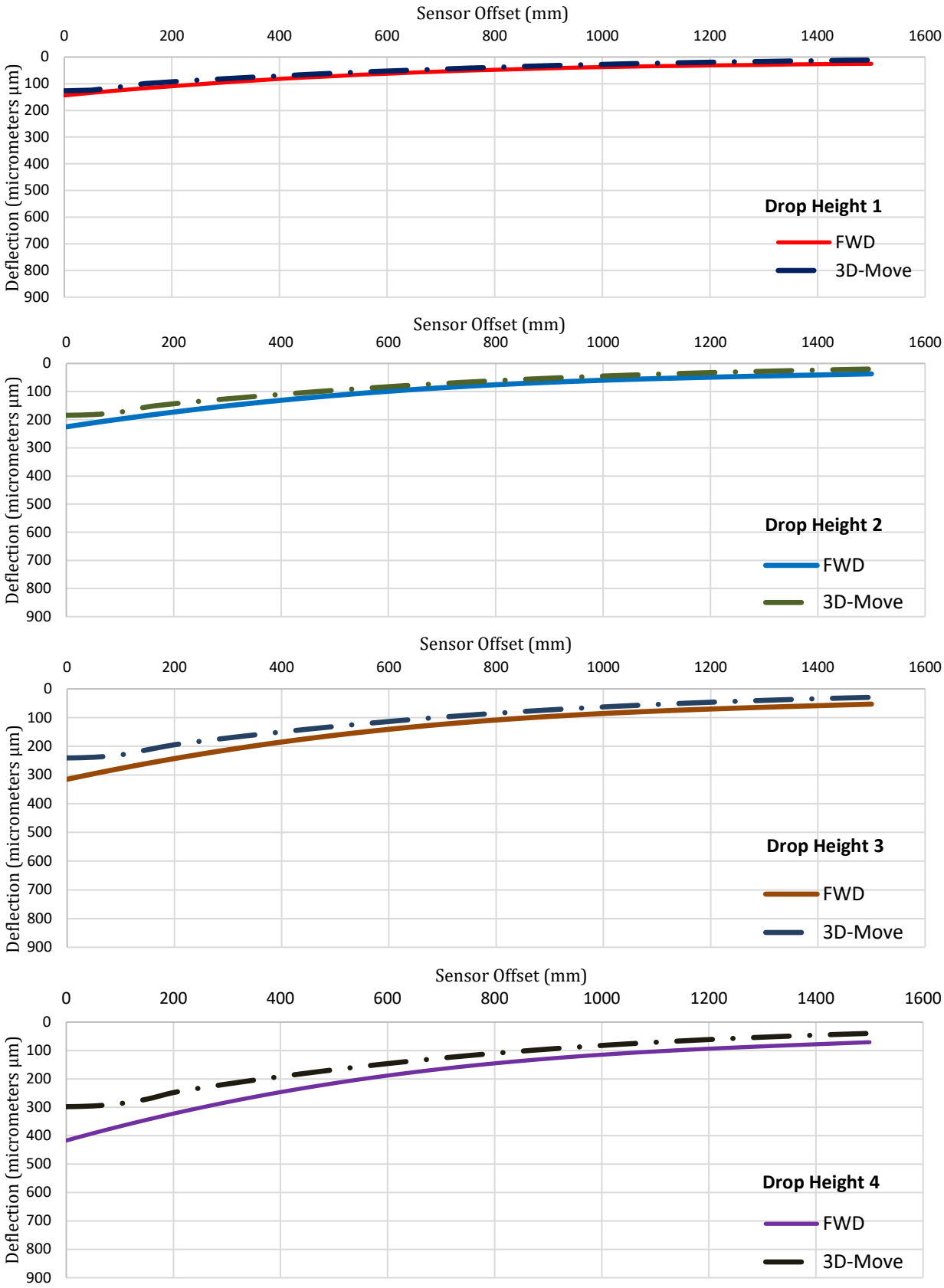


**Figure C-9. Simulated Deflection Bowl for the SHRP section 1111.**

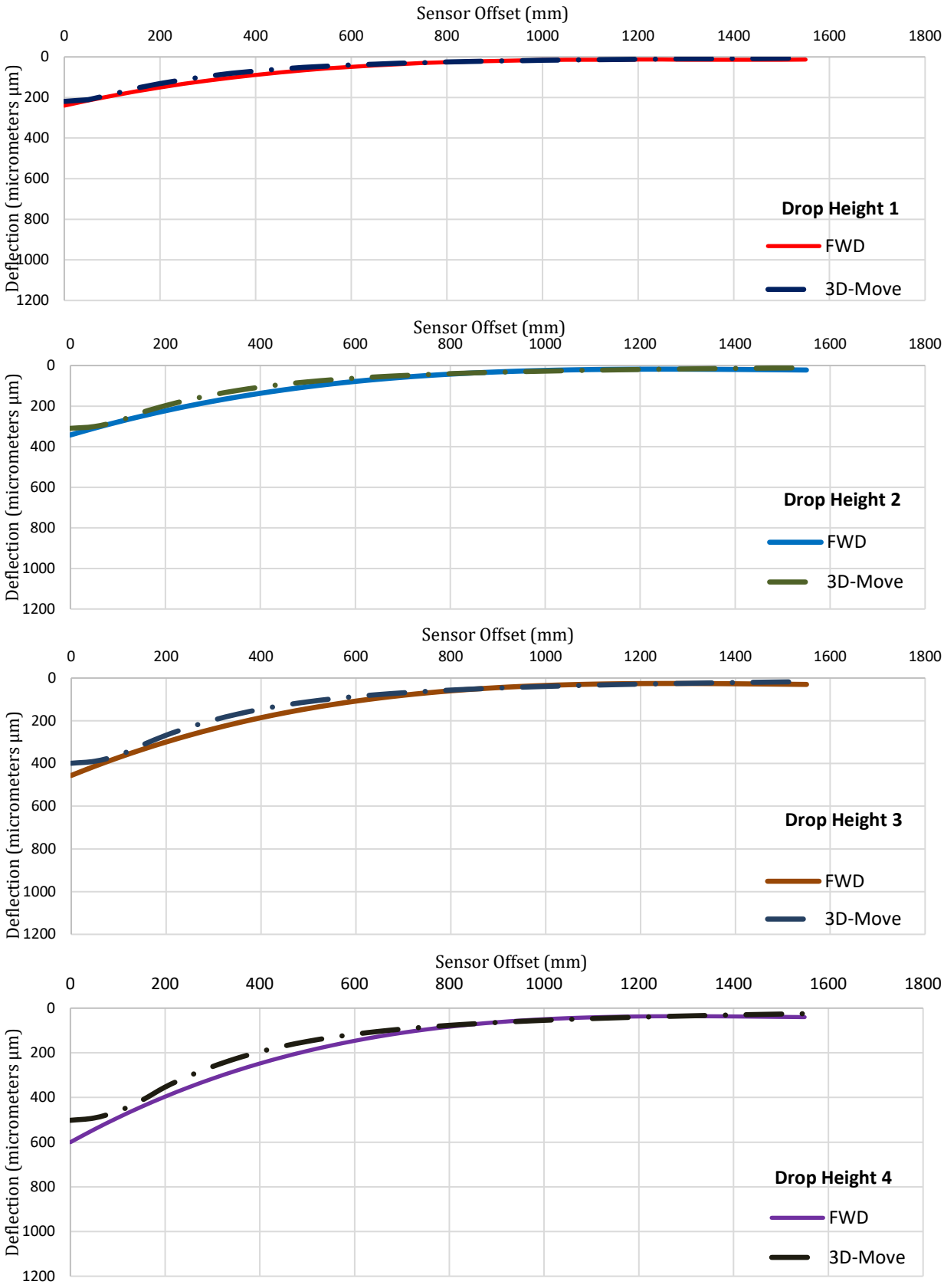


**Figure C-10. Simulated Deflection Bowl for the SHRP section 1113.**

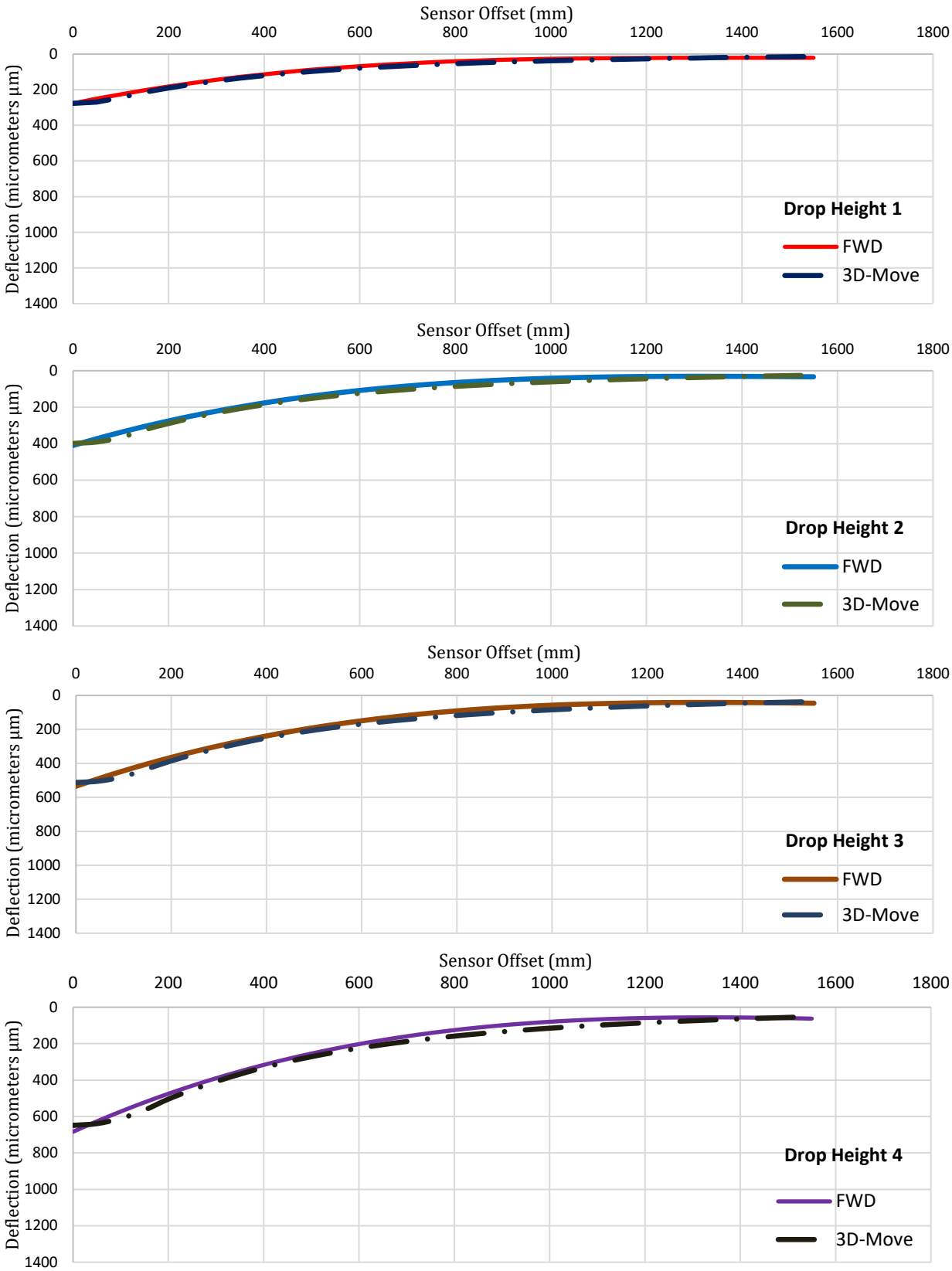


**Figure C-11. Simulated Deflection Bowl for the SHRP section 1116.**

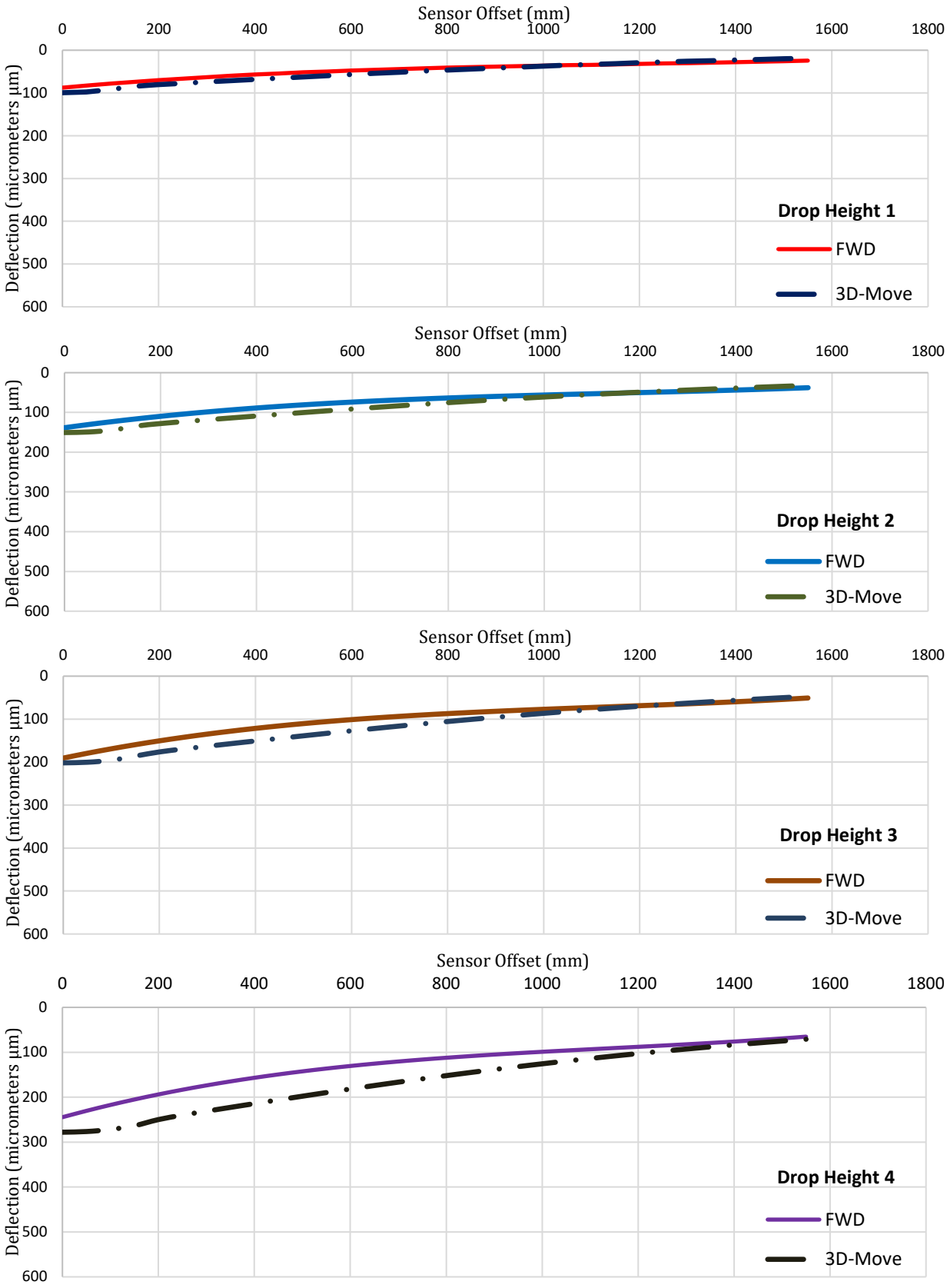


