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Technical Report TR-97/004

Permanent deformation and in-depth deflection records for selected HVS tests

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Abstract: TRANSPORTEK has been involved in accelerated pavement testing (APT) with a fleet of Heavy Vehicle Simulators (HVSs) over the past two decades. During this period, a vast amount of pavement response and performance data has been accumulated, but these data still need to be utilised to their full potential in a structural pavement design model. A data base of selected HVS tests from which structural design models could be developed therefore had to be established.


This report contains material and processed in-depth deflection and permanent deformation data for a number of past HVS tests sections which were added to the structural design database during the current financial year.


Keywords: Pavement structure, pavement materials, in-depth deflection, permanent deformation.


Proposals for implementation: The data gathered and included in the pavement structural design data base to date should be used to develop permanent deformation design models for South African road building materials.

Related documents (eg software, interim or other reports, working drawings etc):

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TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	STRUCTURAL INFORMATION OF PAST HVS SECTIONS	3
3.	IN-DEPTH DEFLECTION DATA FOR PAST HVS TESTS	5
4.	PERMANENT DEFORMATION DATA FOR PAST HVS TESTS	7
5.	RECOMMENDATIONS FOR FUTURE WORK	9
6.	REFERENCES	10

APPENDIX A STRUCTURAL INFORMATION FOR A NUMBER OF SELECTED HVS TESTS

APPENDIX B IN-DEPTH DEFLECTION DATA FOR A NUMBER OF SELECTED HVS TESTS

APPENDIX C PERMANENT DEFORMATION DATA FOR A NUMBER OF SELECTED HVS TESTS

LIST OF FIGURES

FIGURE 1: TYPICAL PAVEMENT STRUCTURE INFORMATION SHEET	4
FIGURE 2: TYPICAL GRAPHICAL REPRESENTATION OF IN-DEPTH DEFLECTION RESULTS .	6
FIGURE 3: TYPICAL GRAPHICAL REPRESENTATION OF PERMANENT DEFORMATION RESULTS	8

LIST OF TABLES

Table 1: List of HVS tests with available data.	2
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1. INTRODUCTION

TRANSPORTEK has been involved in accelerated pavement testing (APT) with a fleet of Heavy Vehicle Simulators (HVSs) over the past two decades. During this period, a vast amount of pavement response and performance data has been accumulated but these data still need to be utilised to their full potential in a structural pavement design model. The development of a data base of selected HVS tests from which structural design models for permanent deformation could be developed was therefore initiated.

HVS test sections included in this data base had to conform to three requirements:

1. The location of the tests sections, wheel load, tyre pressure, pavement material data and instrumentation details had to be known for these sections.
2. In-depth deflection data (Multi Depth Deflectometer, MDD) had to be available with surface deflection data (Road Surface Deflectometer, RSD) optional.
3. In-depth permanent deformation data from the MDD stacks had to be available.

This report contains the material and processed in-depth deflection and permanent deformation data for a number of past HVS tests sections that satisfied the above criteria and which were added to the structural design database during the current financial year. This report does not include the analysis of the data and only serves as a record of the work that has been completed during the current financial year. Subject to the approval of funds, the process will continue in the next financial year with the analysis of the data and determining the exact layer thicknesses and material type of the HVS sections with the aim to develop permanent deformation models for unbound pavement materials.

The HVS sections added to the structural design data base during the current project are all from two sites north-west of Pretoria, namely Bultfontein and Rooiwal. Table 1 contains a list of the test numbers with an indication of the data availability for these sections.

Table 1: List of HVS tests with available data.			
HVS test number	Structural information	In-depth deflection data at test wheel loads	In-depth permanent deformation data
274A4	✓	✓	✓
275A4	✓	✓	✓
289A4	✓	No in-depth deflection data could be found for this test.	✓
294A4	✓	Seems as if only 40 kN in-depth deflection data were recorded during the test. No deflection data at the test load of 100 kN could be found.	✓
306A4	✓	✓	✓
309A4	✓	Seems as if only 40 kN in-depth deflection data were recorded during the test. No deflection data at the test load of 150 kN could be found.	✓
338A4	✓	✓	✓
339A4	✓	✓	✓
340A4	✓	✓	✓
346A4	✓	✓	✓
347A4	✓	✓	✓
348A4	✓	✓	✓
349A4	✓	✓	✓

2. STRUCTURAL INFORMATION OF PAST HVS SECTIONS

One of the biggest challenges of the current project was to obtain the structural information of the pavements tested by HVS in the past. This includes layer thickness data and material classification to a reasonable depth. In many cases the main objective of the HVS tests was to compare different base layer material types or construction techniques with each other, with the result that a proper description of the full pavement profile was seldom done. In most cases only a material classification of the base and subbase is given, with no mention of the material type and layer thickness for the other layers, not to mention initial and final density and moisture profiles.

It is suggested that a full description of the pavement profile should be mandatory for all future HVS tests including the following:

1. A material classification according to TRH14 of all material layers to depth of 1000 mm accompanied and supported by the necessary laboratory test results.
2. A geological description of all the material layer types to a depth of 1000 mm if available. This does not need to be in much detail.
3. An in-situ density and moisture profile taken to a depth of 600 mm. The density reading may be done with the nuclear strata gauge but moisture samples should be removed and oven-dried before the addition of any water during the test (or taken at a point representative of the equilibrium moisture content for the test pavement).
4. DCP tests to a depth of 800 mm.
5. A description of the instrumentation details especially the installation depths for the MDD modules.

Figure 1 shows a typical example of the structural information that has been gathered for this project. Similar sheets for all the sections reported on in this report are contained in Appendix A. The material classification of the pavement layers below subbase is suspect and will be confirmed during future research. A standard form, containing a summary of the data listed under the above points as well as information on the test load, inflation pressure and load repetitions will be developed from Figure 1 for future use.

PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST Nr: 349A4

LOCATION : BULTFONTEIN

TEST LOAD : 70 kN dual wheel

ROAD Nr : P2212

TYRE PRESSURE : 690 kPa

CONTACT PRESSURE :

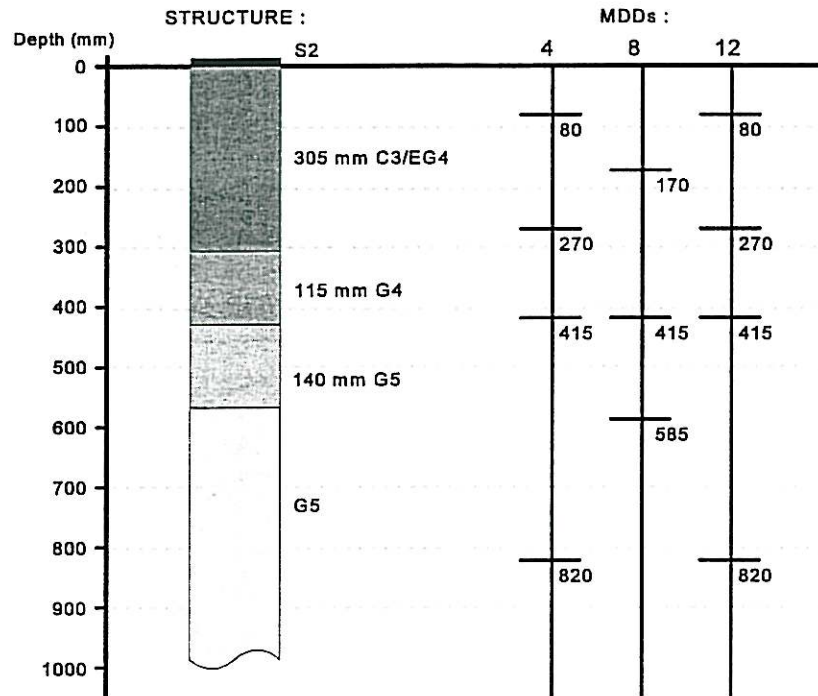


FIGURE 1: TYPICAL PAVEMENT STRUCTURE INFORMATION SHEET

3. IN-DEPTH DEFLECTION DATA FOR PAST HVS TESTS

In order for a specific HVS test to be considered for inclusion in the structural design data base, the in-depth deflection data had to be available at the test wheel load. For some of these HVS tests additional in-depth deflection data were available at wheel loads other than the test wheel load and, in some cases, the deflection data were only available for wheel loads other than the test load. In the first case, the deflection data may be used to back-calculate the stiffness of the pavement layers at different stress levels, thereby quantifying the stress dependency of the different pavement materials. In the latter case, unfortunately, because the deflection measurements at the test wheel load are not available, the stresses and strains that caused the permanent deformation of the different pavement layers, may not be calculated with confidence.

An electronic data base in a spreadsheet format of in-depth deflection at various wheel loads has been created for the HVS sections discussed in this report. To assist in the evaluation of the data, graphical representations such as illustrated in Figure 2 are automatically generated by the data base. Appendix B contains similar results for all the HVS sections included in this report. Two types of graphs are produced per wheel load. Firstly the deflection is plotted against depth and secondly against the number of load repetitions. One such sheet is produced for each MDD stack of the test.

Once validated, these deflection data will be used to back-calculate the stress and strain levels in the various pavement layers under the test wheel load.

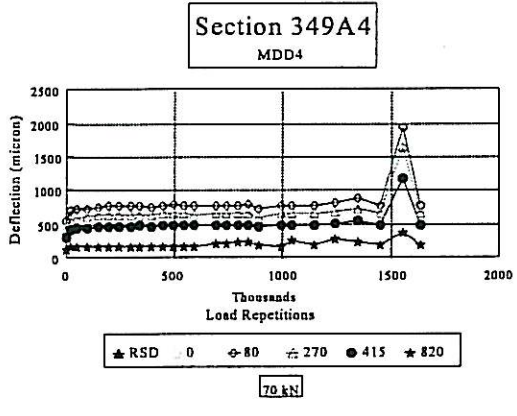
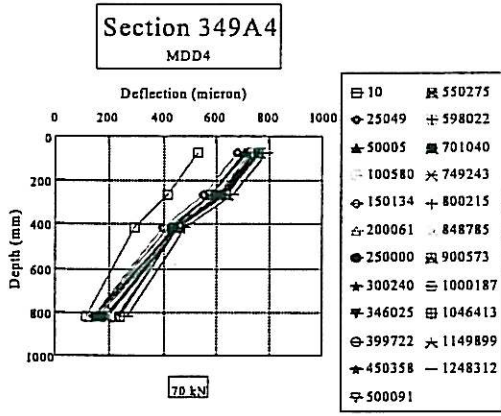
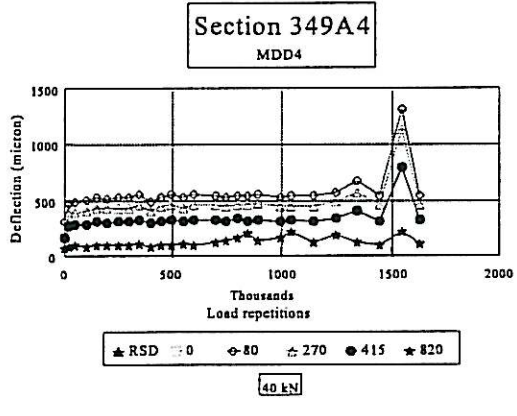
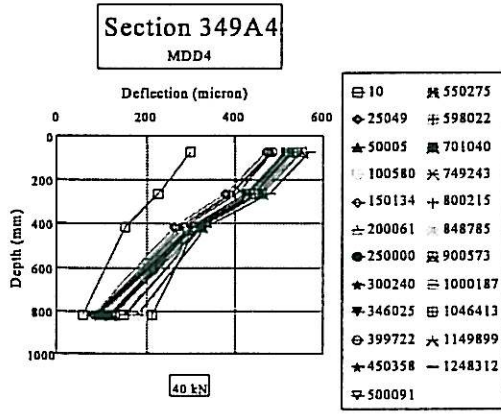
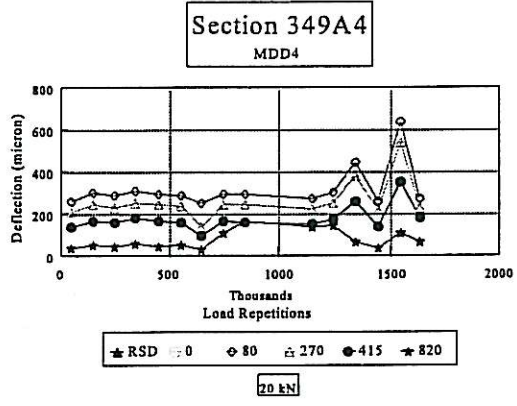
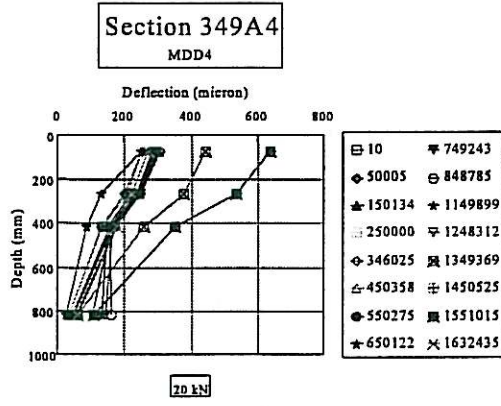


FIGURE 2: TYPICAL GRAPHICAL REPRESENTATION OF IN-DEPTH DEFLECTION RESULTS

4. PERMANENT DEFORMATION DATA FOR PAST HVS TESTS

In addition to the spreadsheet data base of in-depth deflection, the permanent deformation data obtained from each of the MDD modules were also entered in a spreadsheet data base. Figure 3 illustrates the graphical representation of these permanent deformation results as produced by the data base. Appendix C contains similar output from the data base for all the HVS sections included in this report.

The top graph in the left hand column represents the raw in-depth permanent deformation data and the top graph in the right hand column represents the validated data. In some cases a number of obvious outliers had to be removed and in other cases only the permanent deformation for a certain duration of the test was retained for further analysis.

The graph in the middle of the left hand column illustrates the regression functions fitted to the permanent deformation data. The basic form of these regression functions is listed in Equation 1. Wolff¹ illustrated that the function listed in Equation 1 may be fitted to in-depth permanent deformation data with a high degree of accuracy.

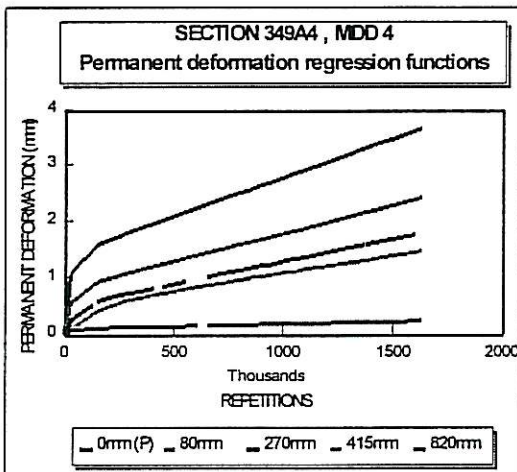
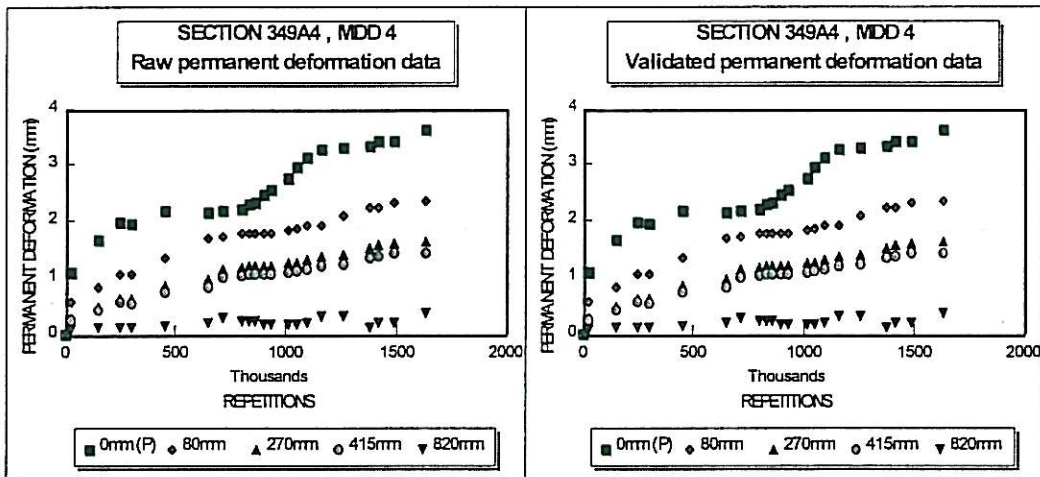
$$PD = (mN + a)(1 - e^{-bN}) \quad (1)$$

Where PD = Permanent Deformation (mm)
N = Number of load repetitions
e = Base of the natural logarithm
m, a, b = Regression coefficients

The table to the right of the abovementioned graph contains a summary of the regression and correlation coefficients at various depths in the pavement structure.

The graph in the bottom left-hand corner illustrates the permanent deformation data for the upper three pavement layers expressed as a percentage of the original layer thickness. This relative permanent deformation is calculated by deducting the measured deformation at the bottom of the layer from the measured deformation at the top of the layer and dividing the result by the original layer thickness.

The graph in the bottom right hand corner illustrates the absolute displacement of the bottom three MDD modules therefore representing the total deformation from the level of the MDD module downwards. In addition to the individual data points, the regression functions fitted to the data are also shown.



SECTION 349A4, MDD 4

Level	Regression coefficients			Correlation
	a	b	m	
0mm(P)	1.4	5.60E-05	1.40E-06	0.99989
80mm	0.8	4.50E-05	1.00E-06	0.97319
270mm	0.5	2.80E-05	8.00E-07	0.99822
415mm	0.5	8.00E-05	6.00E-07	0.98445
820mm	0.1	4.30E-05	9.00E-08	0.50175

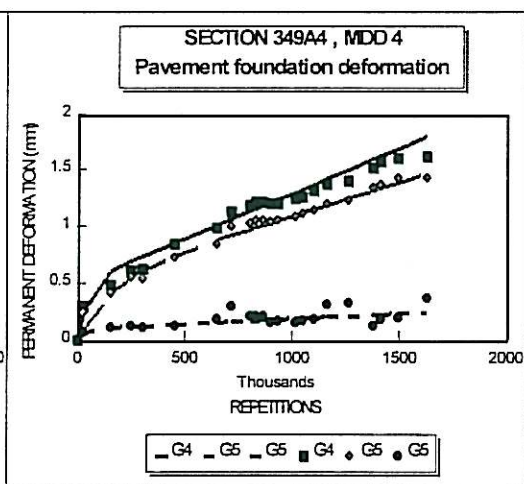
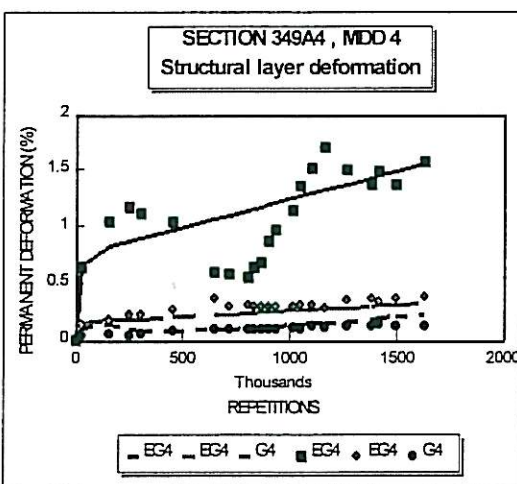


FIGURE 3: TYPICAL GRAPHICAL REPRESENTATION OF PERMANENT DEFORMATION RESULTS

5. RECOMMENDATIONS FOR FUTURE WORK

Because of the lack of pavement structure information for past HVS tests it is suggested that a full description of the pavement profile should be mandatory for all future HVS tests including the following:

1. A material classification of all layers to depth of 1000 mm according to TRH14.
2. A geological description of all the material layers to a depth of 1000 mm if available. This does not need to be in much detail.
3. An in-situ density and moisture profile taken to a depth of 600 mm. This could be done with the nuclear strata gauge.
4. DCP tests to a depth of 800 mm.
5. A description of the instrumentation details especially the installation depths for the MDD modules.

A standard form for recording the above data will be developed for future use.

An attempt should be made to obtain the structural information and DCP profiles for at least the HVS tests listed in this report and in a previous report by Theyse². These data, combined with the in-depth deflection and permanent deformation data in the structural design data base, will create a platform from which several structural design issues may be investigated from a broader base than just one or two HVS tests. The total structural design data base will then include the complete data for 29 HVS tests done in the moderate to wet regions in South-Africa.

The acquisition of this data will also enhance the commercial HVS data base currently under development at TRANSPORTEK.

6. REFERENCES

1. WOLFF, H. 1992. **The Elasto-Plastic behaviour of granular pavement layers in South Africa.** Pretoria: Ph D Thesis, University of Pretoria.
2. THEYSE, H.L. 1996. **The structural design of low volume roads.** Pretoria: Division for Roads and Transport Technology, CSIR. (DRTT Technical Report; TR-96/037)

APPENDIX A

**STRUCTURAL INFORMATION FOR A NUMBER OF SELECTED HVS
TESTS**

PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 274A4

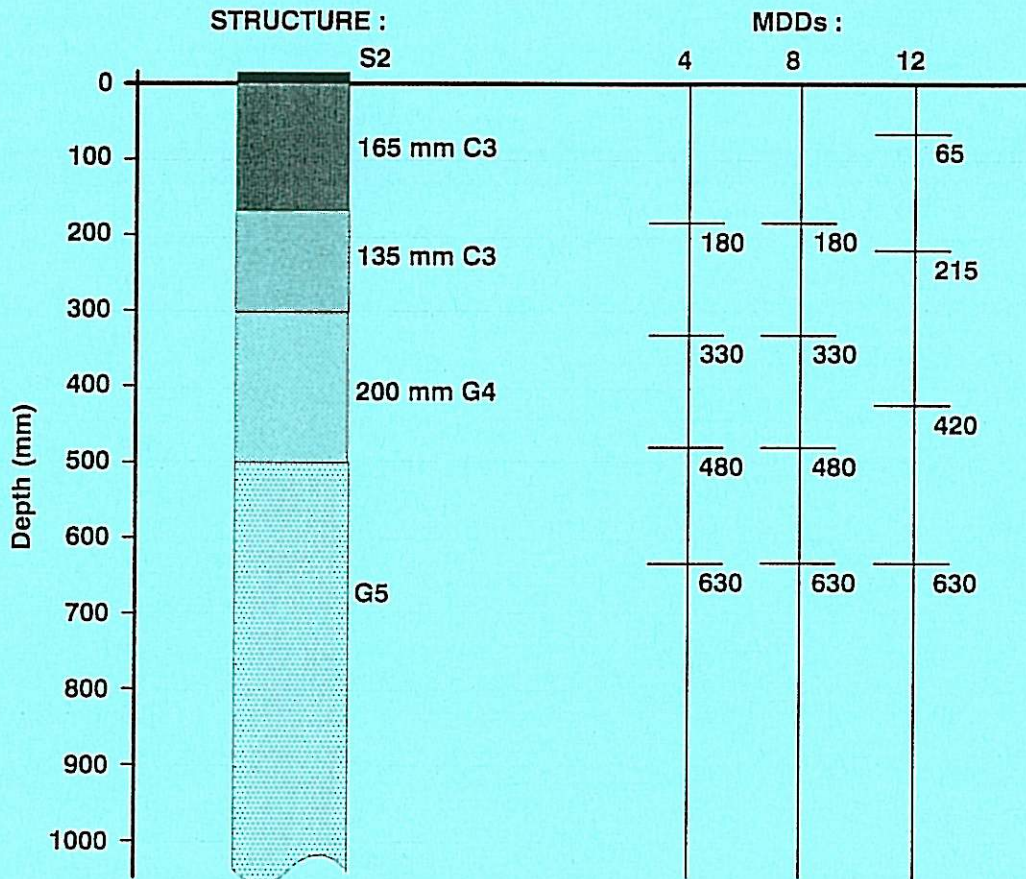
LOCATION : ROOIWAL

TEST LOAD : 40 kN dual wheel

ROAD # : R1932

TYRE PRESSURE : 520 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 275A4

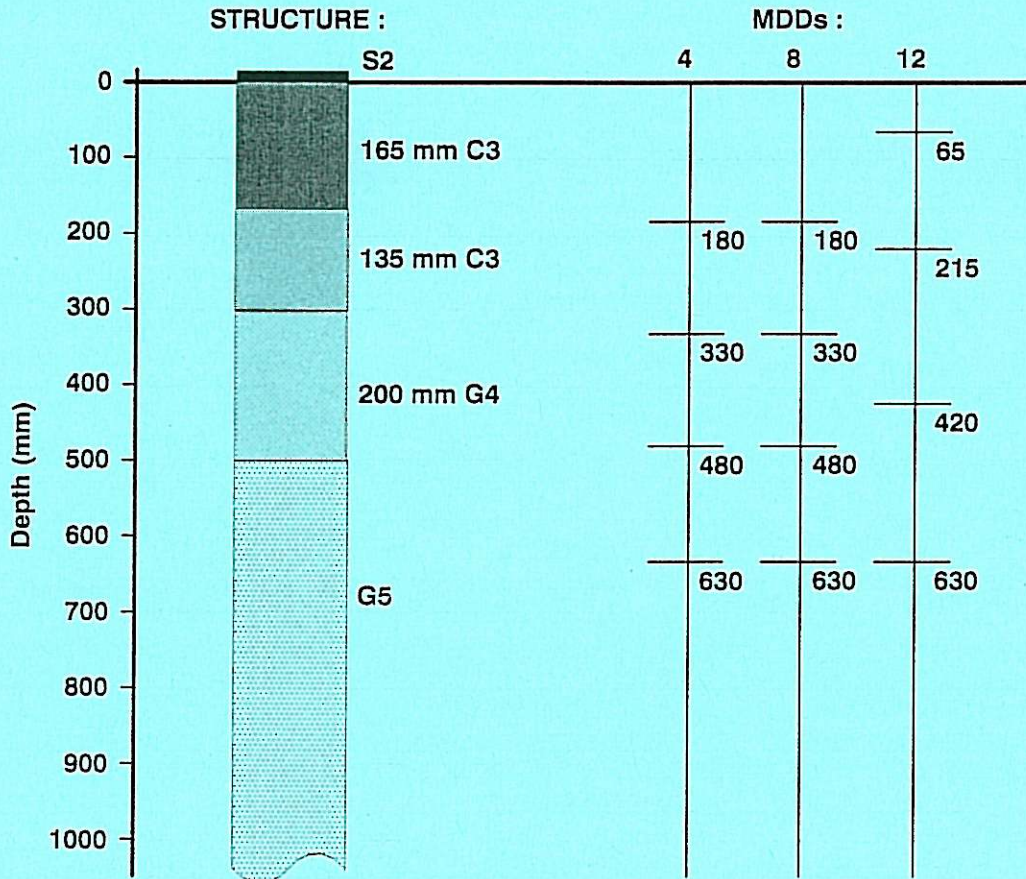
LOCATION : ROOIWAL

TEST LOAD : 40 kN dual wheel

ROAD # : R1932

TYRE PRESSURE : 700 kPa

CONTACT PRESSURE :



- Note:
- 1) PD only fitted from 109 804 to 2 105 910 load repetitions for MDD4
 - 2) PD only fitted from 109 804 to 1 533 249 load repetitions for MDD8
 - 3) PD only fitted from 109 804 to 1 110 626 load repetitions for MDD12

PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 289A4

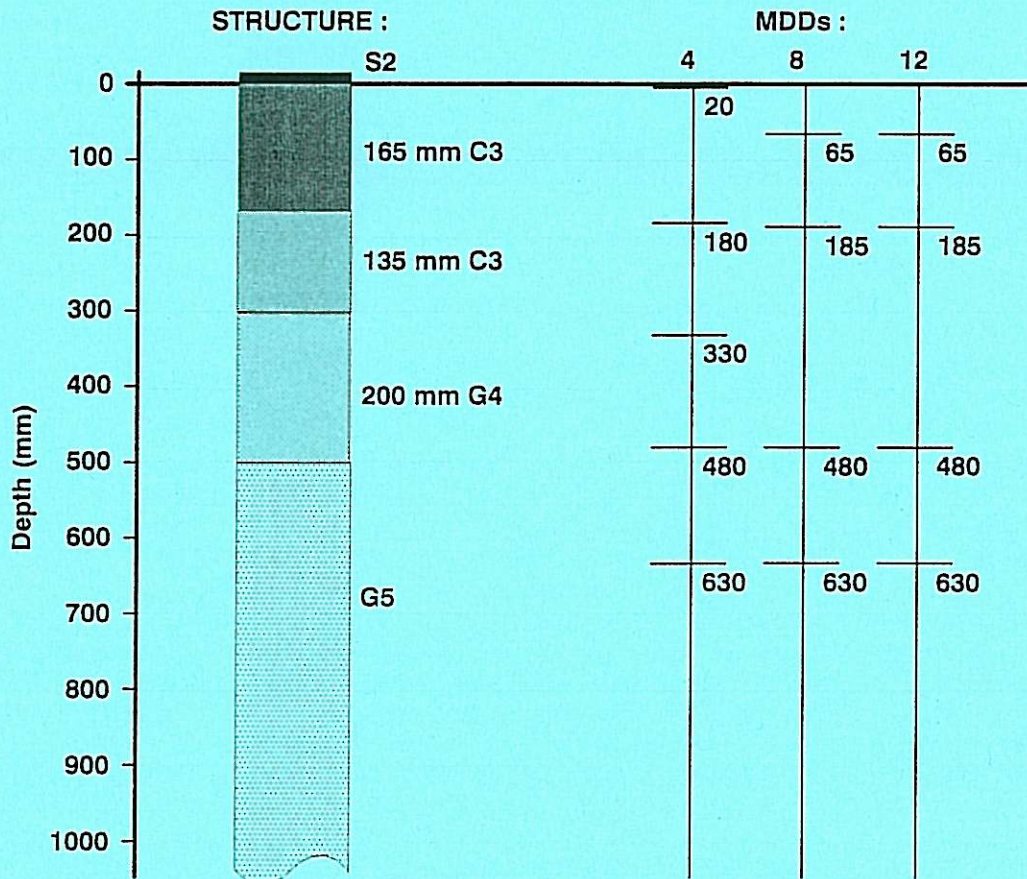
LOCATION : ROOIWAL

TEST LOAD : 70 kN dual wheel

ROAD # : R1932

TYRE PRESSURE : 700 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 294A4

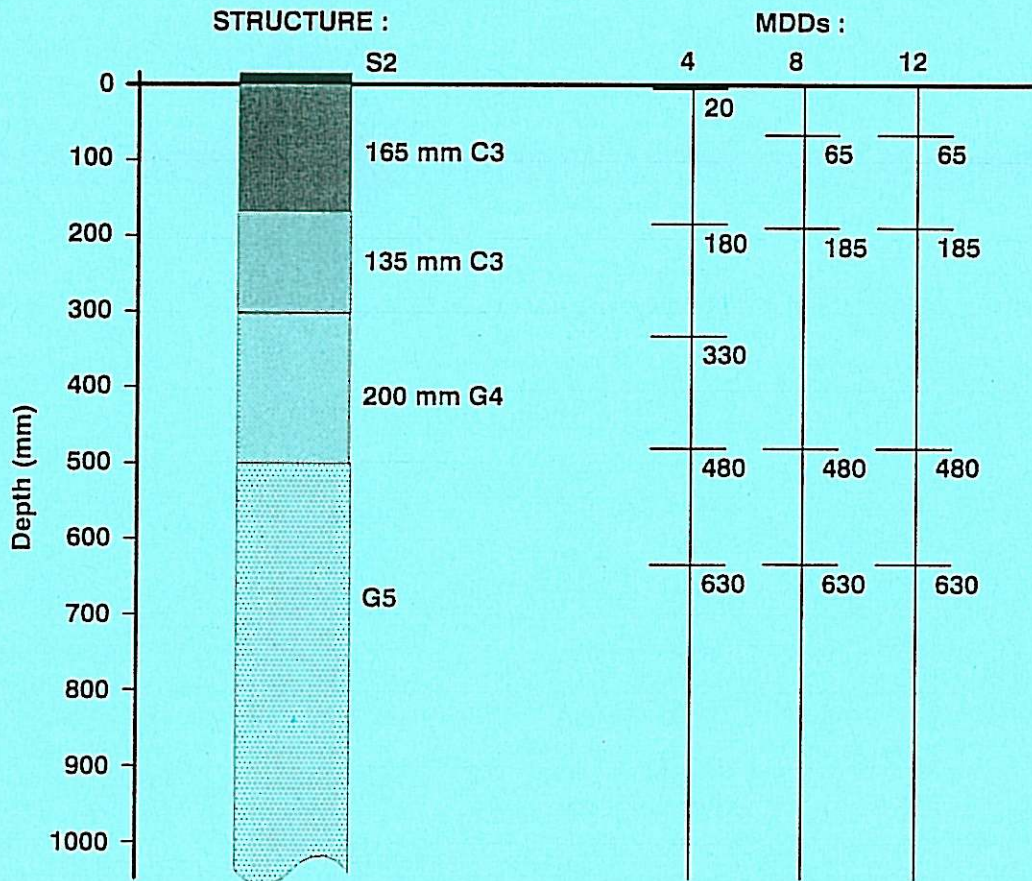
LOCATION : ROOIWAL

TEST LOAD : 100 kN dual wheel

ROAD # : R1932

TYRE PRESSURE : 700 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 306A4

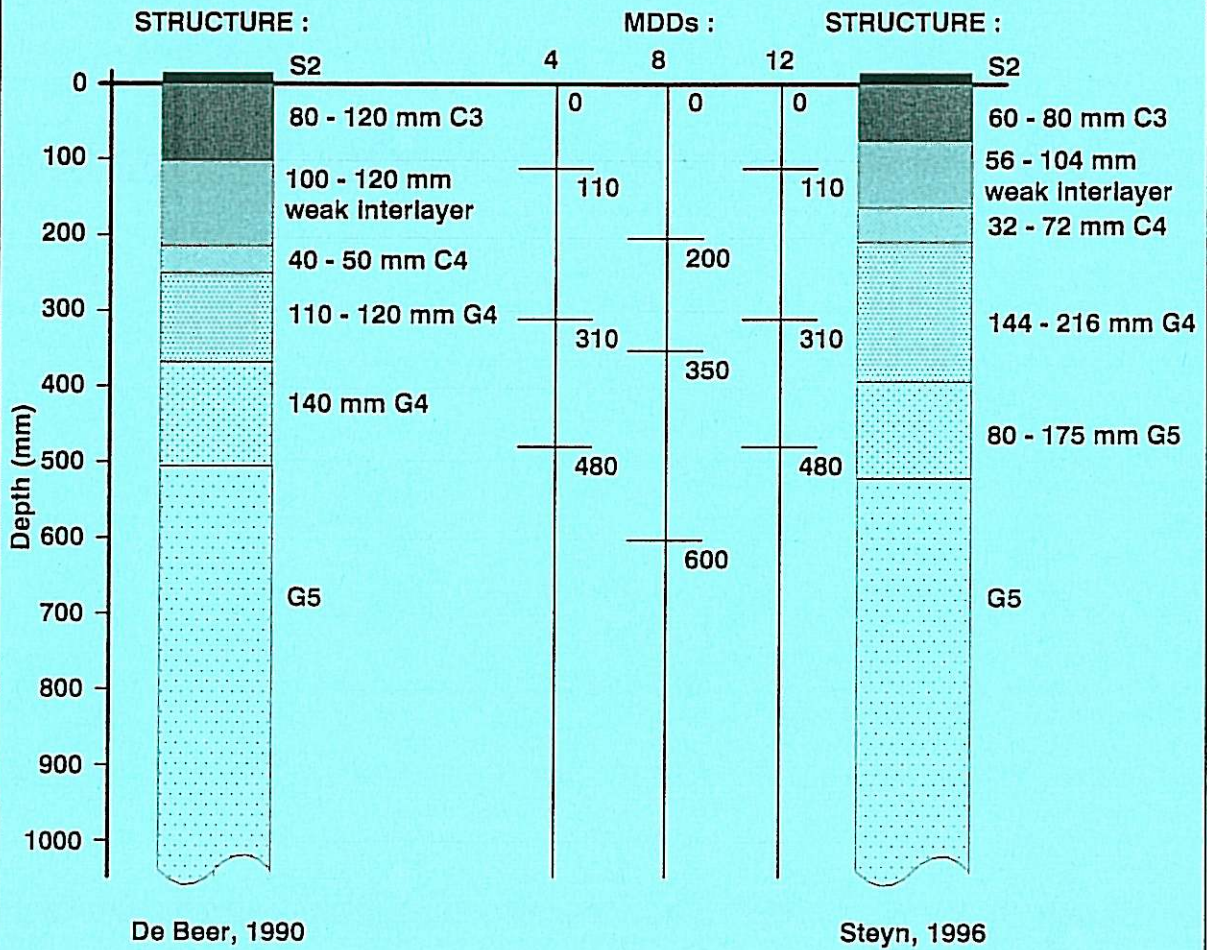
LOCATION : BULTFONTEIN

TEST LOAD : 40 kN dual wheel

ROAD # : P2212

TYRE PRESSURE : 700 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 309A4

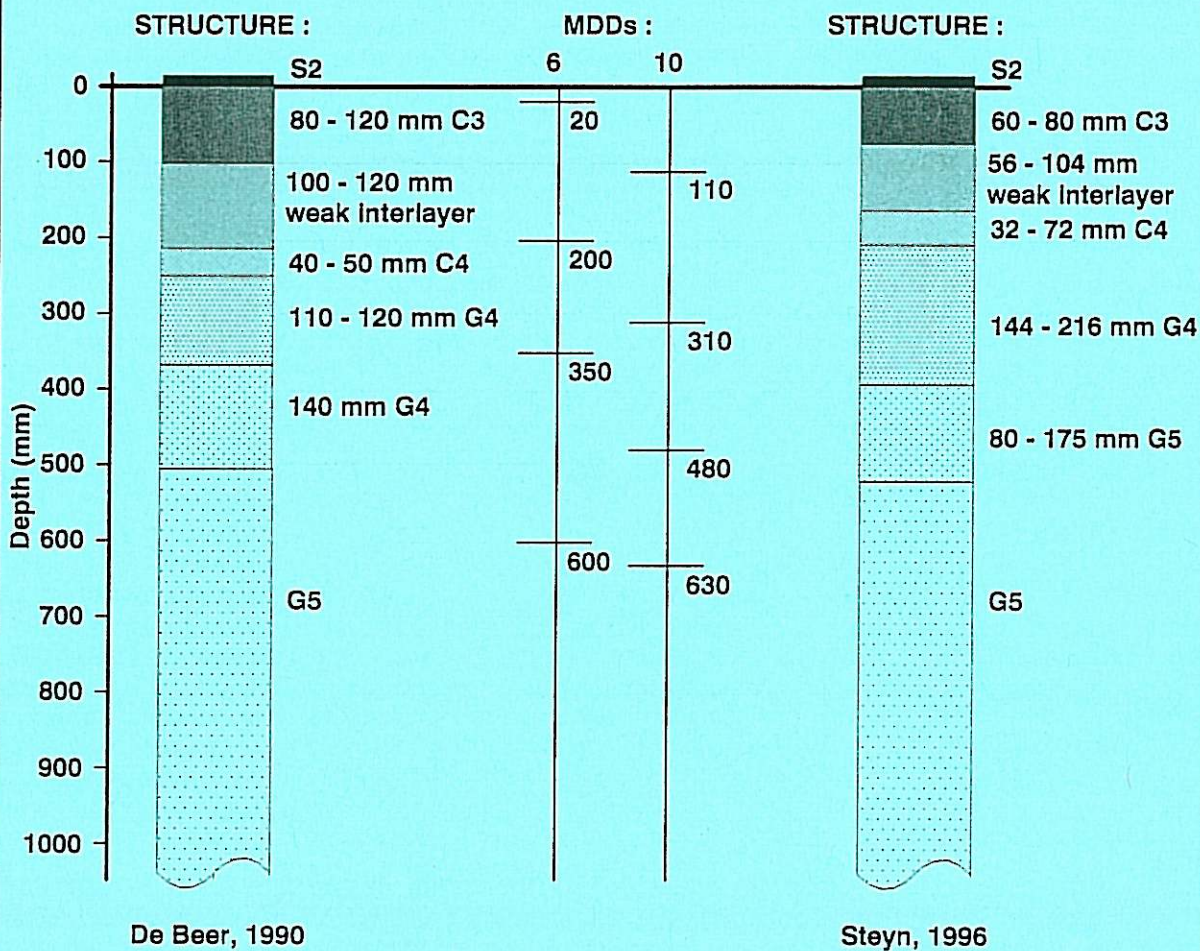
LOCATION : BULTFONTEIN

TEST LOAD : 150 kN single wheel

ROAD # : P2212

TYRE PRESSURE : 1445 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 338A4

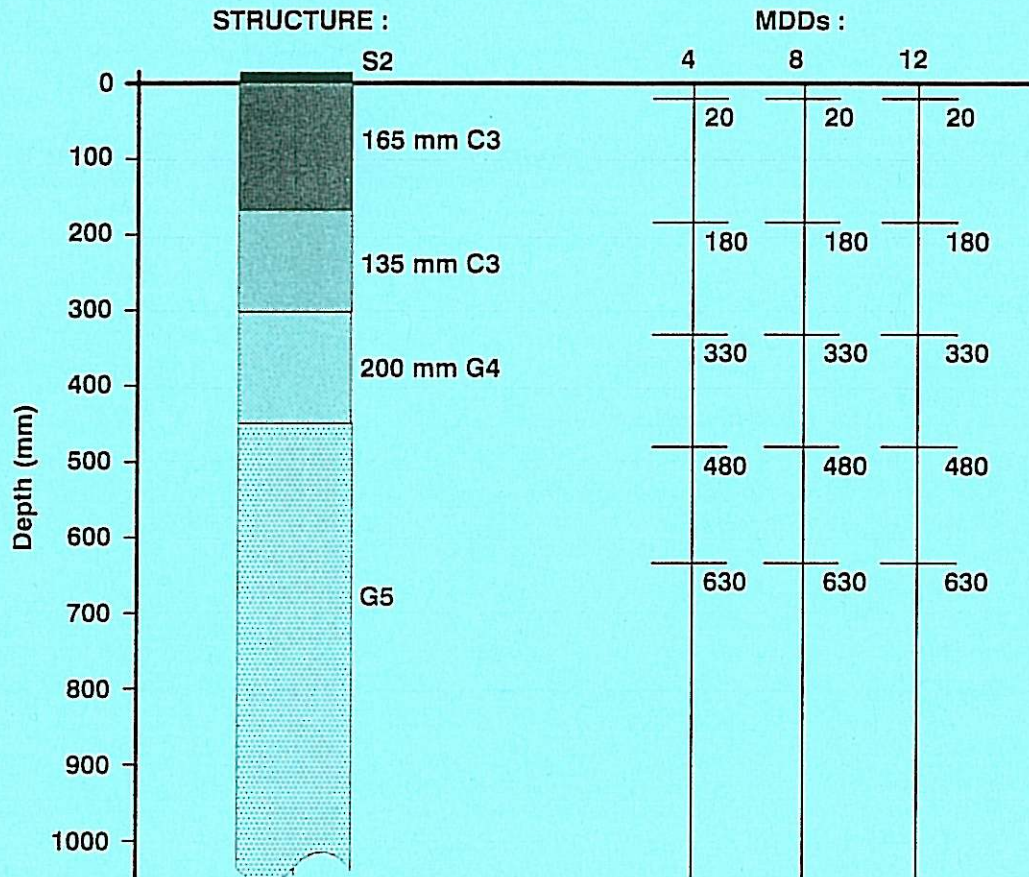
LOCATION : ROOIWAL

TEST LOAD : 150 kN single wheel

ROAD # : R1932

TYRE PRESSURE : 960 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 339A4

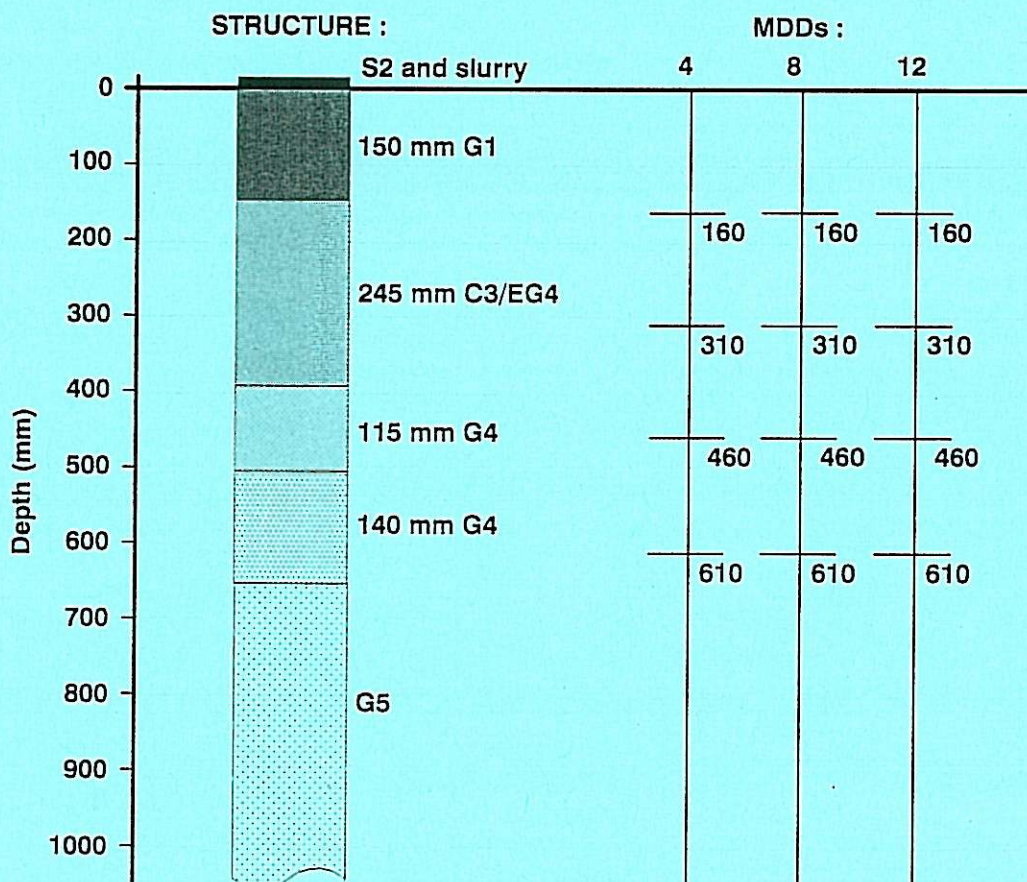
LOCATION : BULTFONTEIN

TEST LOAD : 40 kN dual wheel

ROAD # : P2212

TYRE PRESSURE : 690 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 340A4

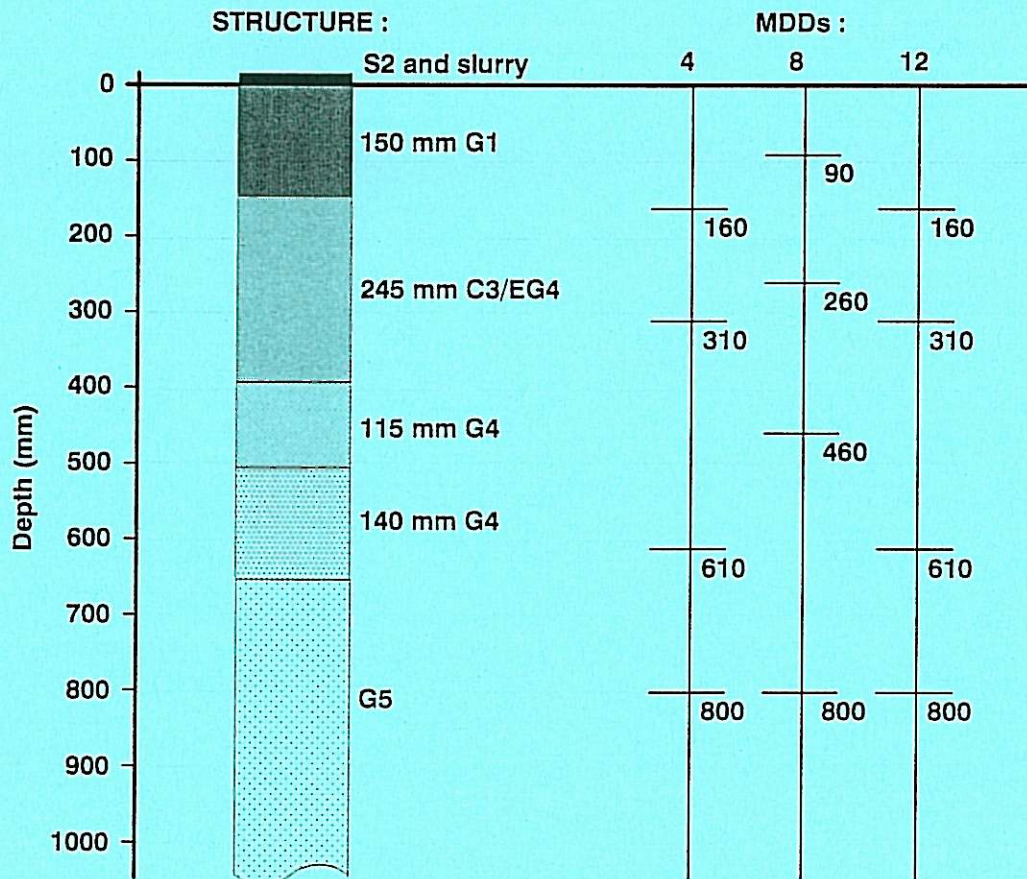
LOCATION : BULTFONTEIN

TEST LOAD : 70 kN dual wheel

ROAD # : P2212

TYRE PRESSURE : 690 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 346A4

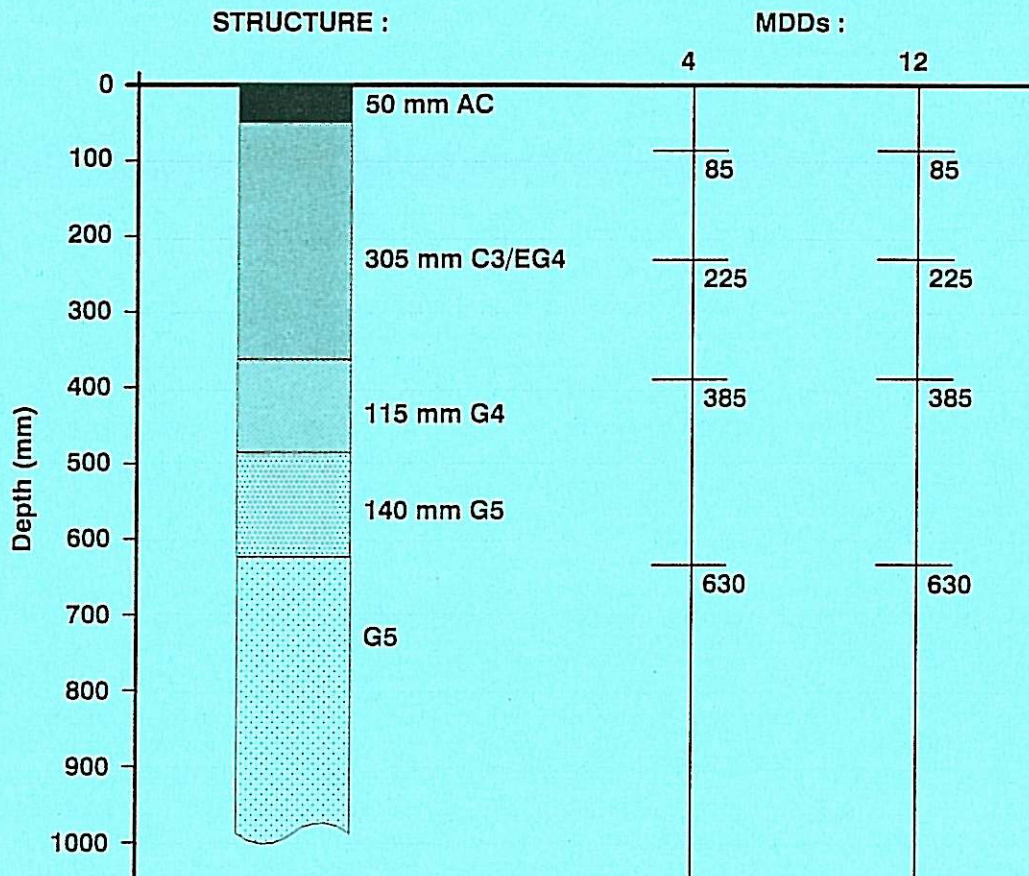
LOCATION : BULTFONTEIN

TEST LOAD : 40 kN dual wheel

ROAD # : P2212

TYRE PRESSURE : 690 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 347A4

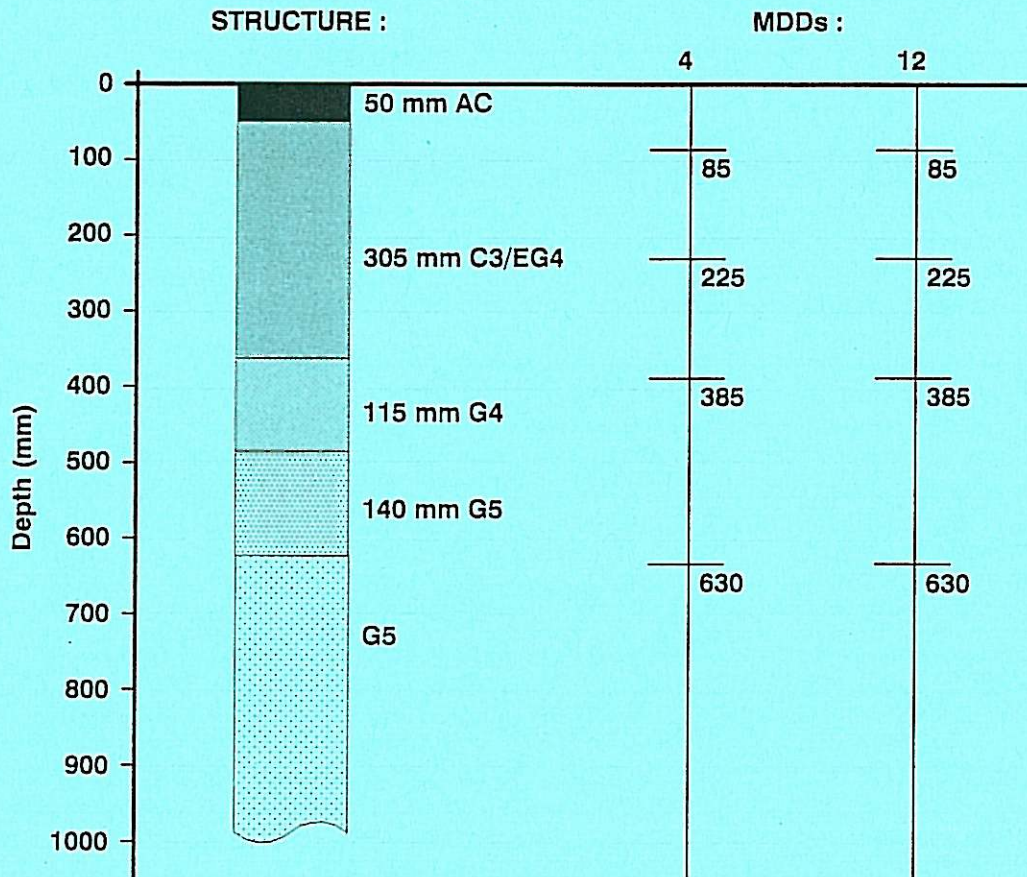
LOCATION : BULTFONTEIN

TEST LOAD : 70 kN dual wheel

ROAD # : P2212

TYRE PRESSURE : 690 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 348A4

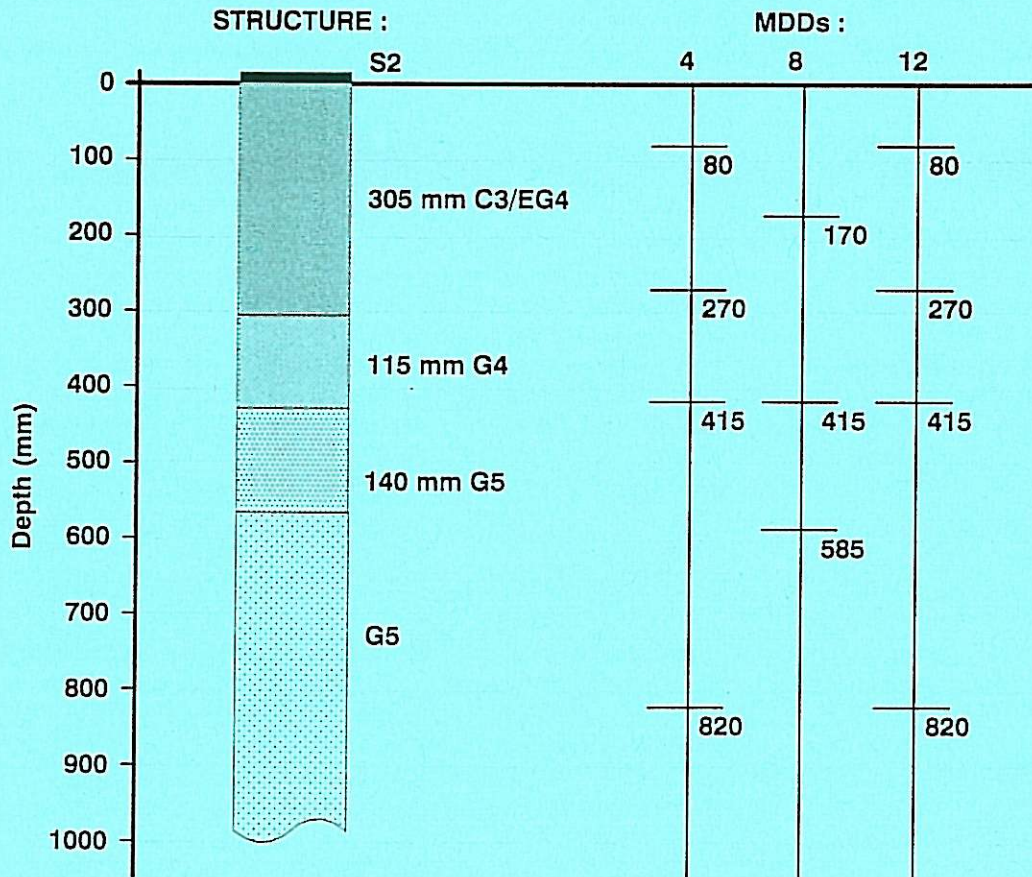
LOCATION : BULTFONTEIN

TEST LOAD : 40 kN dual wheel

ROAD # : P2212

TYRE PRESSURE : 690 kPa

CONTACT PRESSURE :



PAVEMENT STRUCTURE AND MDD DEPTHS

HVS TEST #: 349A4

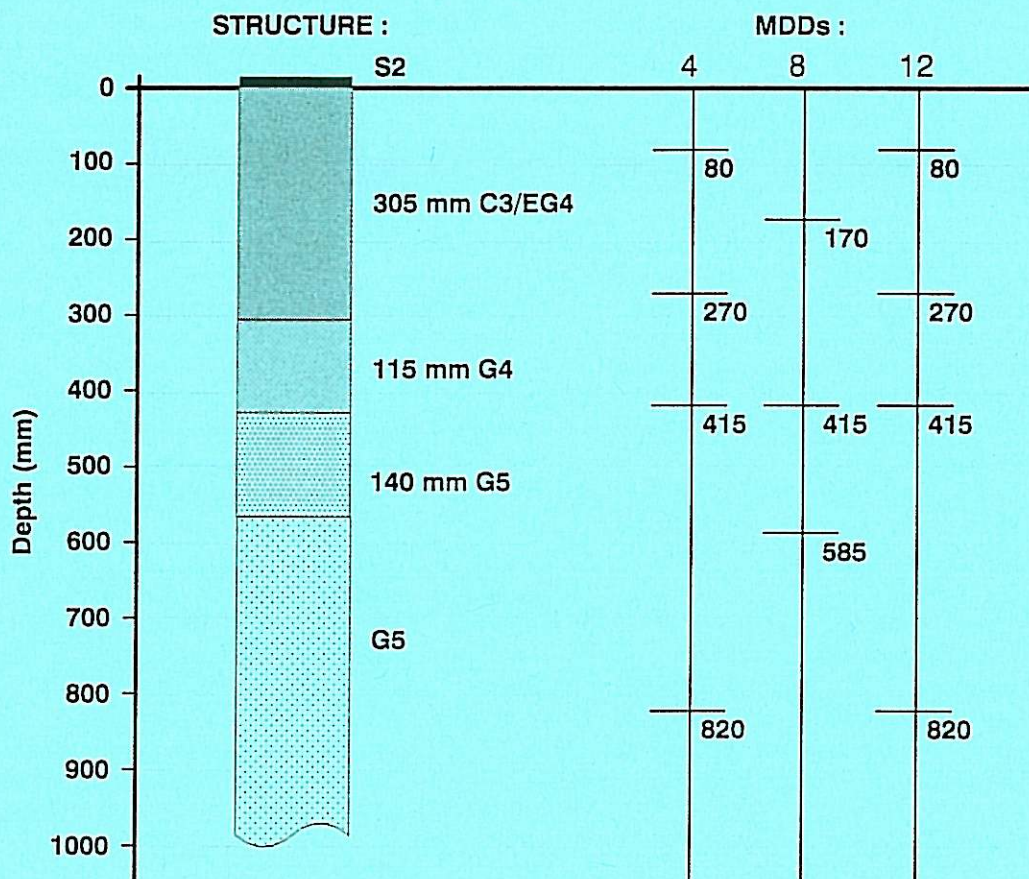
LOCATION : BULTFONTEIN

TEST LOAD : 70 kN dual wheel

ROAD # : P2212

TYRE PRESSURE : 690 kPa

CONTACT PRESSURE :

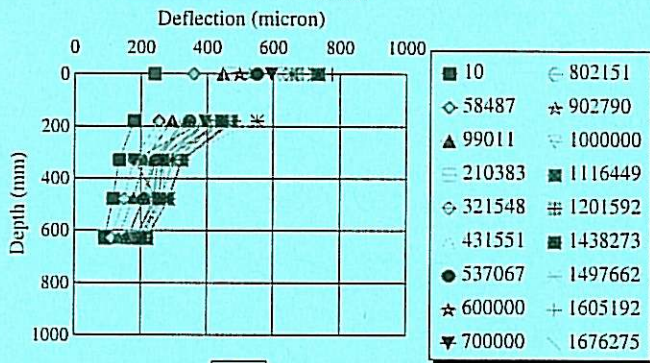


APPENDIX B

**IN-DEPTH DEFLECTION DATA FOR A NUMBER OF SELECTED HVS
TESTS**

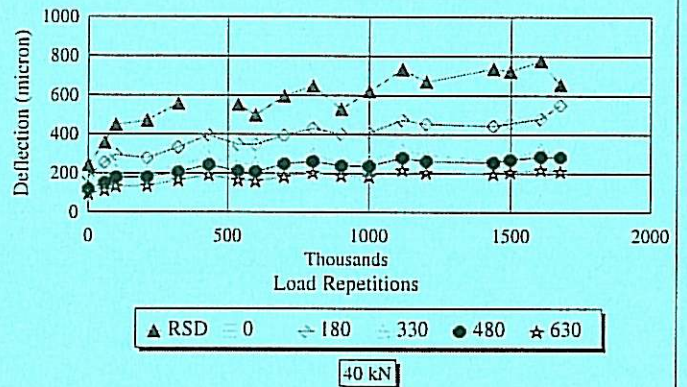
Section 274A4

MDD4



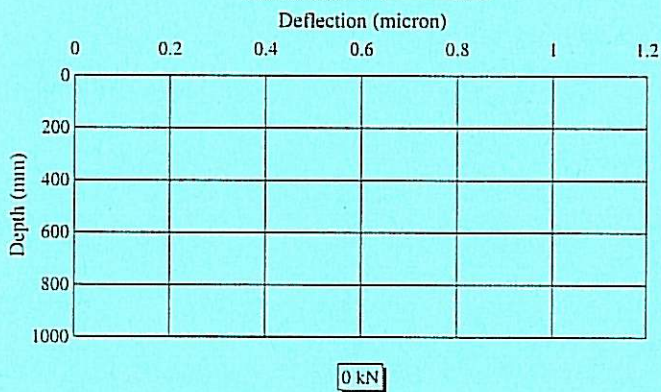
Section 274A4

MDD4



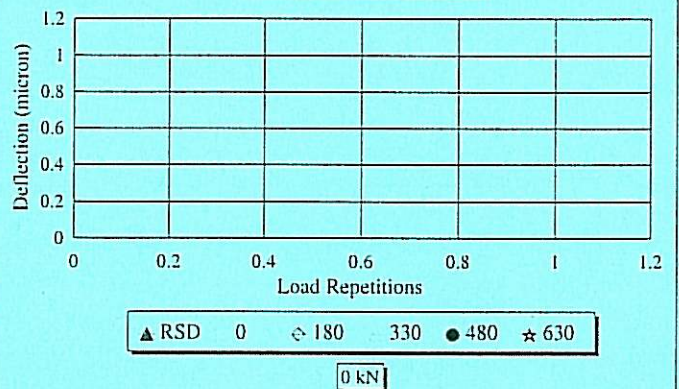
Section 274A4

MDD4



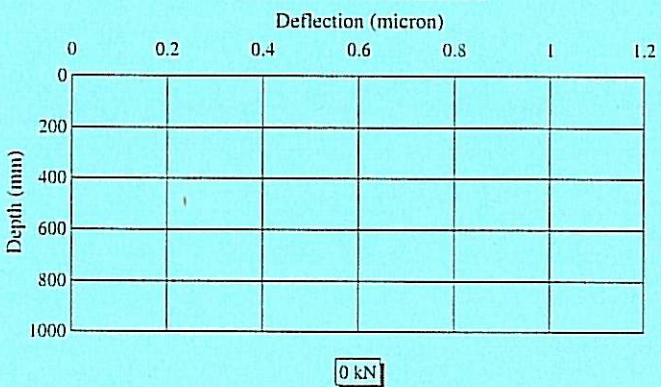
Section 274A4

MDD4



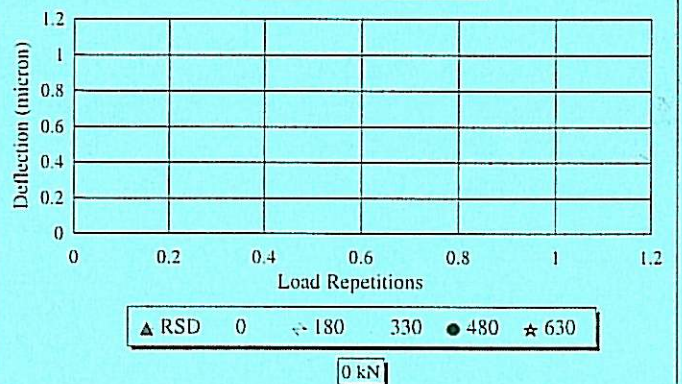
Section 274A4

MDD4



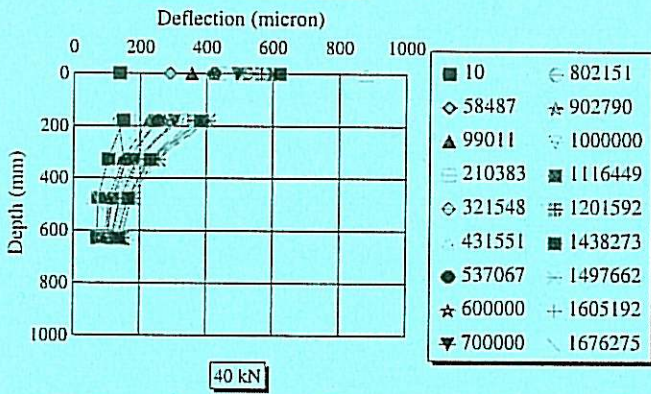
Section 274A4

MDD4



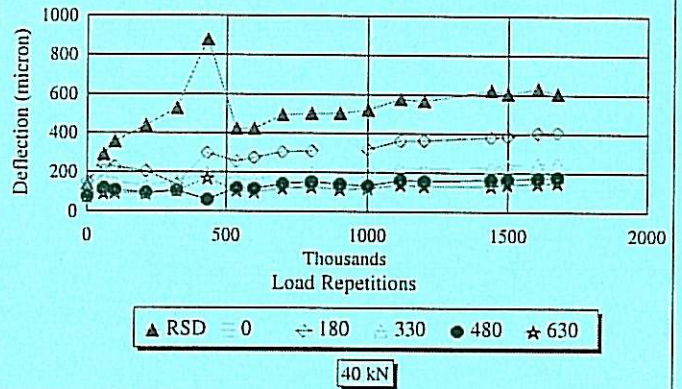
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MDD8



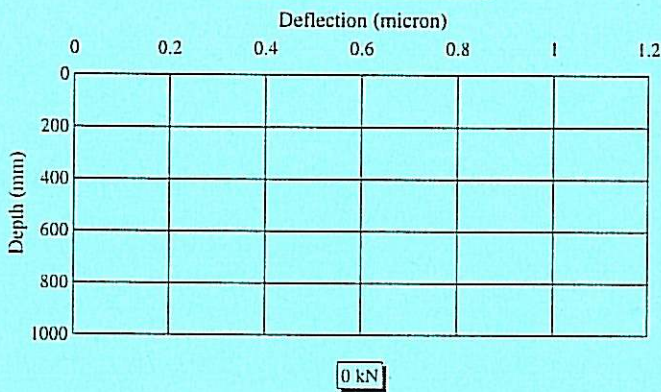
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MDD8



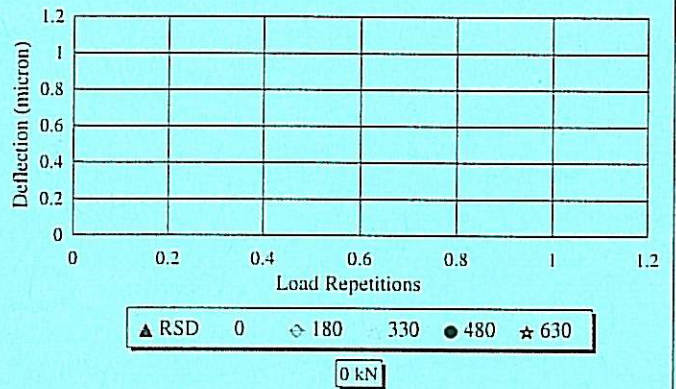
Section 274A4

MDD8



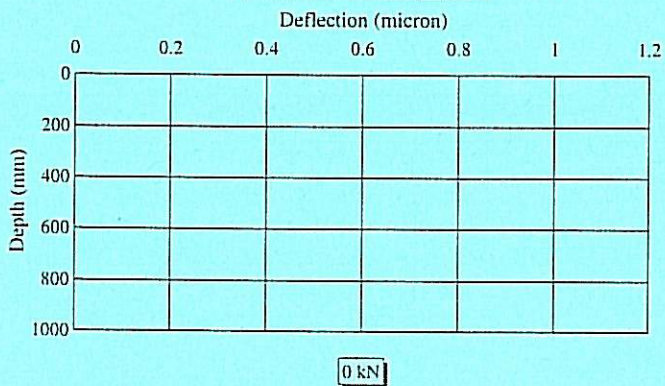
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MDD8



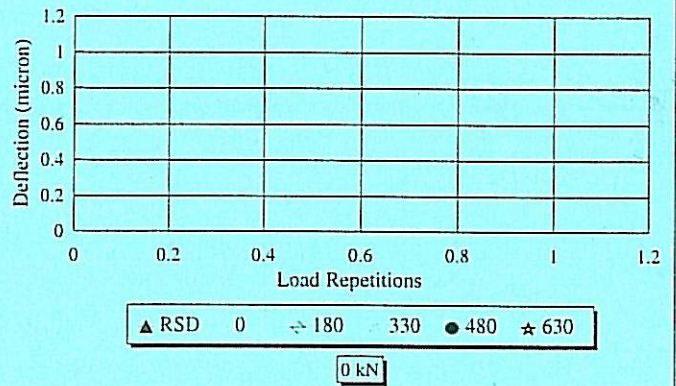
Section 274A4

MDD8



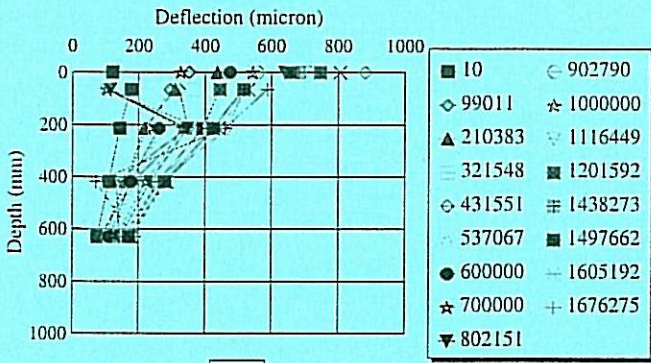
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MDD8