**Figure C-12. Simulated Deflection Bowl for the SHRP section 2172.**

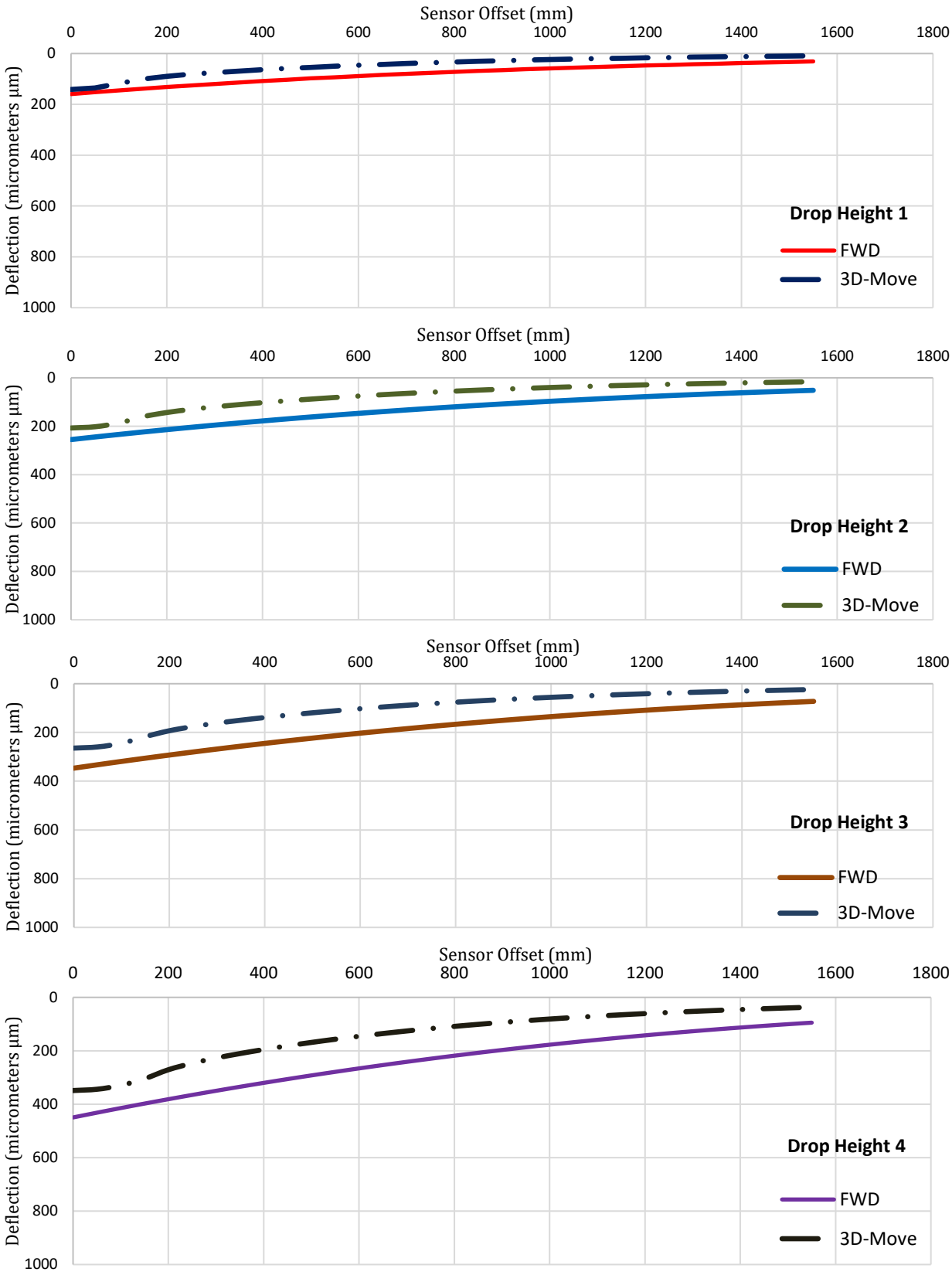


**Figure C-13. Simulated Deflection Bowl for the SHRP section 2176.**

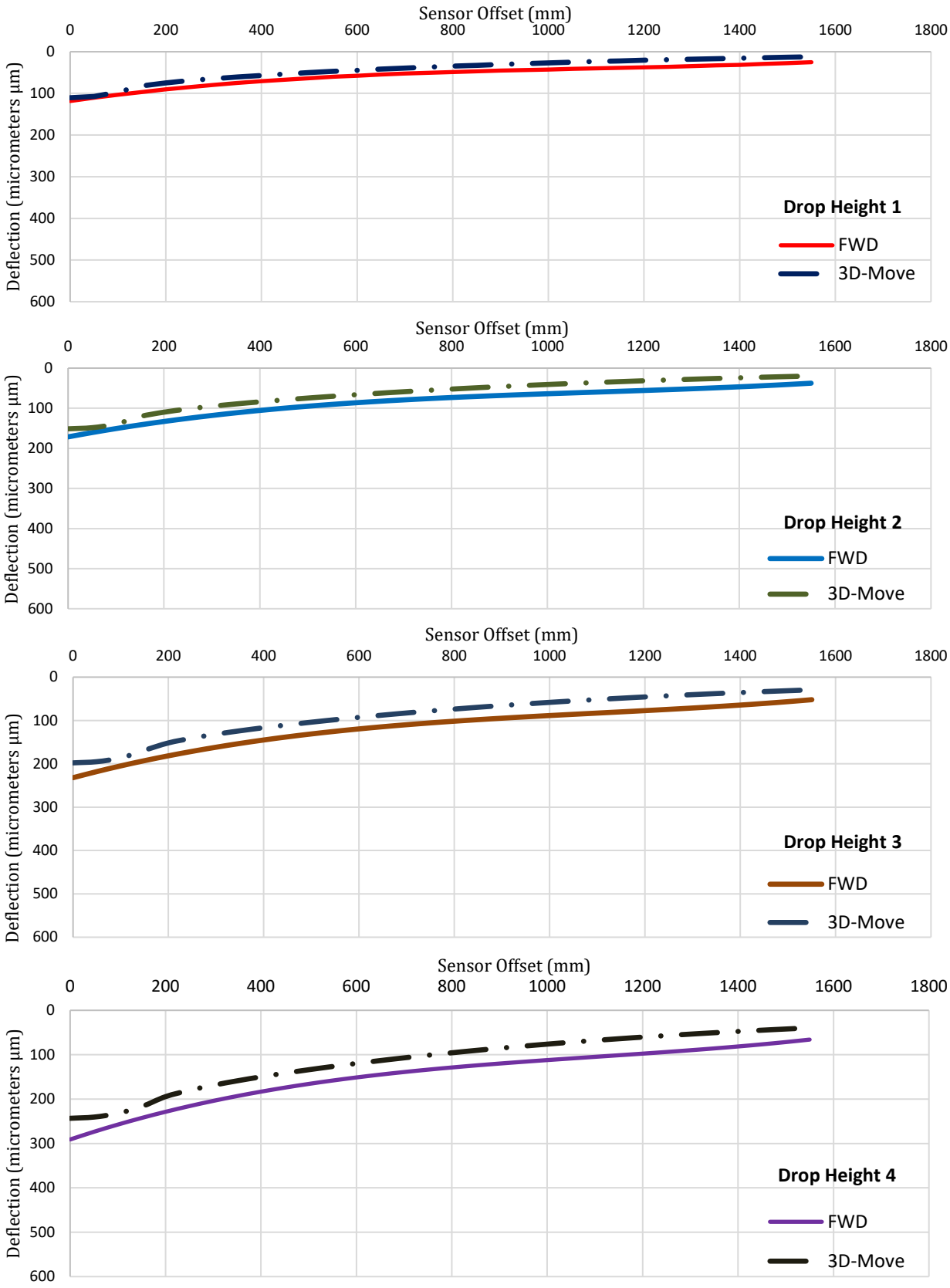


**Figure C-14. Simulated Deflection Bowl for the SHRP section 3669.**

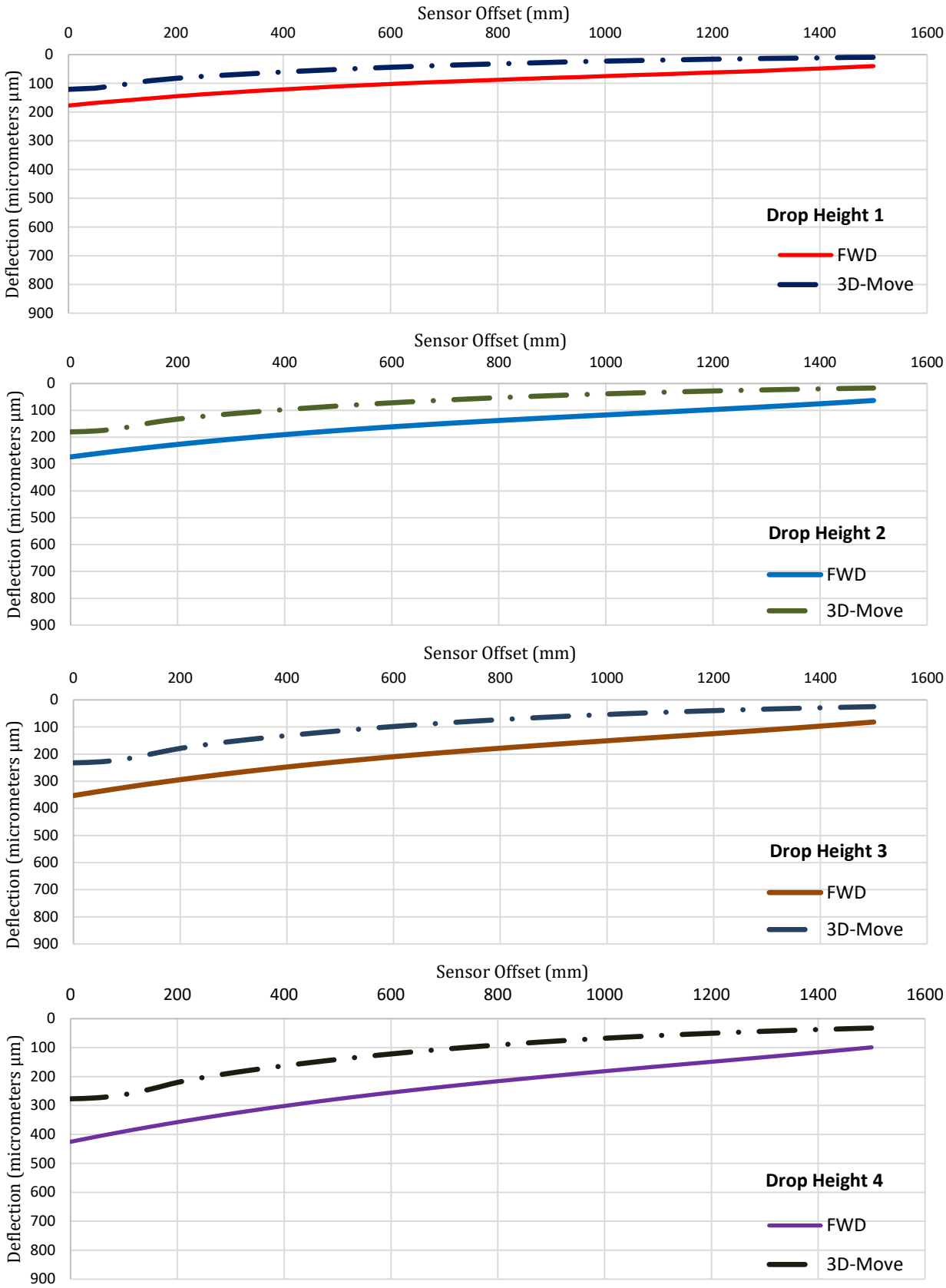


**Figure C-15. Simulated Deflection Bowl for the SHRP section 3679.**

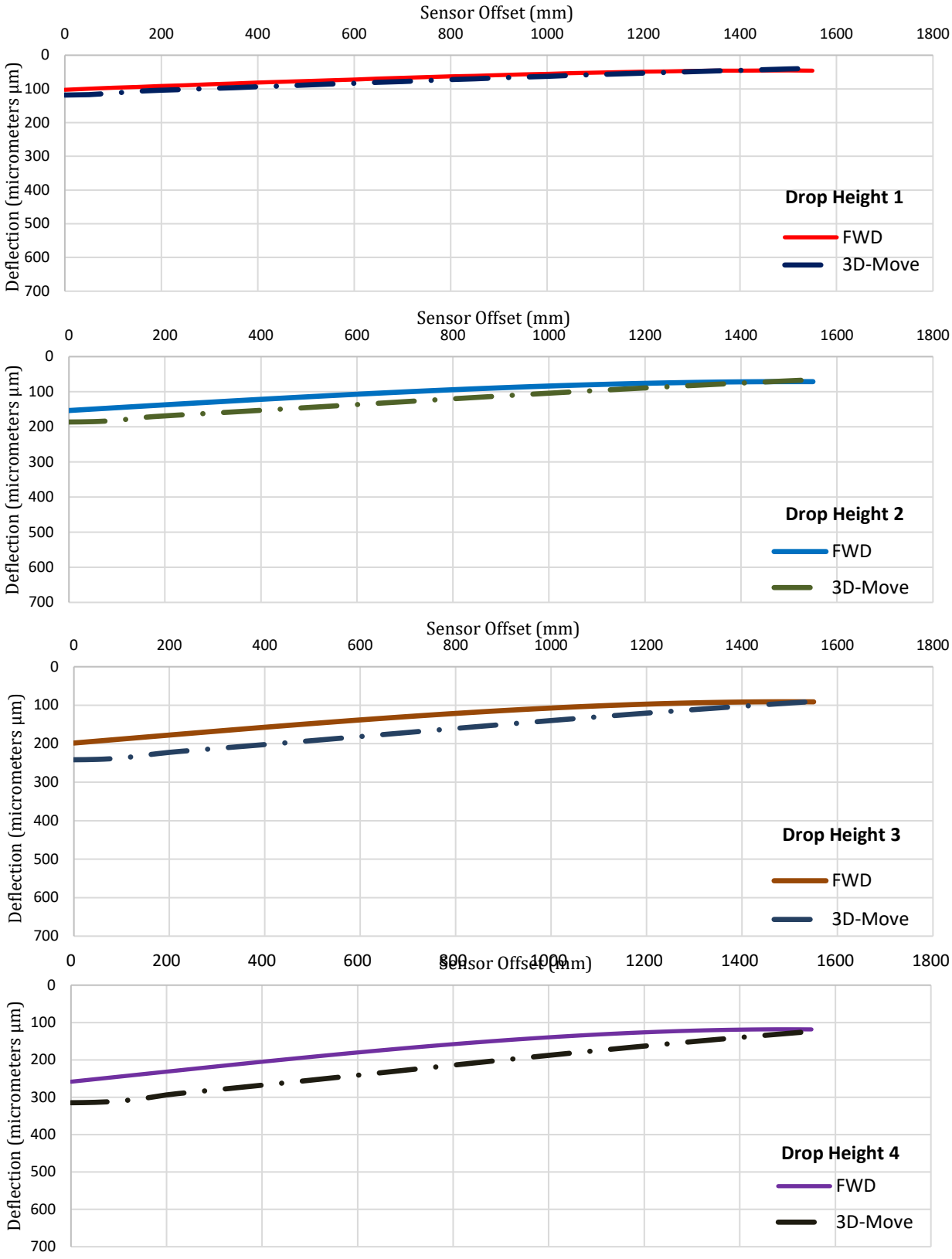


**Figure C-16. Simulated Deflection Bowl for the SHRP section 3729.**

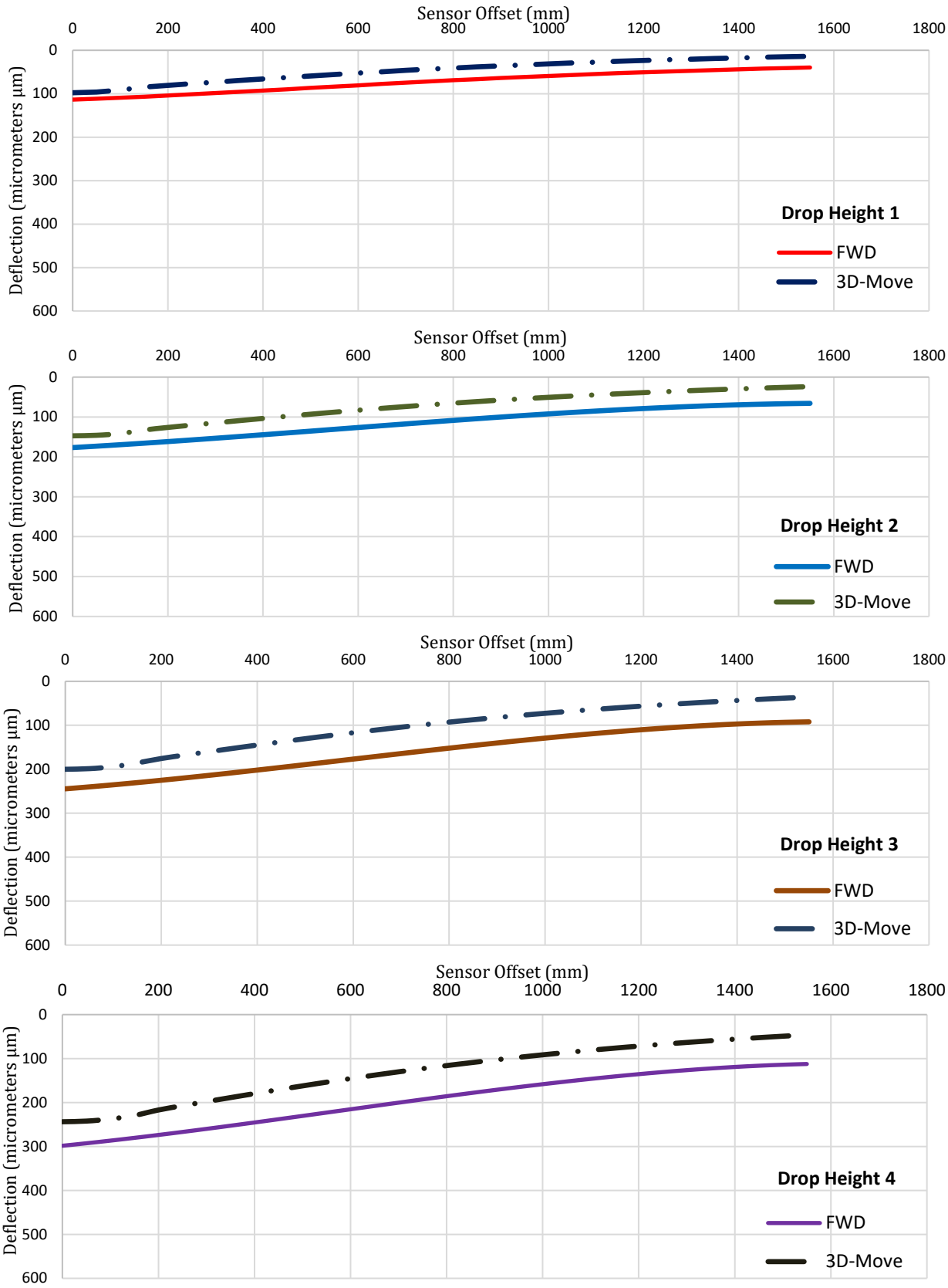


**Figure C-17. Simulated Deflection Bowl for the SHRP section 3835.**

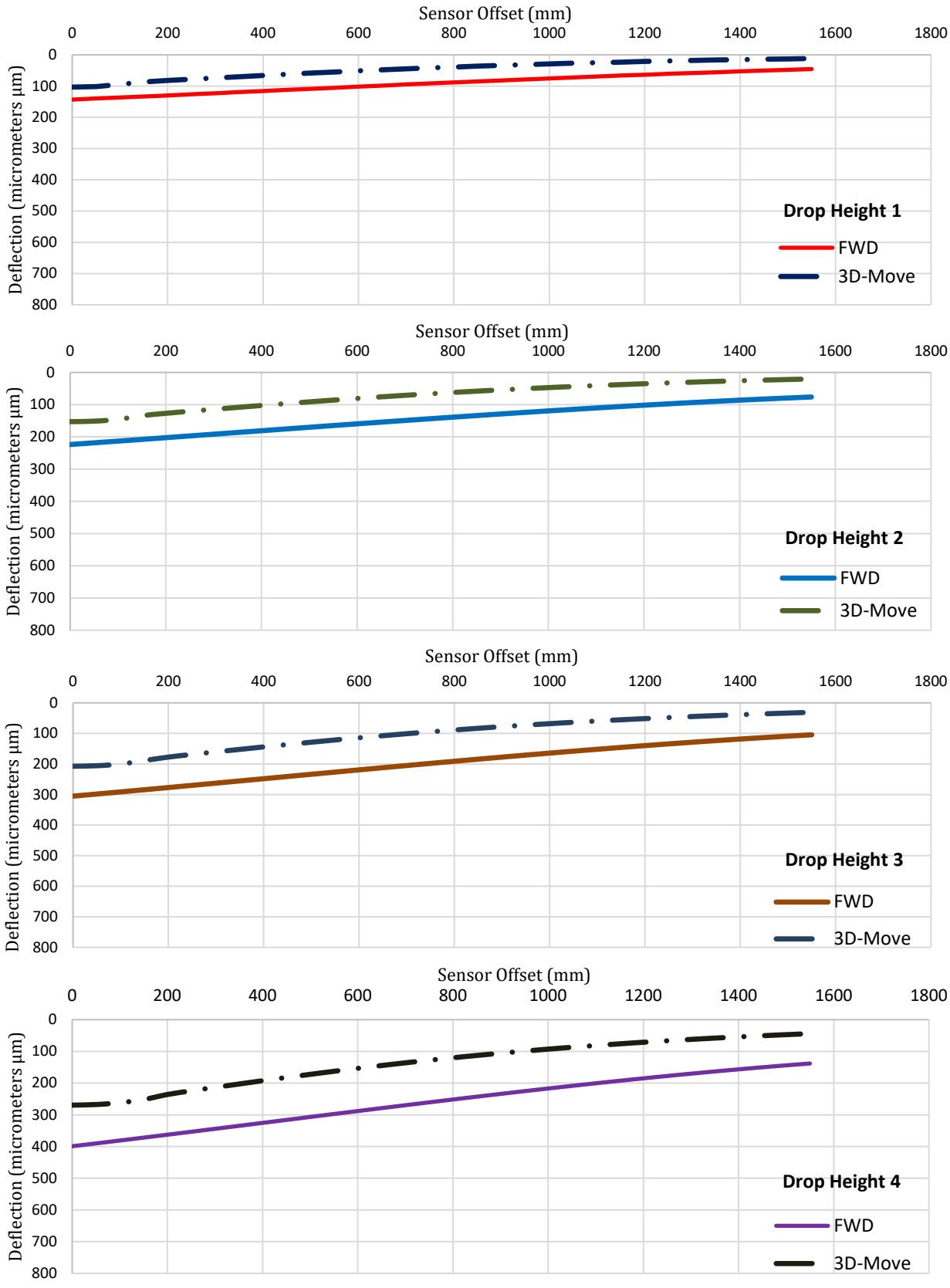


**Figure C-18. Simulated Deflection Bowl for the SHRP section 6079.**

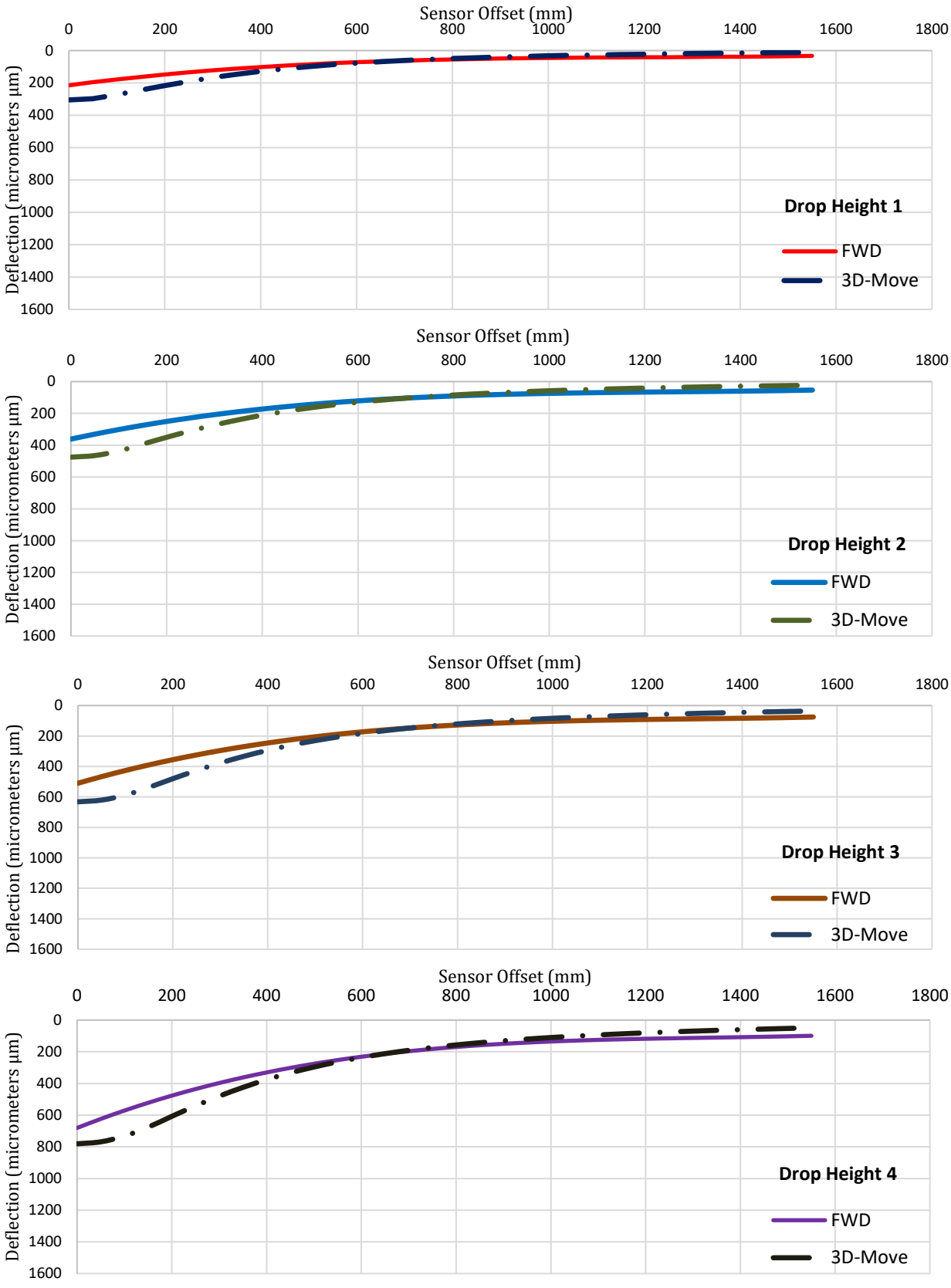