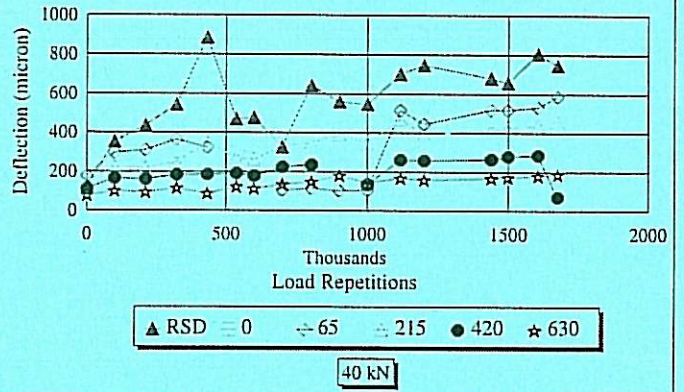
Section 274A4

MDD12



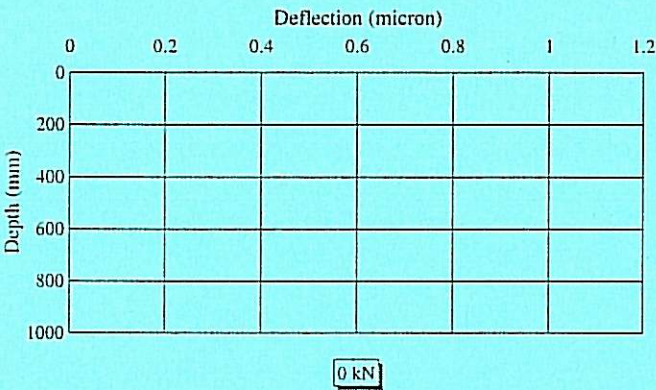
Section 274A4

MDD12



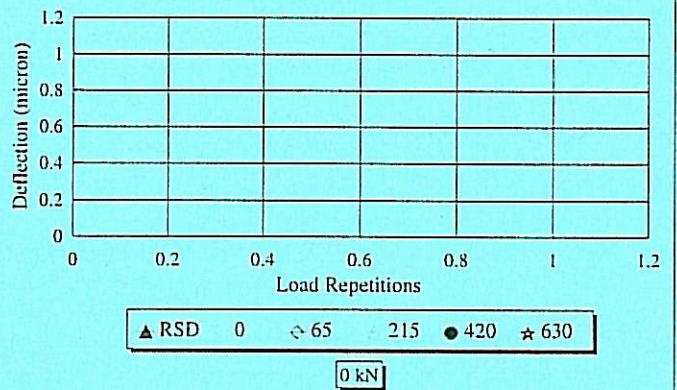
Section 274A4

MDD12



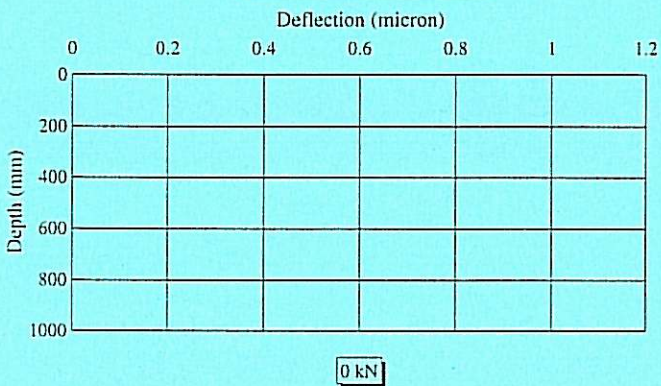
Section 274A4

MDD12



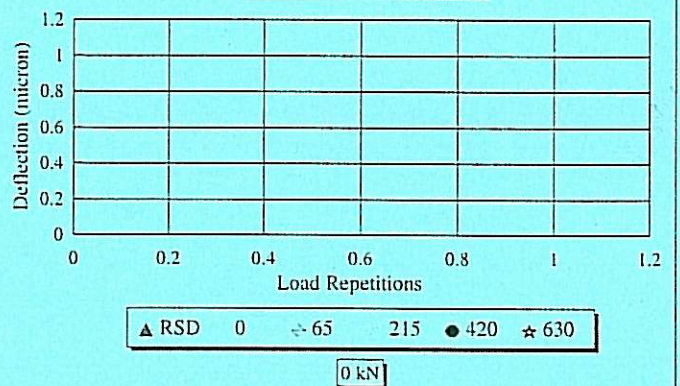
Section 274A4

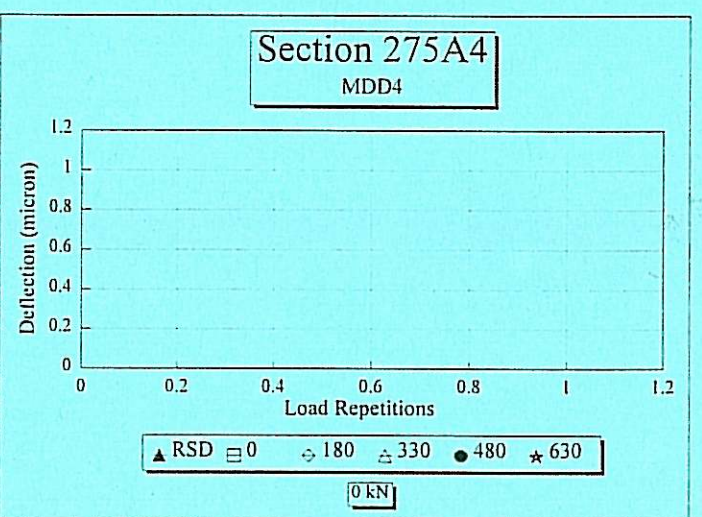
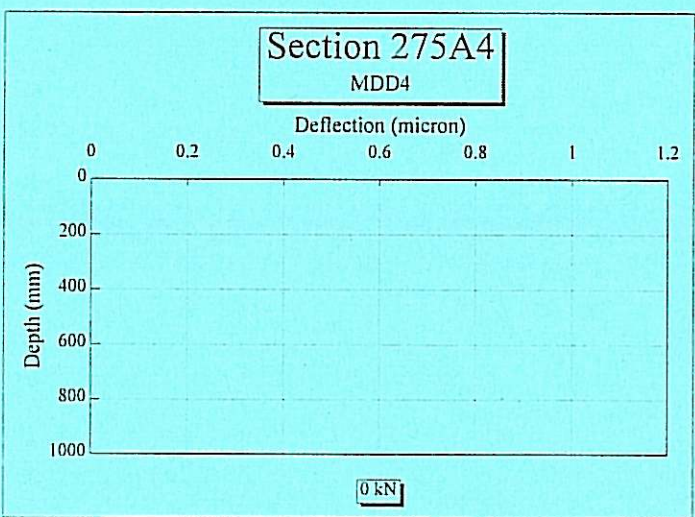
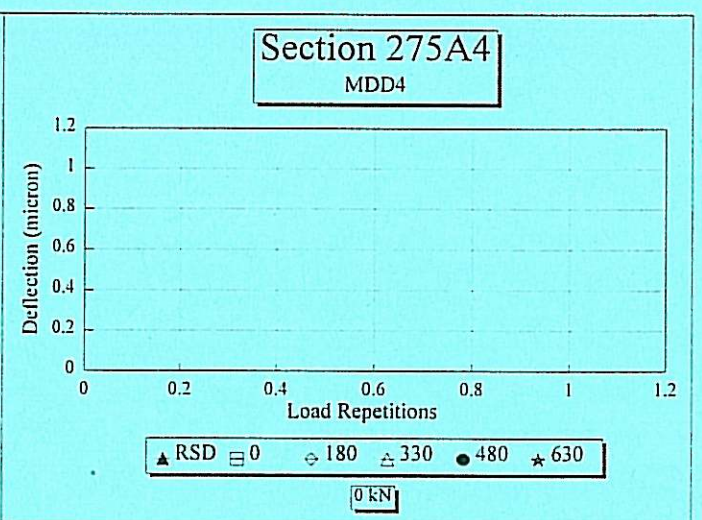
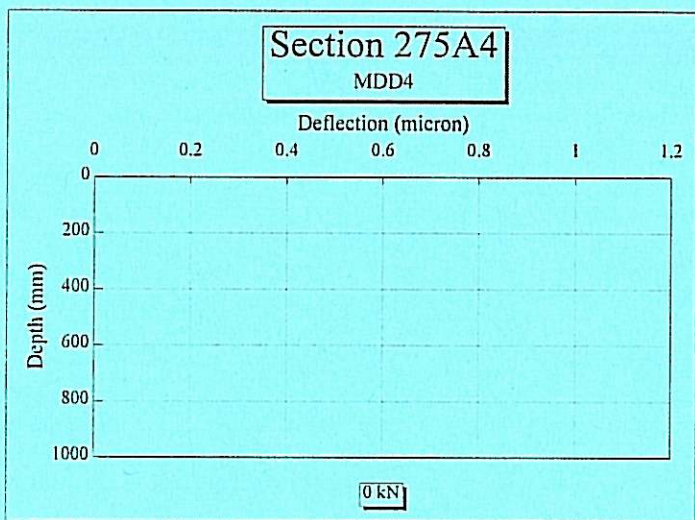
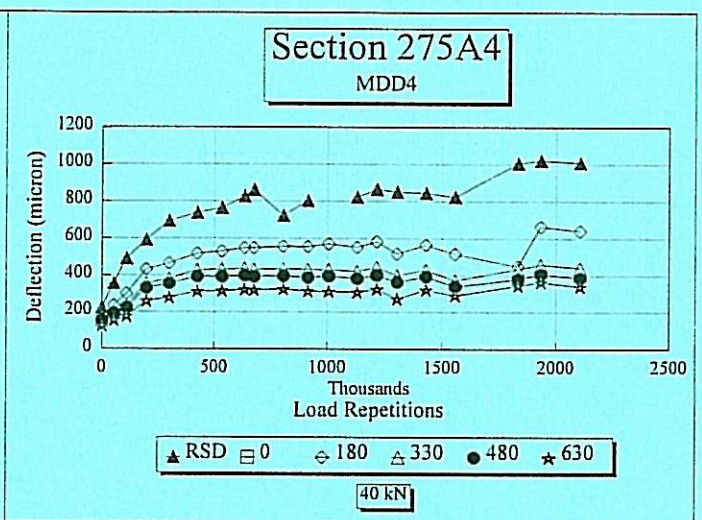
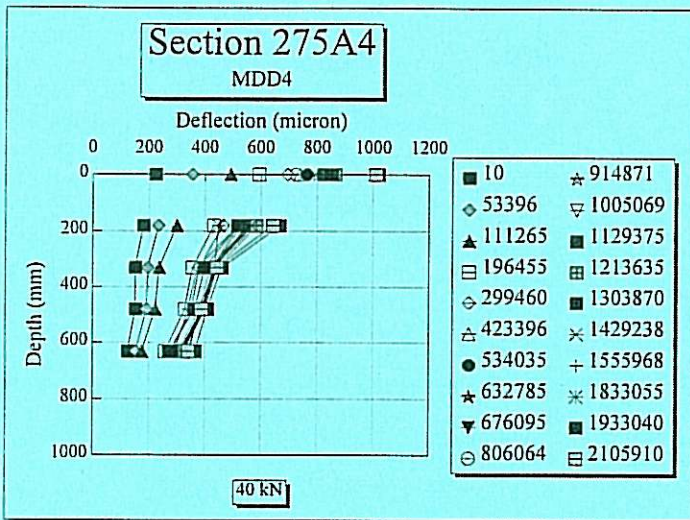
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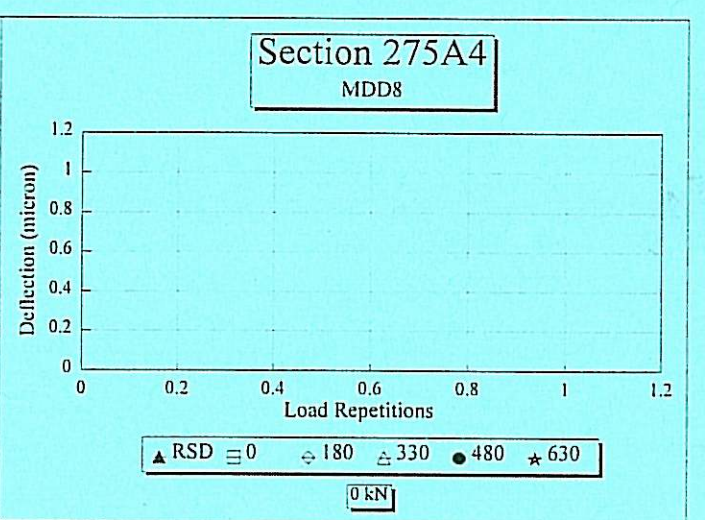
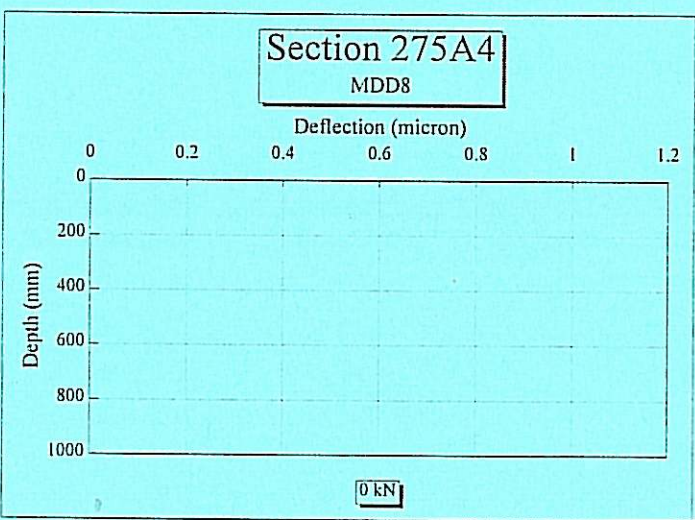
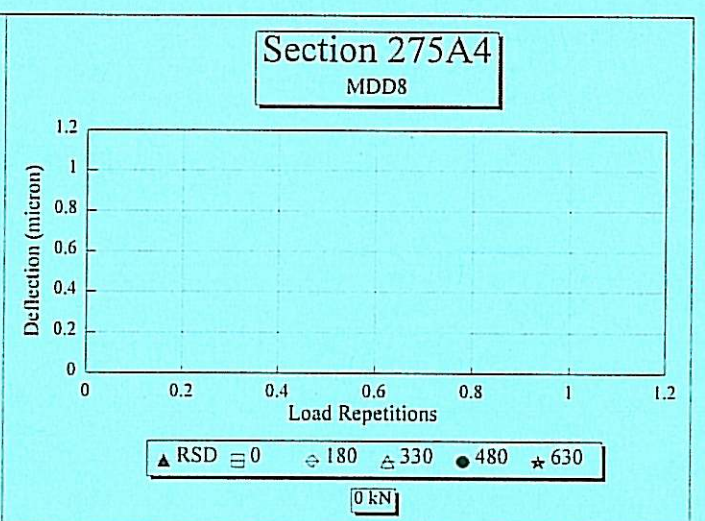
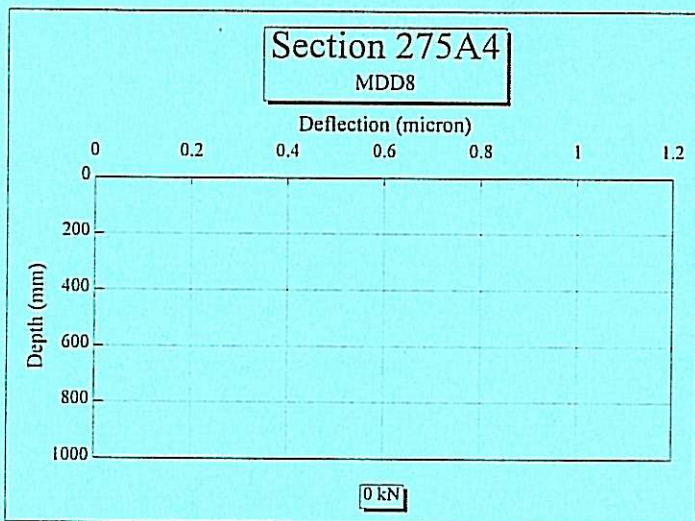
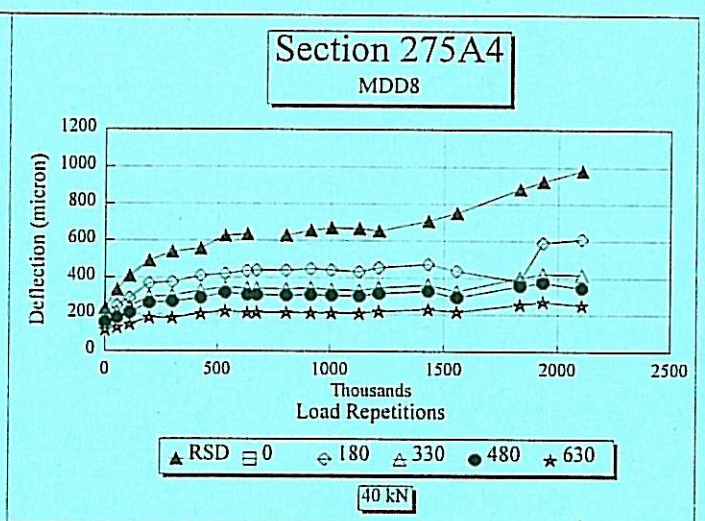
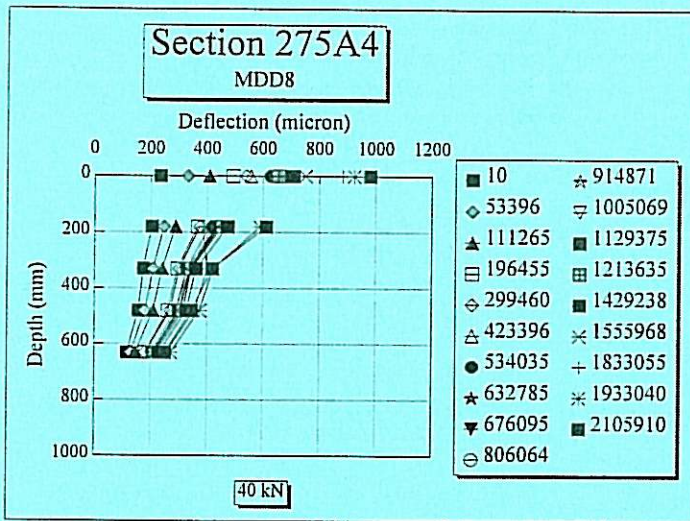


Section 274A4

MDD12

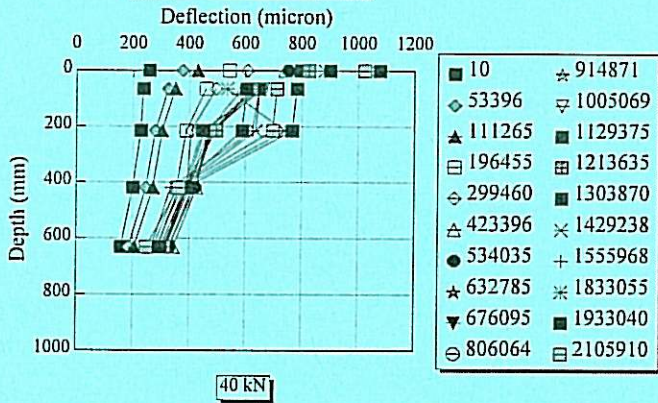






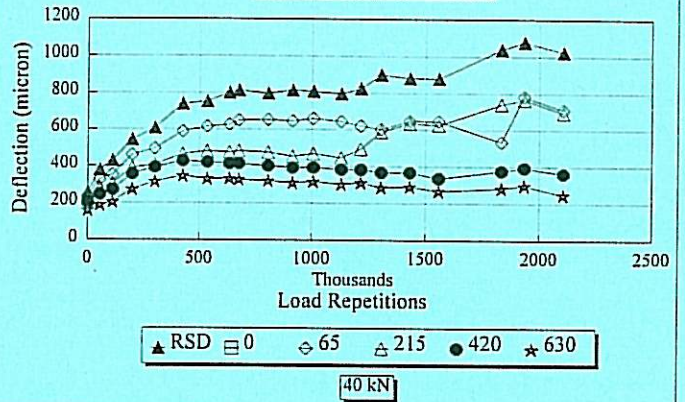
Section 275A4

MDD12



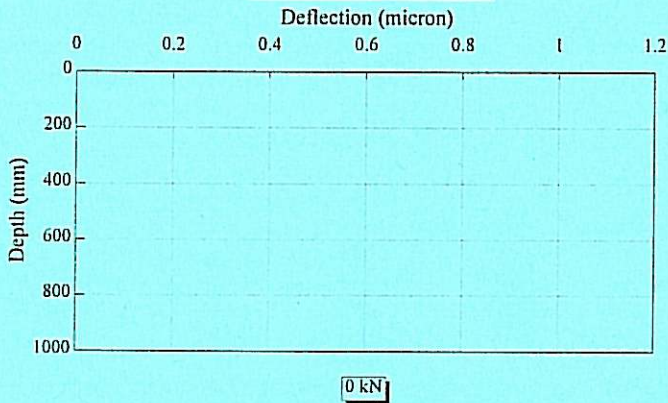
Section 275A4

MDD12



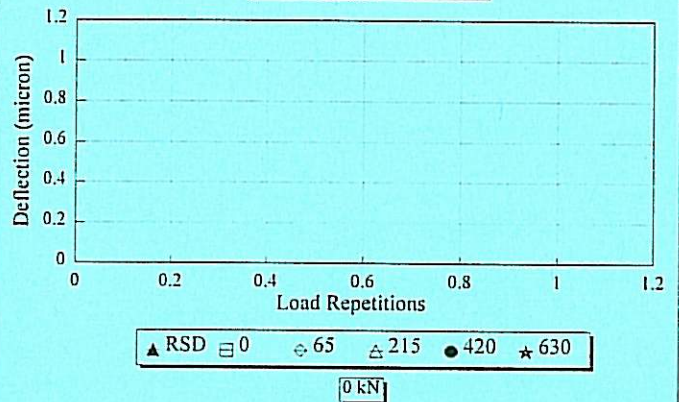
Section 275A4

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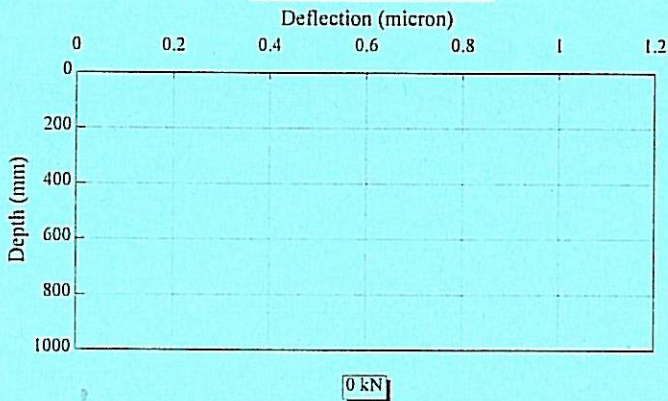
Section 275A4

MDD12



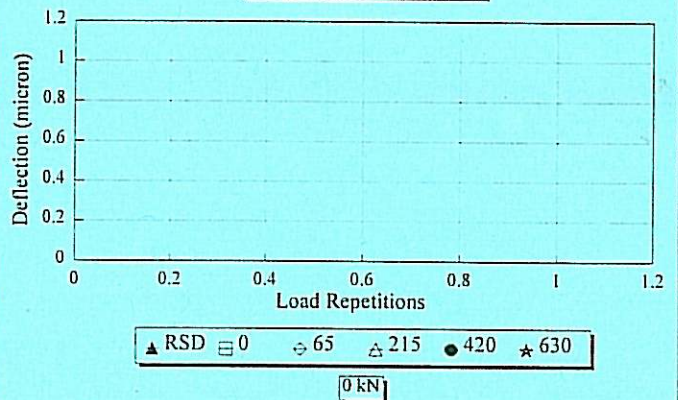
Section 275A4

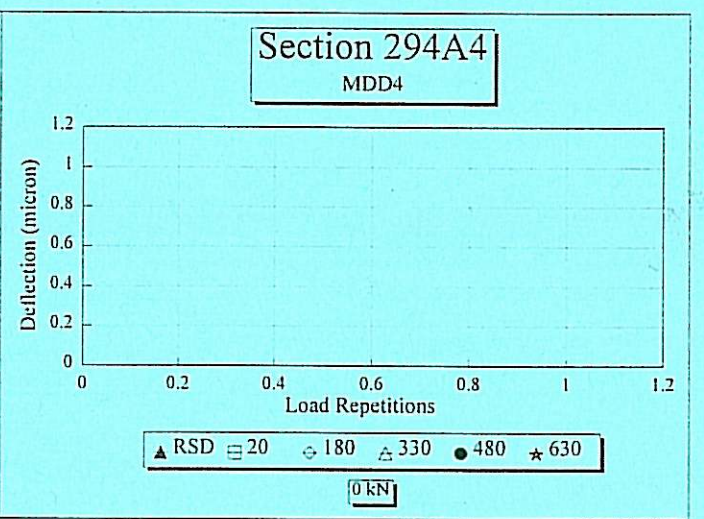
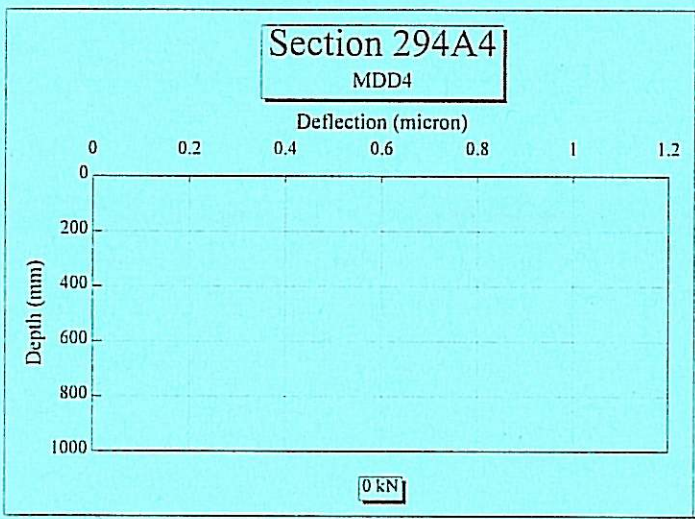
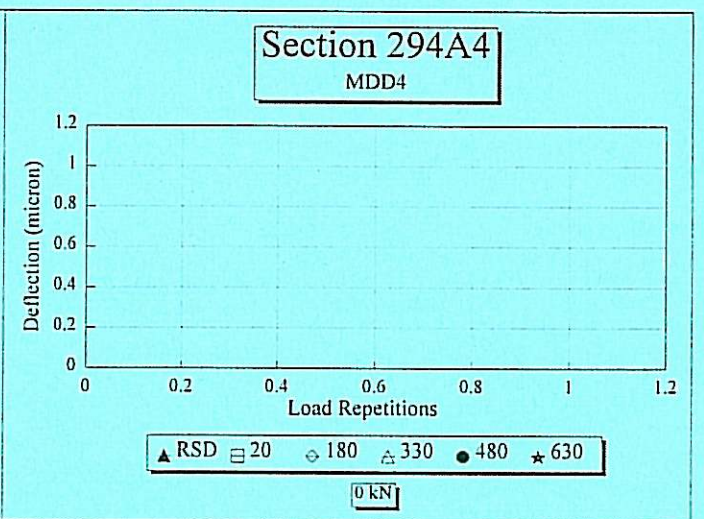
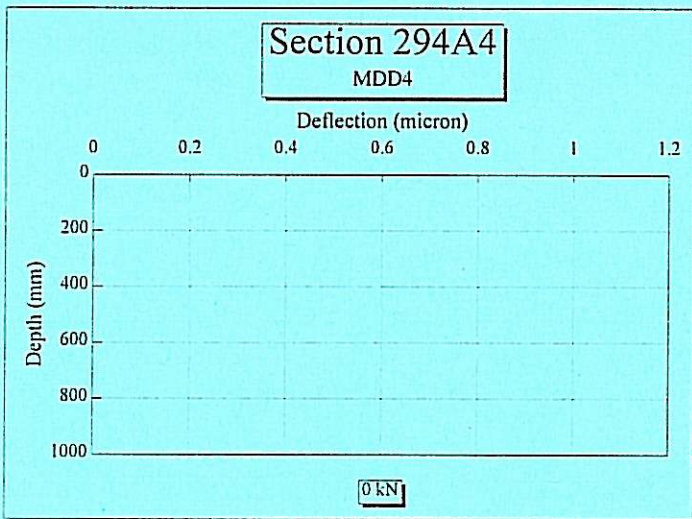
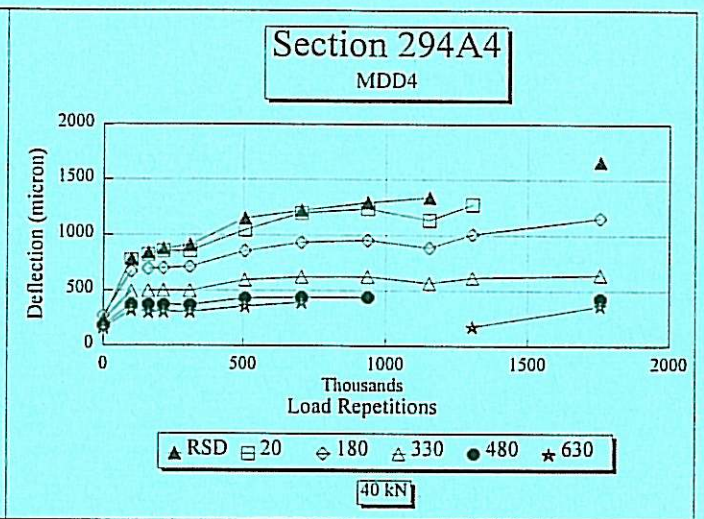
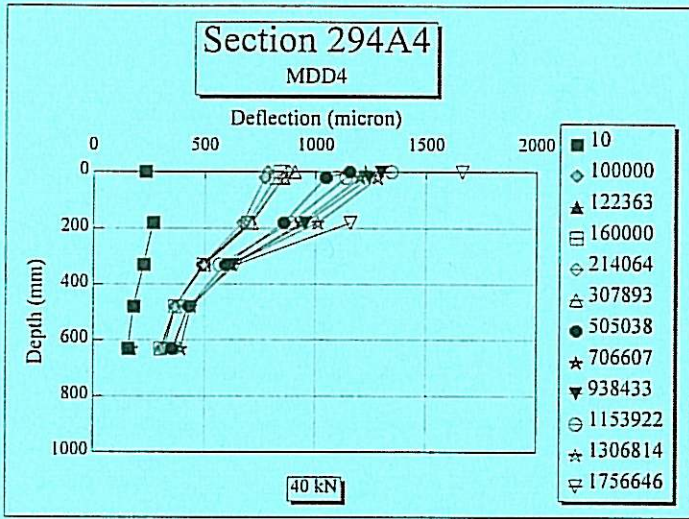
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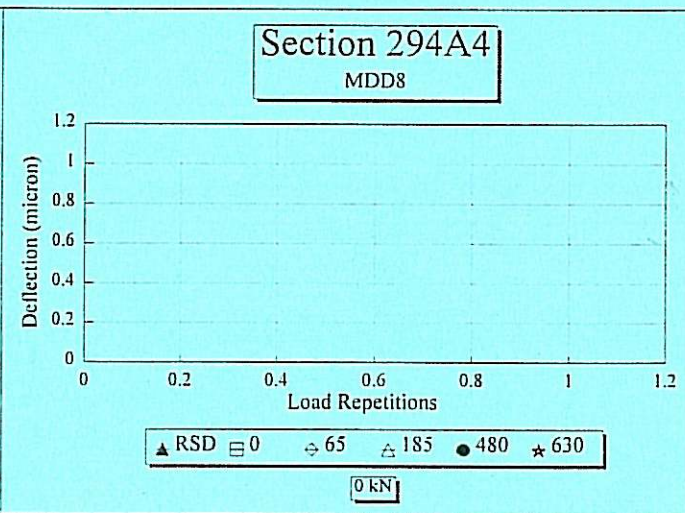
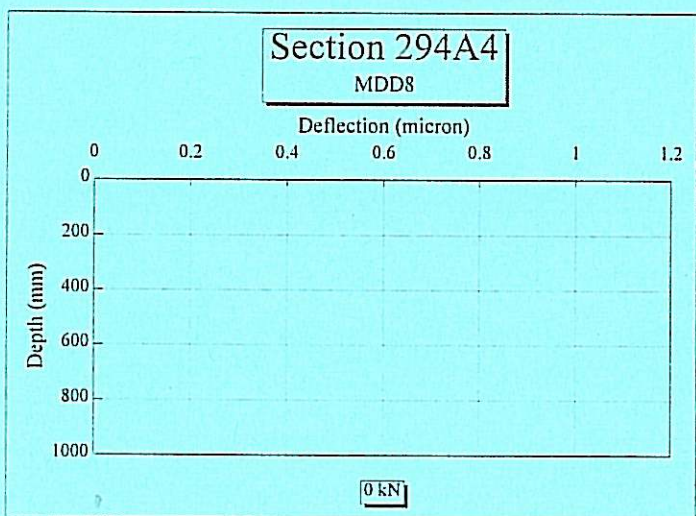
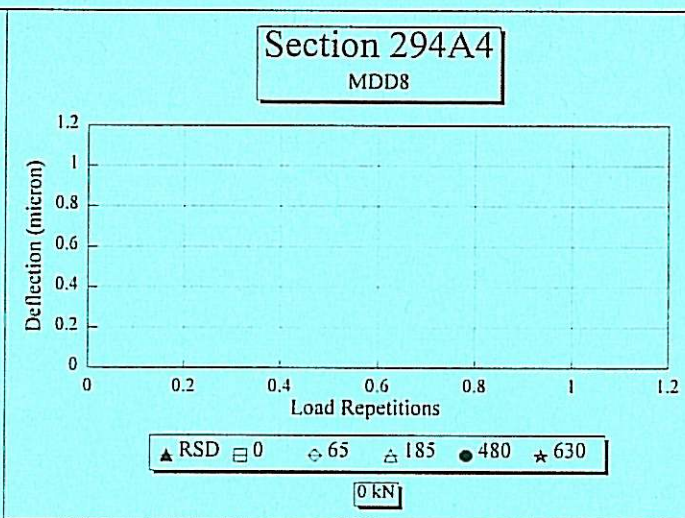
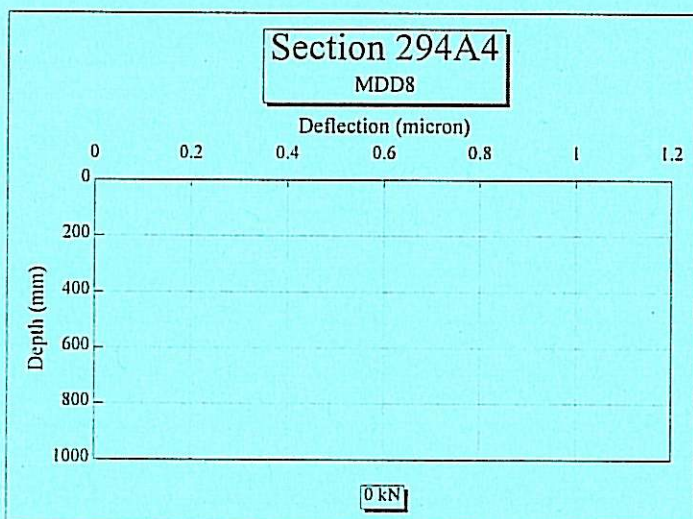
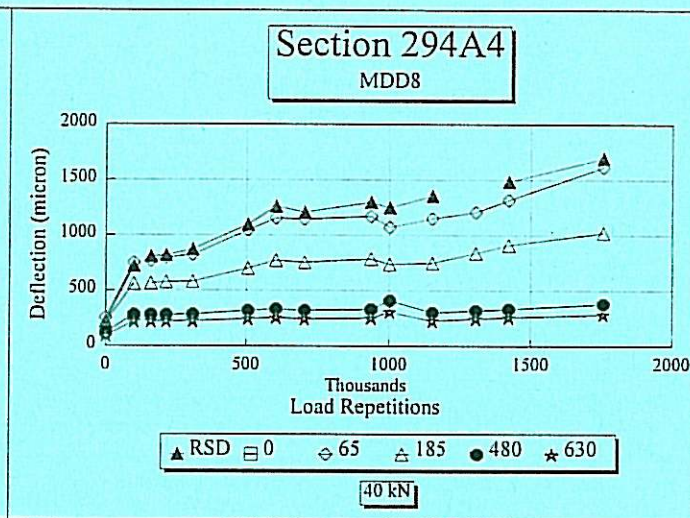
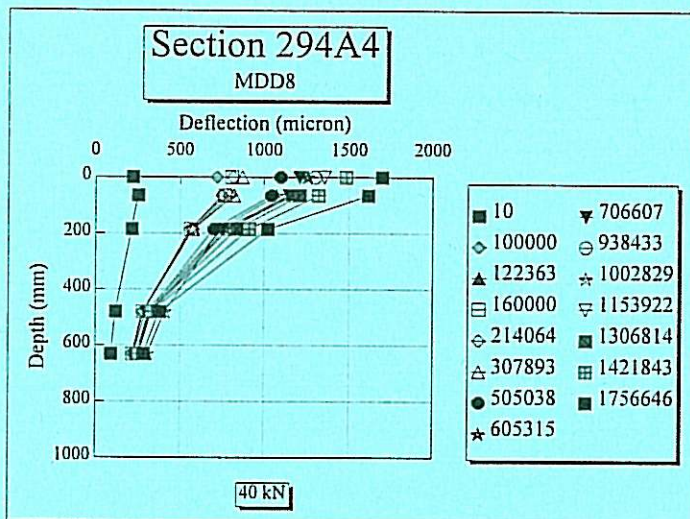


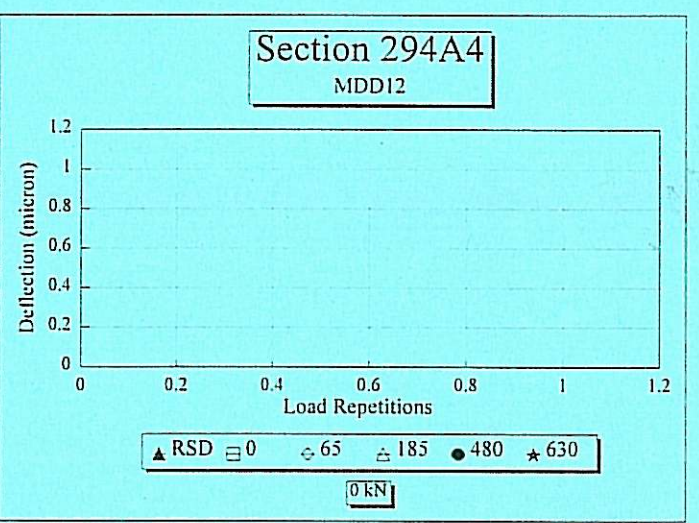
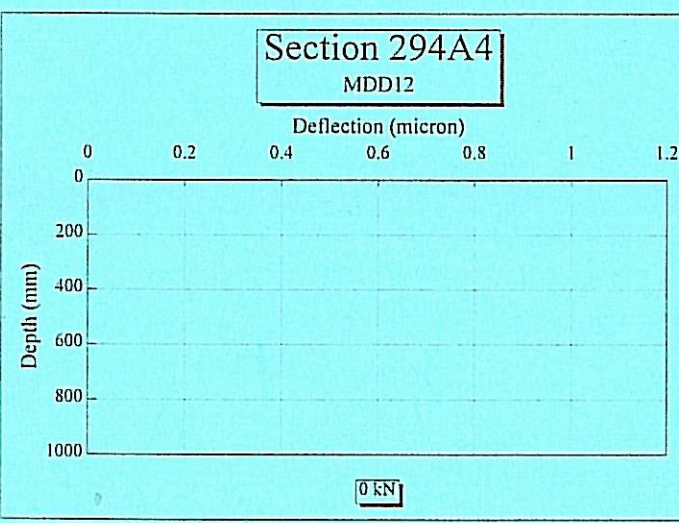
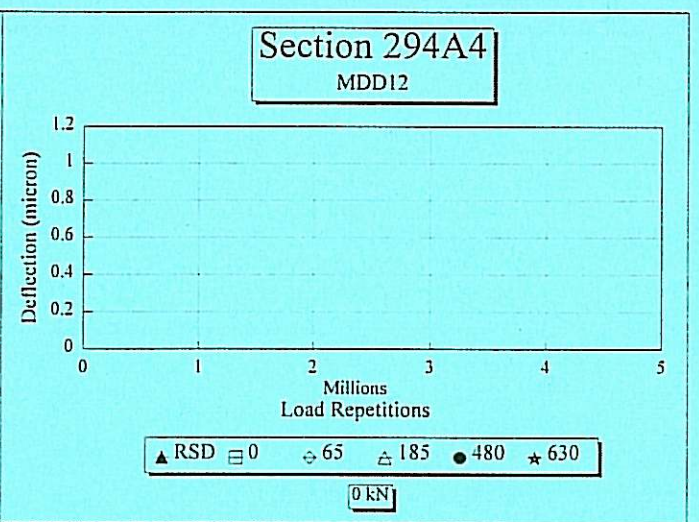
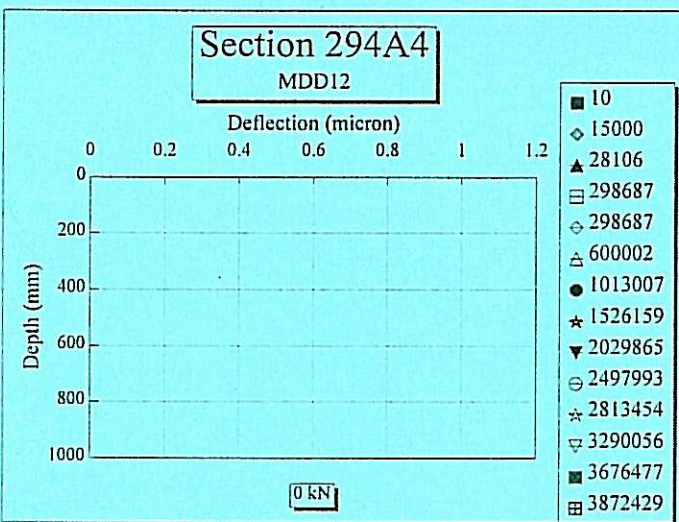
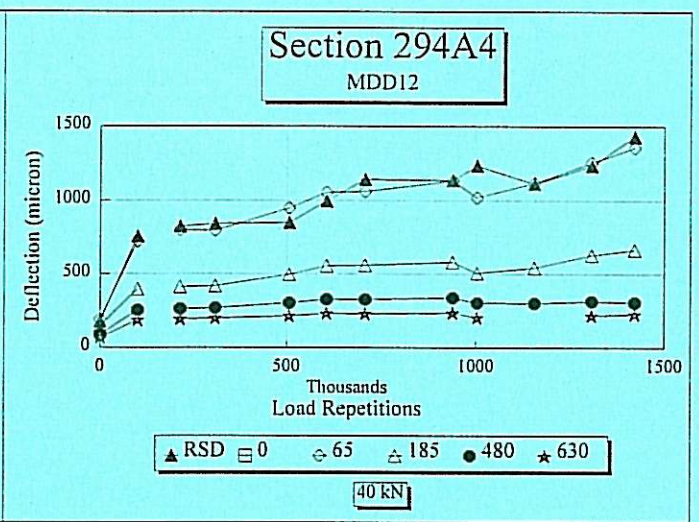
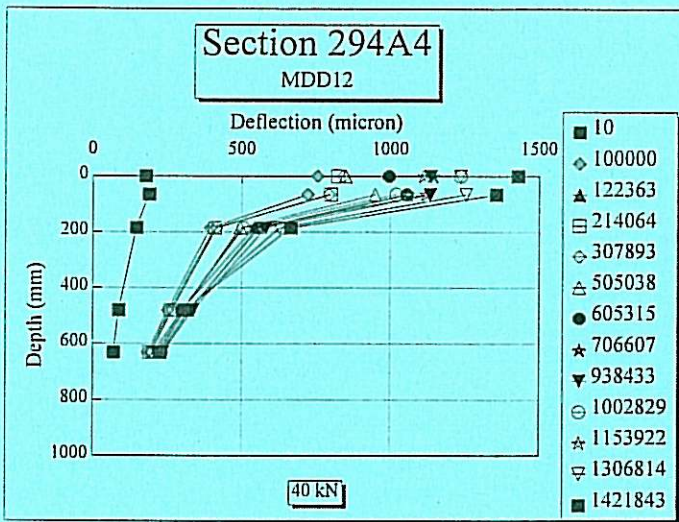
Section 275A4