**Figure C-19. Simulated Deflection Bowl for the SHRP section 9005.**

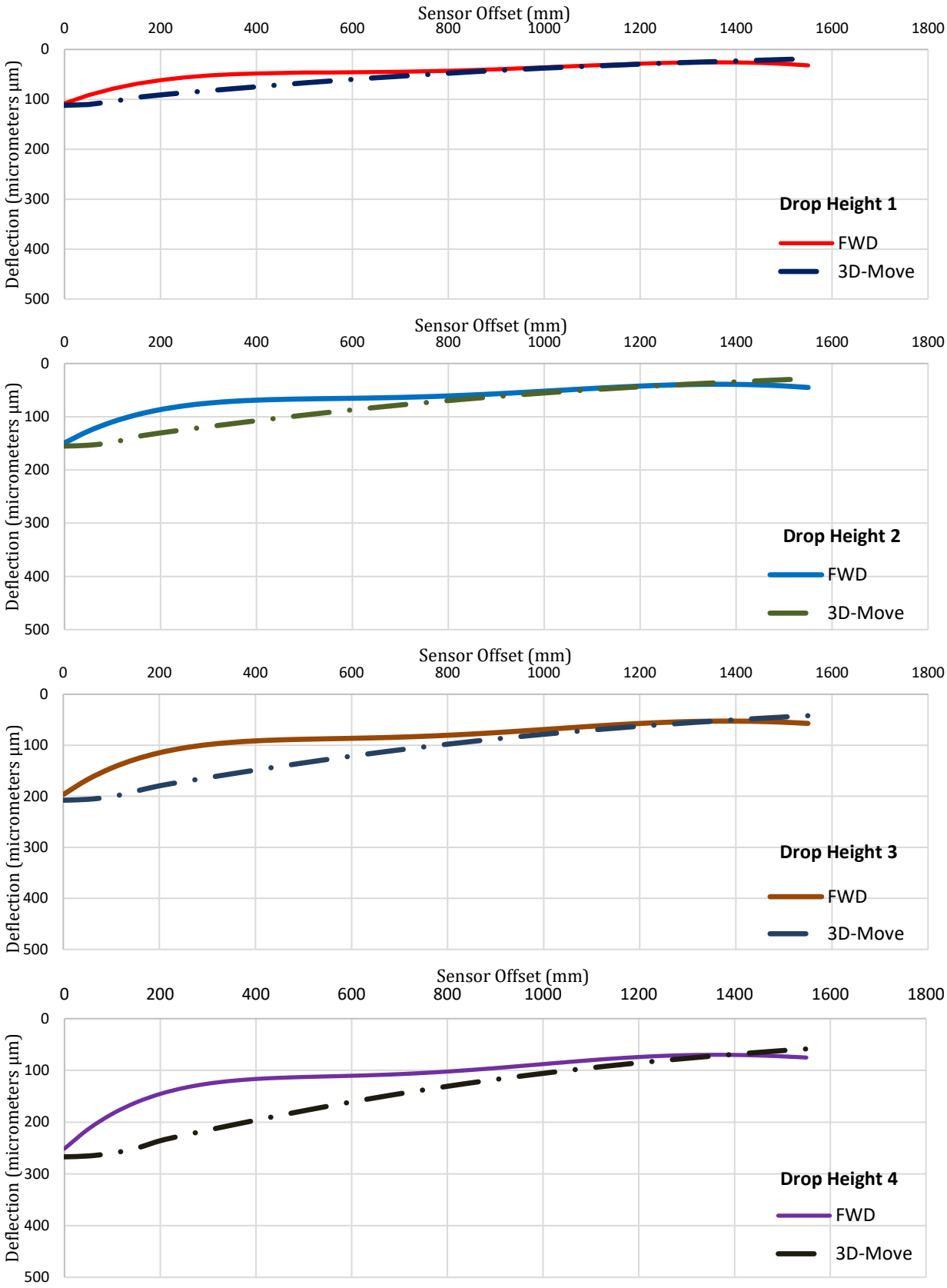


**Figure C-20. Simulated Deflection Bowl for the SHRP section A502.**

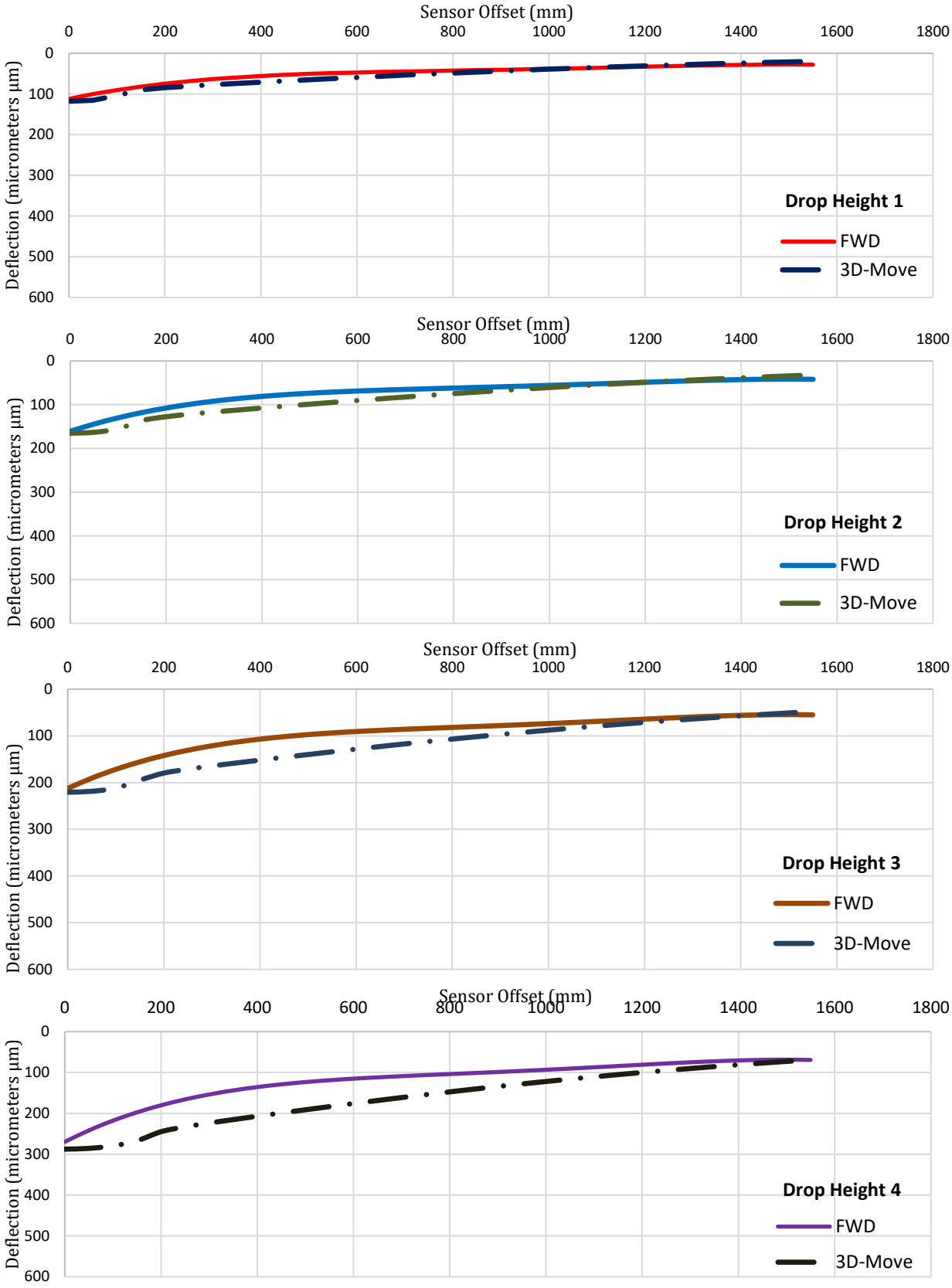


**Figure C-21. Simulated Deflection Bowl for the SHRP section A504.**

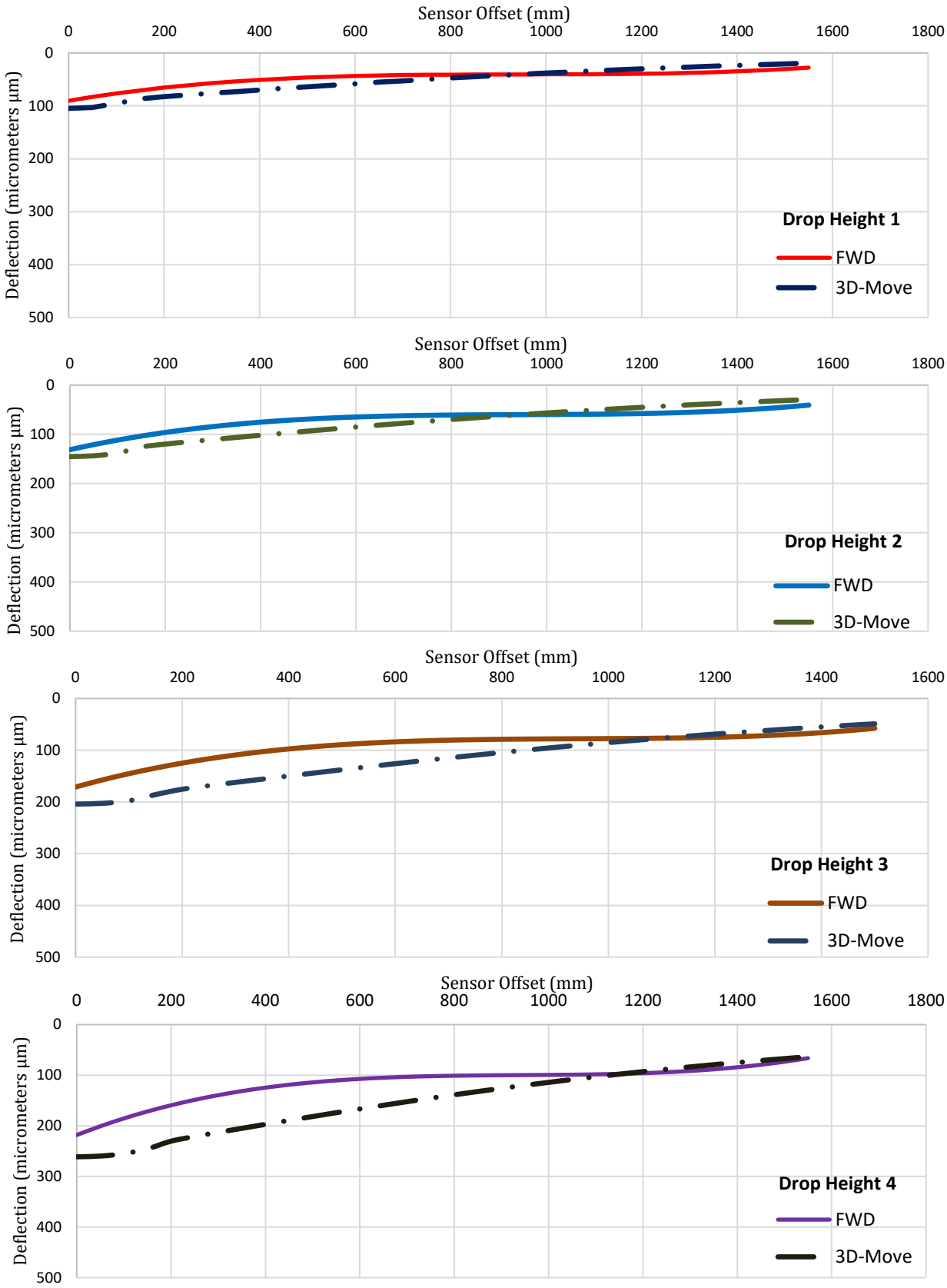


**Figure C-22. Simulated Deflection Bowl for the SHRP section A505.**

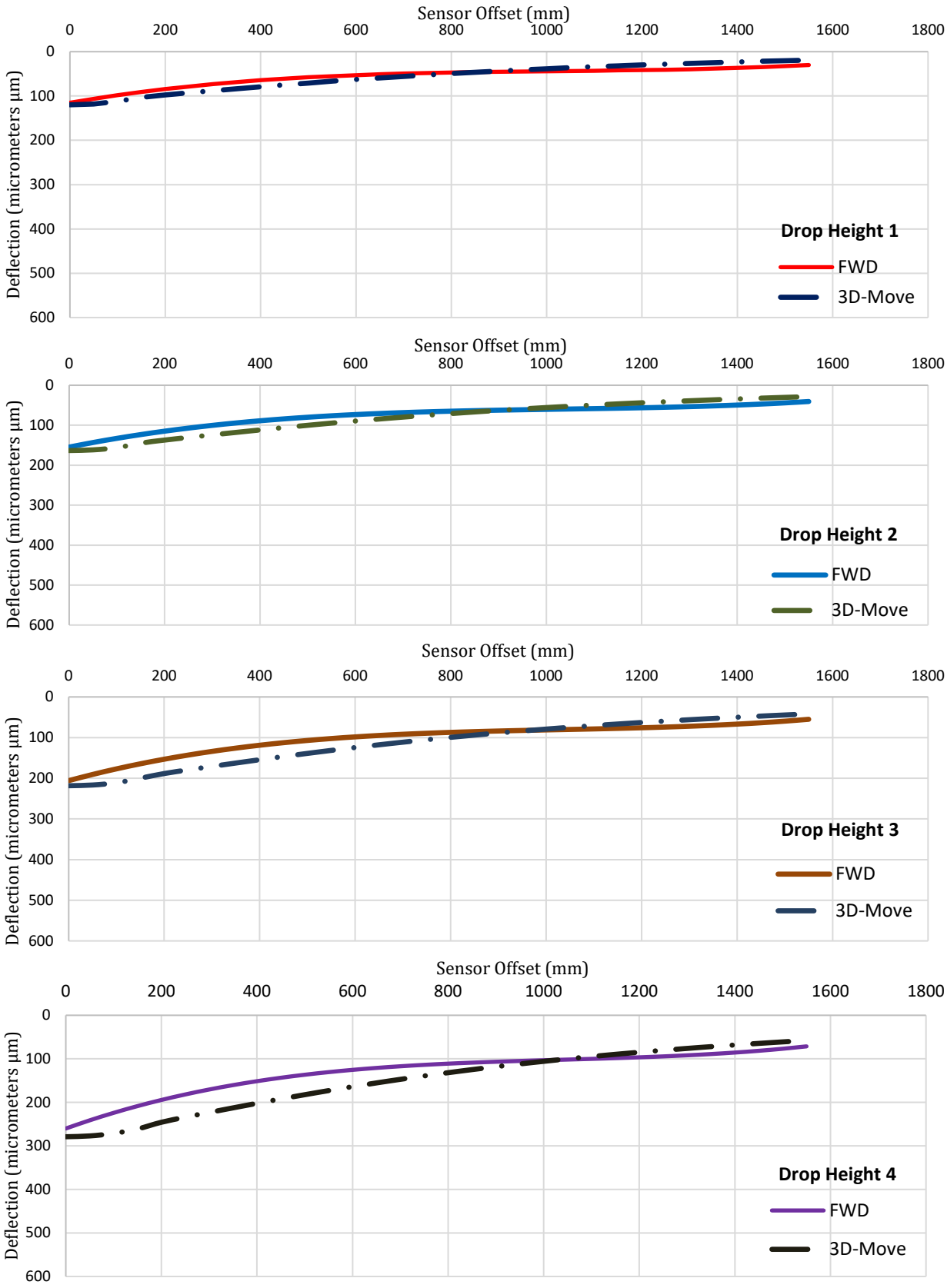


**Figure C-23. Simulated Deflection Bowl for the SHRP section A507.**

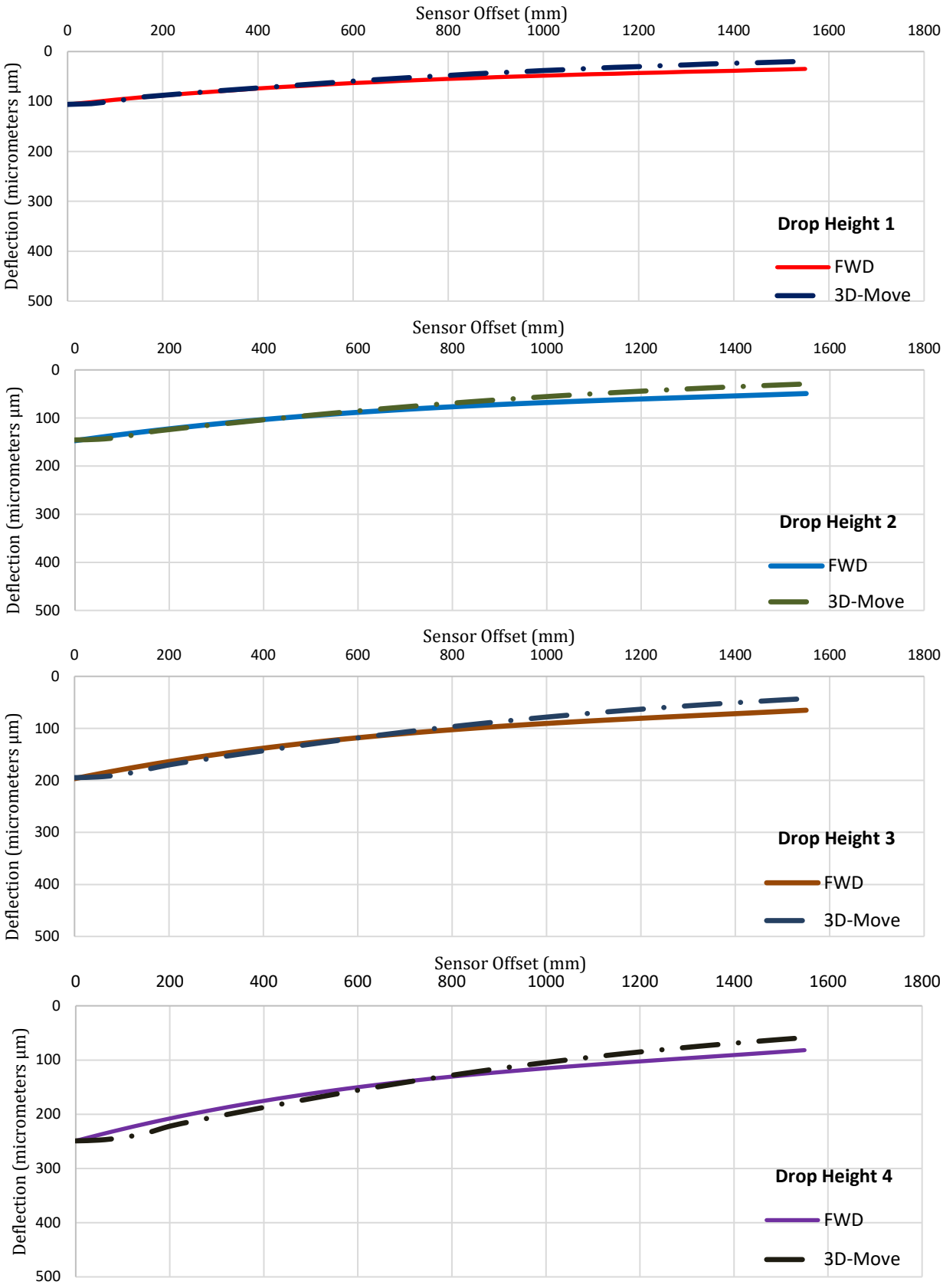


**Figure C-24. Simulated Deflection Bowl for the SHRP section A508.**

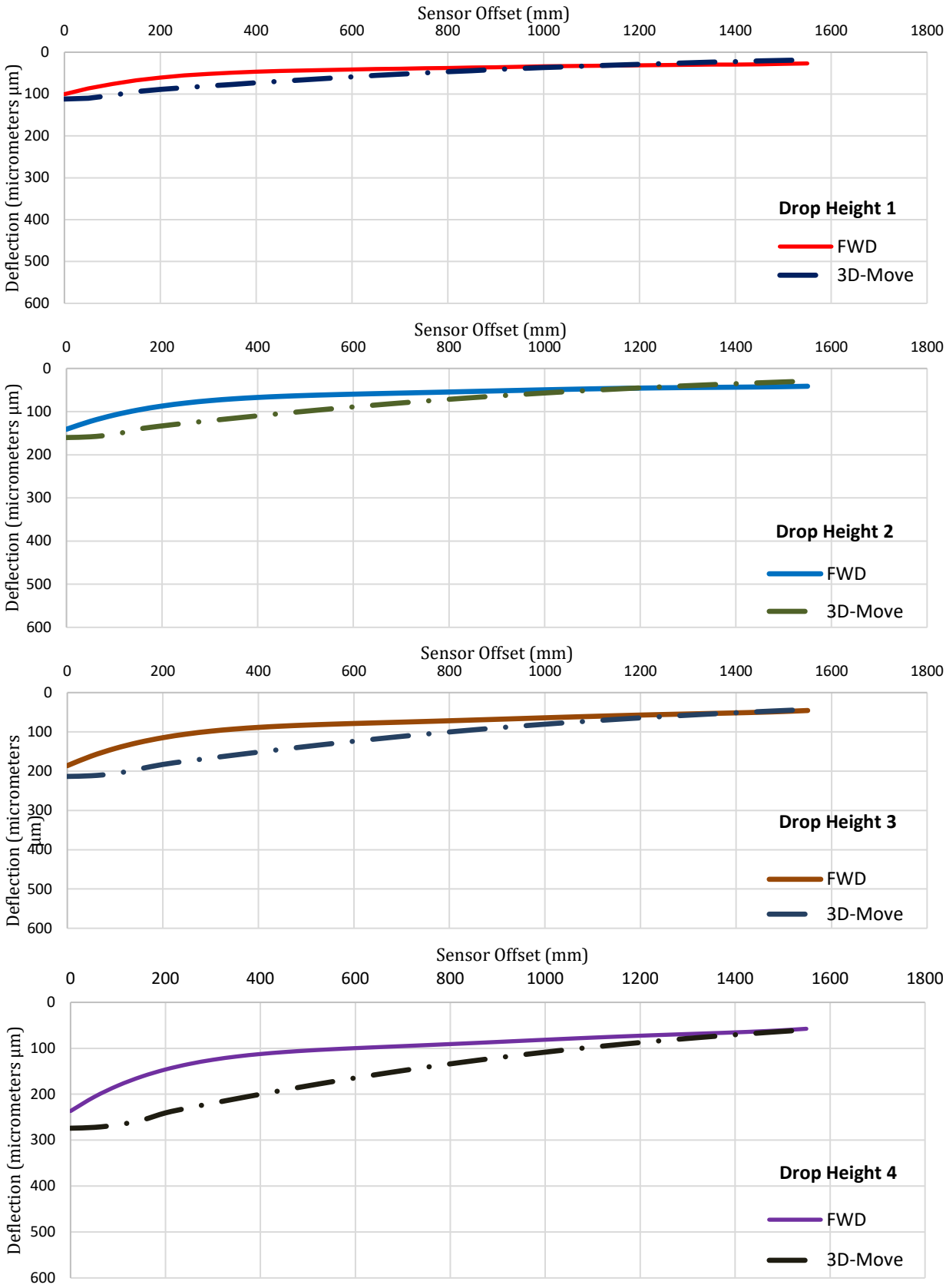