MDD12



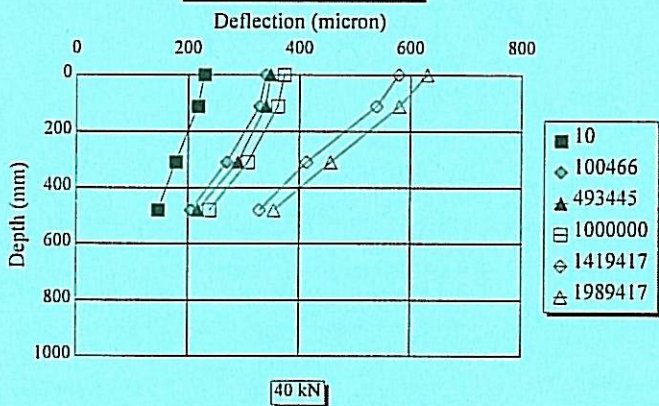






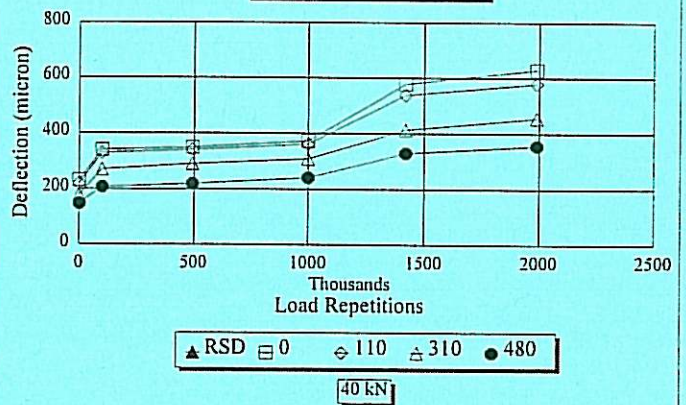
Section 306A4

MDD4



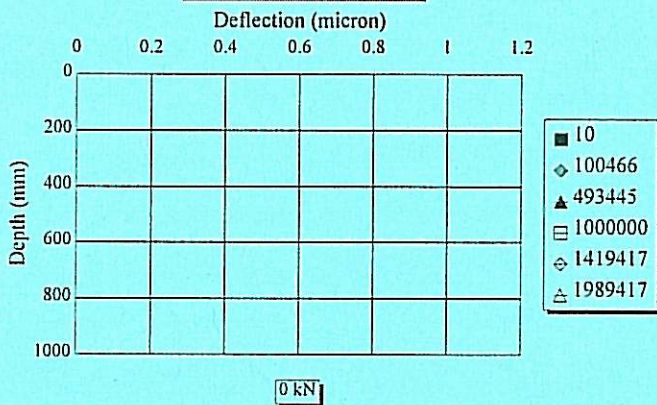
Section 306A4

MDD4



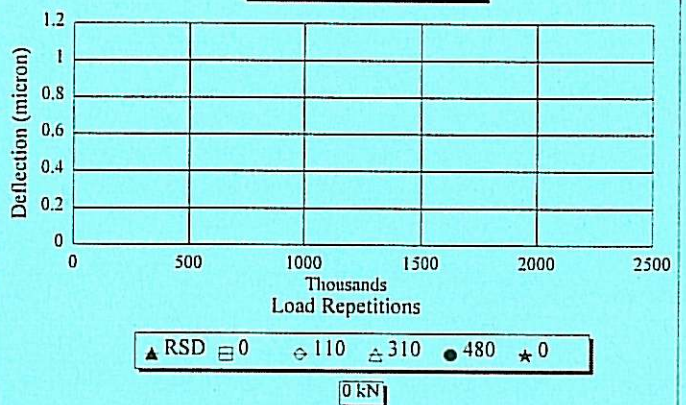
Section 306A4

MDD4



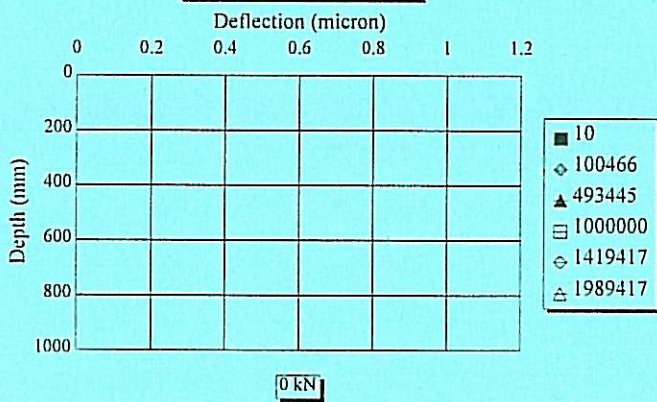
Section 306A4

MDD4



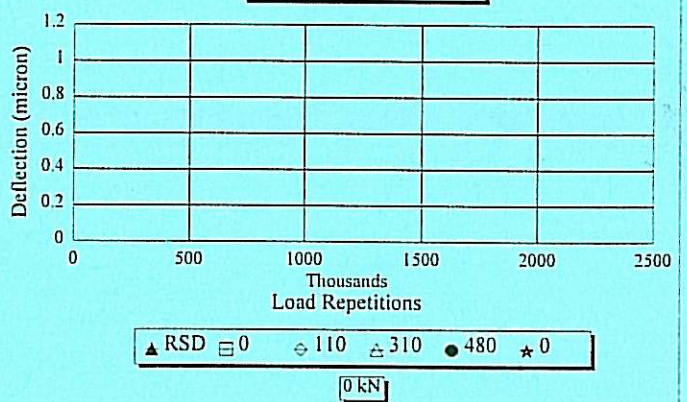
Section 306A4

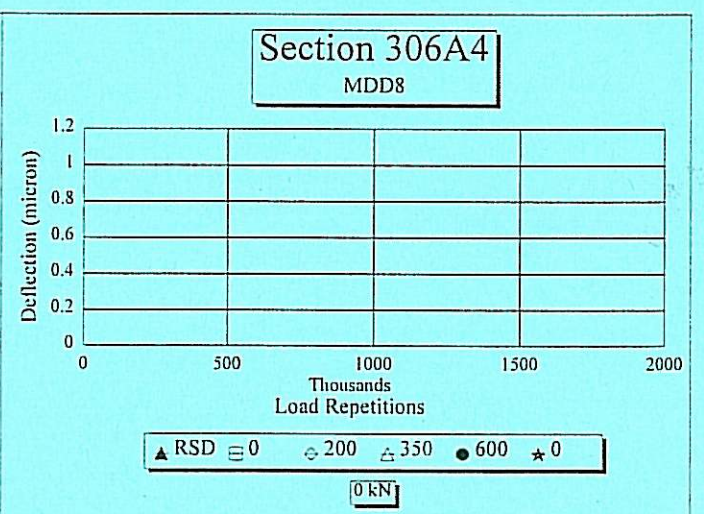
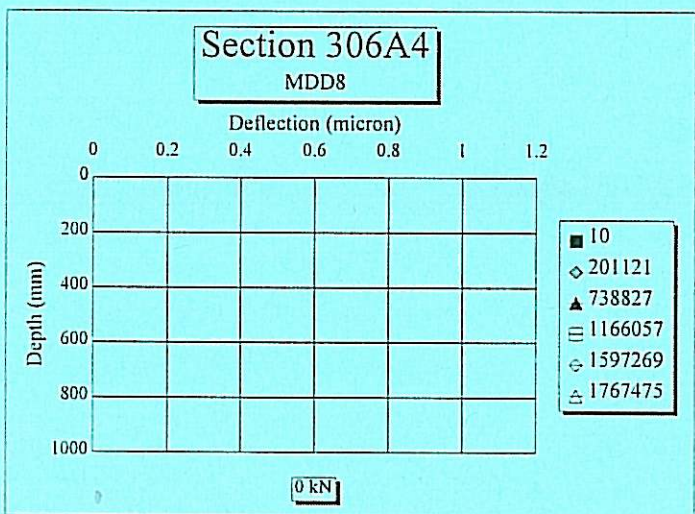
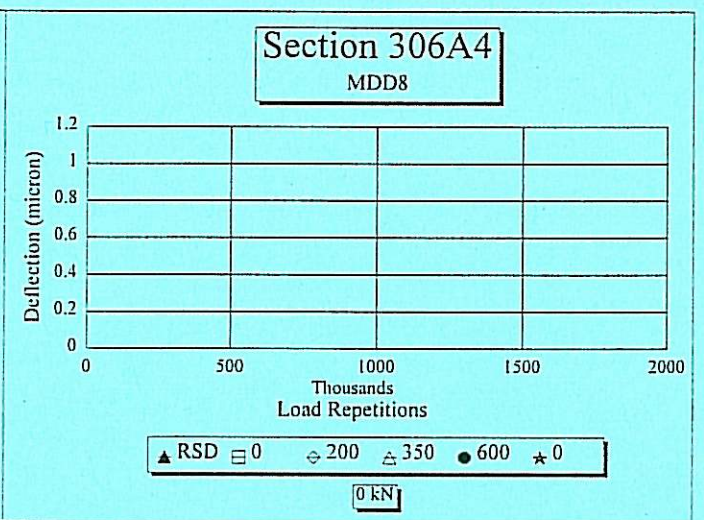
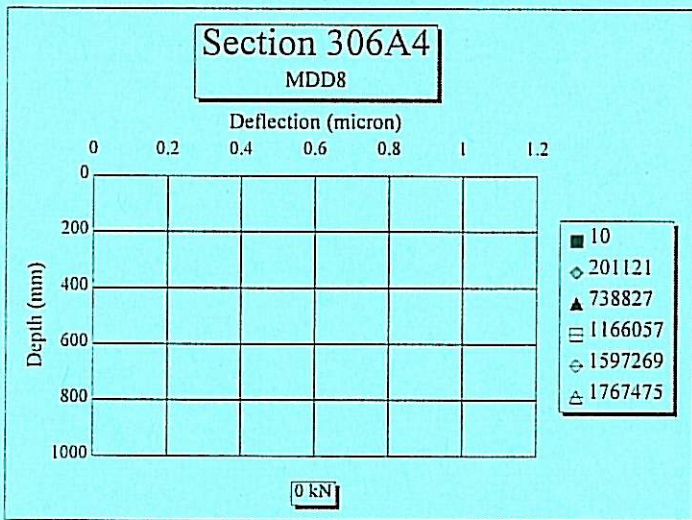
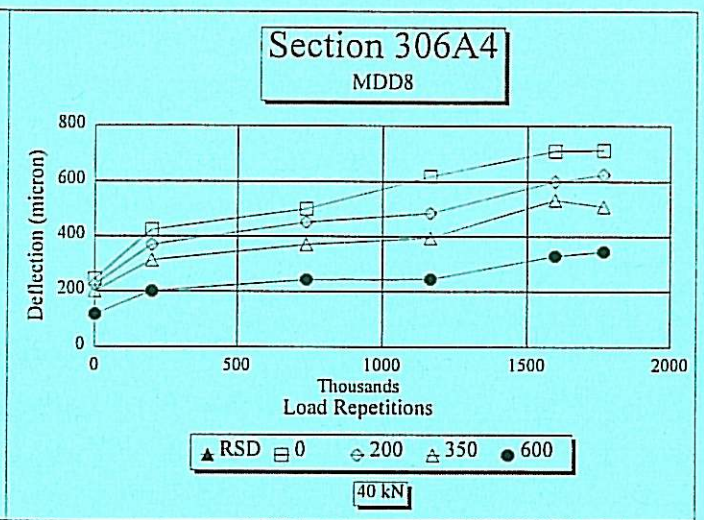
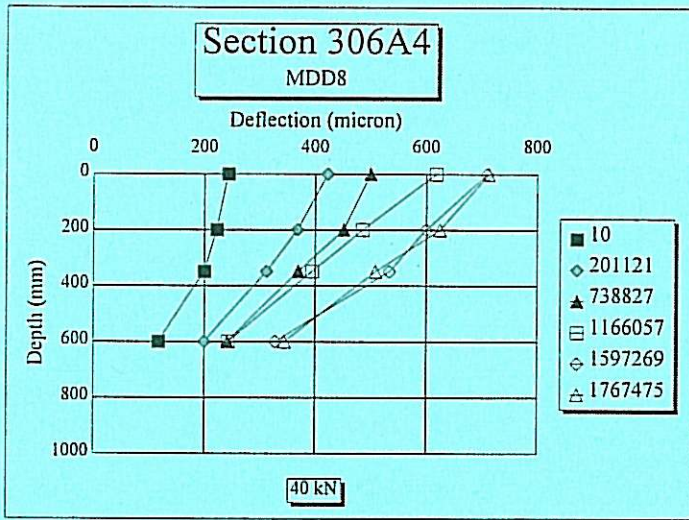
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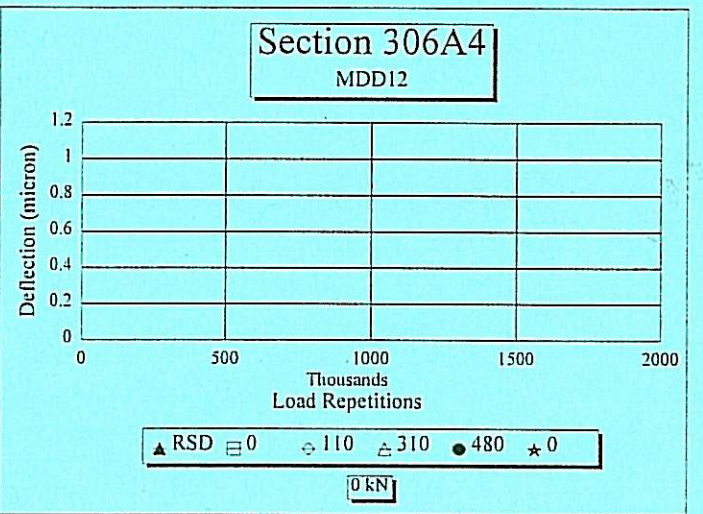
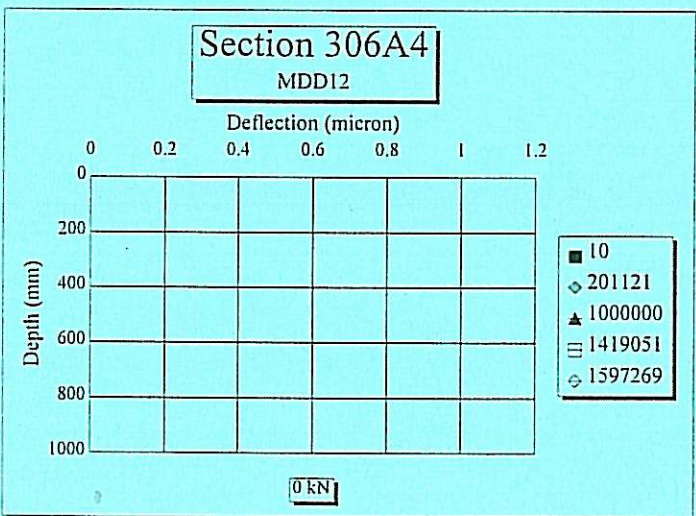
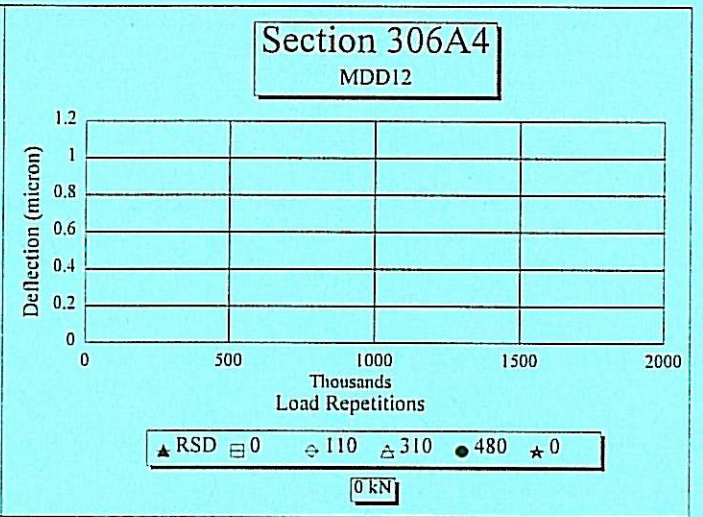
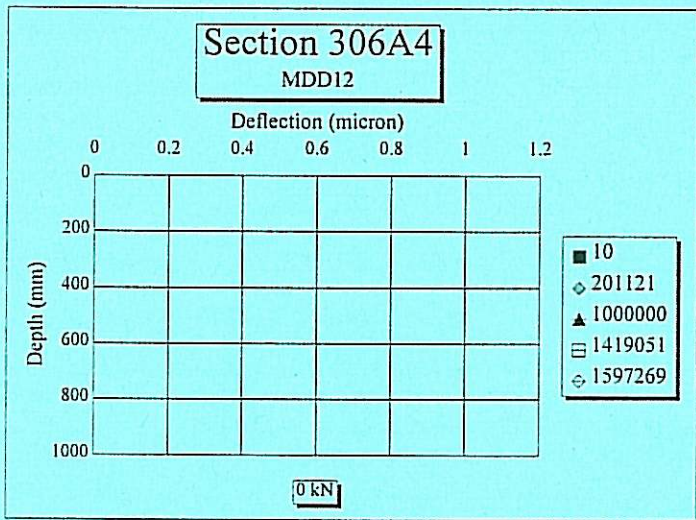
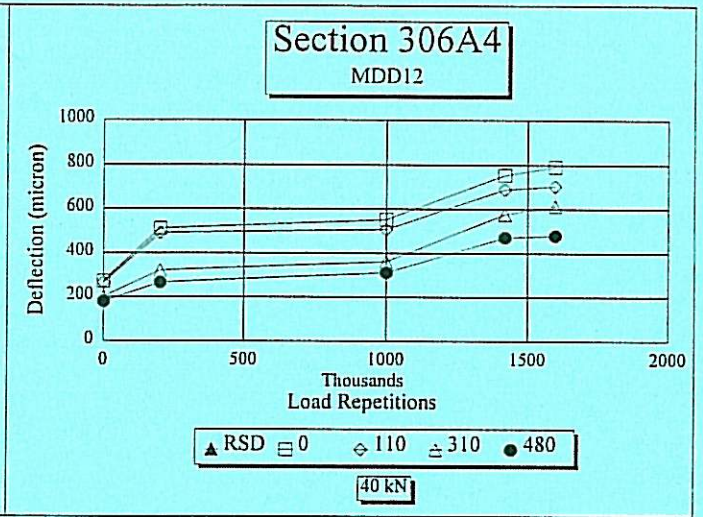
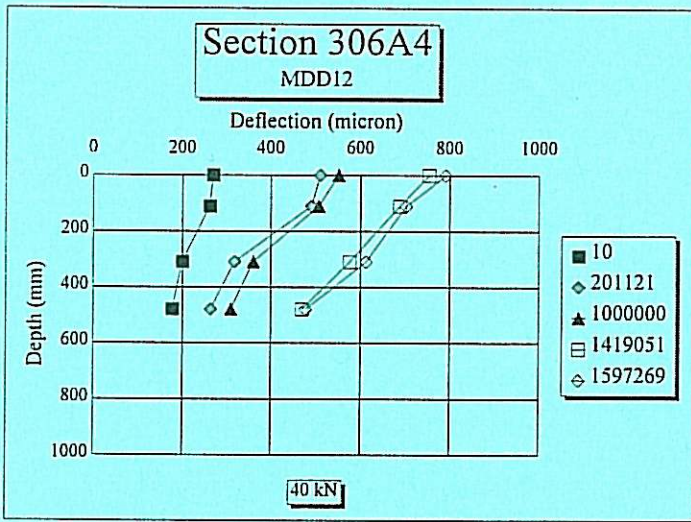


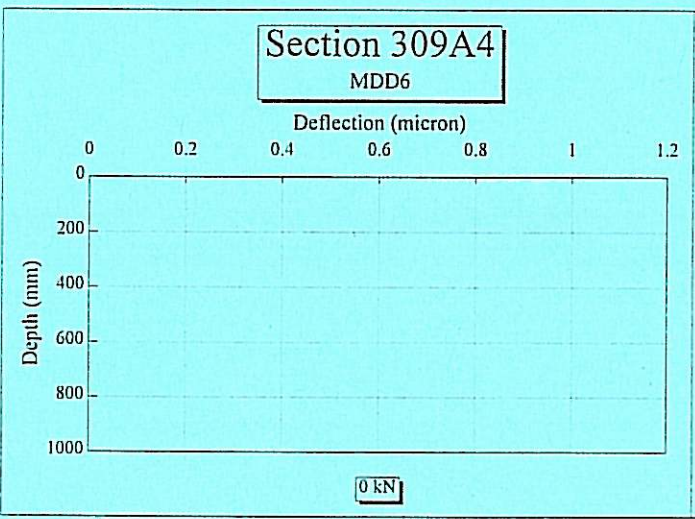
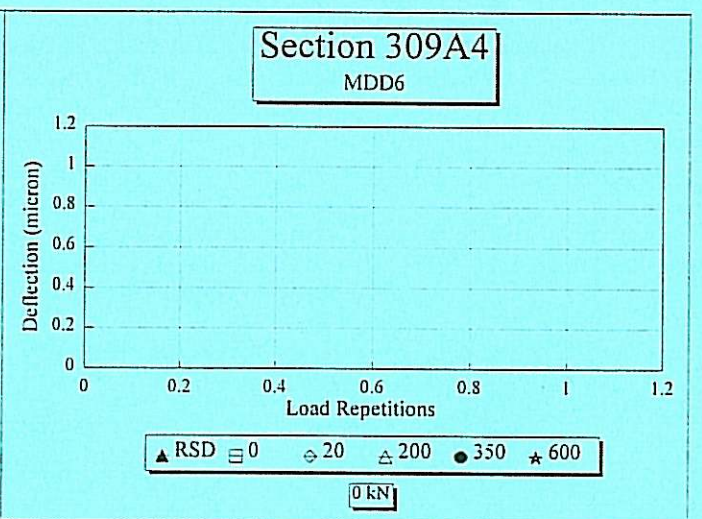
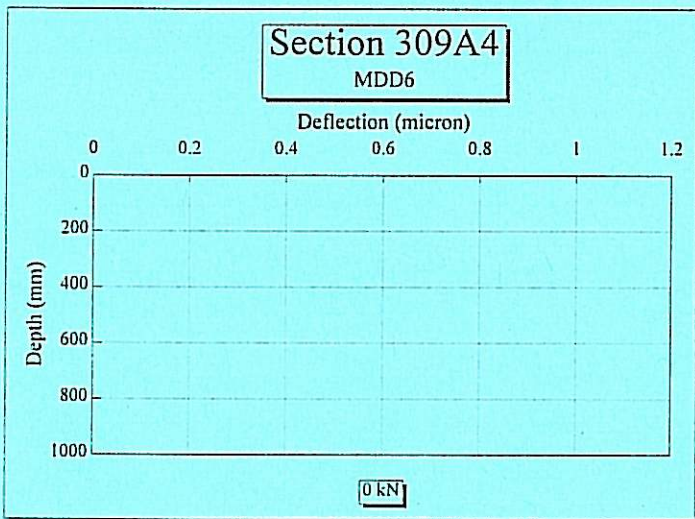
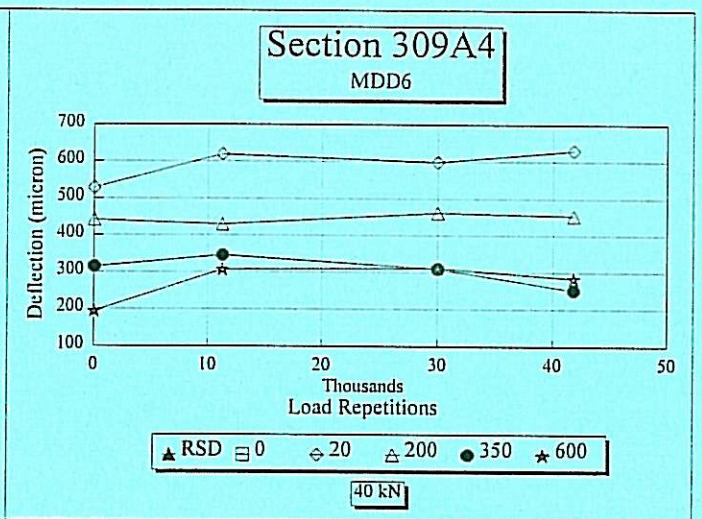
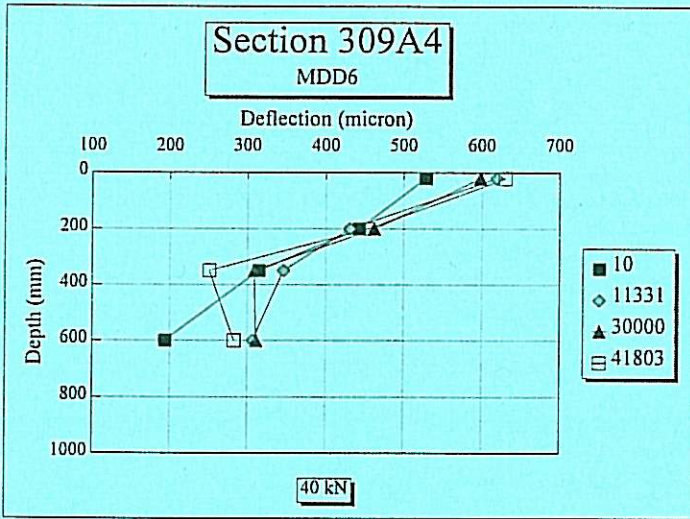
Section 306A4

MDD4

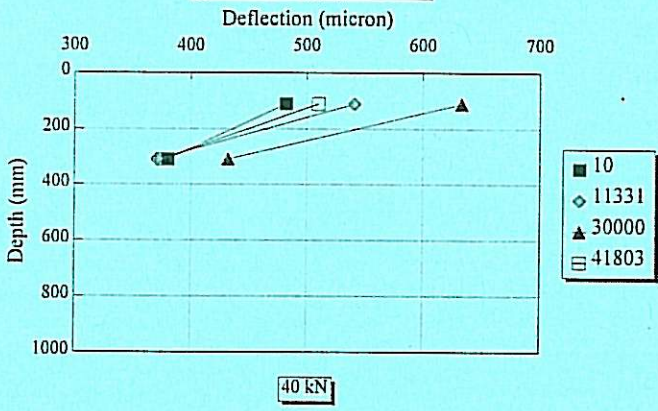




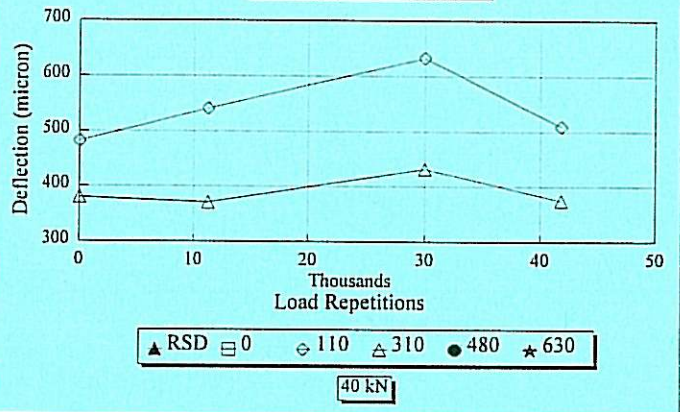




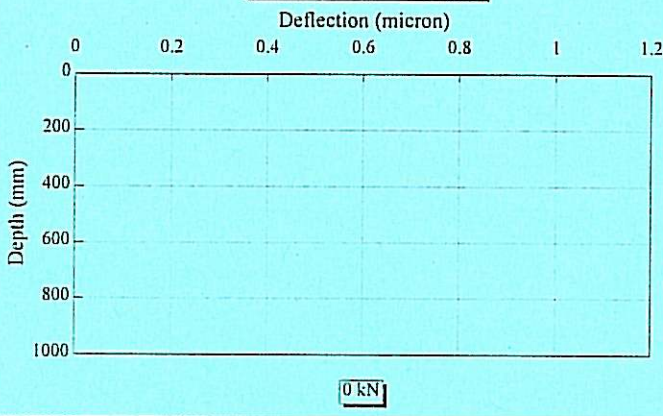
Section 309A4
MDD10



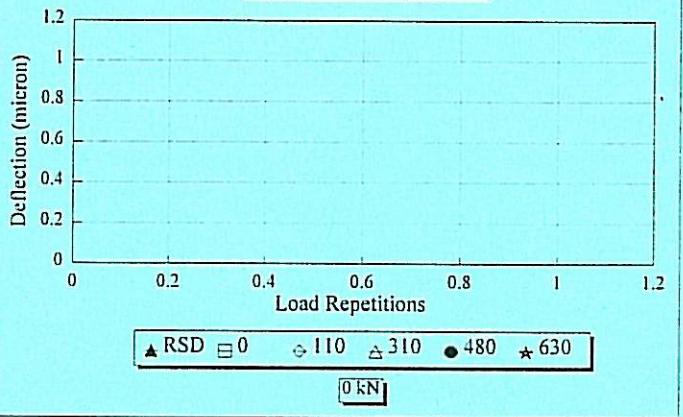
Section 309A4
MDD10



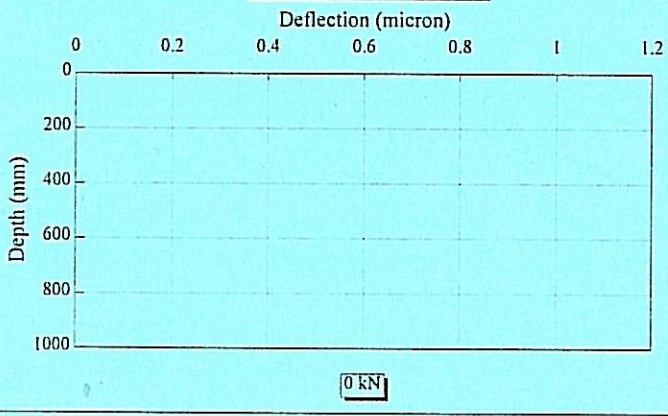
Section 309A4
MDD10



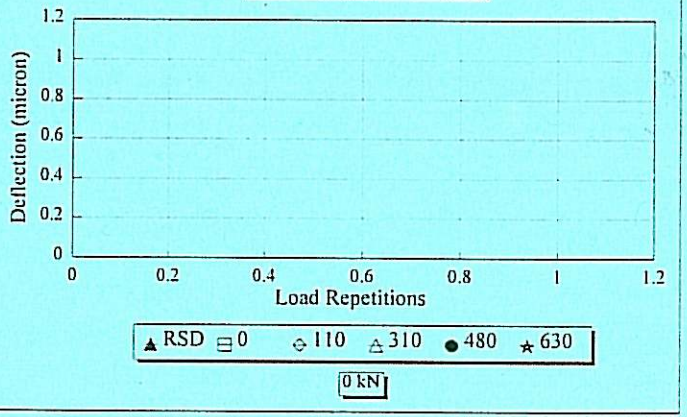
Section 309A4
MDD10

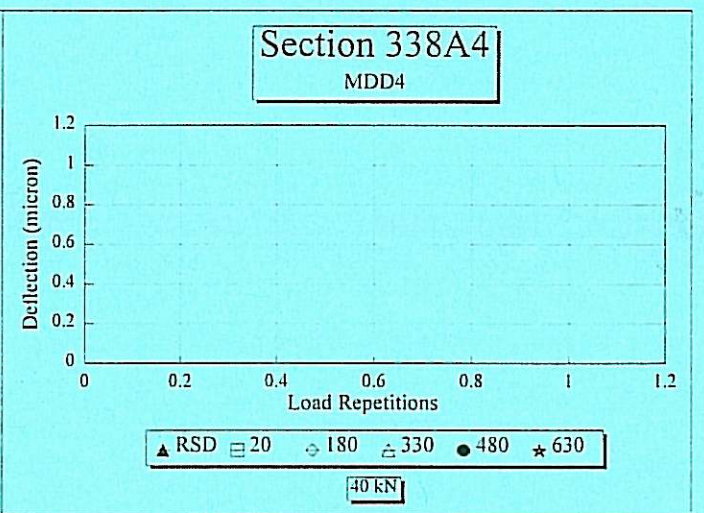
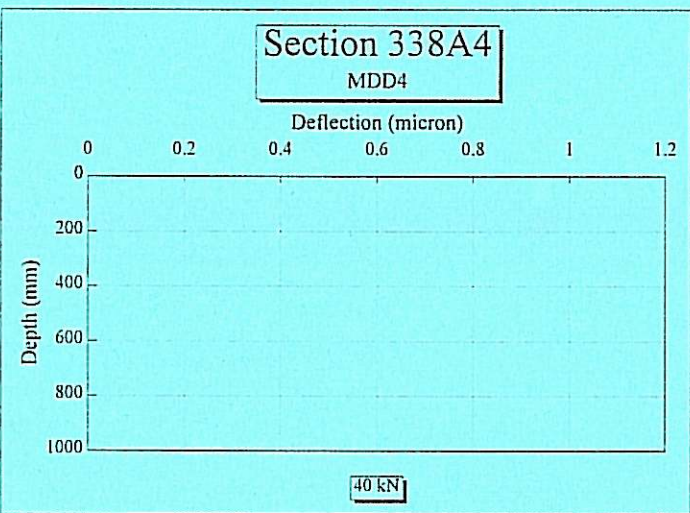
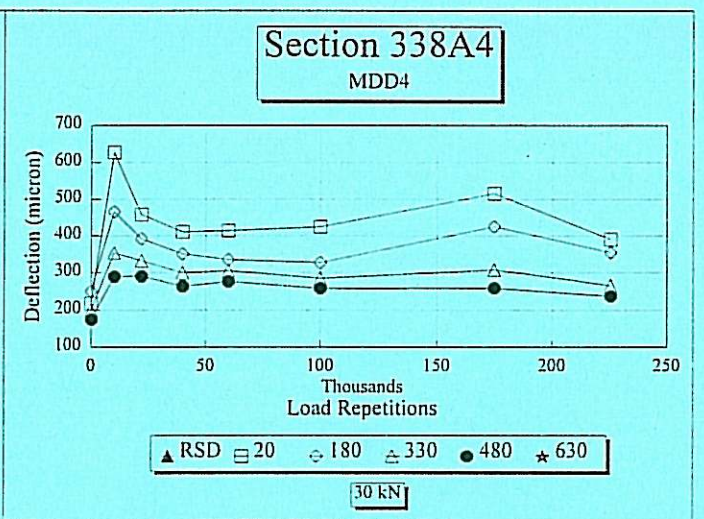
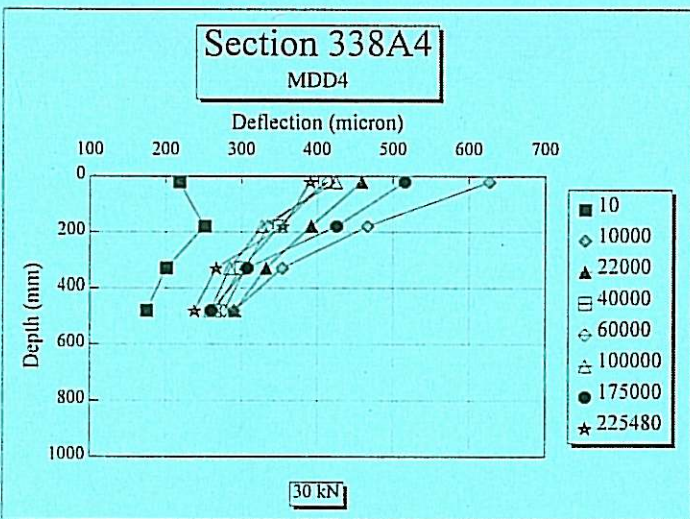
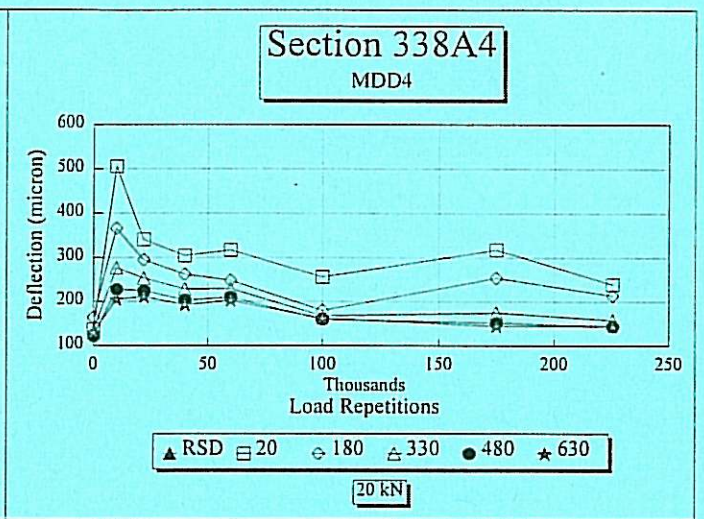
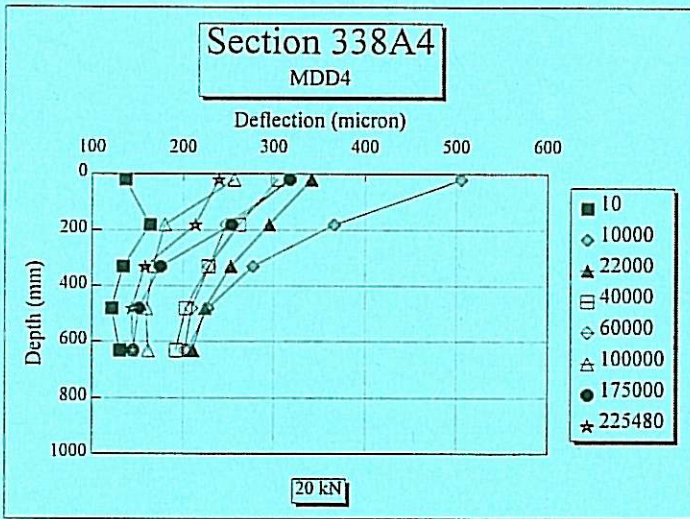


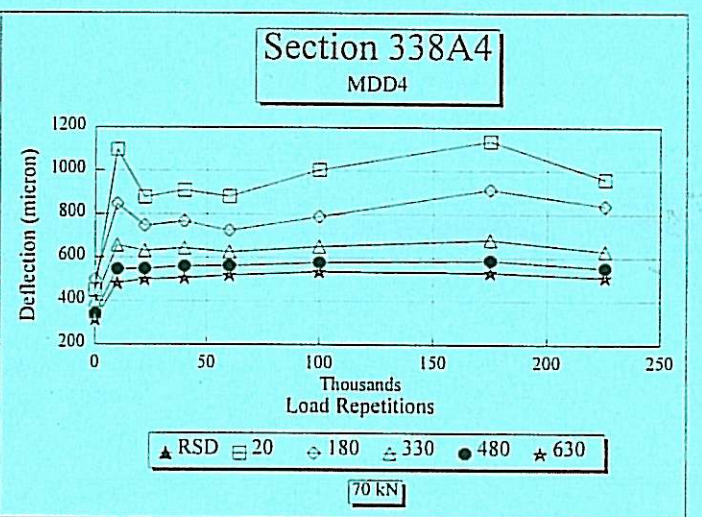
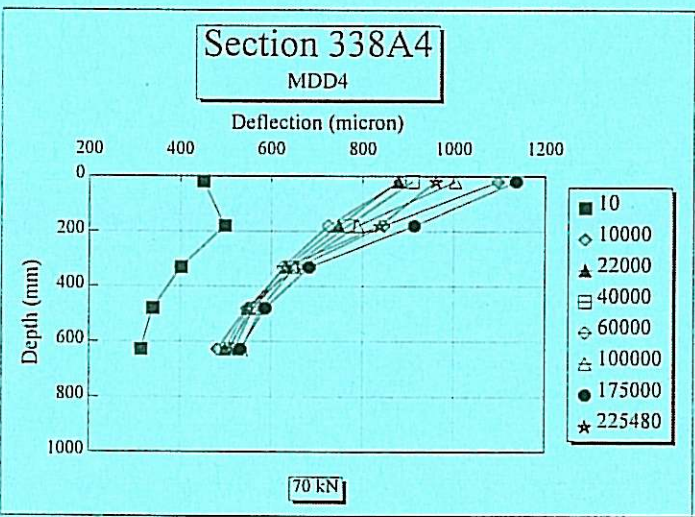
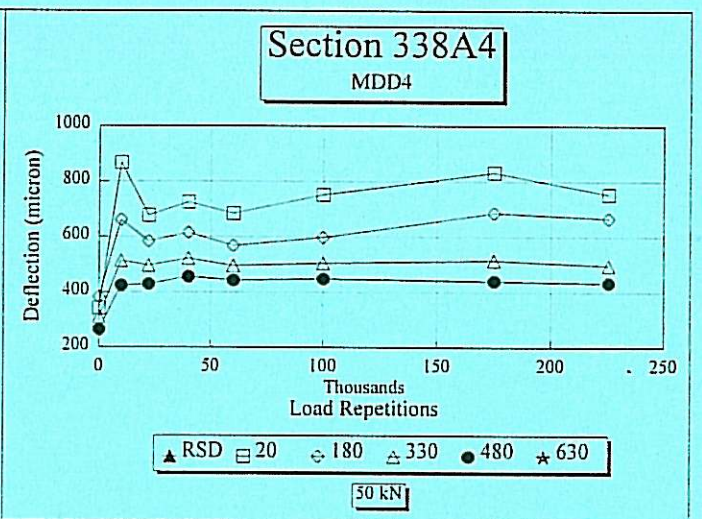
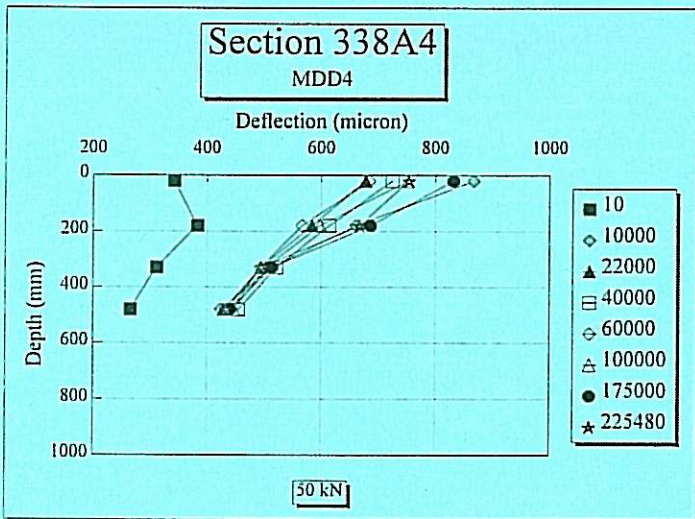
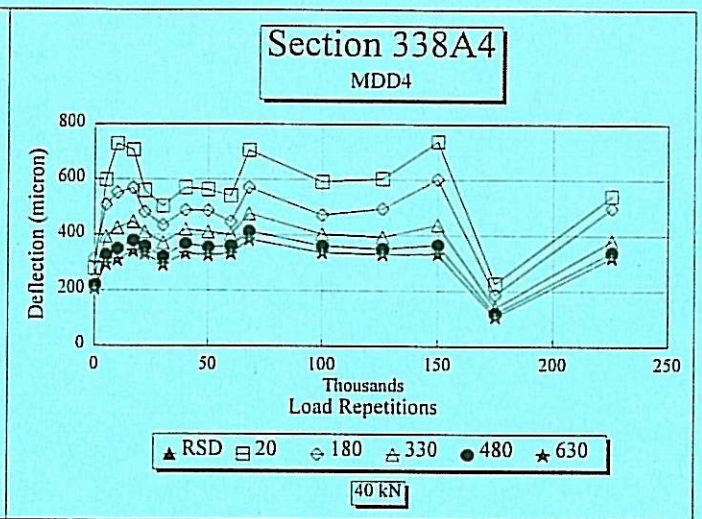
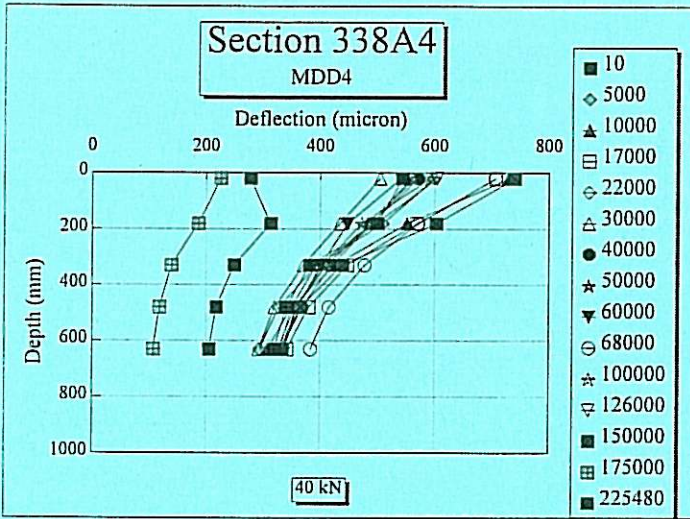
Section 309A4
MDD10