**Figure C-25. Simulated Deflection Bowl for the SHRP section B310.**

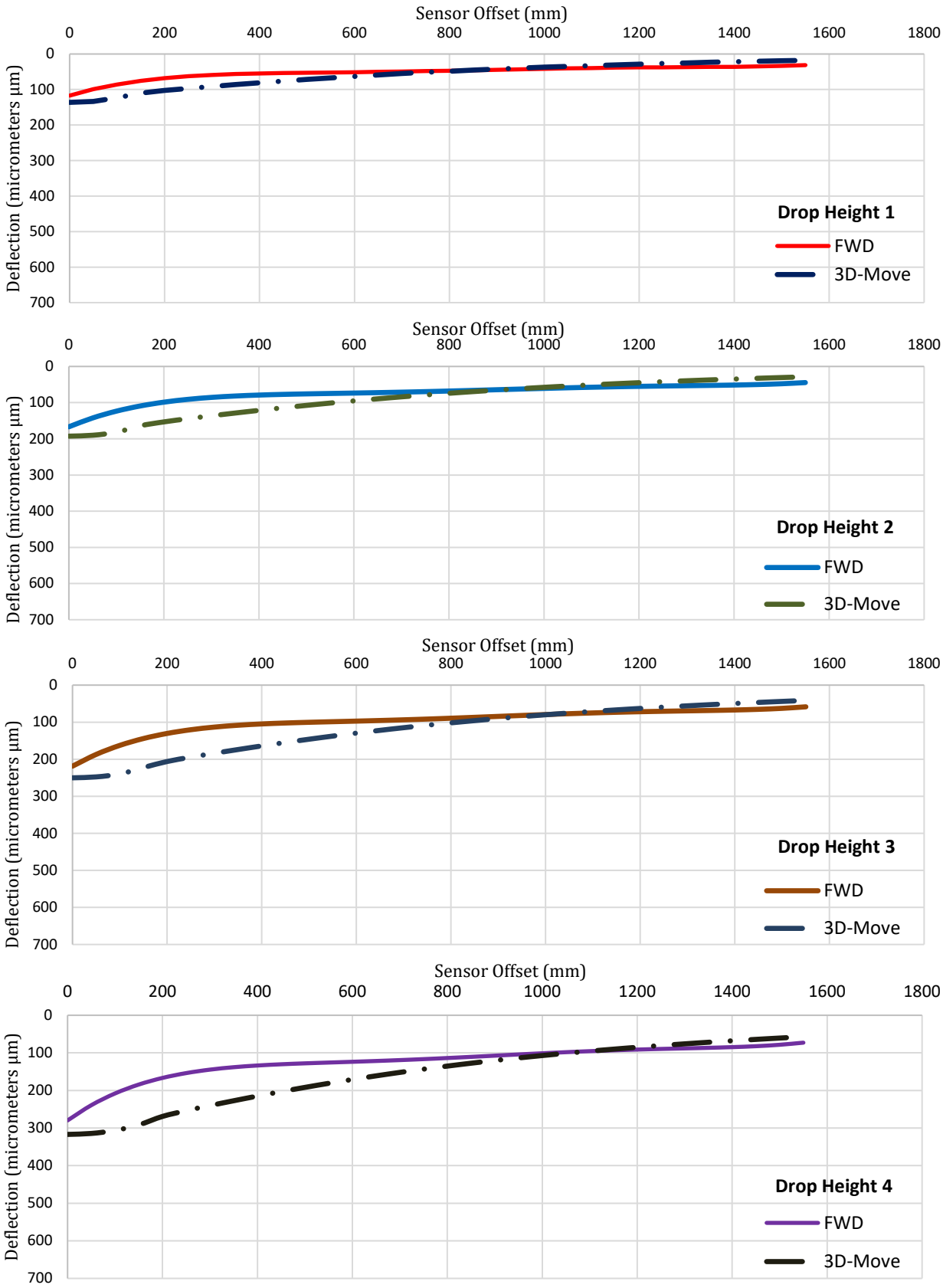


**Figure C-26. Simulated Deflection Bowl for the SHRP section B320.**

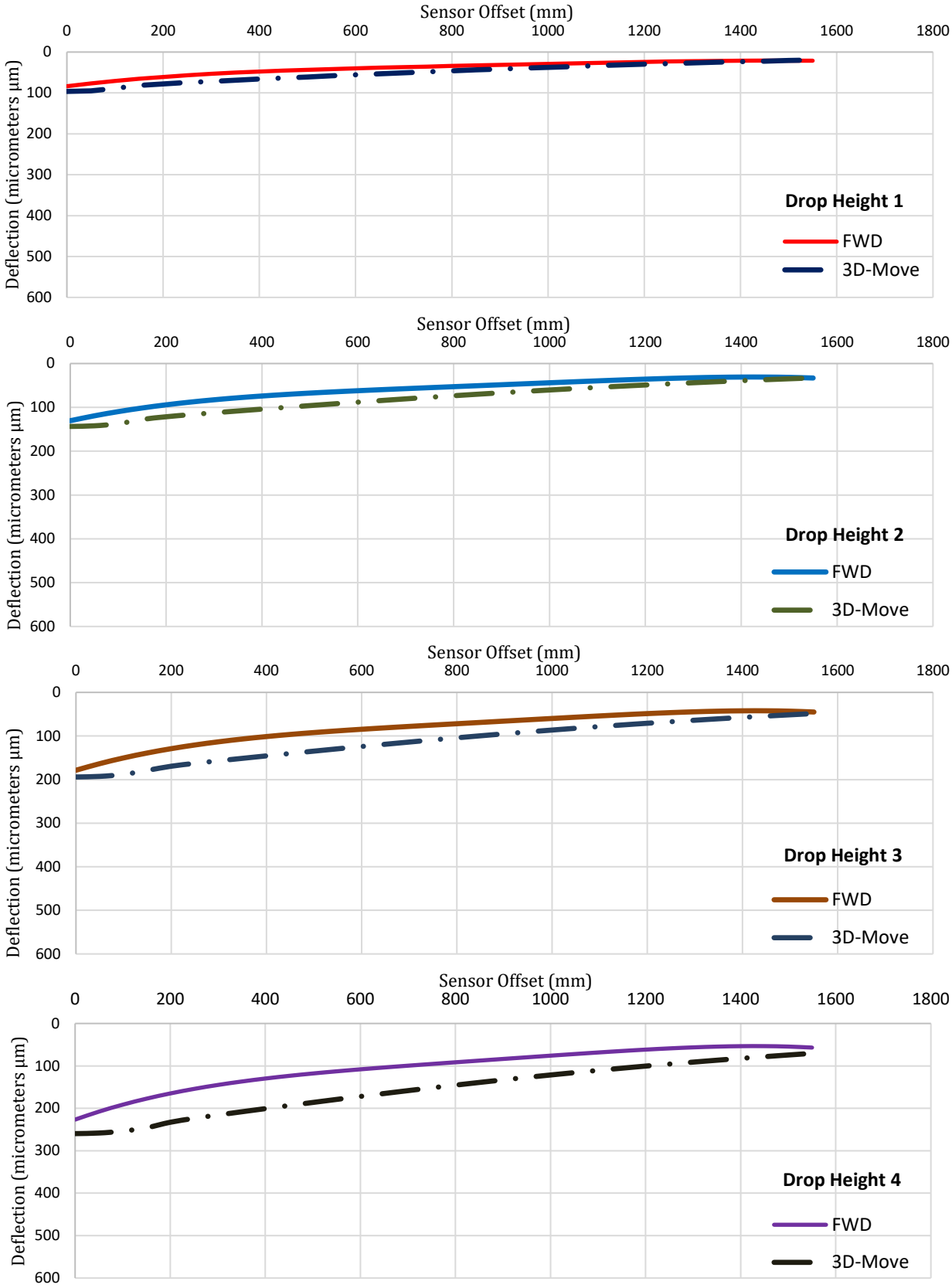


**Figure C-27. Simulated Deflection Bowl for the SHRP section D310.**

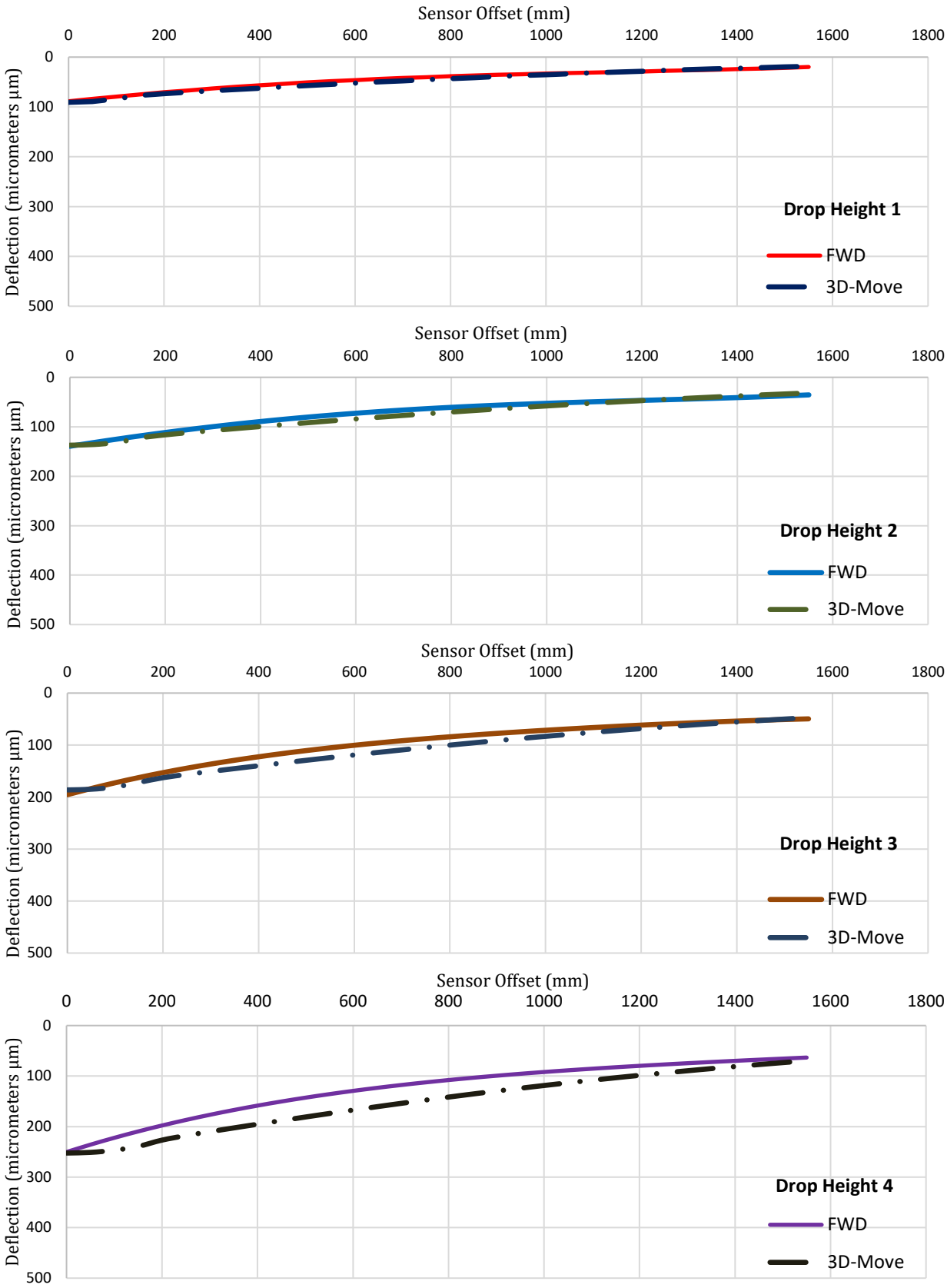


**Figure C-28. Simulated Deflection Bowl for the SHRP section D320.**

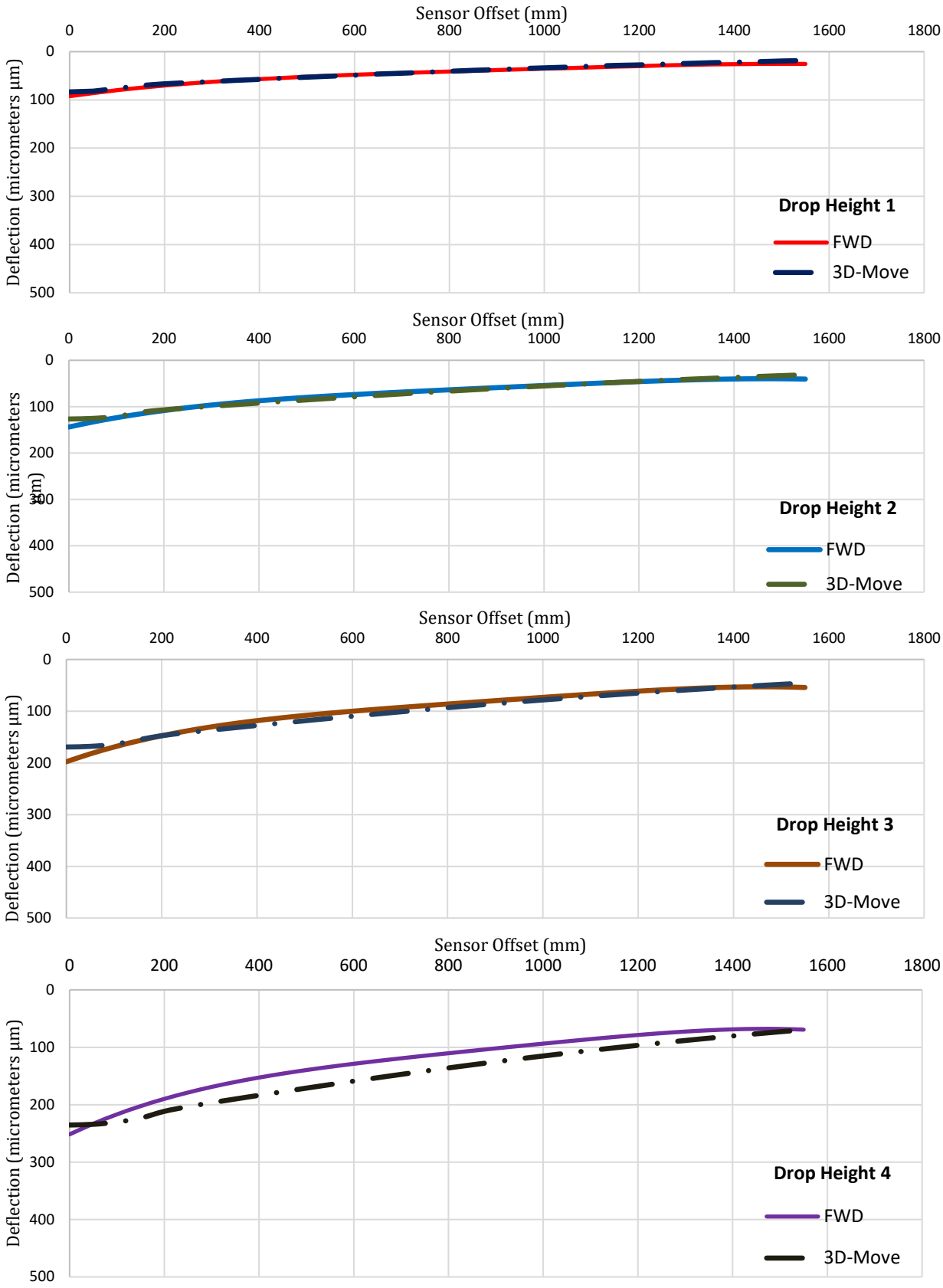


**Figure C-29. Simulated Deflection Bowl for the SHRP section D330.**

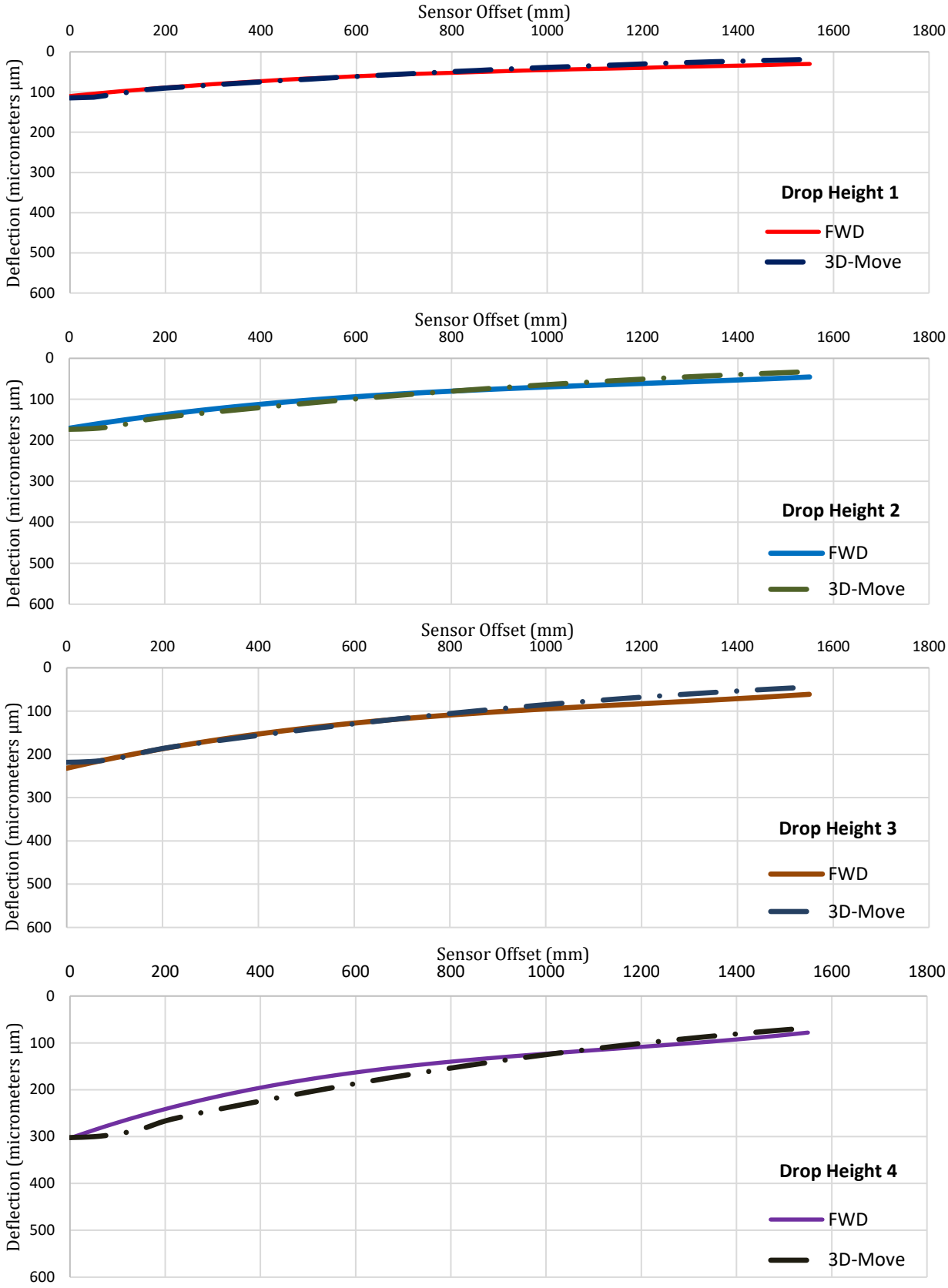


**Figure C-30. Simulated Deflection Bowl for the SHRP section D350.**

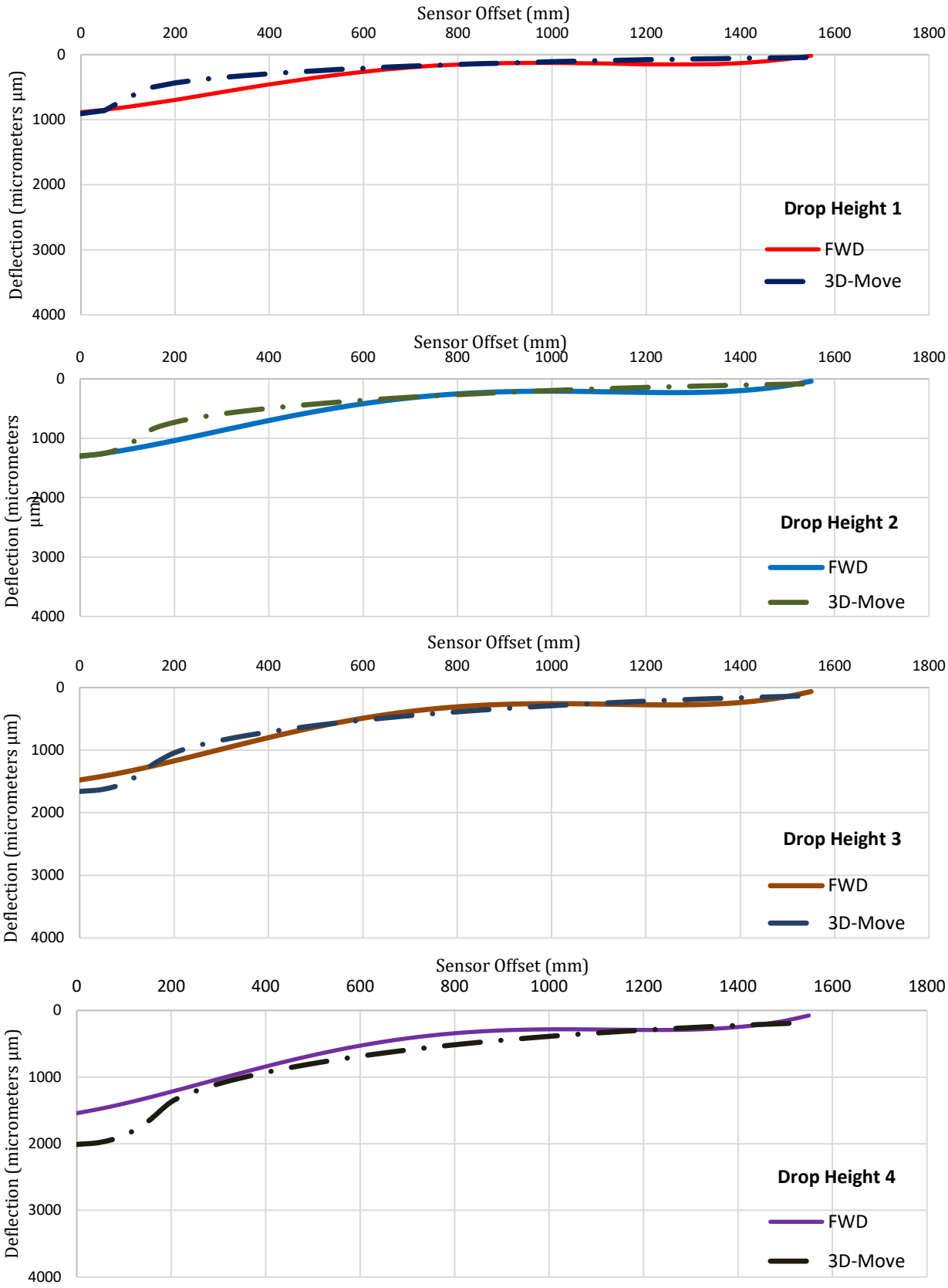


**Figure C-31. Simulated Deflection Bowl for the SHRP section M310.**

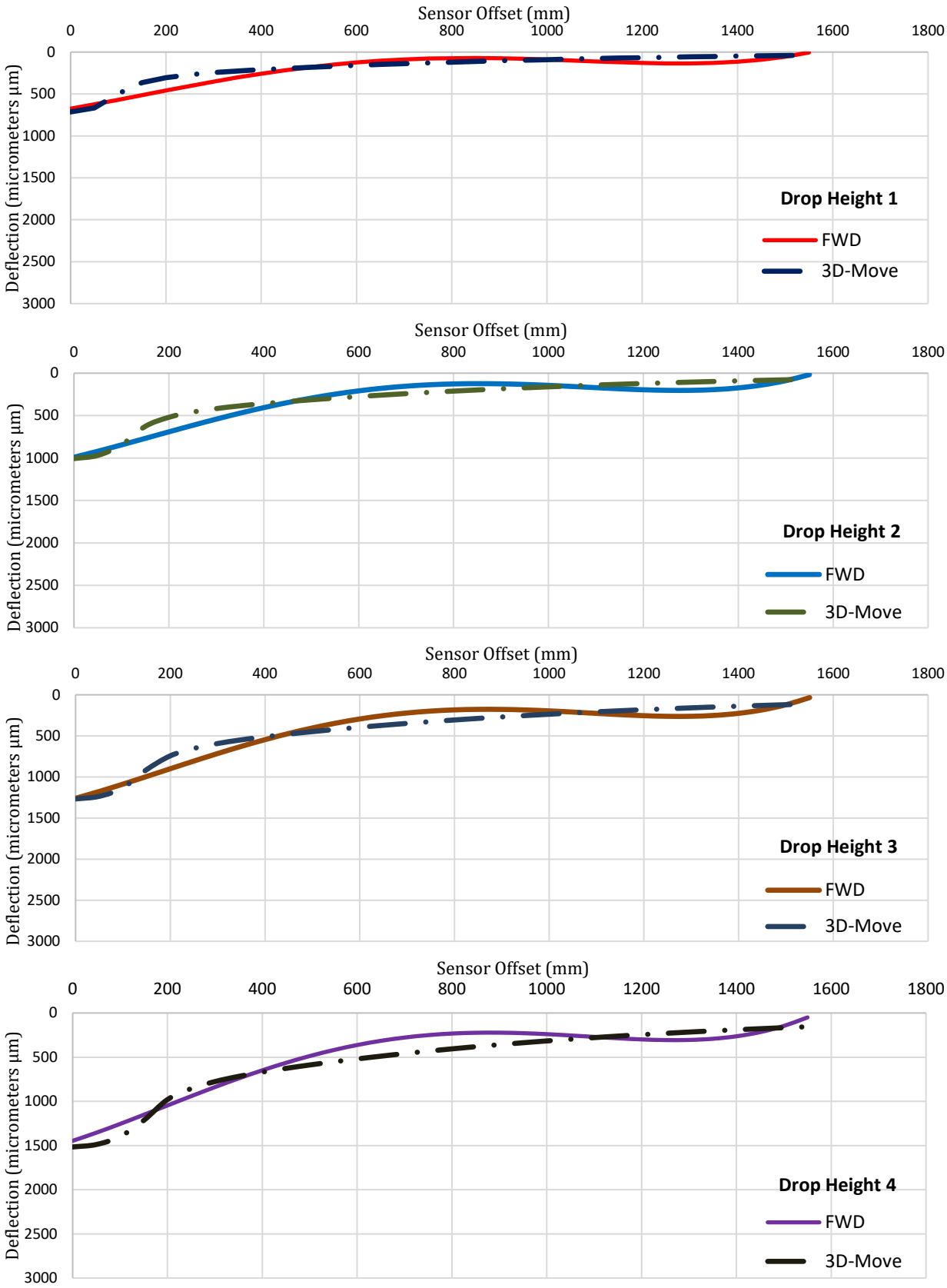