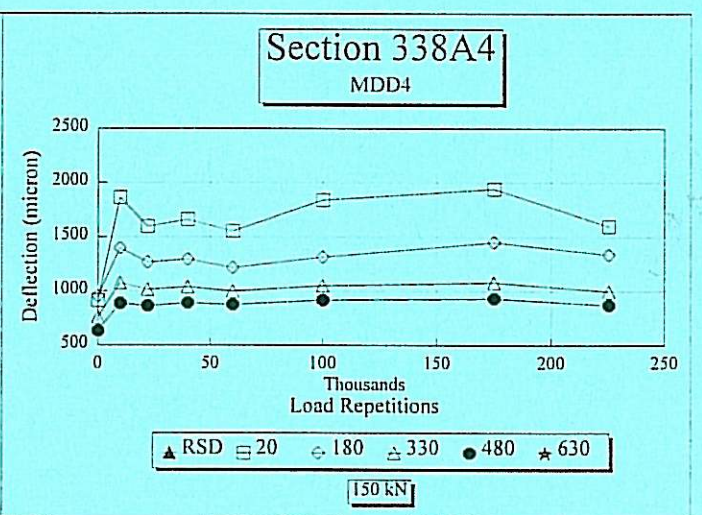
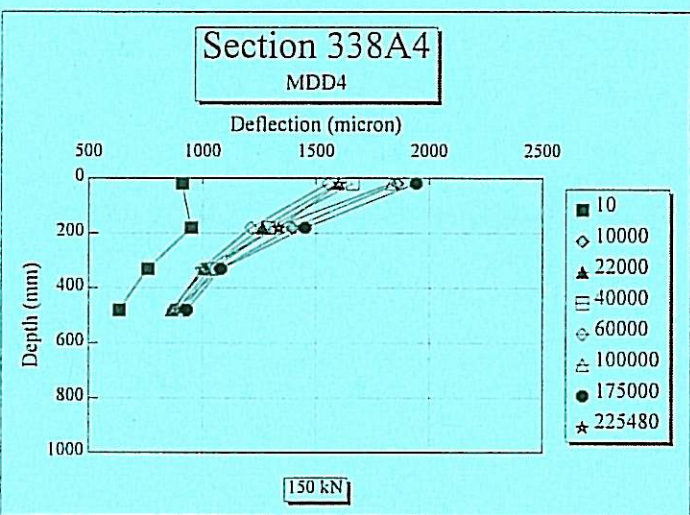
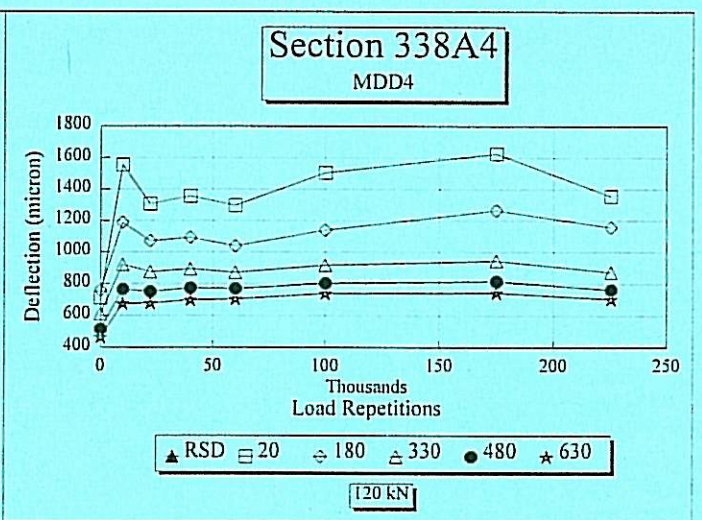
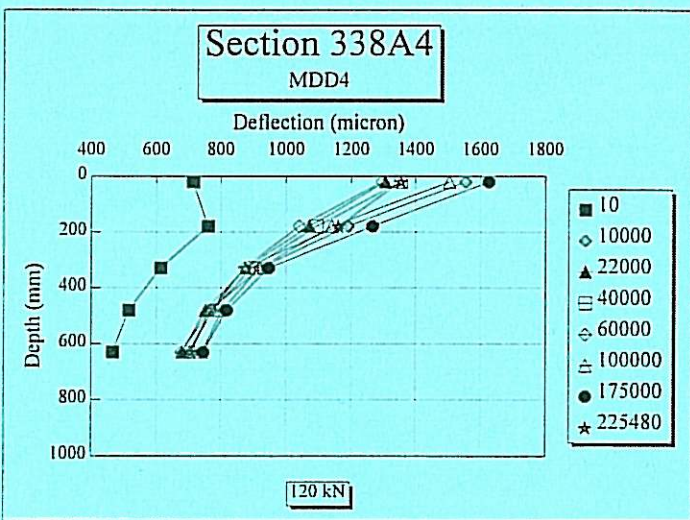
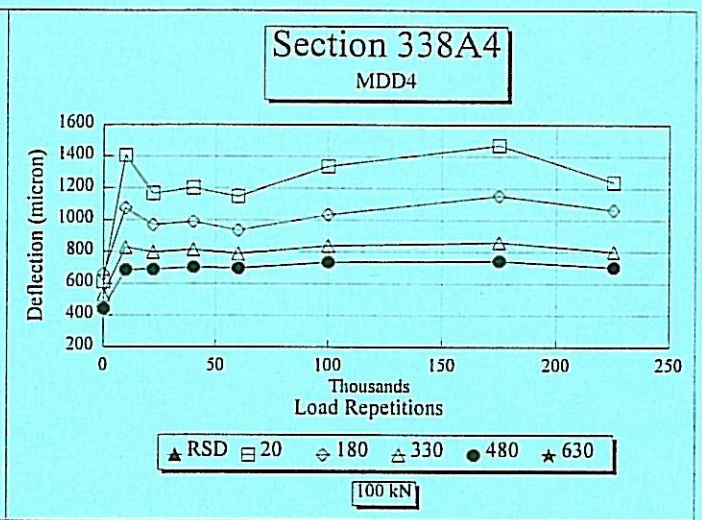
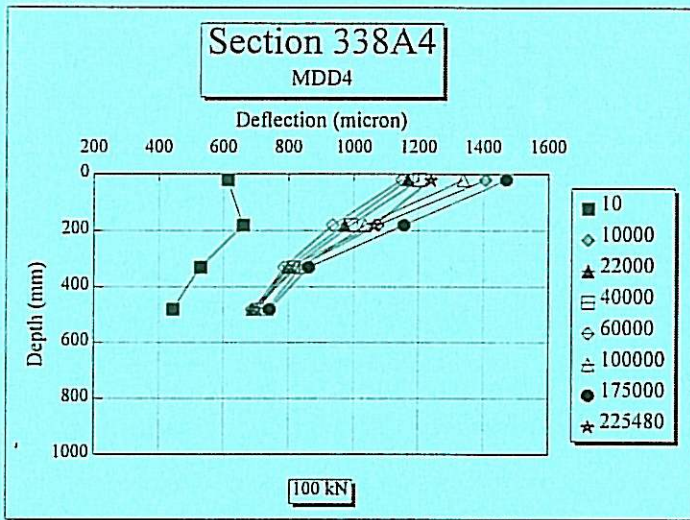


Section 309A4
MDD10

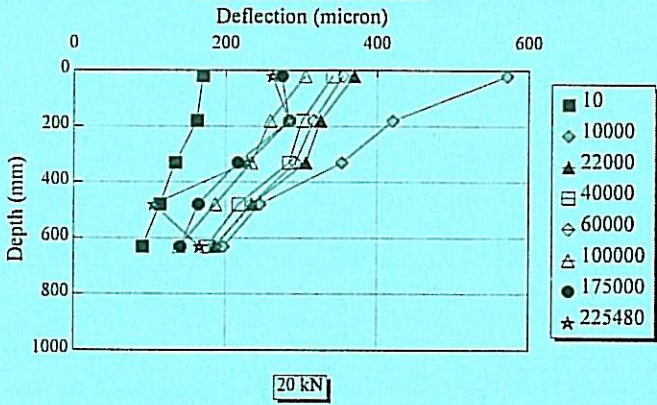




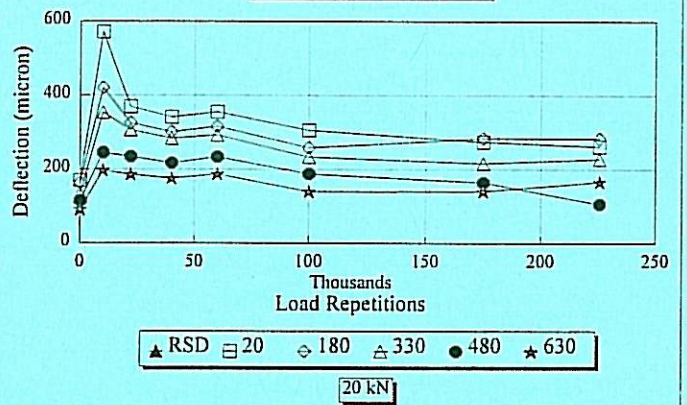




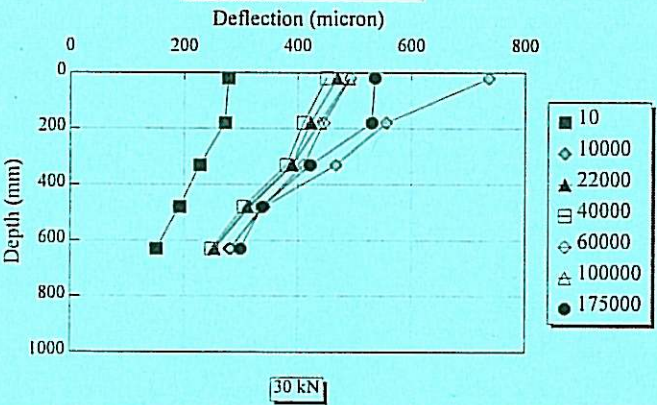
Section 338A4
MDD8



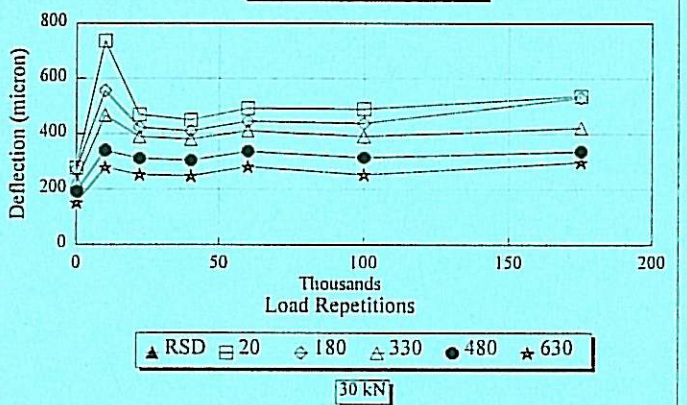
Section 338A4
MDD8



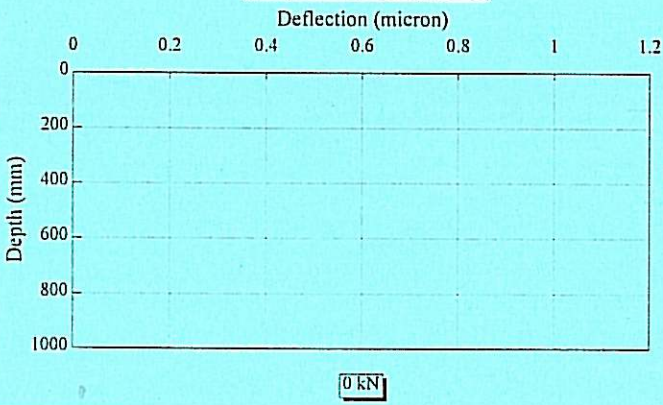
Section 338A4
MDD8



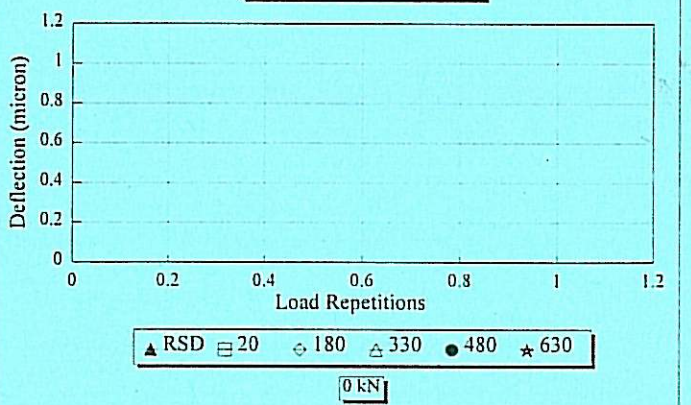
Section 338A4
MDD8

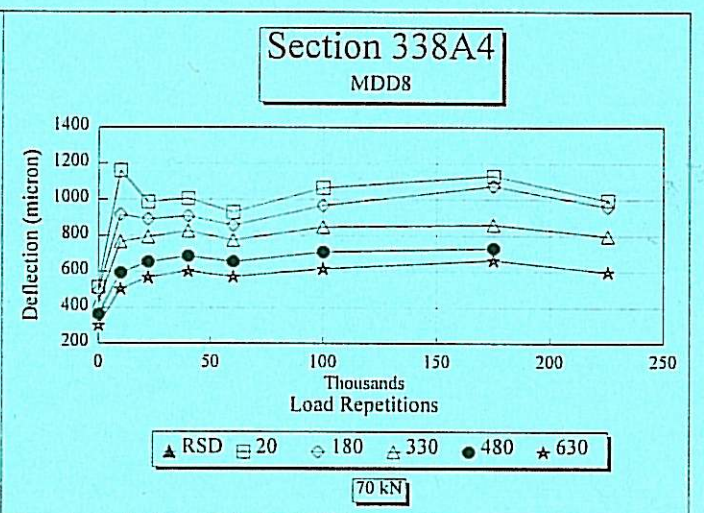
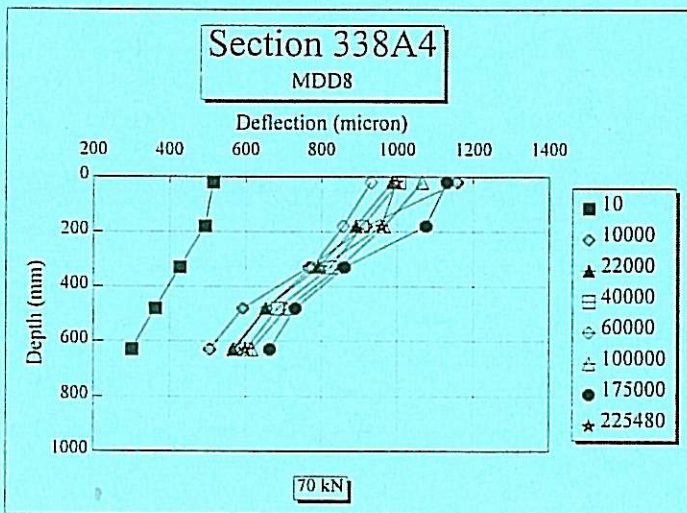
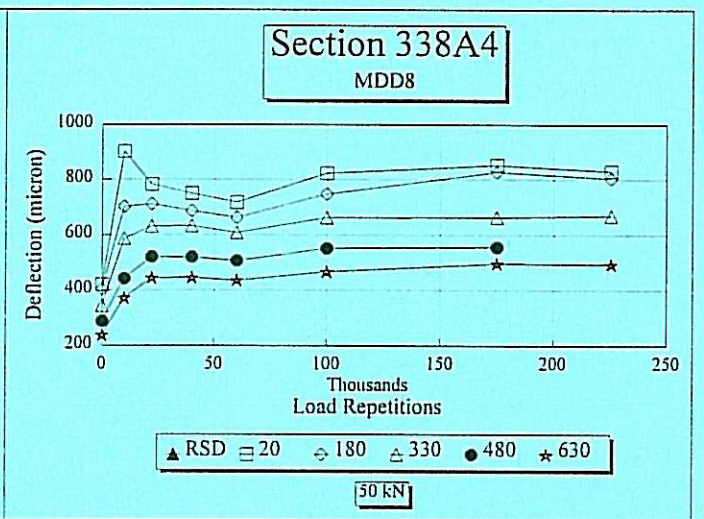
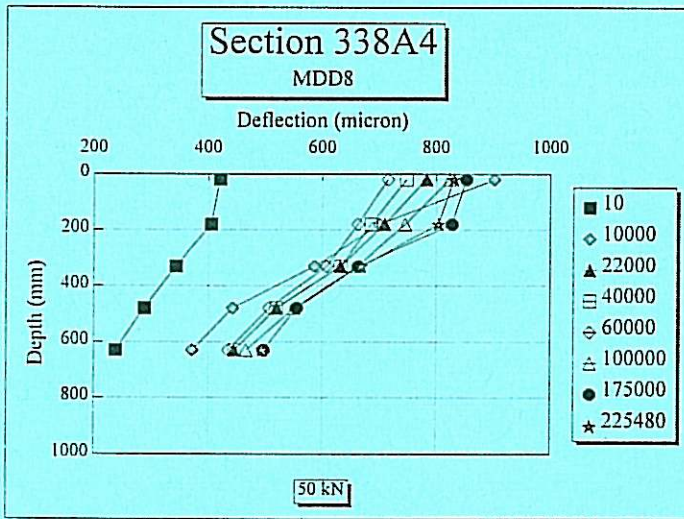
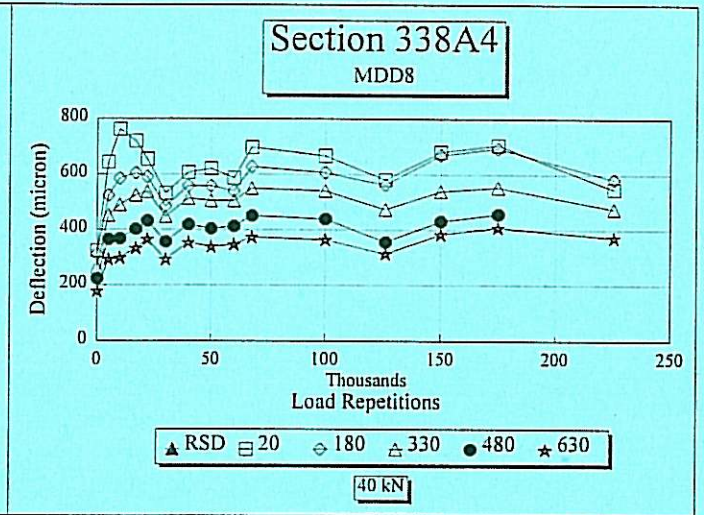
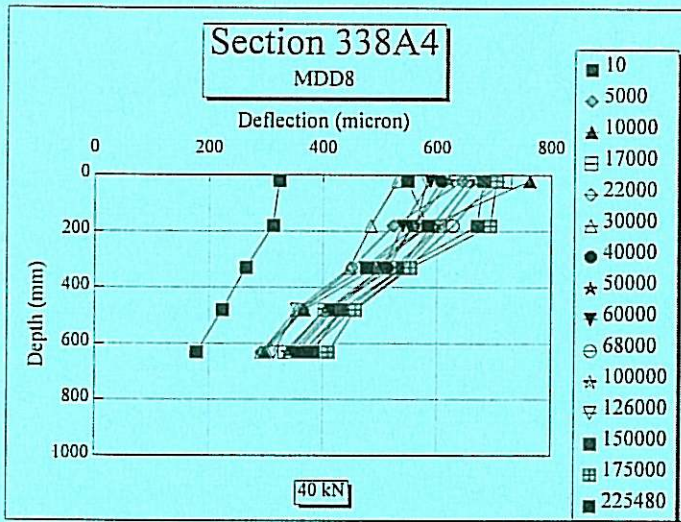


Section 338A4
MDD8

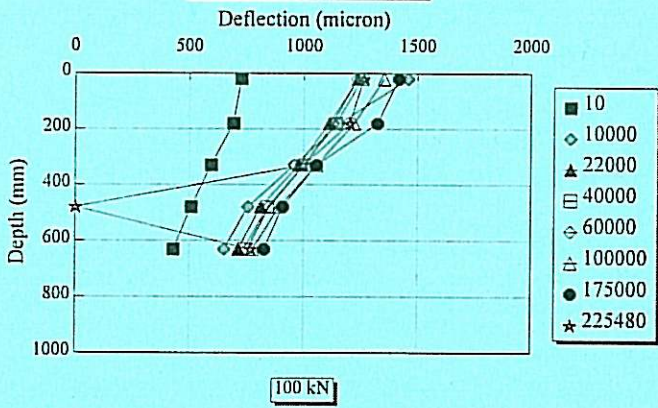


Section 338A4
MDD8

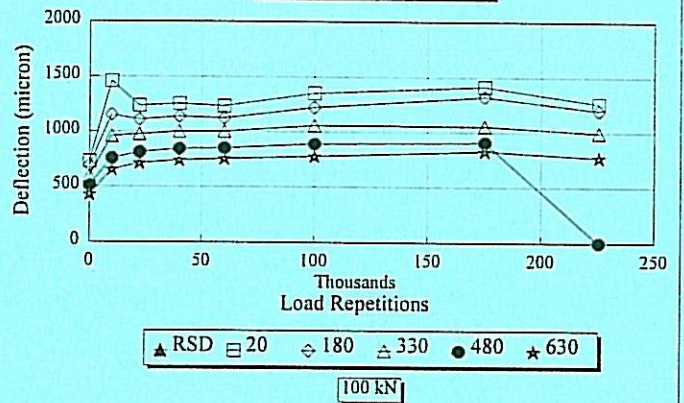




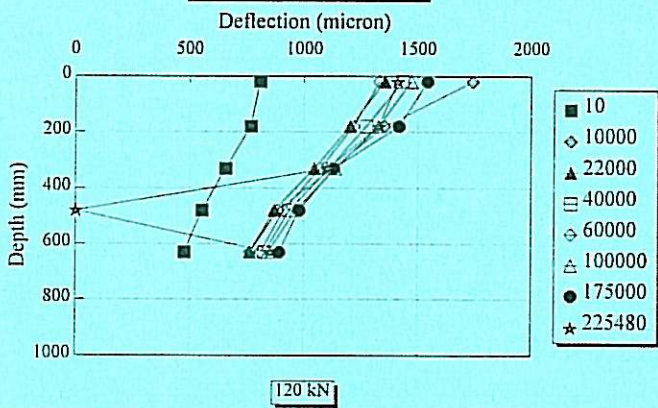
Section 338A4
MDD8



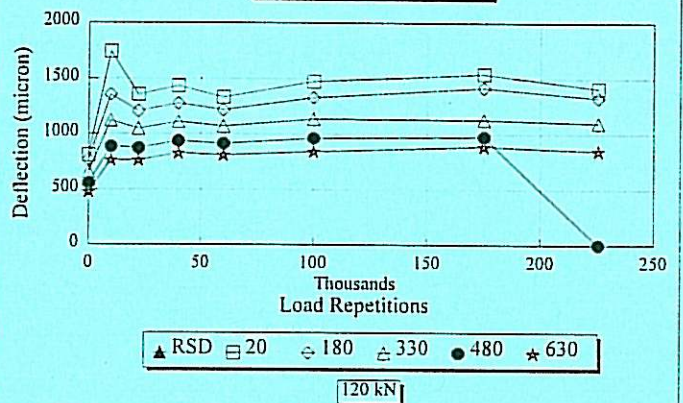
Section 338A4
MDD8



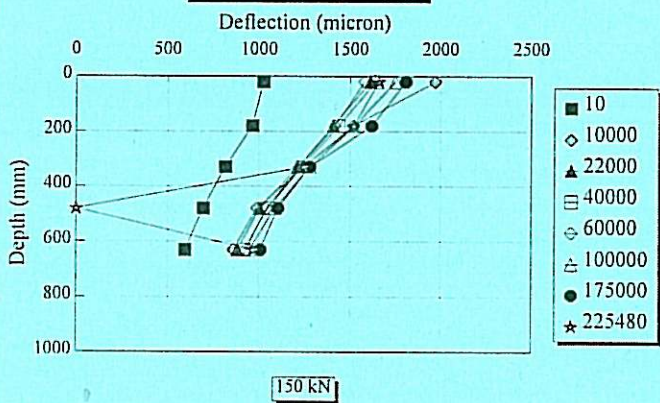
Section 338A4
MDD8



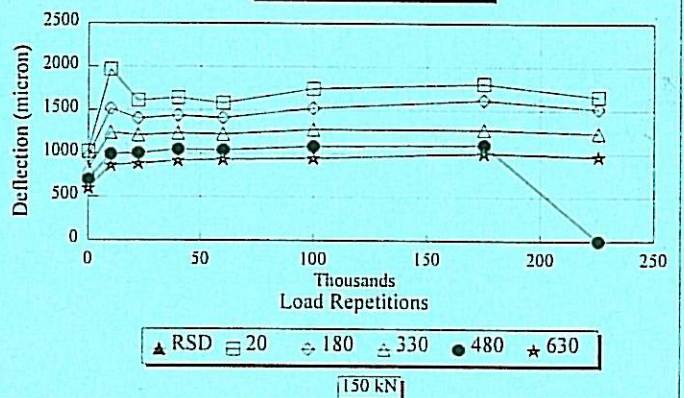
Section 338A4
MDD8

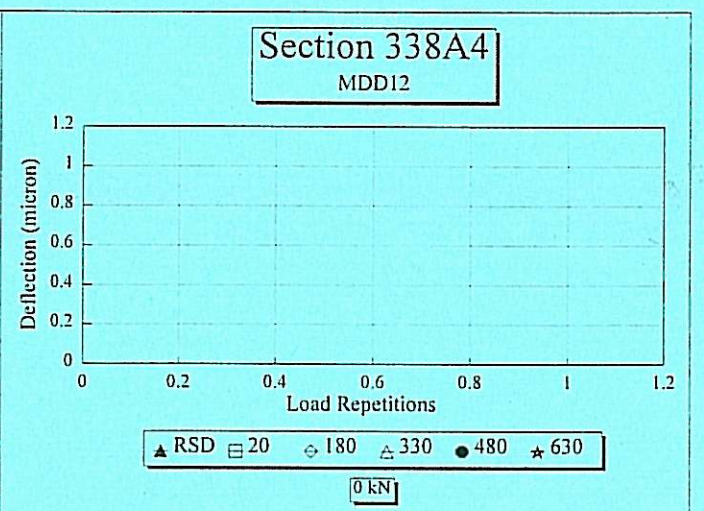
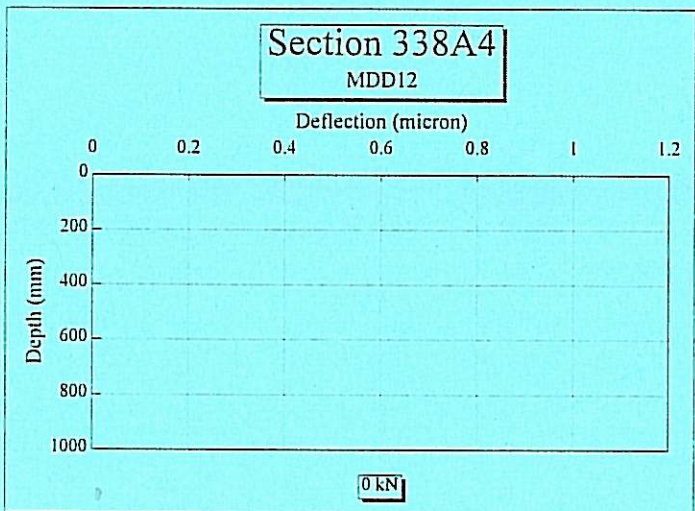
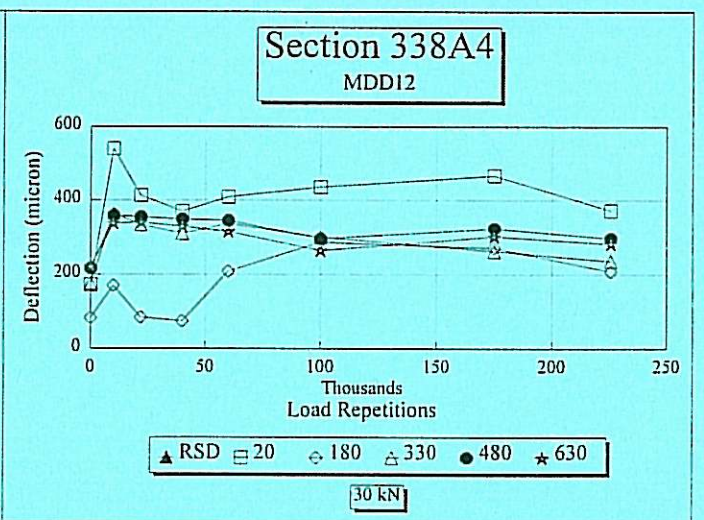
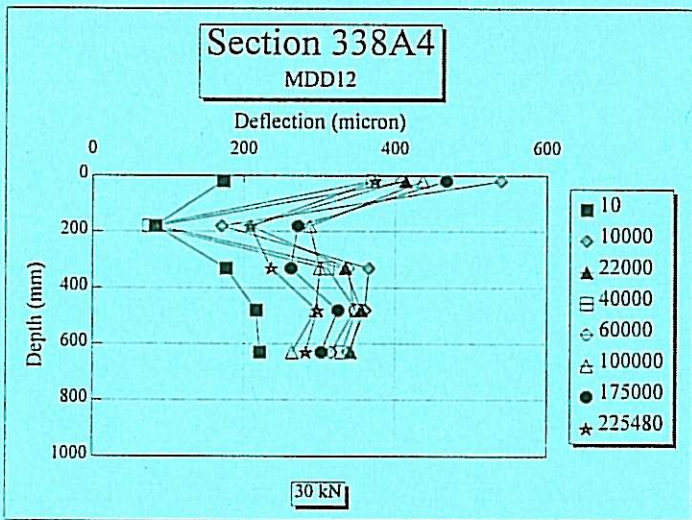
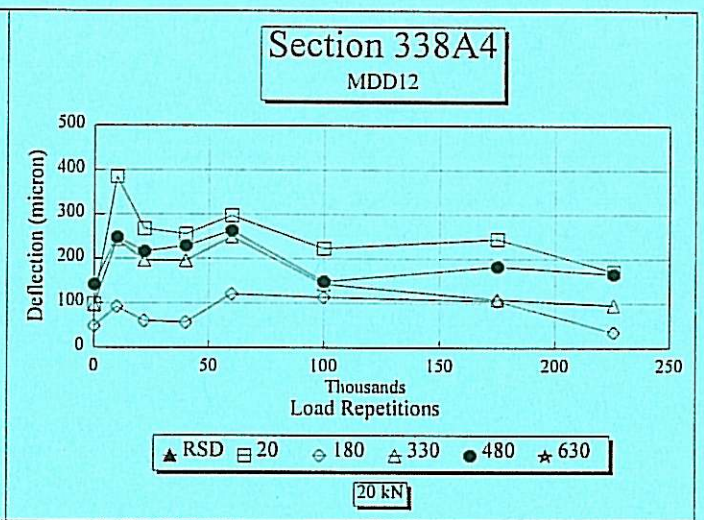
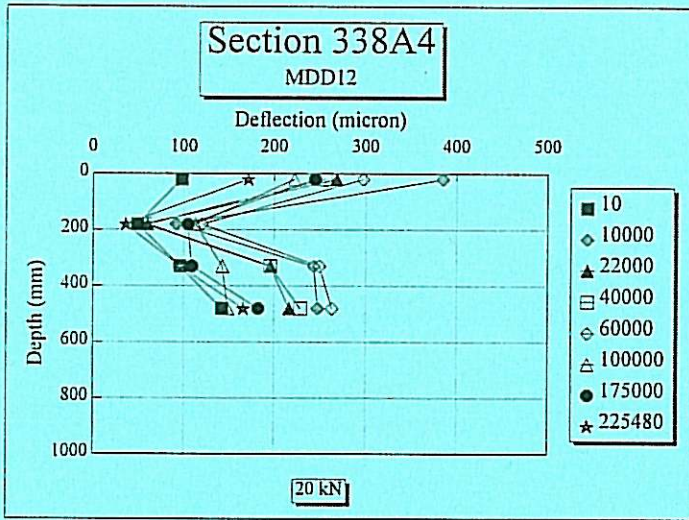


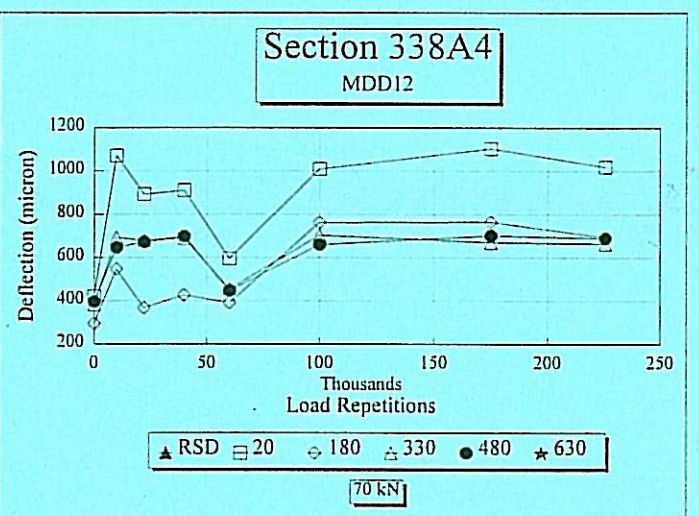
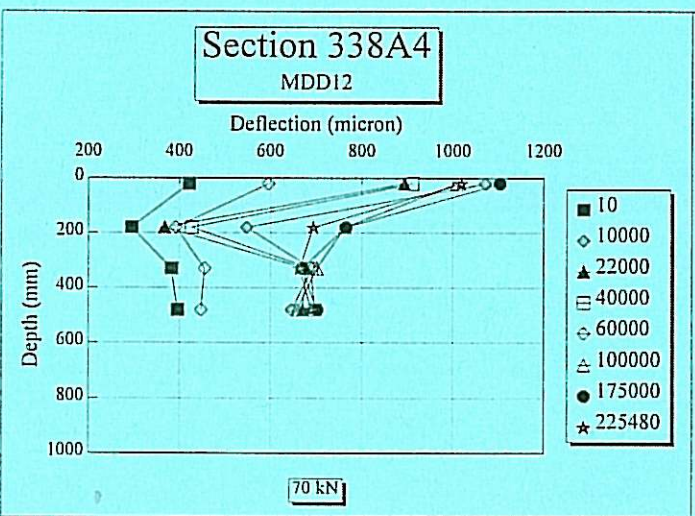
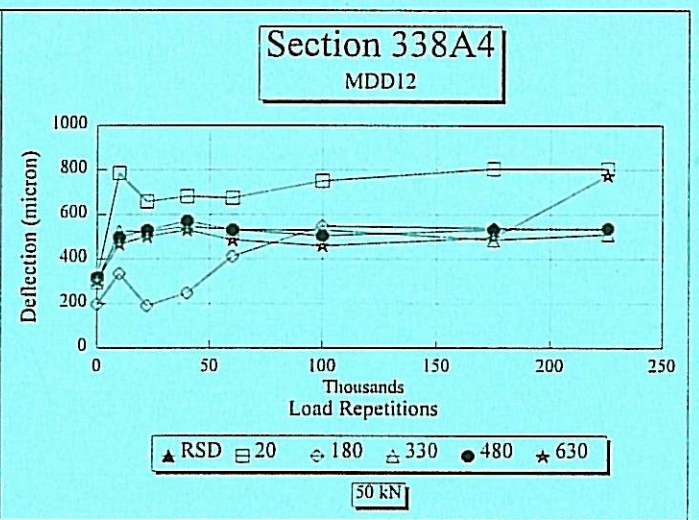
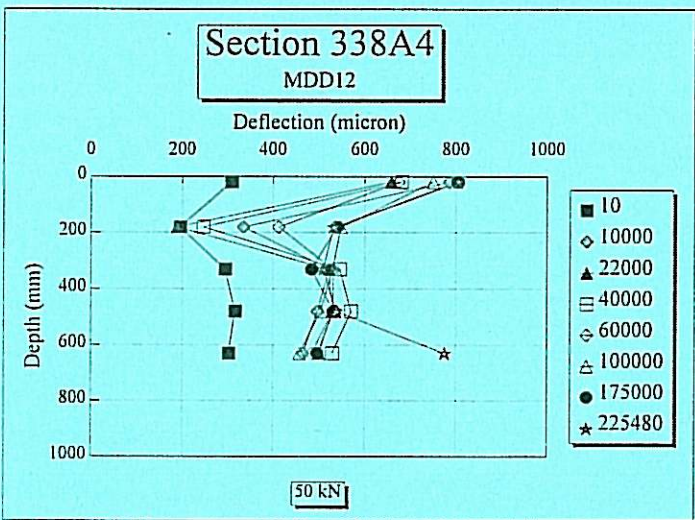
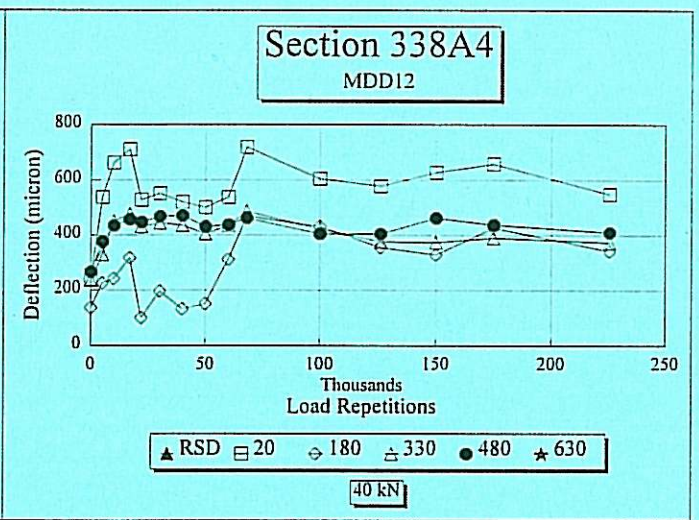
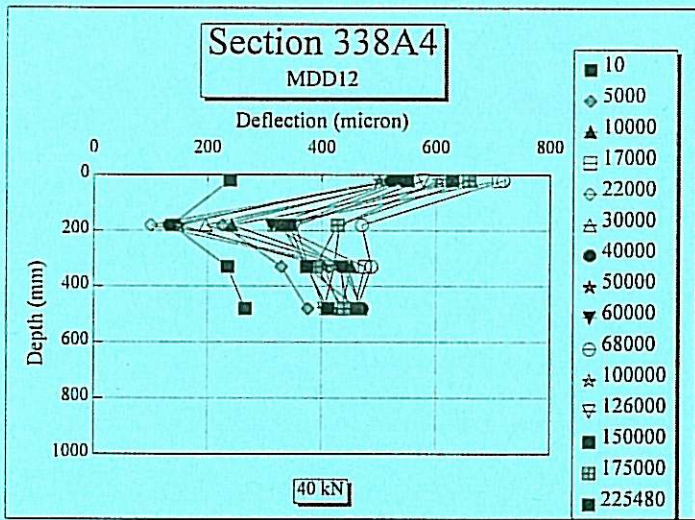
Section 338A4
MDD8



Section 338A4
MDD8

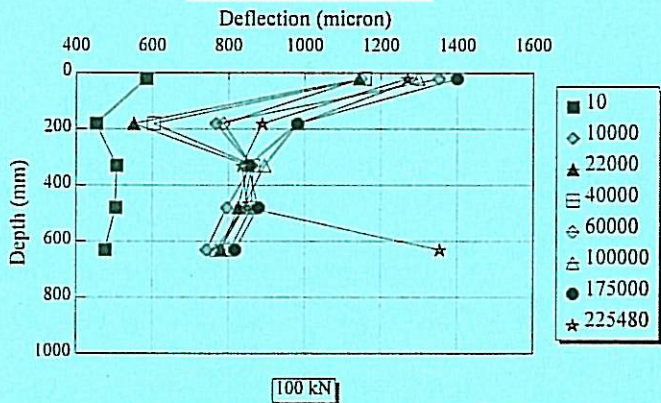






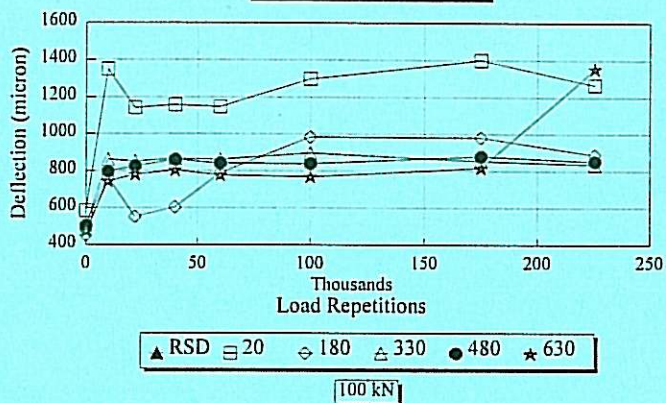
Section 338A4

MDD12



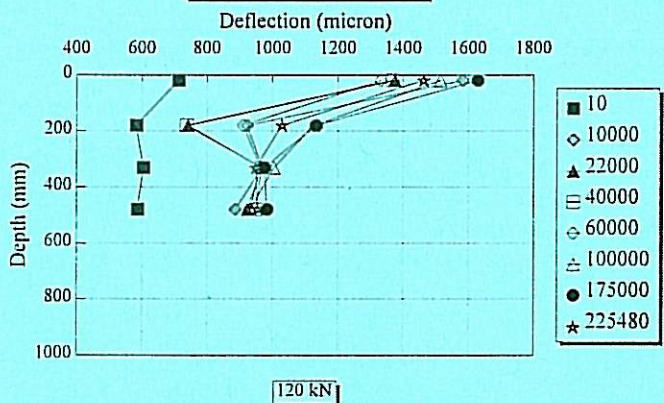
Section 338A4

MDD12



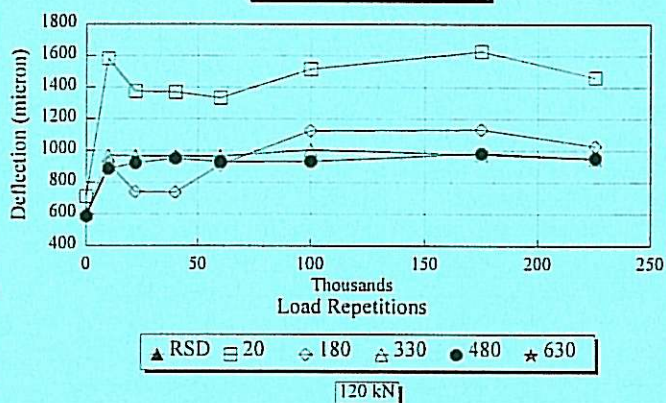
Section 338A4

MDD12



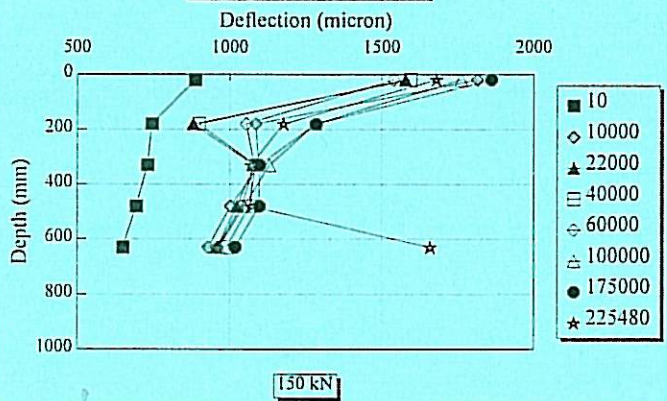
Section 338A4

MDD12



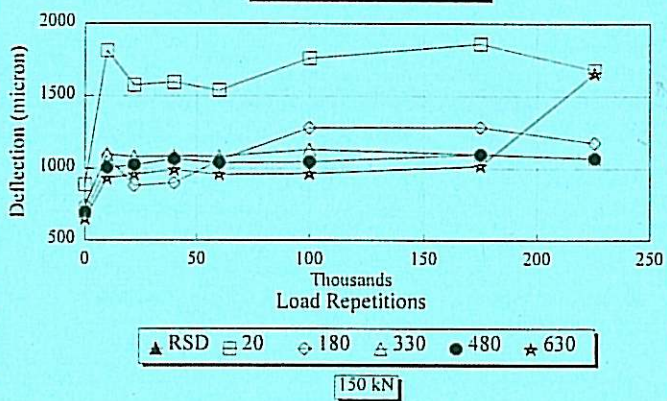
Section 338A4

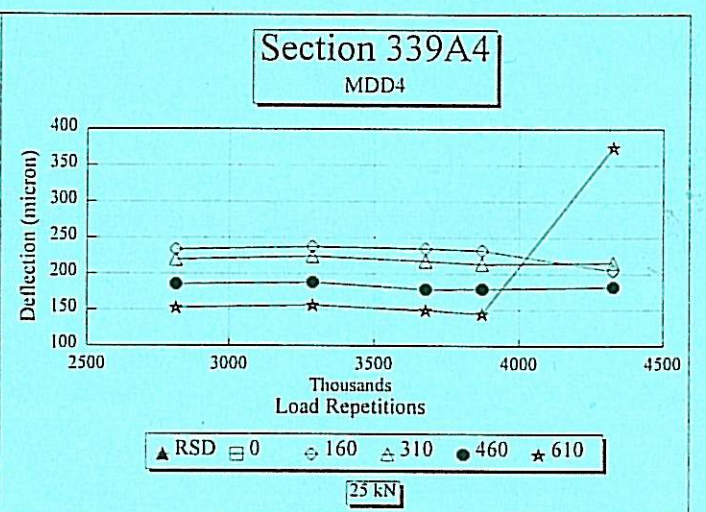
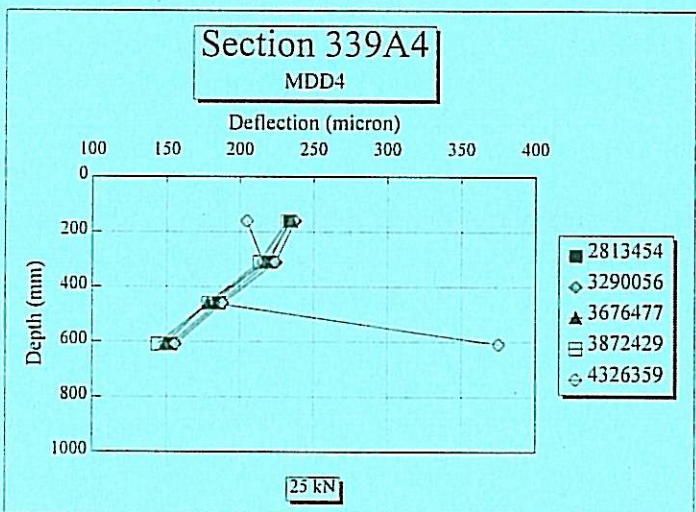
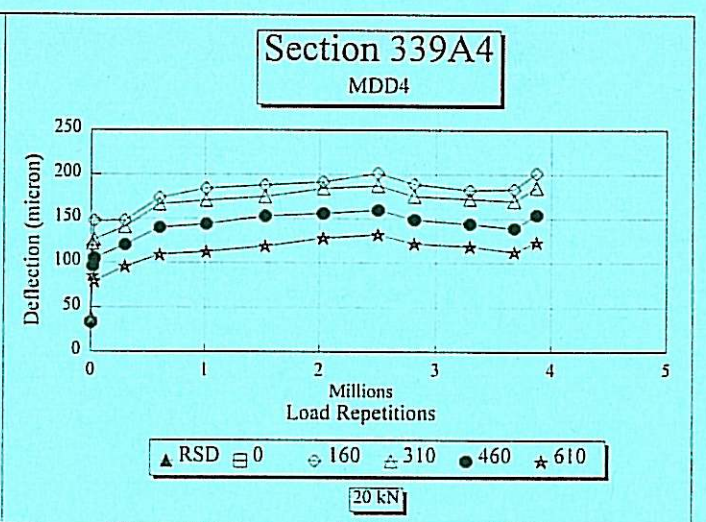
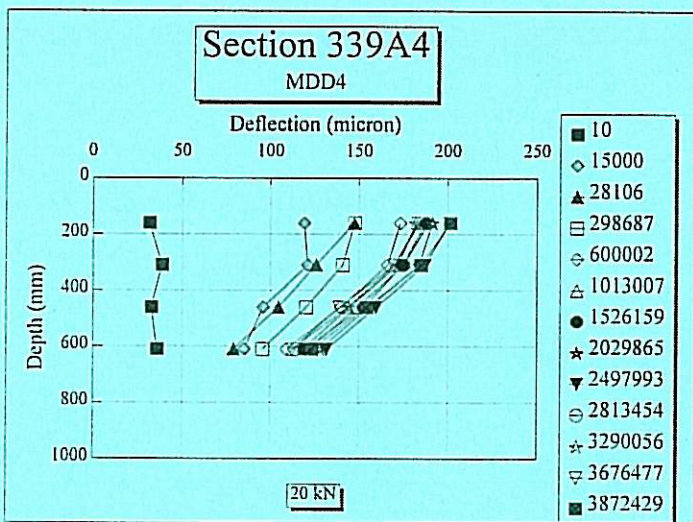
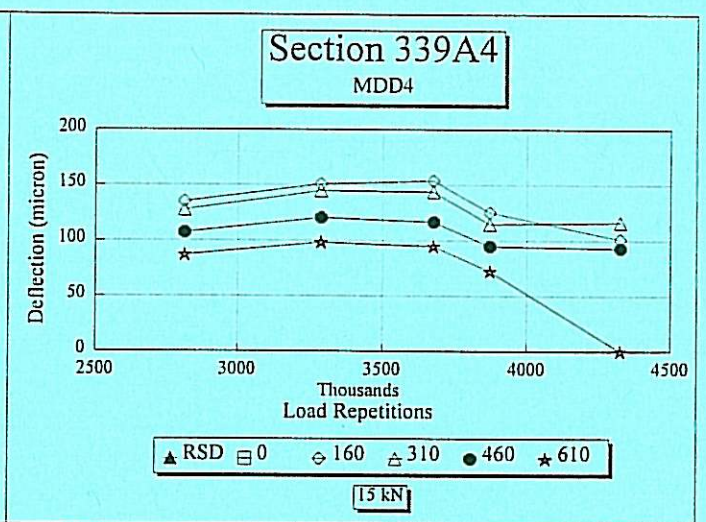
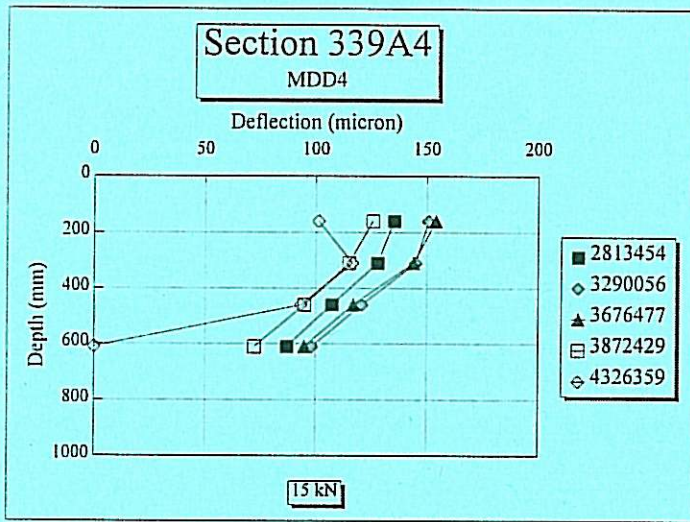
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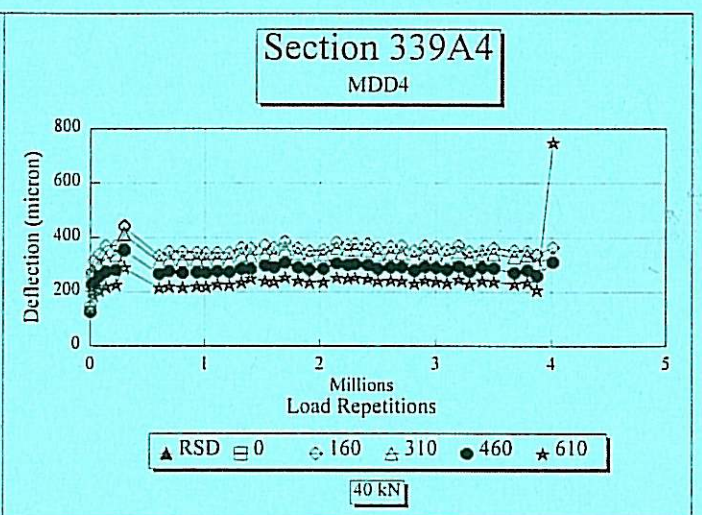
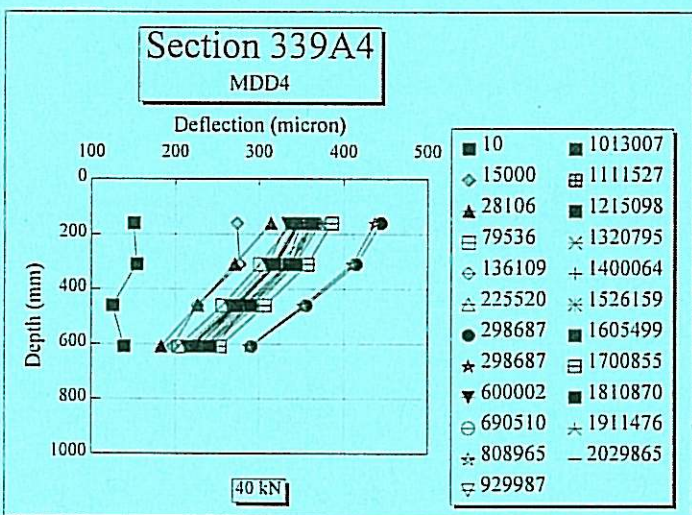
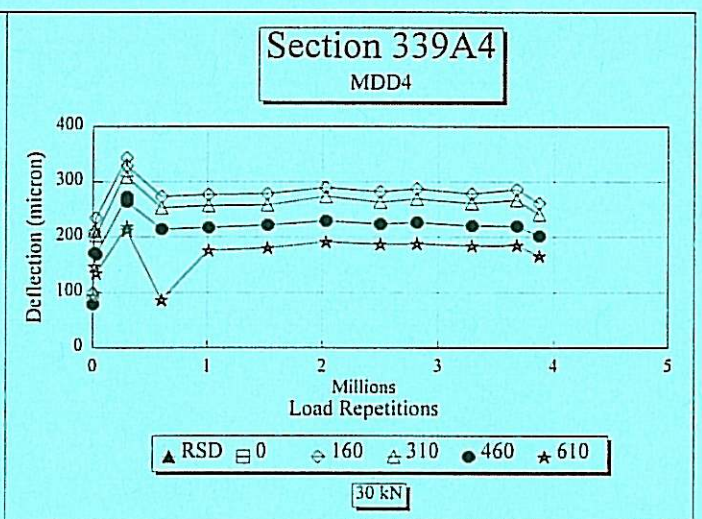
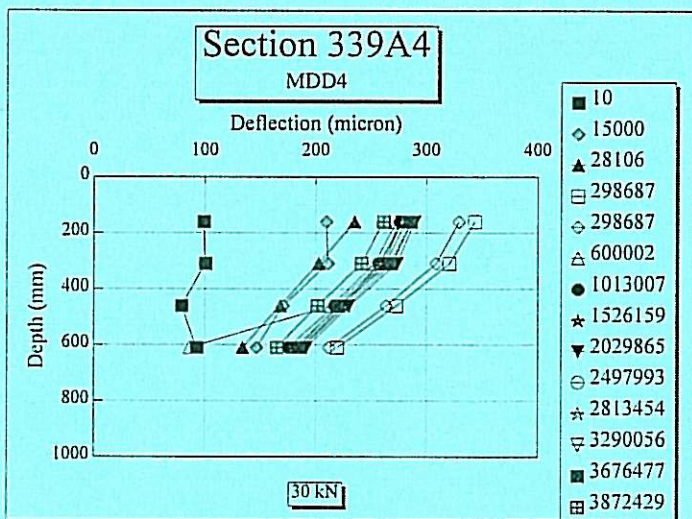
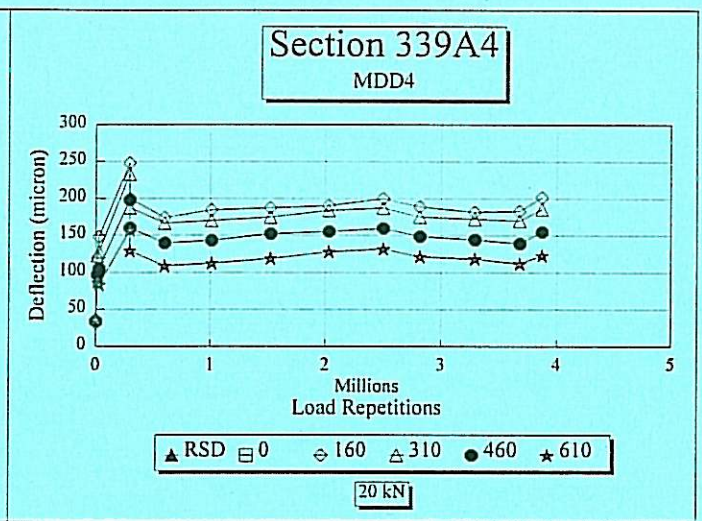
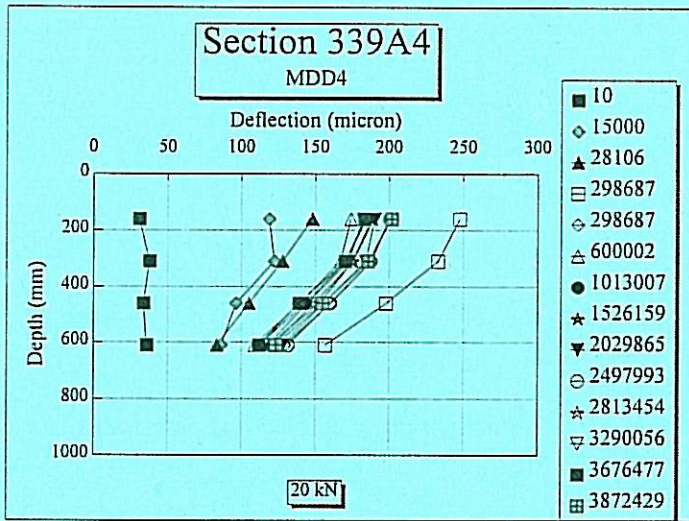


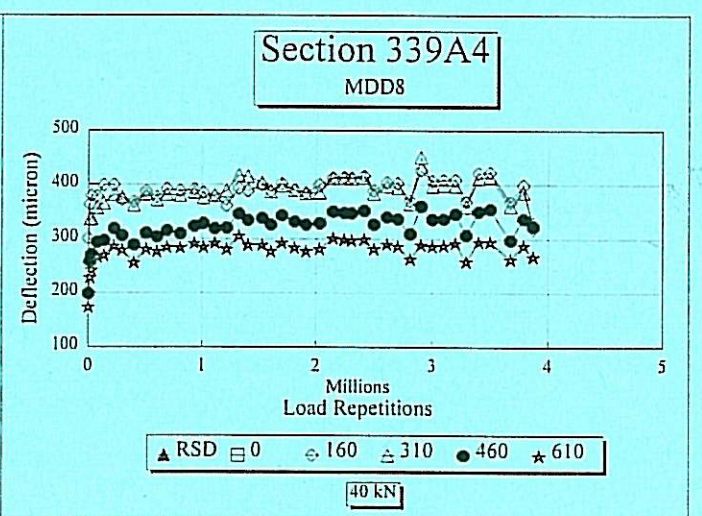
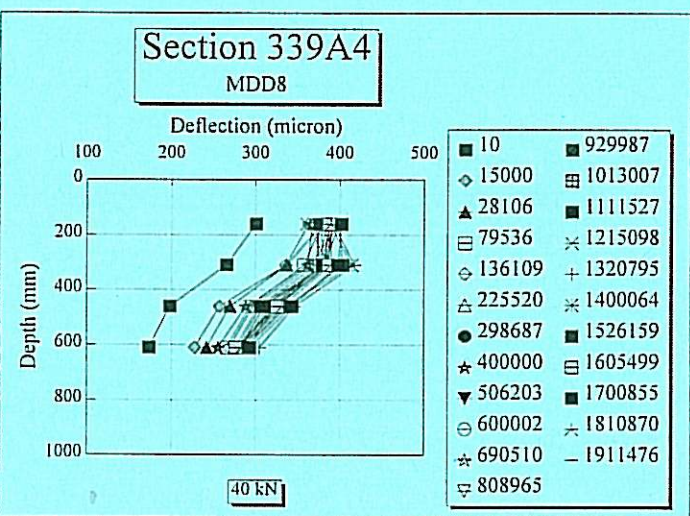
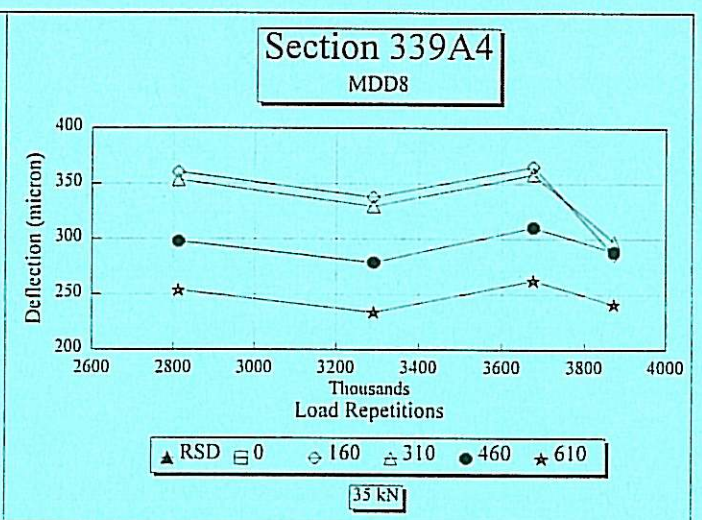
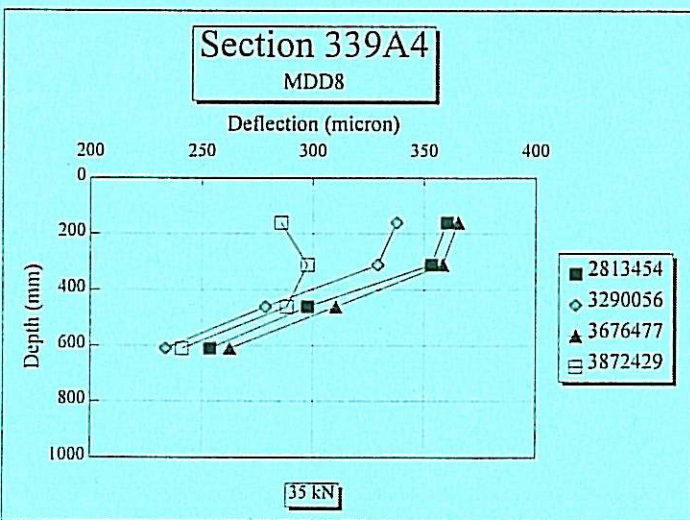
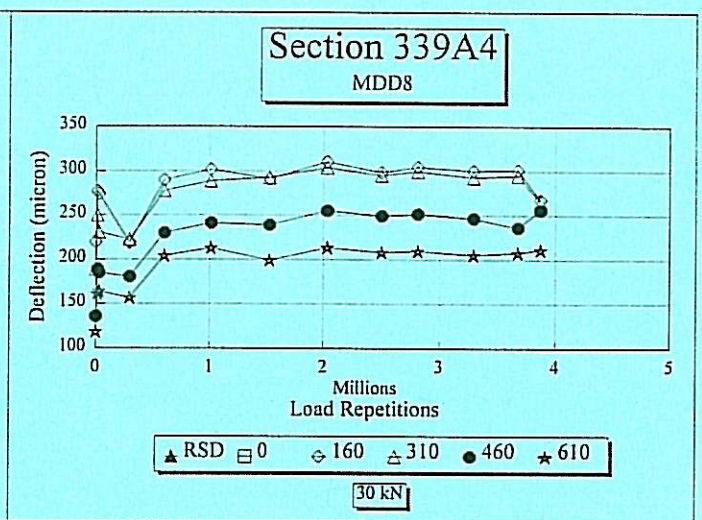
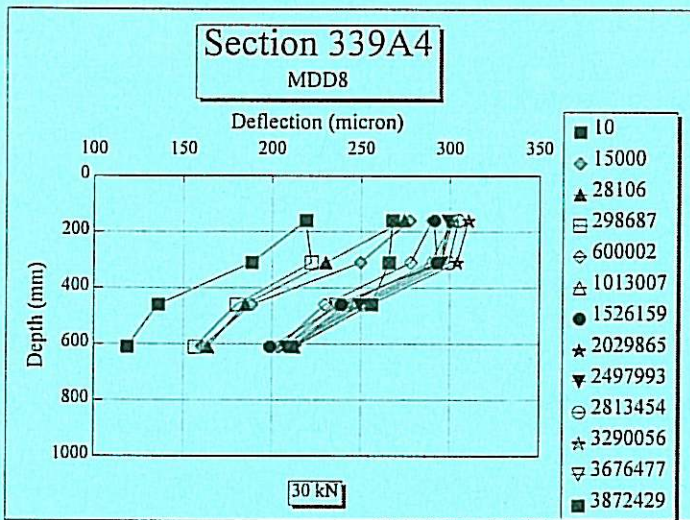
Section 338A4

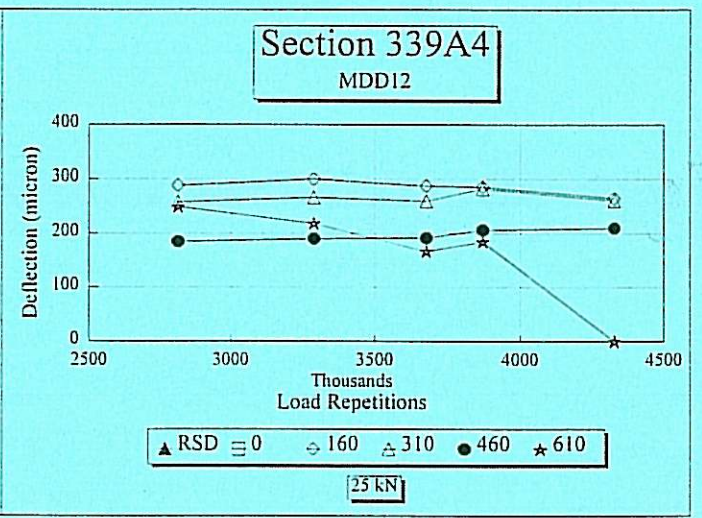
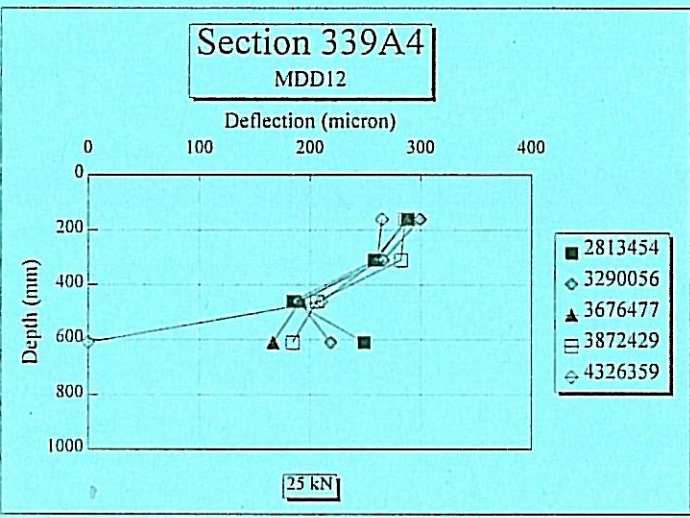
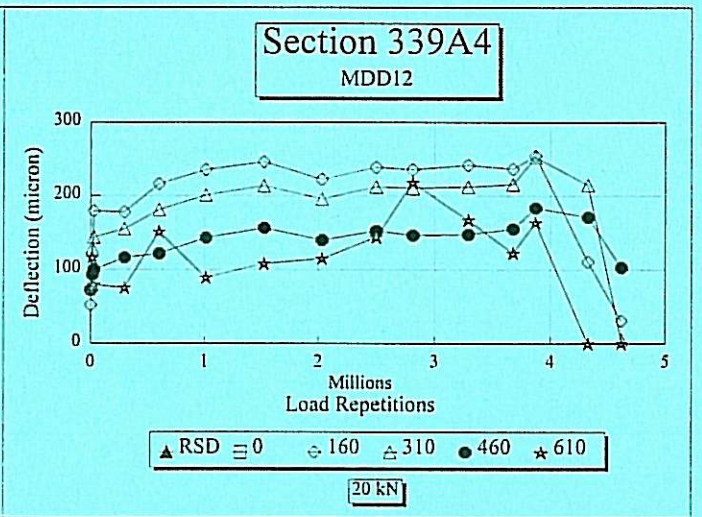
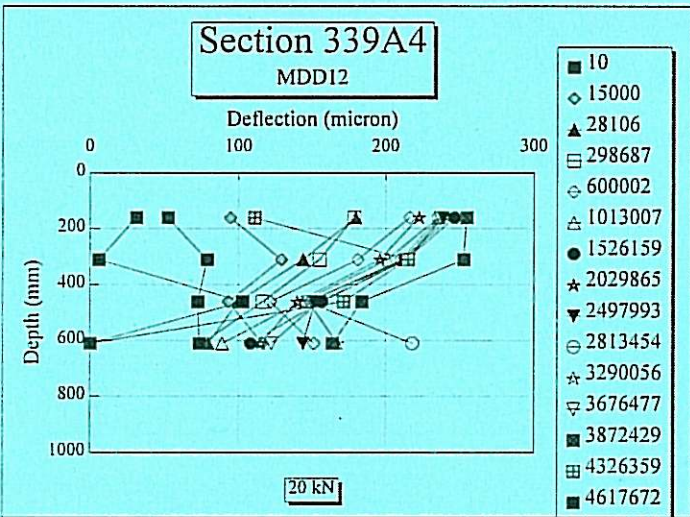
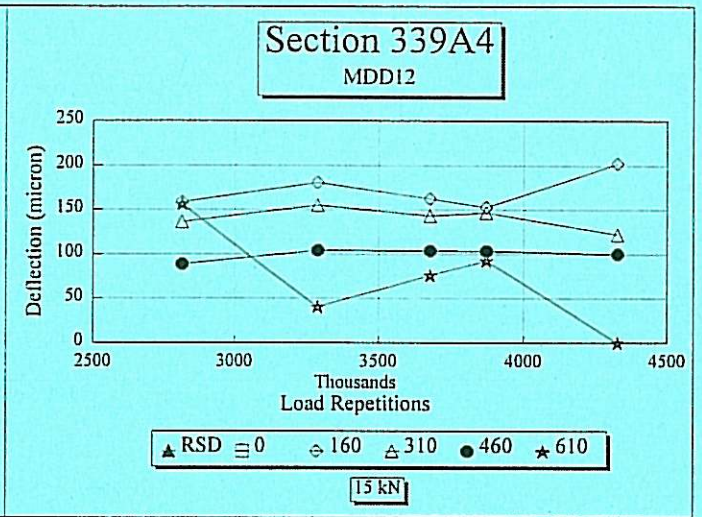
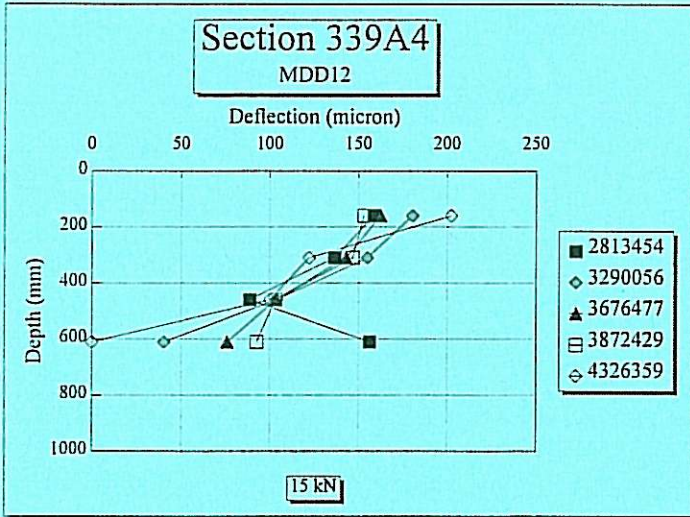
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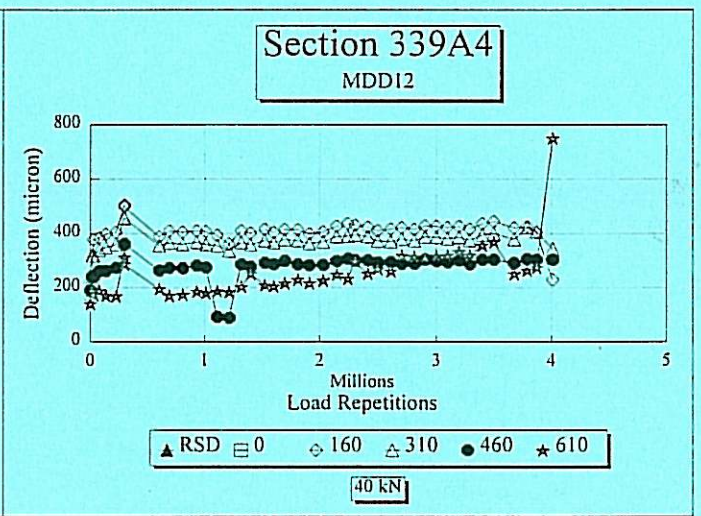
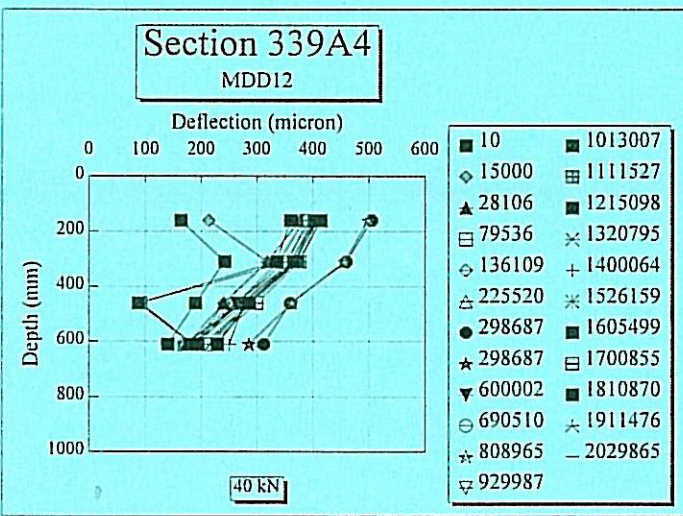
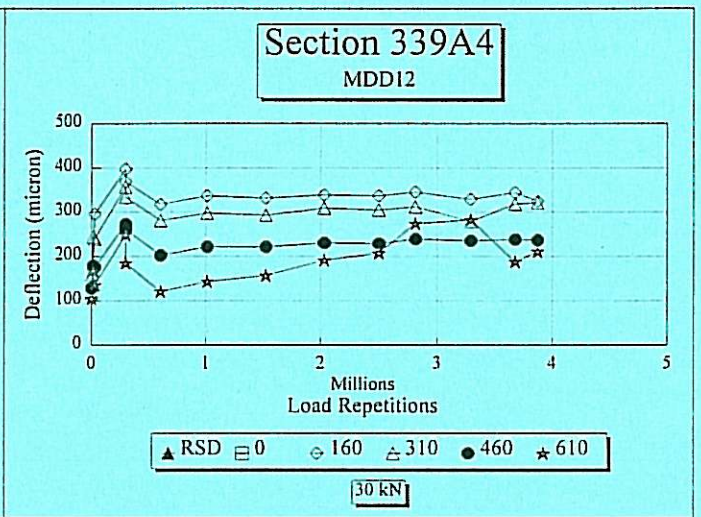
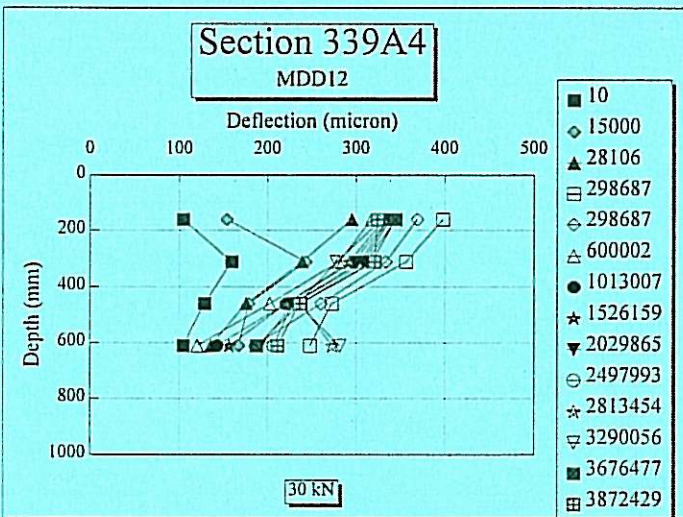
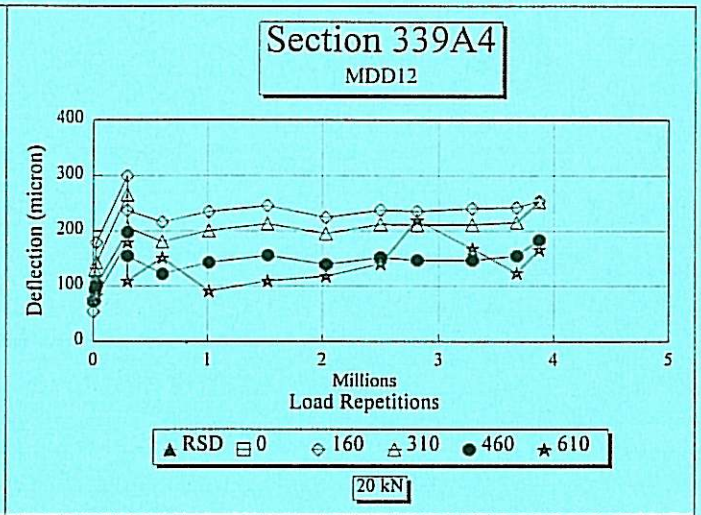
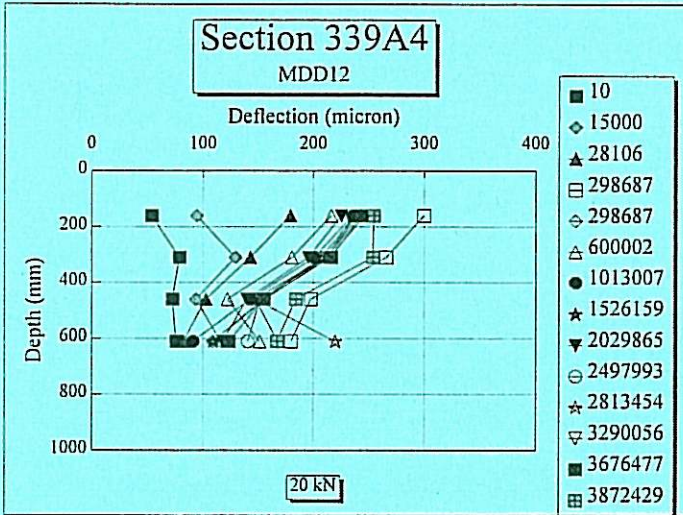