**Figure C-32. Simulated Deflection Bowl for the SHRP section M320.**

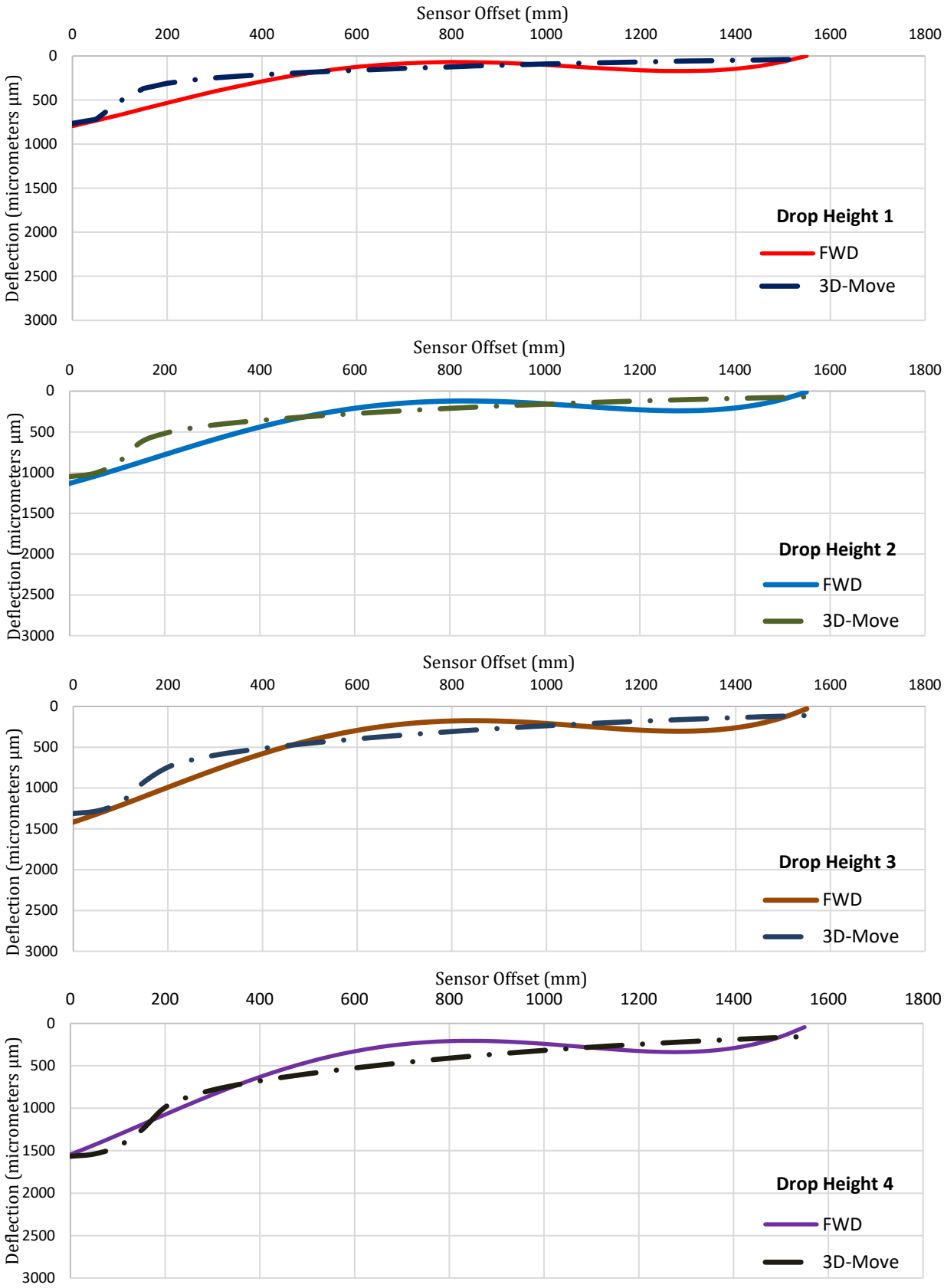


**Figure C-33. Simulated Deflection Bowl for the SHRP section M330.**

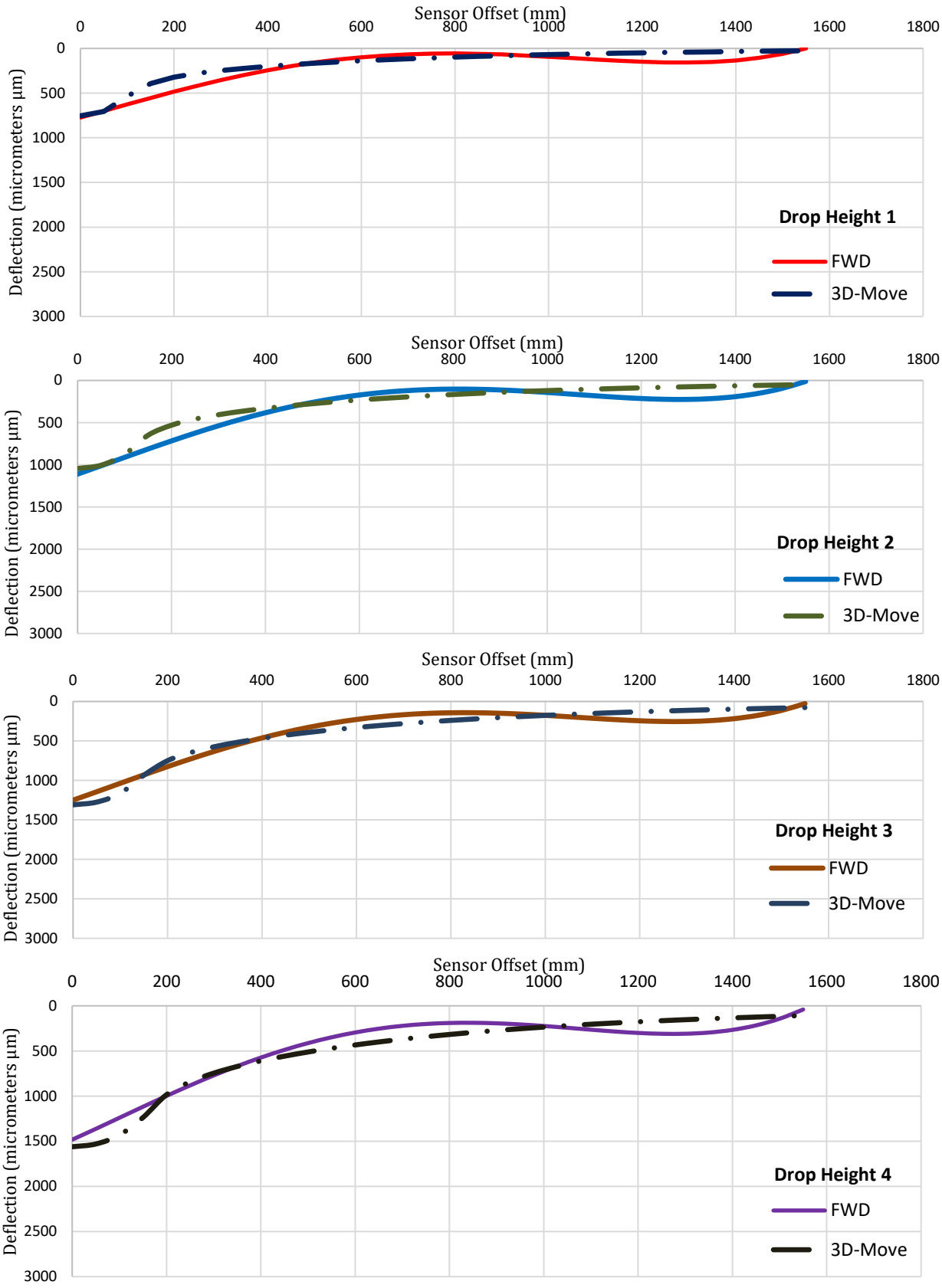


**Figure C-34. Simulated Deflection Bowl for the SHRP section M340.**

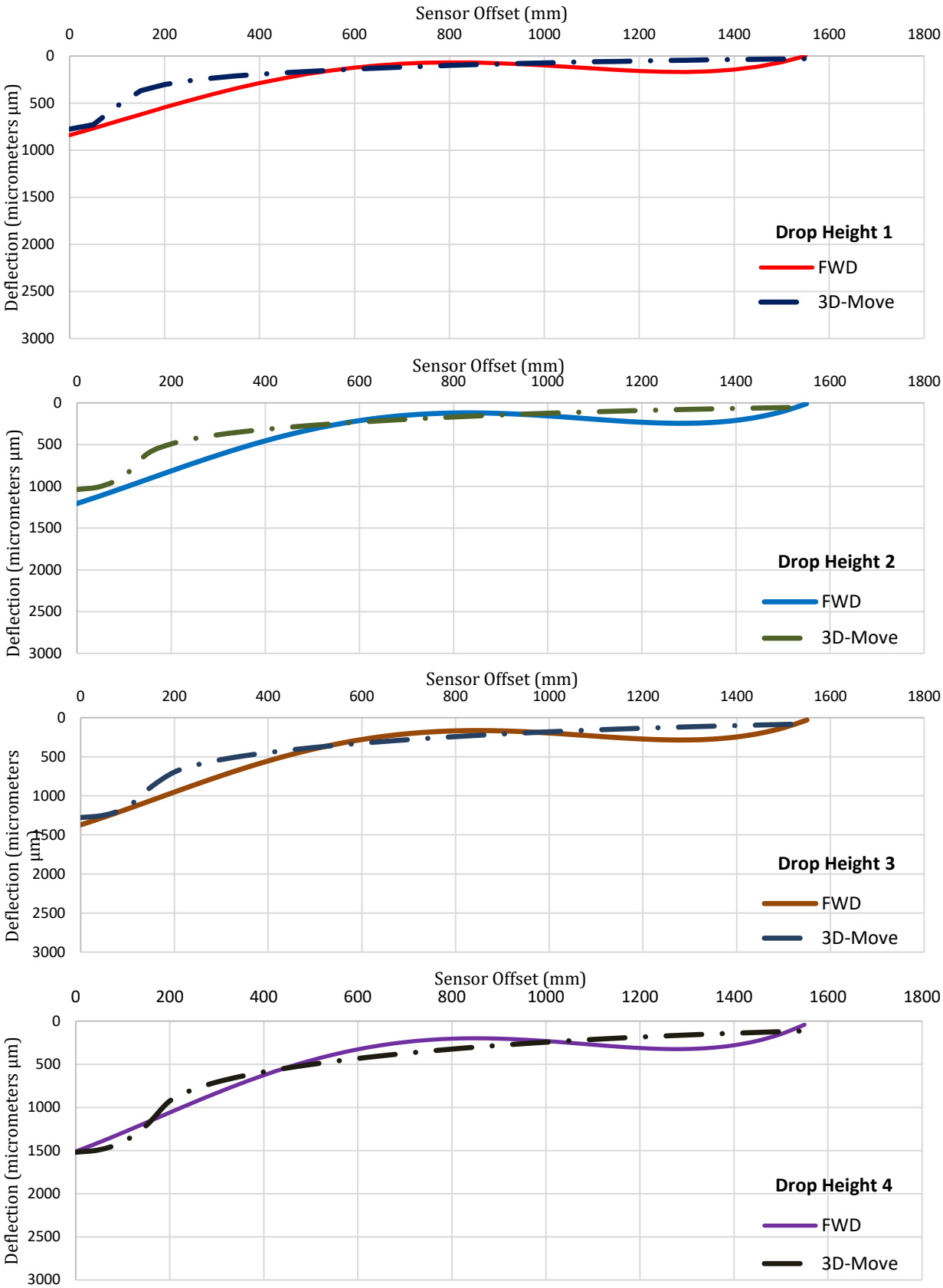


**Figure C-35. Simulated Deflection Bowl for the SHRP section M350.**