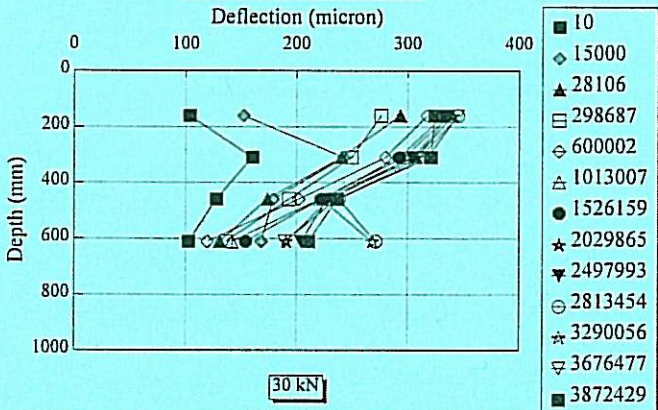




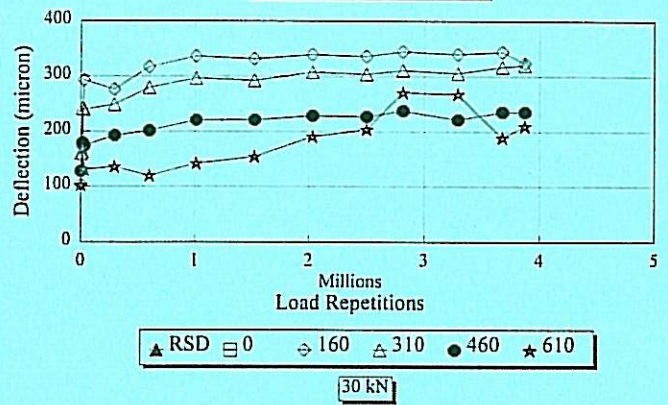




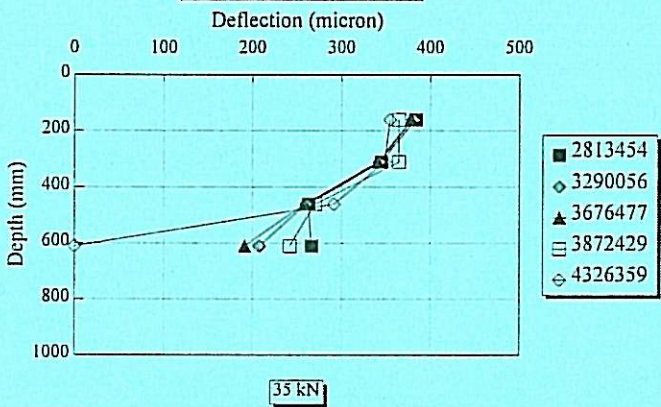
Section 339A4
MDD12



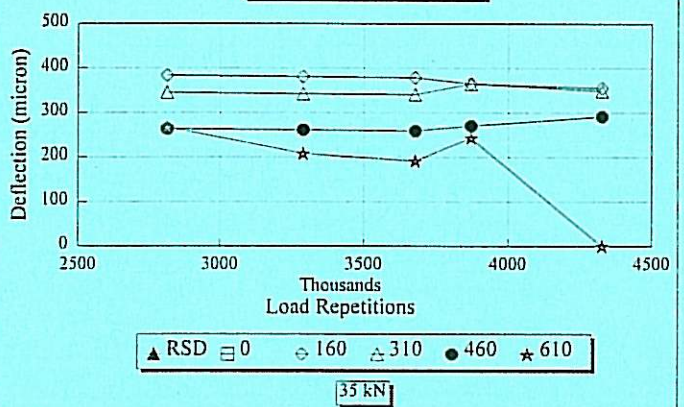
Section 339A4
MDD12



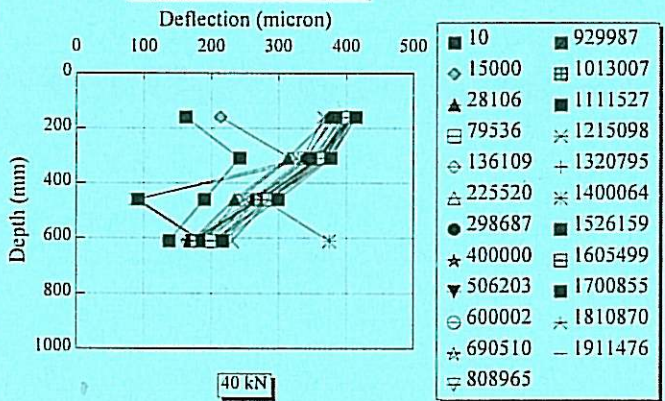
Section 339A4
MDD12



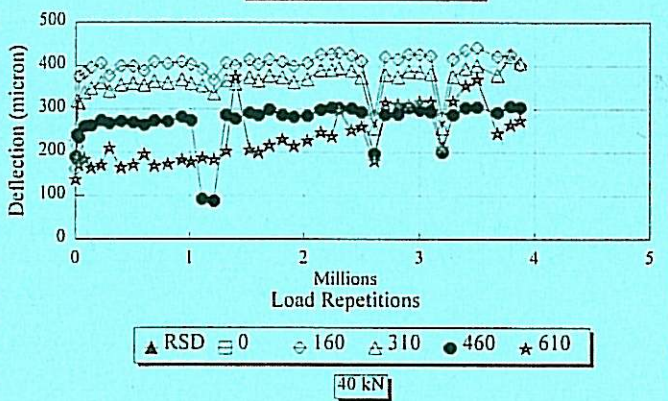
Section 339A4
MDD12

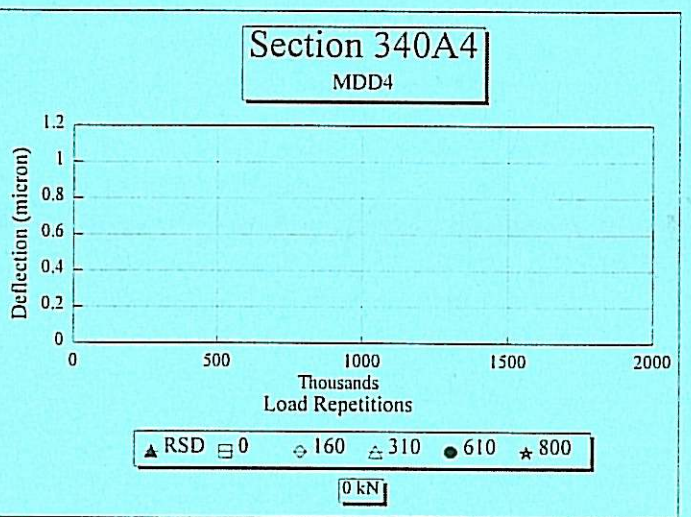
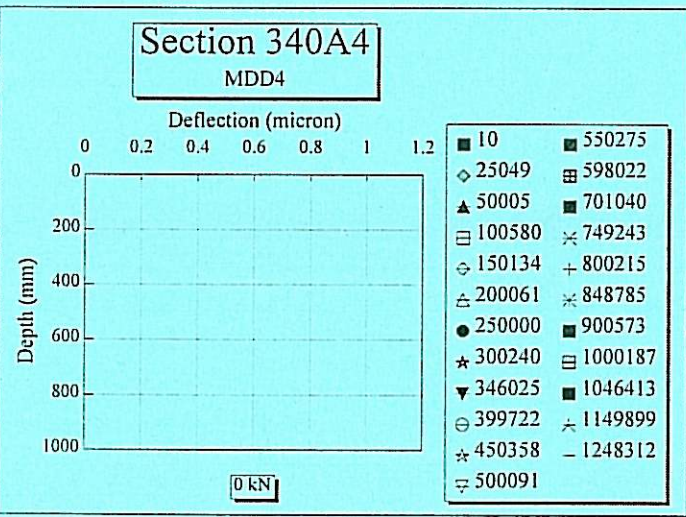
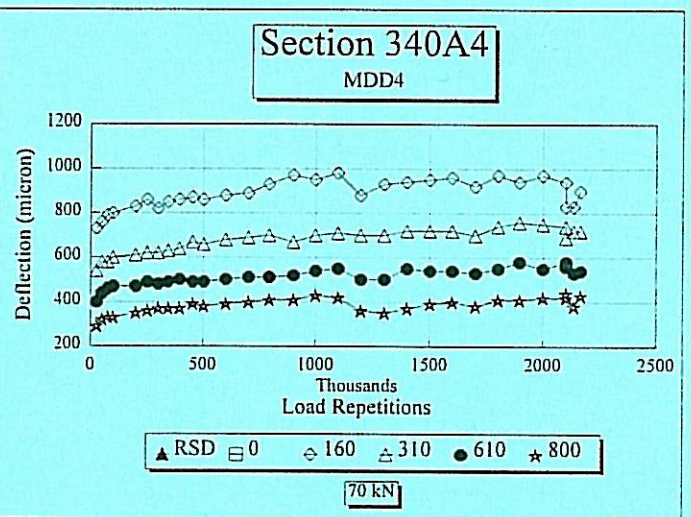
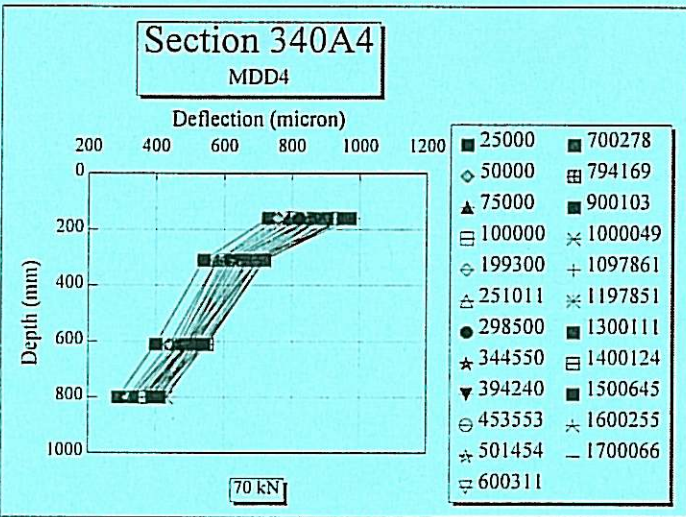
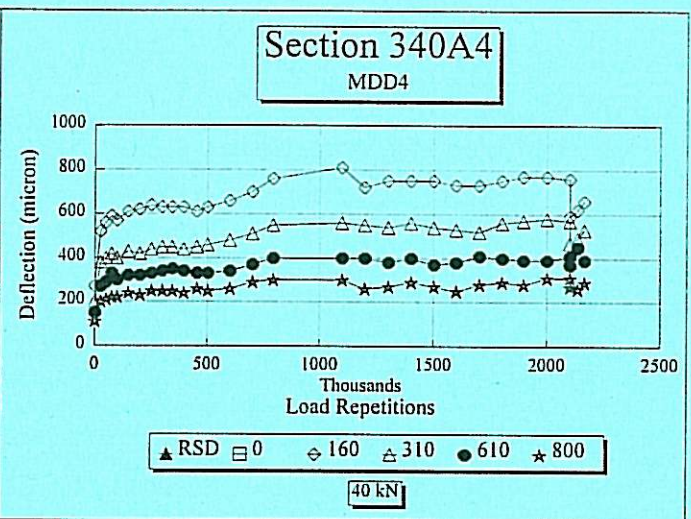
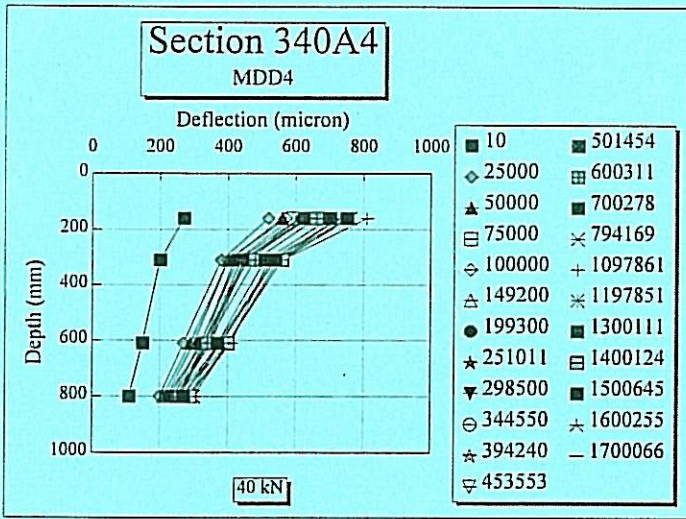


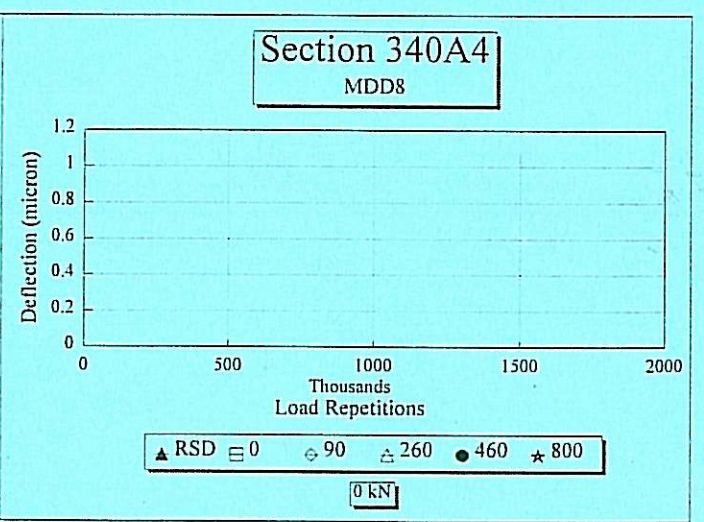
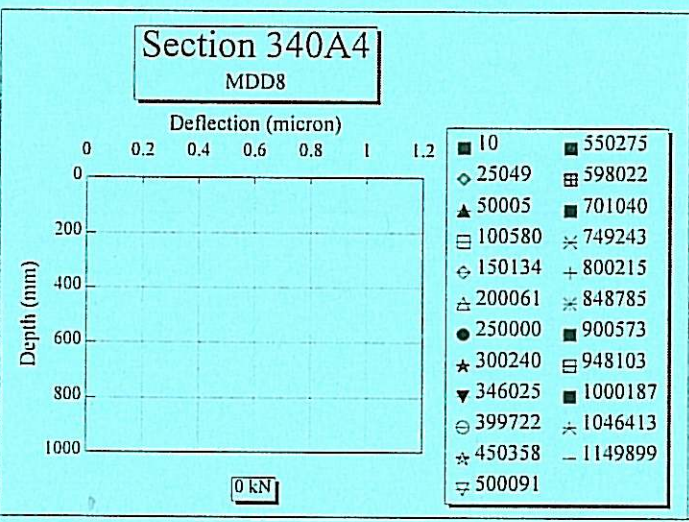
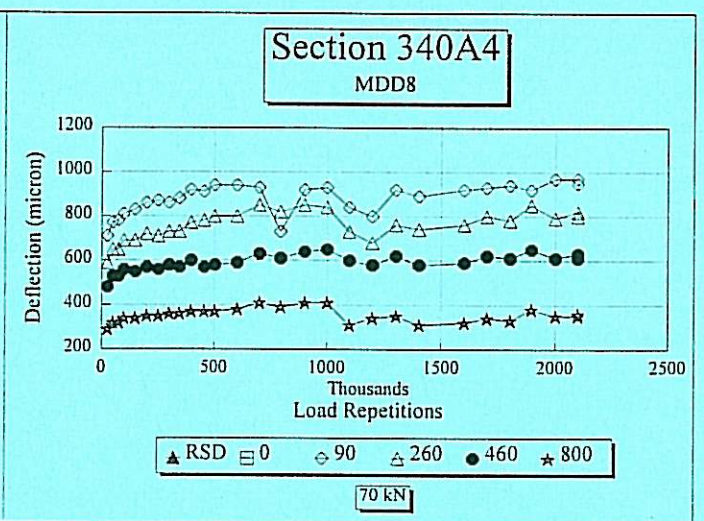
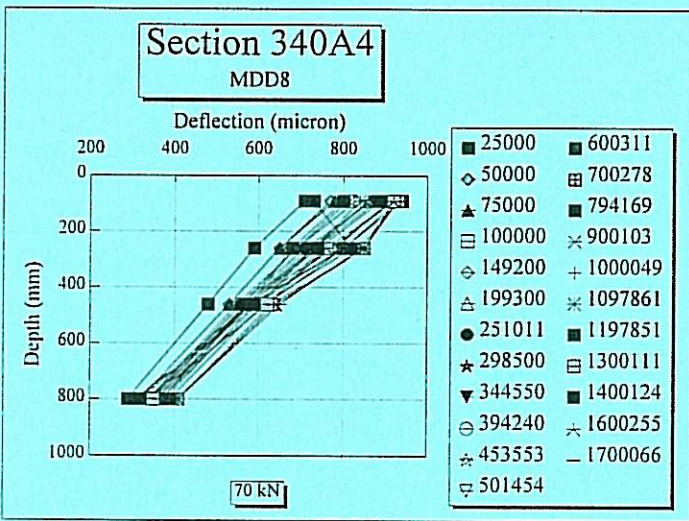
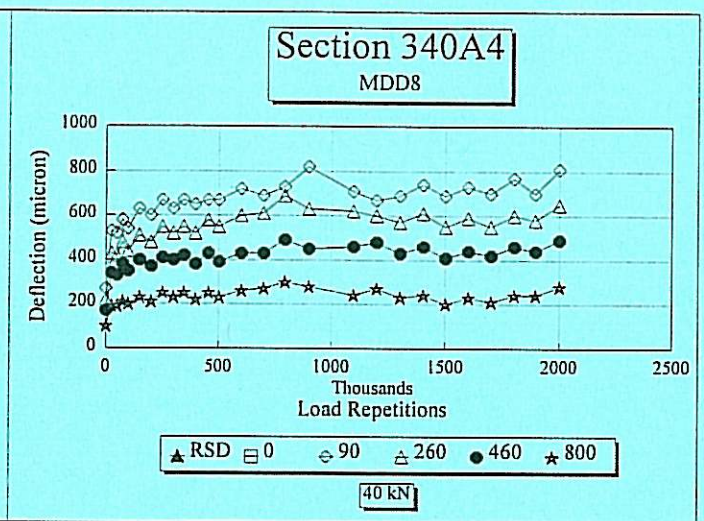
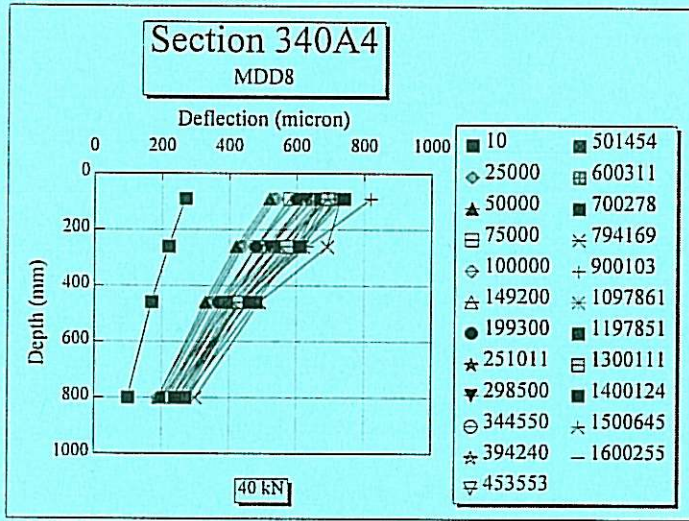
Section 339A4
MDD12



Section 339A4
MDD12

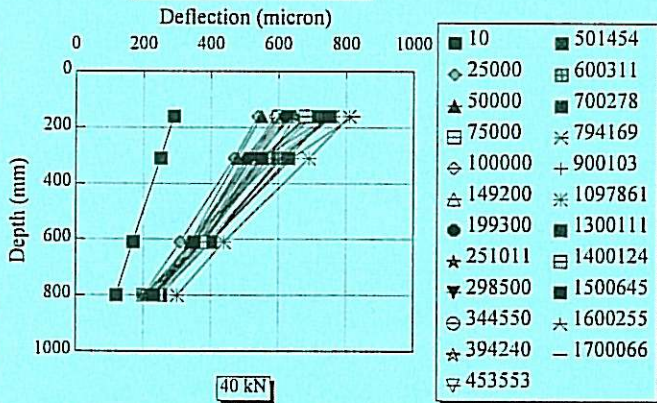






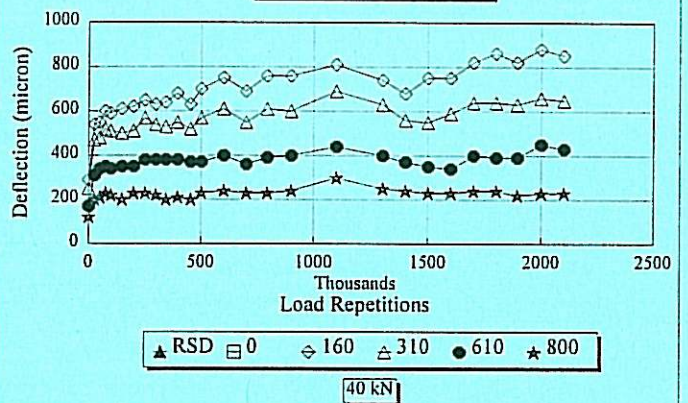
Section 340A4

MDD12



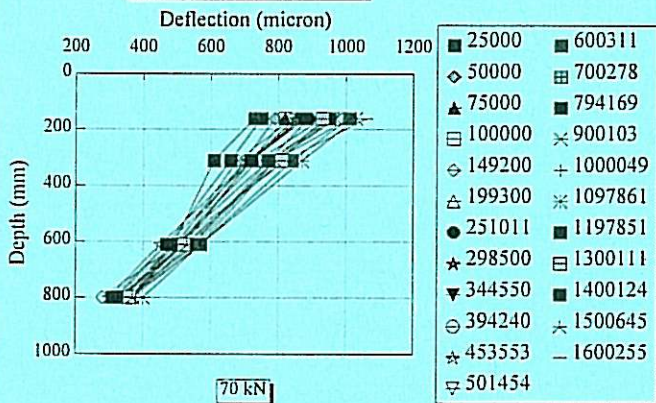
Section 340A4

MDD12



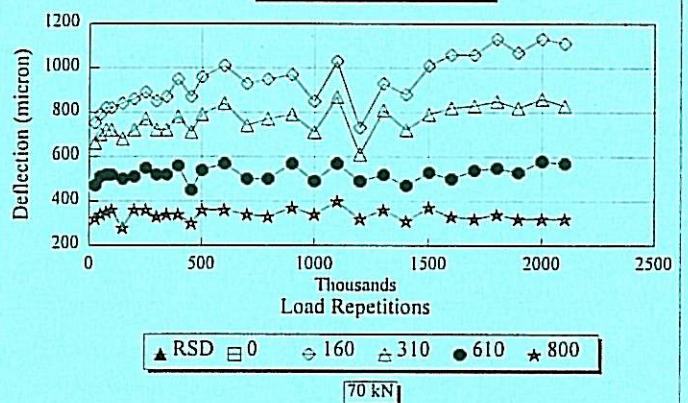
Section 340A4

MDD12



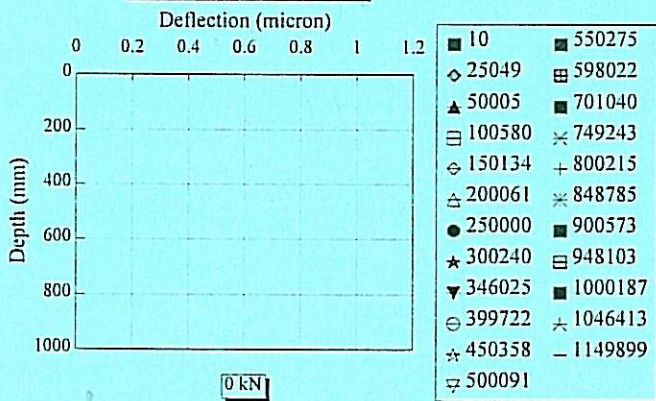
Section 340A4

MDD12



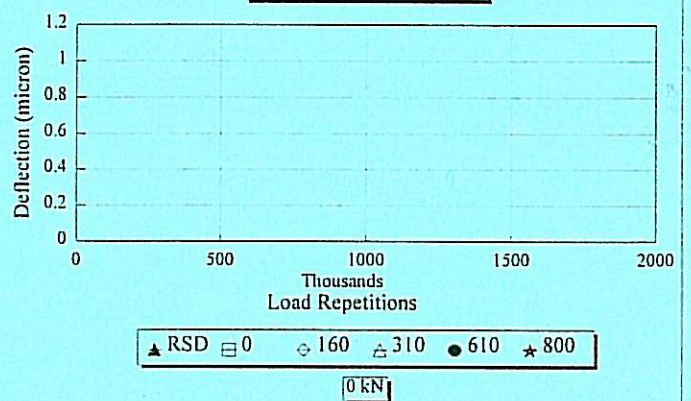
Section 340A4

MDD12



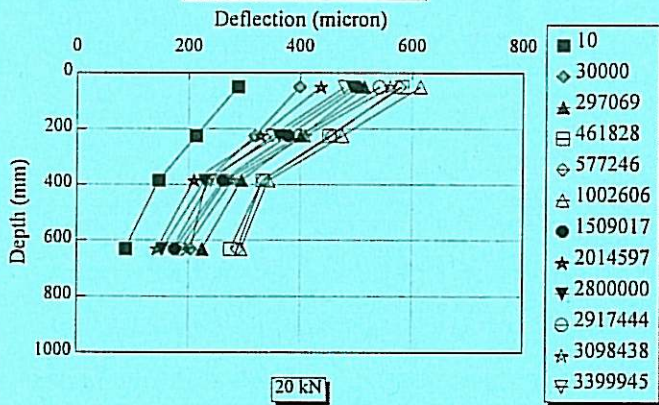
Section 340A4

MDD12



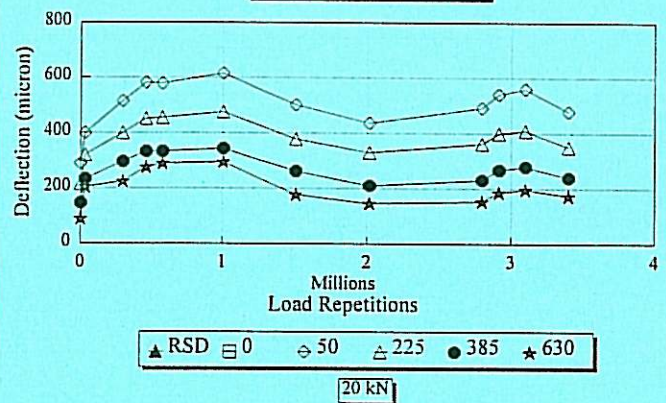
Section 346A4

MDD4



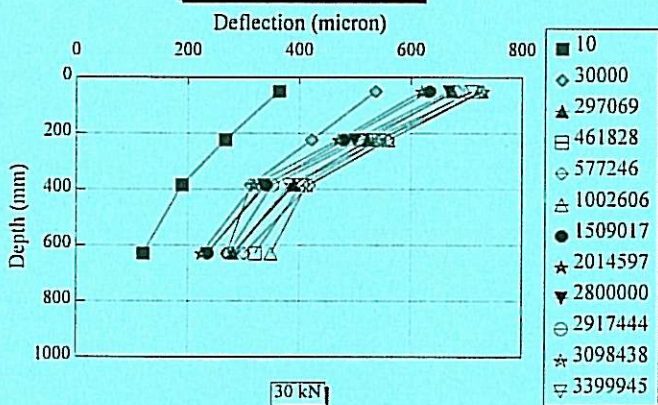
Section 346A4

MDD4



Section 346A4

MDD4



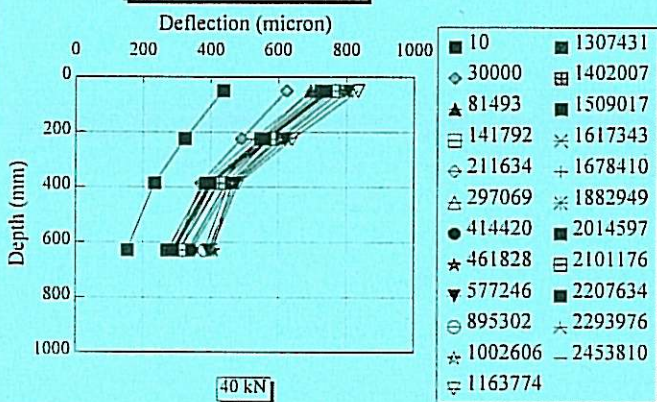
Section 346A4

MDD4



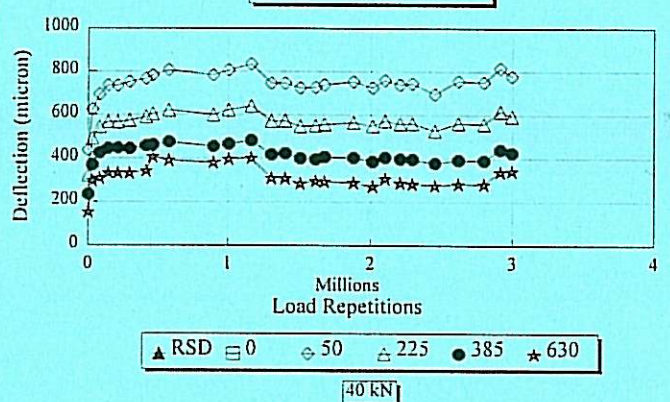
Section 346A4

MDD4



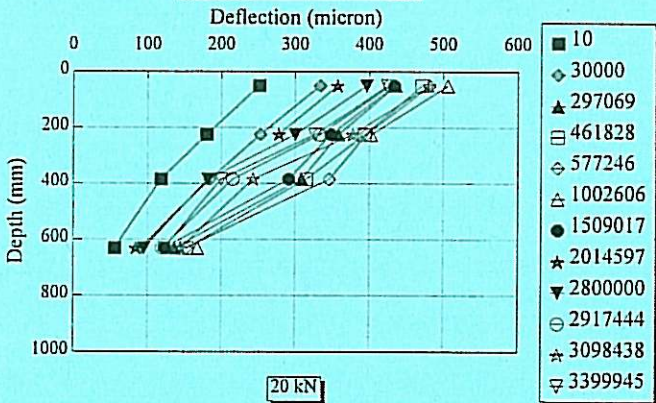
Section 346A4

MDD4



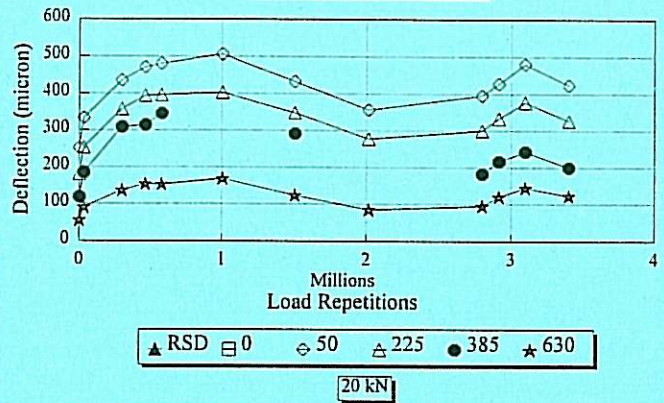
Section 346A4

MDD12



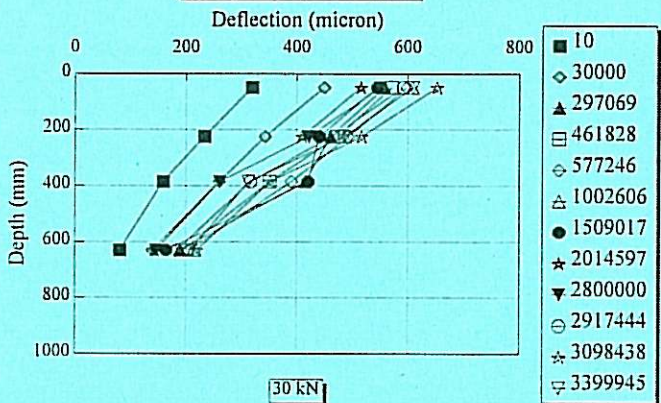
Section 346A4

MDD12



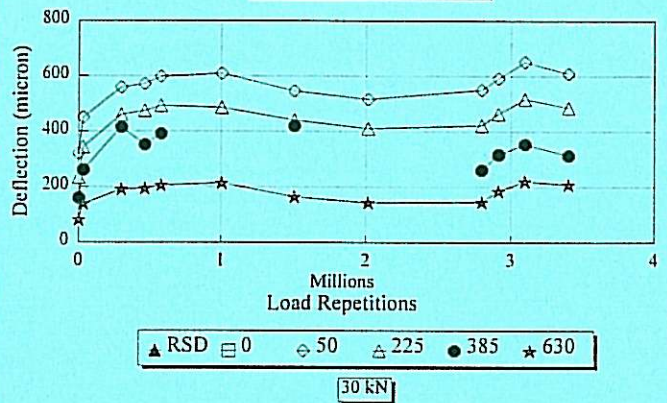
Section 346A4

MDD12



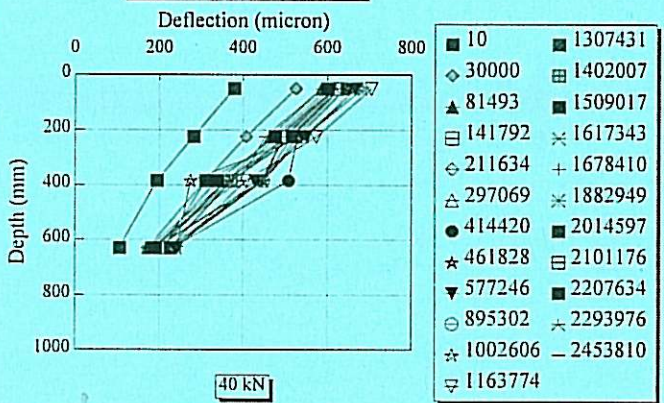
Section 346A4

MDD12



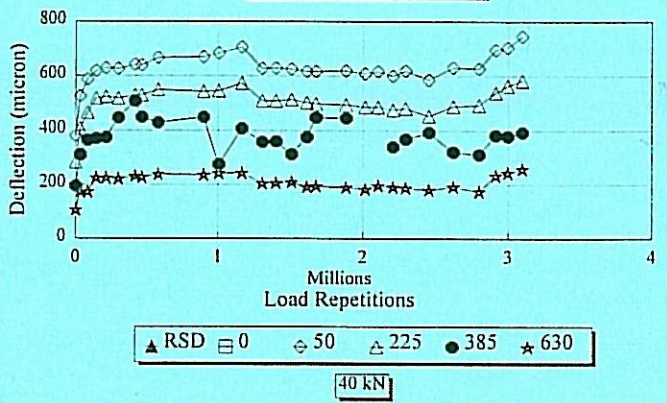
Section 346A4

MDD12

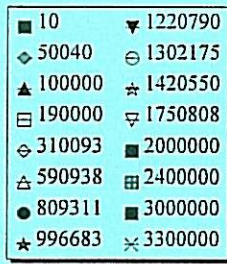
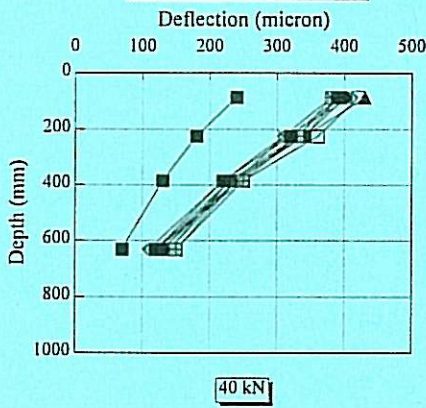


Section 346A4

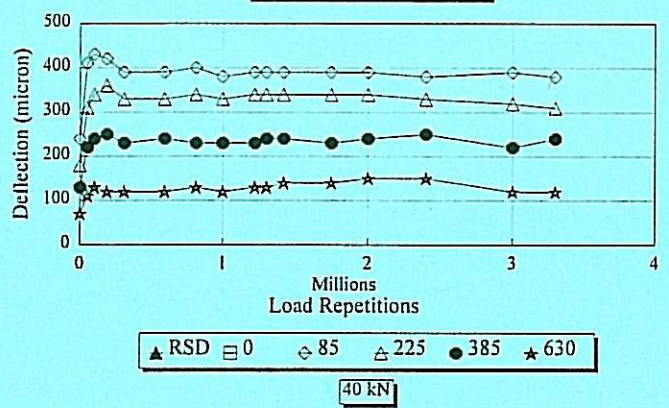
MDD12



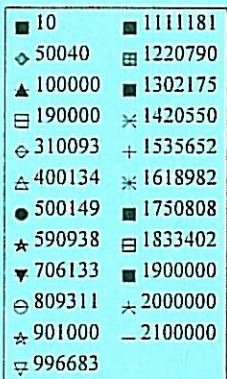
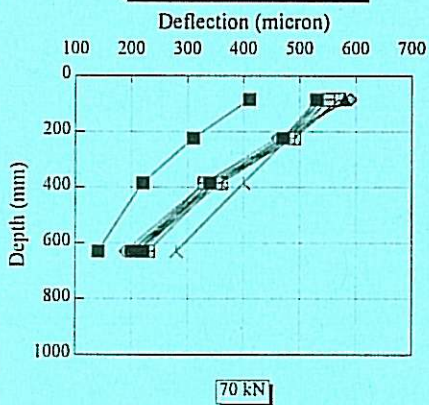
Section 347A4 MDD4



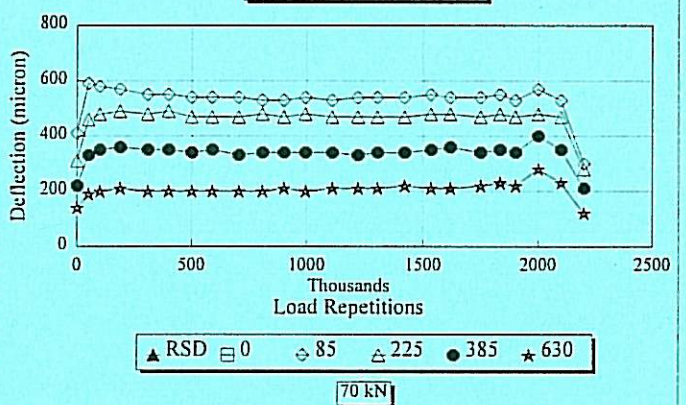
Section 347A4 MDD4



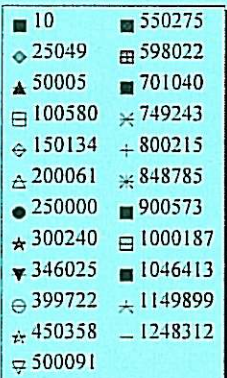
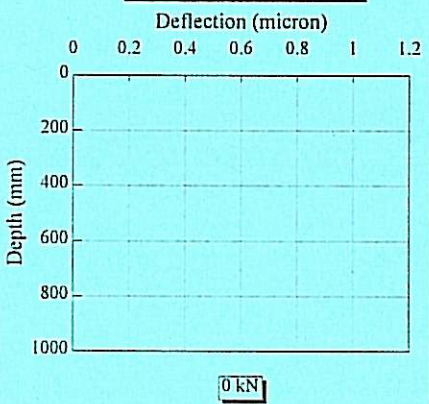
Section 347A4 MDD4



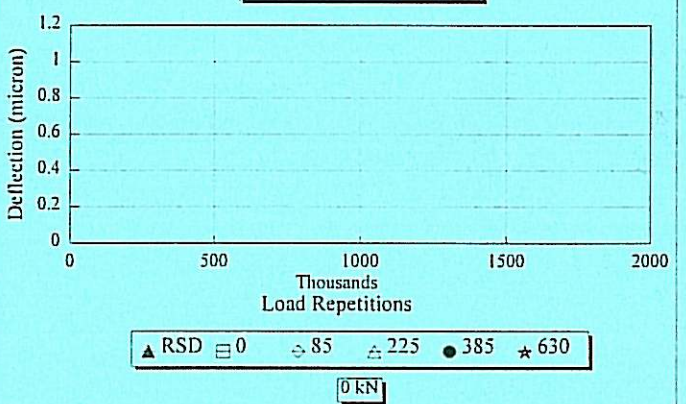
Section 347A4 MDD4



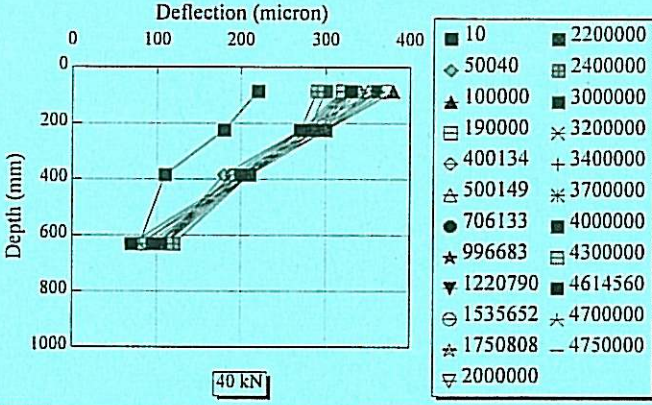
Section 347A4 MDD4



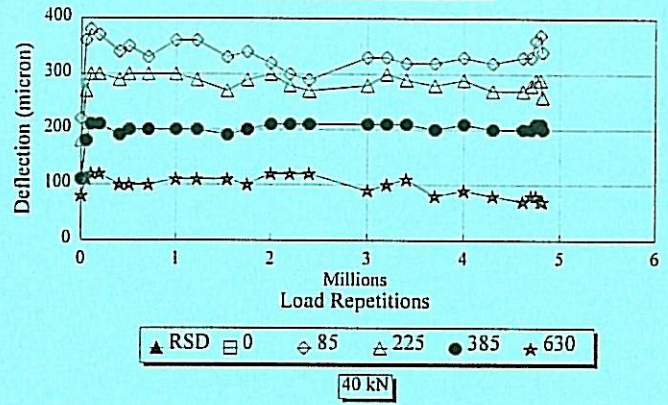
Section 347A4 MDD4



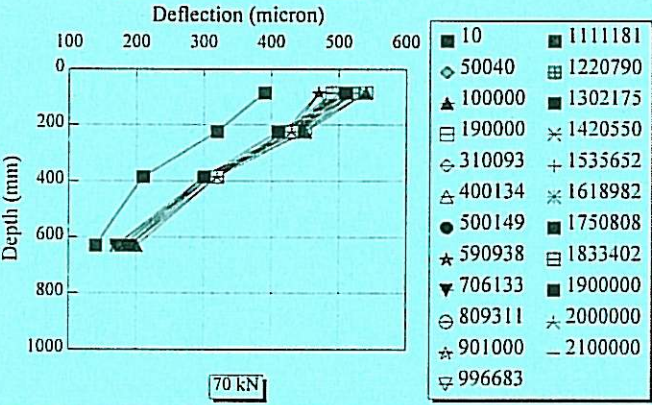
Section 347A4
MDD12



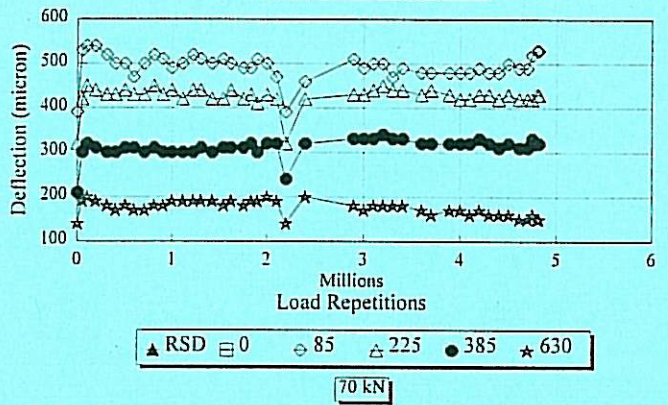
Section 347A4
MDD12



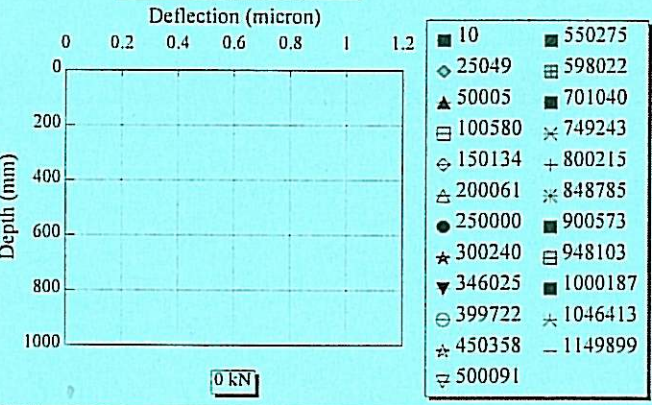
Section 347A4
MDD12



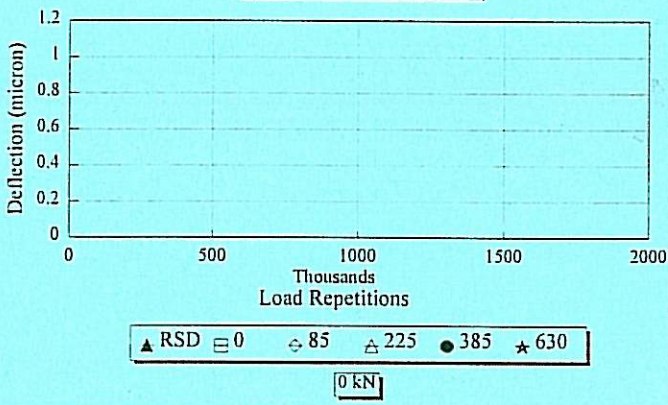
Section 347A4
MDD12

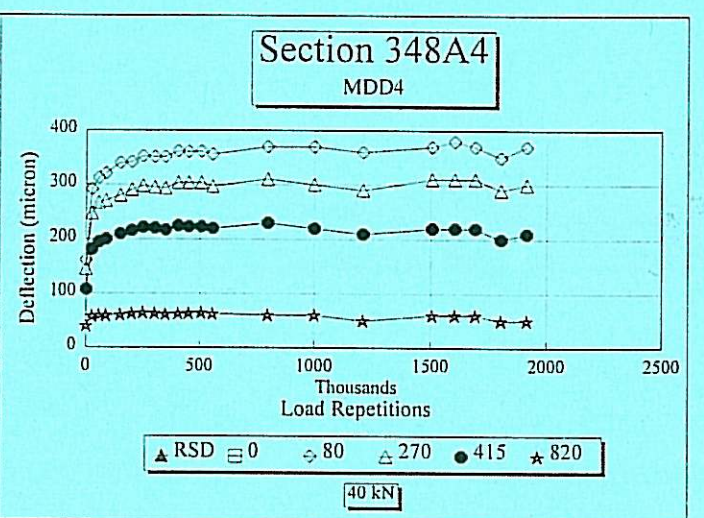
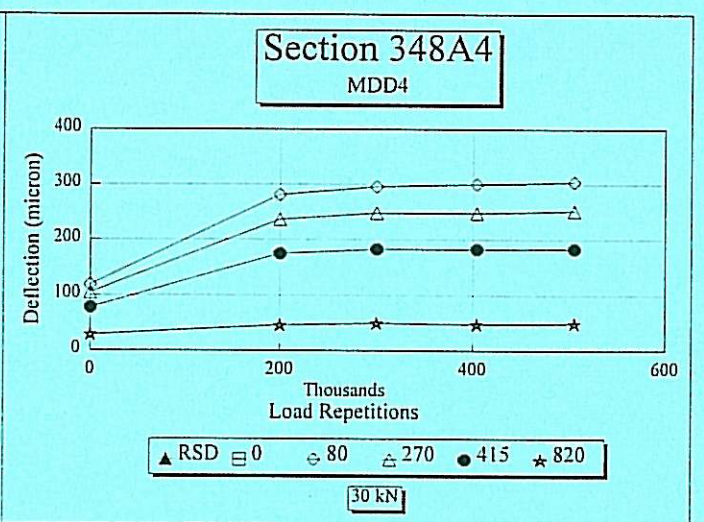
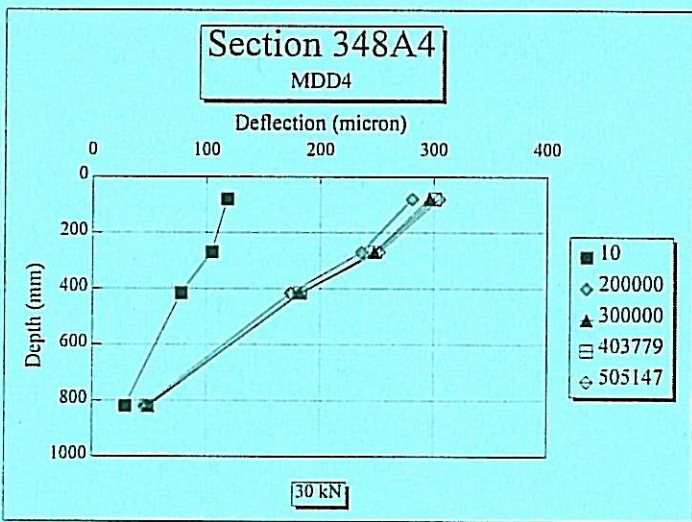
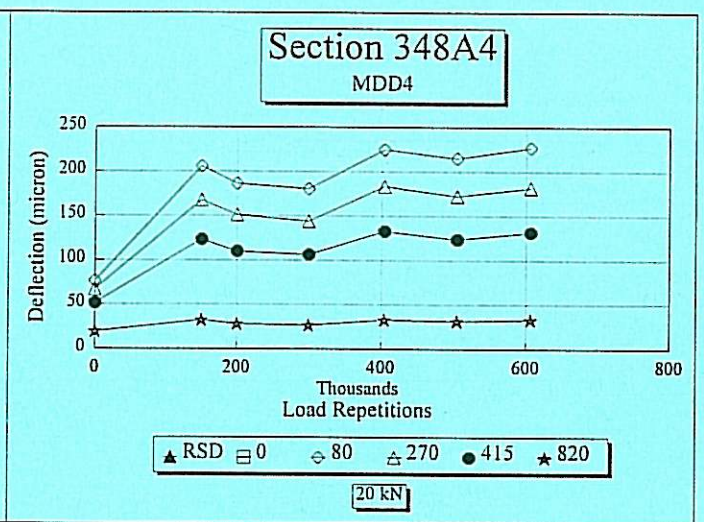
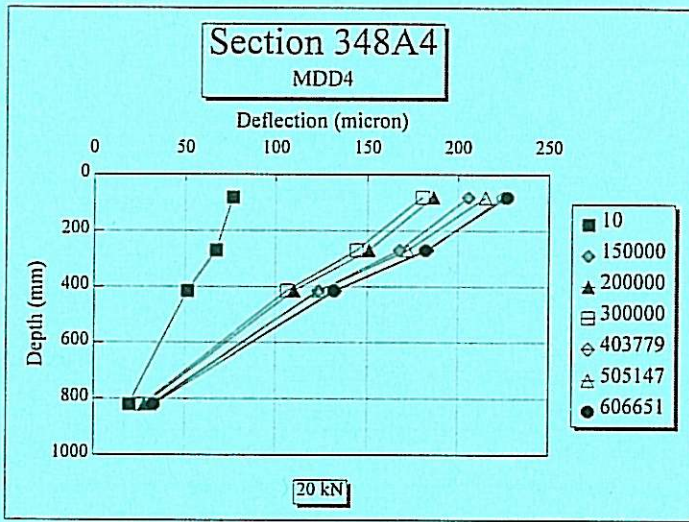


Section 347A4
MDD12



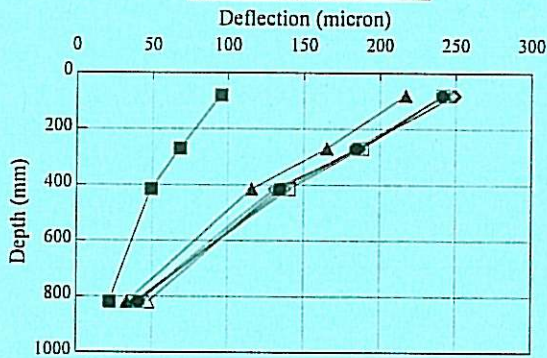
Section 347A4
MDD12





Section 348A4

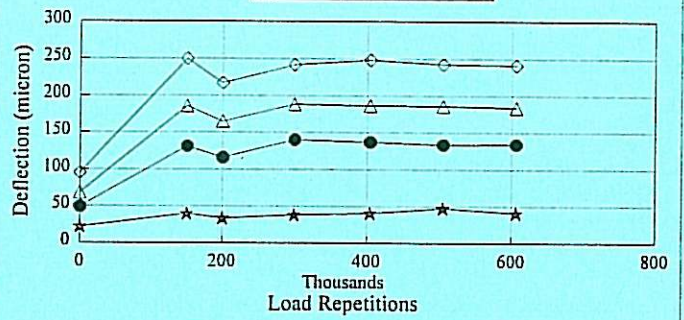
MDD12



20 kN

Section 348A4

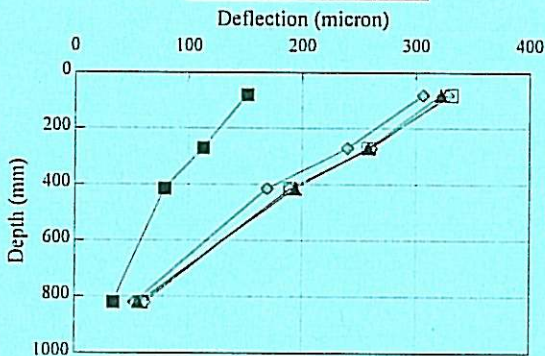
MDD12



20 kN

Section 348A4

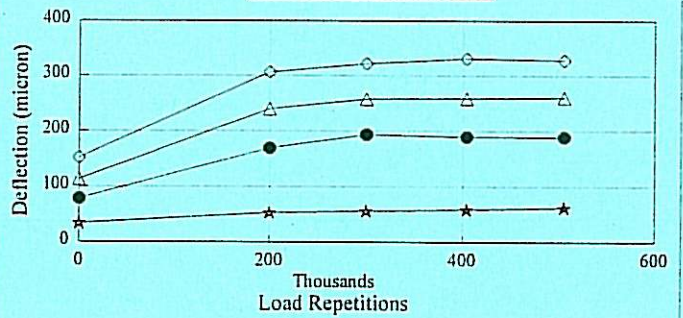
MDD12



30 kN

Section 348A4

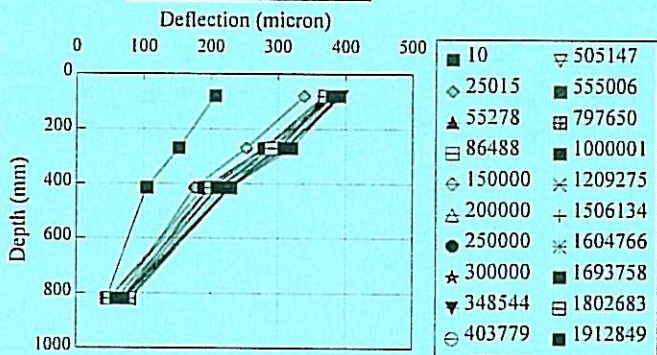
MDD12



30 kN

Section 348A4

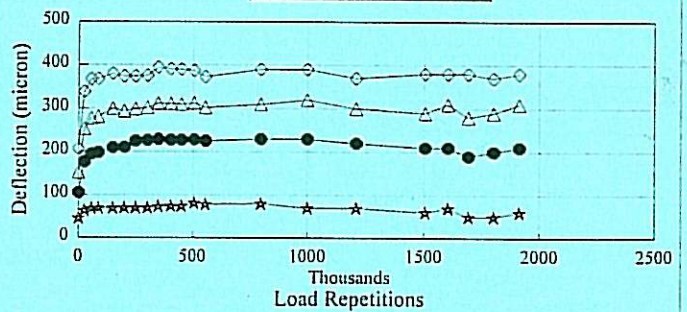
MDD12



40 kN

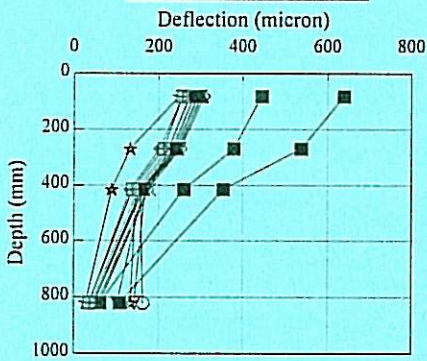
Section 348A4

MDD12



40 kN

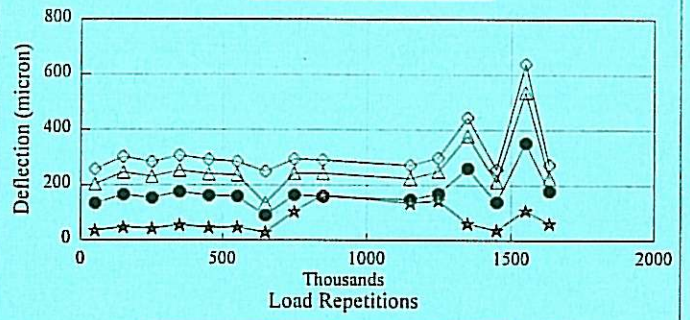
Section 349A4
MDD4



- | | |
|----------|-----------|
| ■ 10 | ▼ 749243 |
| ◇ 50005 | ○ 848785 |
| ▲ 150134 | ☆ 1149899 |
| □ 250000 | ◇ 1248312 |
| ◇ 346025 | ■ 1349369 |
| △ 450358 | ▨ 1450525 |
| ● 550275 | ■ 1551015 |
| ★ 650122 | ✱ 1632435 |

20 kN

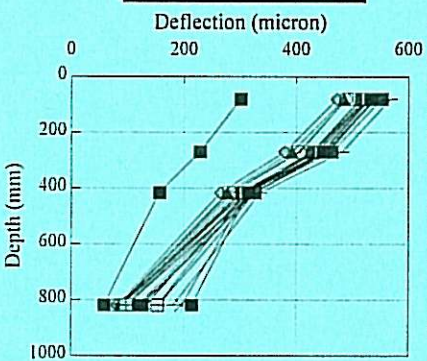
Section 349A4
MDD4



- | | | | | | |
|-------|-----|------|-------|-------|-------|
| ▲ RSD | □ 0 | ◇ 80 | △ 270 | ● 415 | ★ 820 |
|-------|-----|------|-------|-------|-------|

20 kN

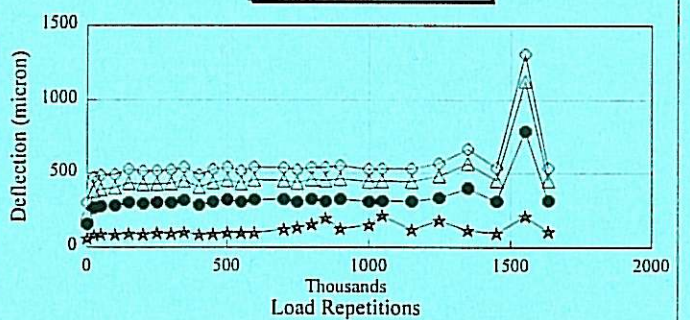
Section 349A4
MDD4



- | | |
|----------|-----------|
| ■ 10 | ■ 550275 |
| ◇ 25049 | ▨ 598022 |
| ▲ 50005 | ■ 701040 |
| □ 100580 | ✱ 749243 |
| ◇ 150134 | + 800215 |
| △ 200061 | ✱ 848785 |
| ● 250000 | ■ 900573 |
| ★ 300240 | ▨ 1000187 |
| ▼ 346025 | ■ 1046413 |
| ○ 399722 | ☆ 1149899 |
| ☆ 450358 | - 1248312 |
| ▽ 500091 | |

40 kN

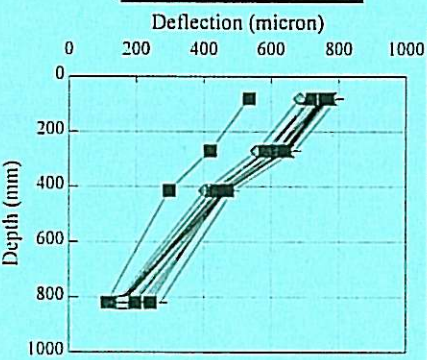
Section 349A4
MDD4



- | | | | | | |
|-------|-----|------|-------|-------|-------|
| ▲ RSD | □ 0 | ◇ 80 | △ 270 | ● 415 | ★ 820 |
|-------|-----|------|-------|-------|-------|

40 kN

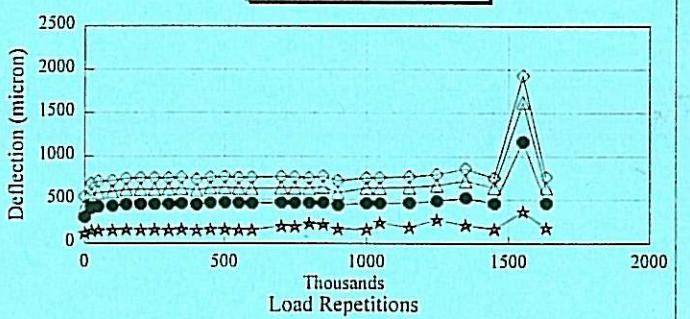
Section 349A4
MDD4



- | | |
|----------|-----------|
| ■ 10 | ■ 550275 |
| ◇ 25049 | ▨ 598022 |
| ▲ 50005 | ■ 701040 |
| □ 100580 | ✱ 749243 |
| ◇ 150134 | + 800215 |
| △ 200061 | ✱ 848785 |
| ● 250000 | ■ 900573 |
| ★ 300240 | ▨ 1000187 |
| ▼ 346025 | ■ 1046413 |
| ○ 399722 | ☆ 1149899 |
| ☆ 450358 | - 1248312 |
| ▽ 500091 | |

70 kN

Section 349A4
MDD4

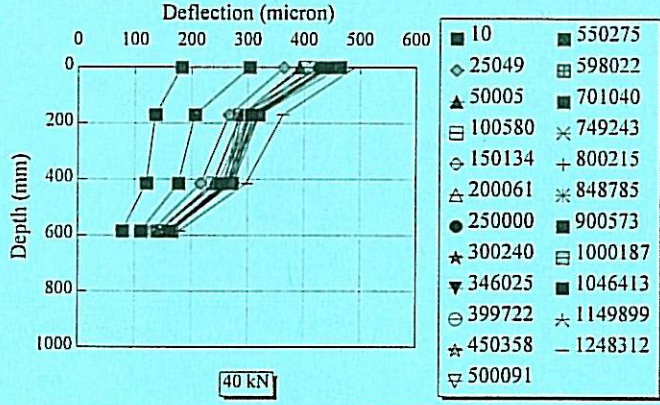


- | | | | | | |
|-------|-----|------|-------|-------|-------|
| ▲ RSD | □ 0 | ◇ 80 | △ 270 | ● 415 | ★ 820 |
|-------|-----|------|-------|-------|-------|

70 kN

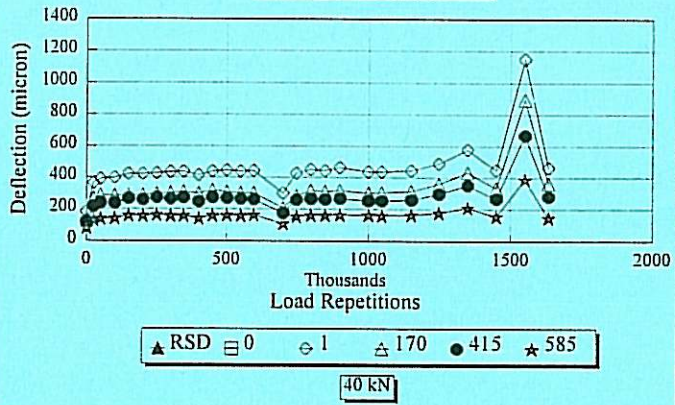
Section 349A4

MDD8



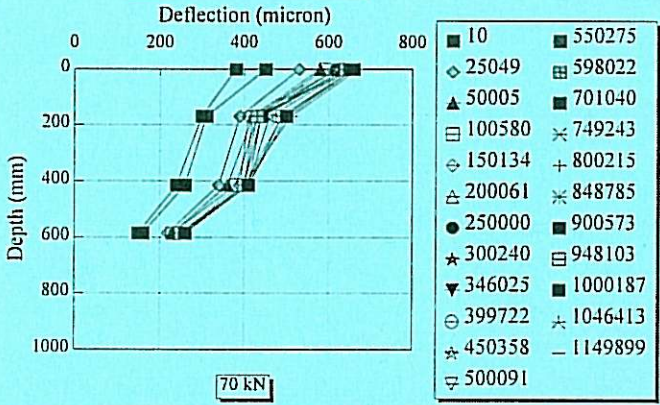
Section 349A4

MDD8



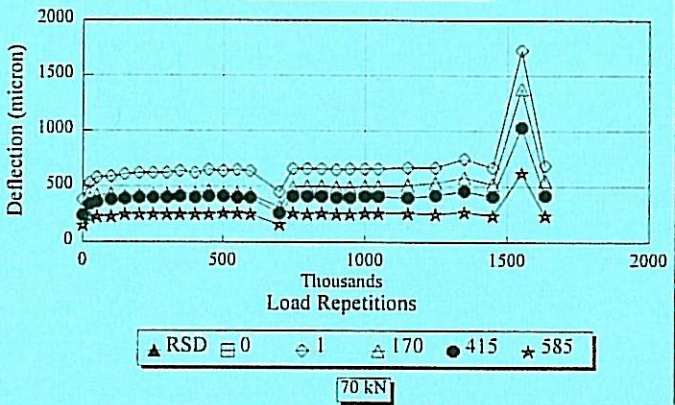
Section 349A4

MDD8



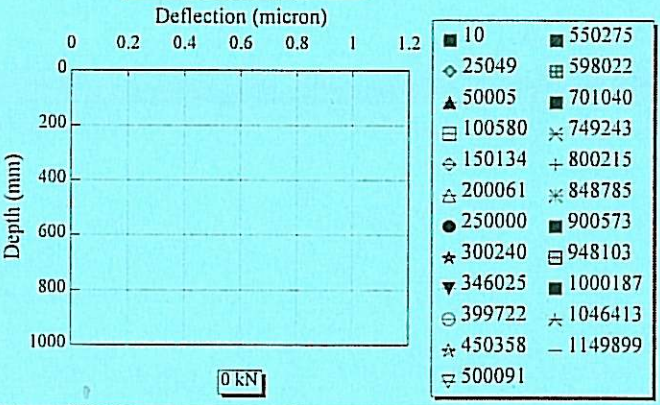
Section 349A4

MDD8



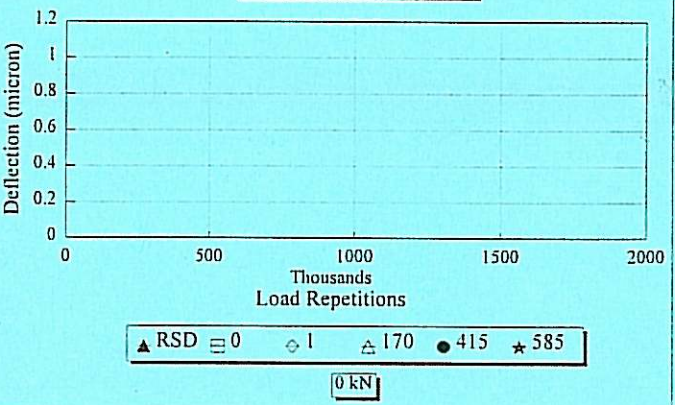
Section 349A4

MDD8



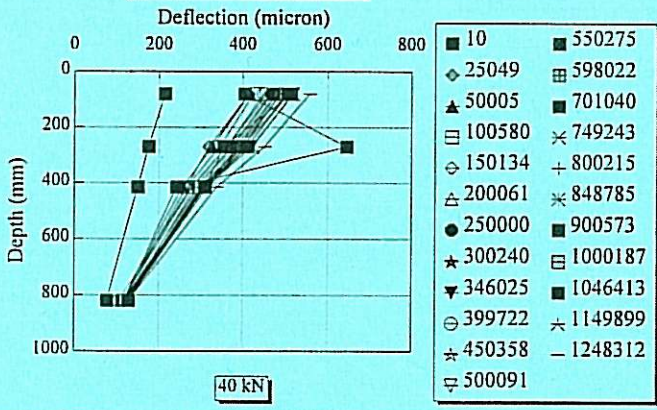
Section 349A4

MDD8



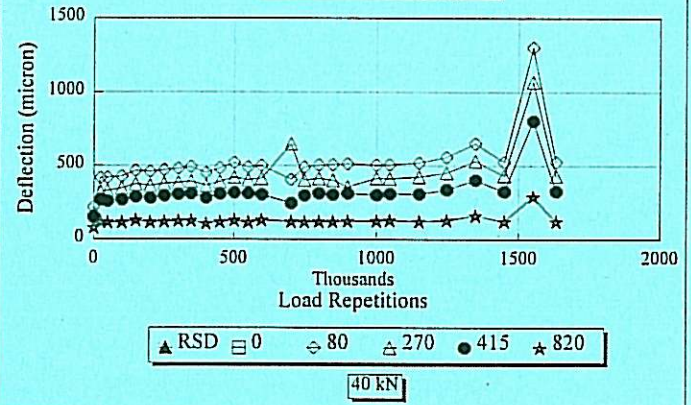
Section 349A4

MDD12



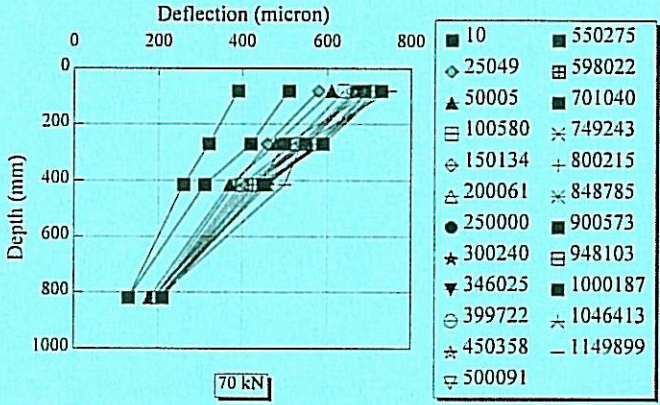
Section 349A4

MDD12



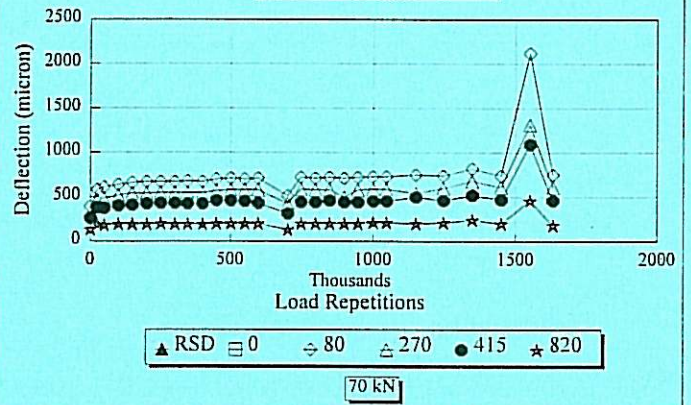
Section 349A4

MDD12



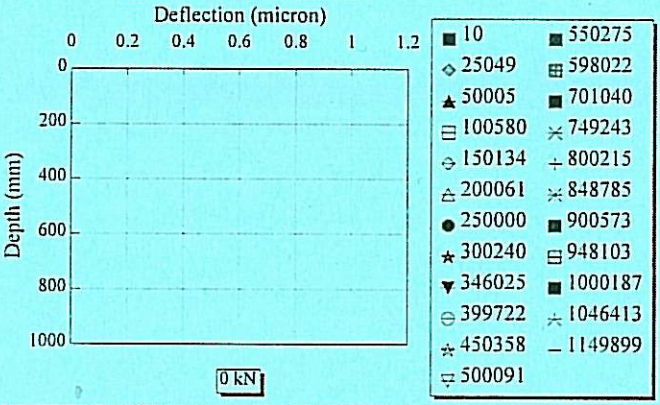
Section 349A4

MDD12



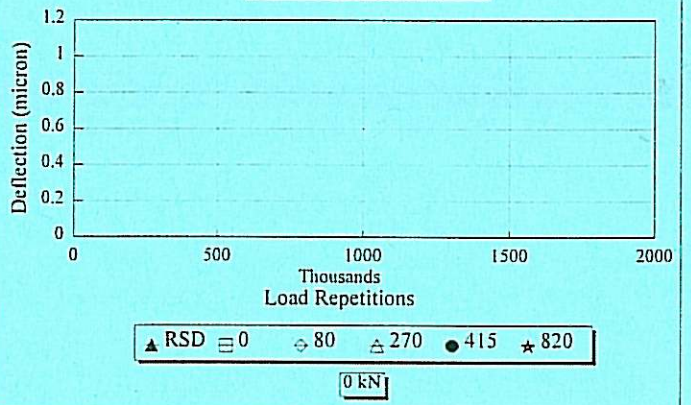
Section 349A4

MDD12



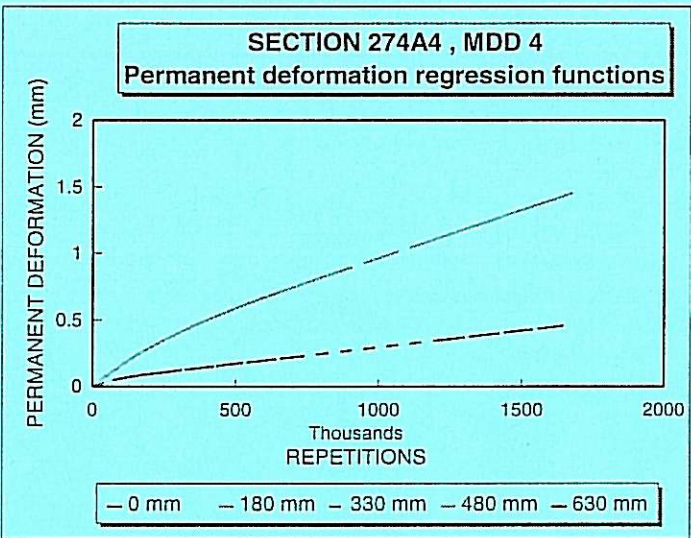
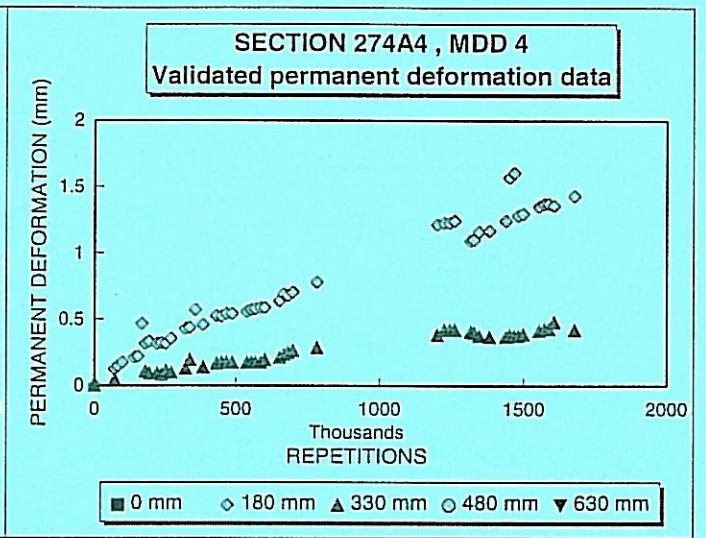
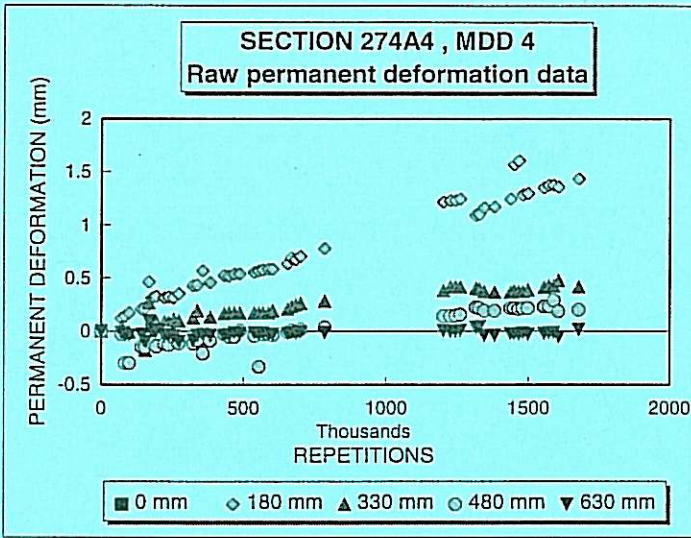
Section 349A4

MDD12



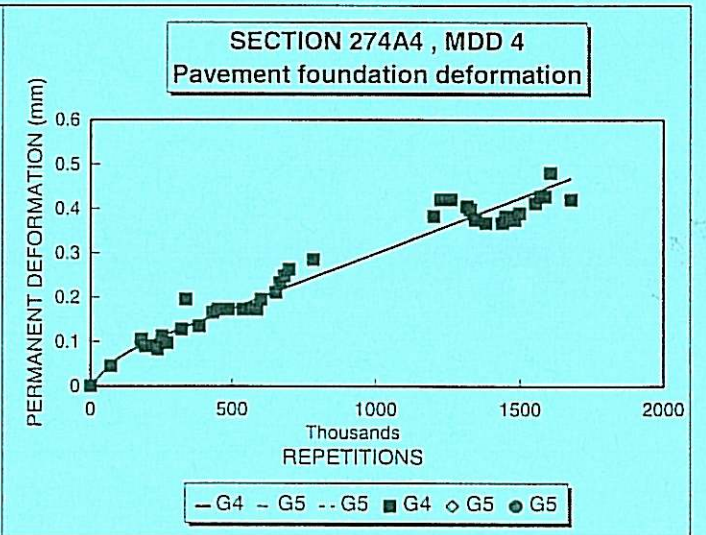
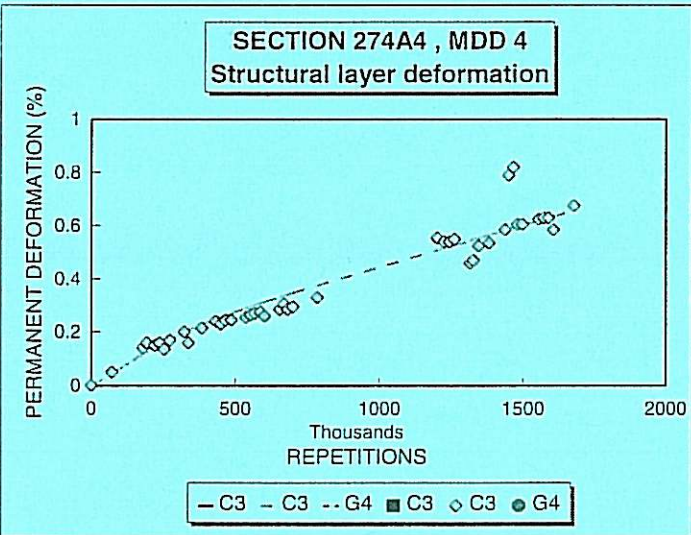
APPENDIX C

**PERMANENT DEFORMATION DATA FOR A NUMBER OF
SELECTED HVS TESTS**

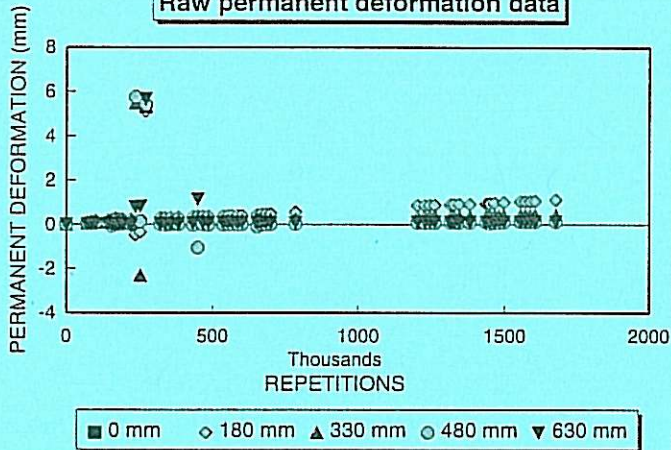


SECTION 274A4 , MDD 4

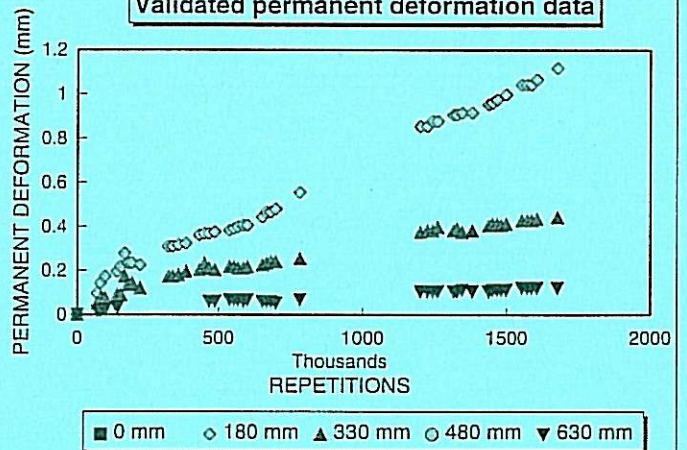
Level	Regression coefficients			Correlation
	a	b	m	
0 mm	0	0.00E+00	0.00E+00	0.00000
180 mm	0.25	7.00E-06	7.20E-07	0.96506
330 mm	0.05	2.00E-05	2.50E-07	0.95253
480 mm	0	0.00E+00	0.00E+00	0.00000
630 mm	0	0.00E+00	0.00E+00	0.00000



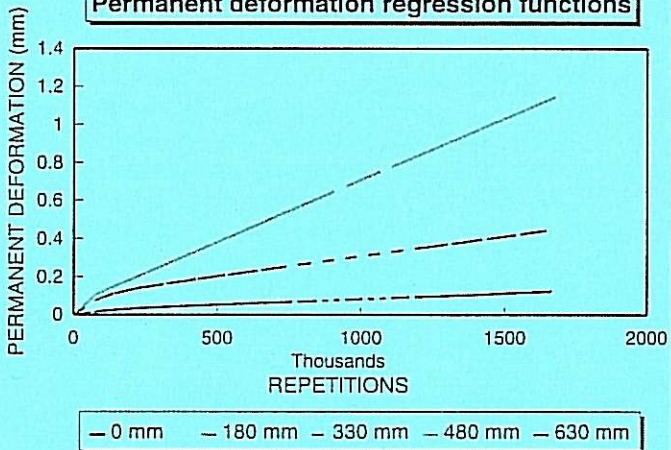
SECTION 274A4 , MDD 8
Raw permanent deformation data



SECTION 274A4 , MDD 8
Validated permanent deformation data



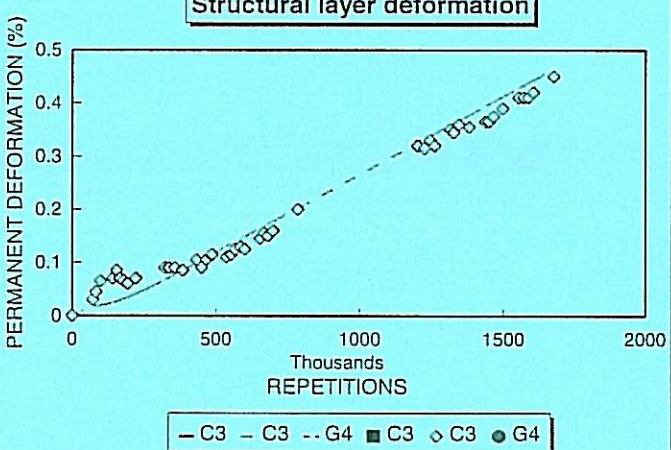
SECTION 274A4 , MDD 8
Permanent deformation regression functions



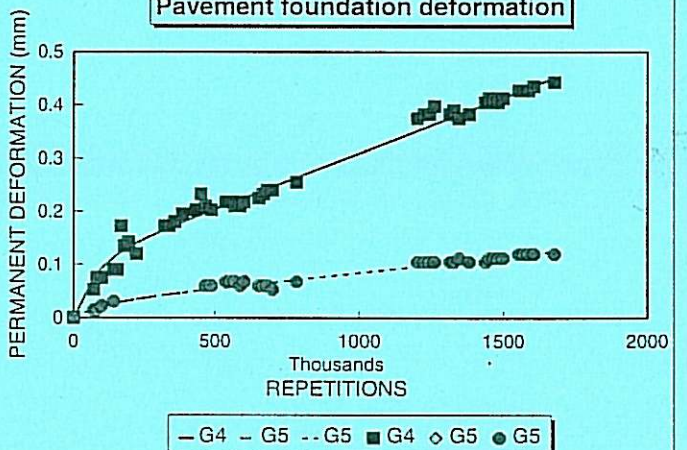
SECTION 274A4 , MDD 8

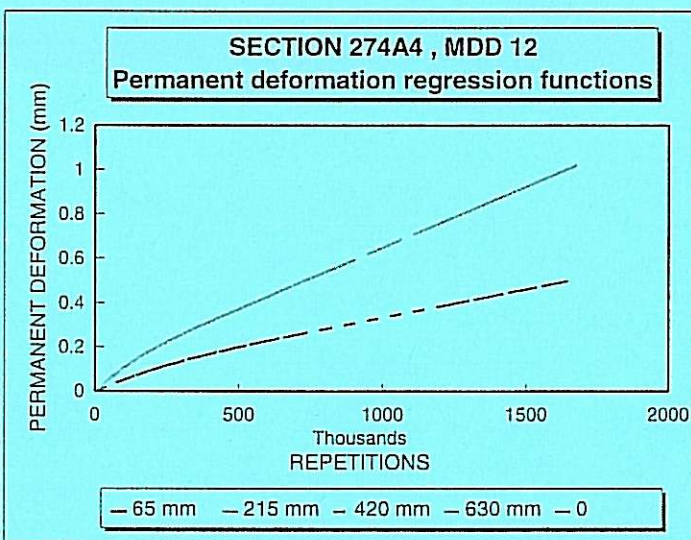
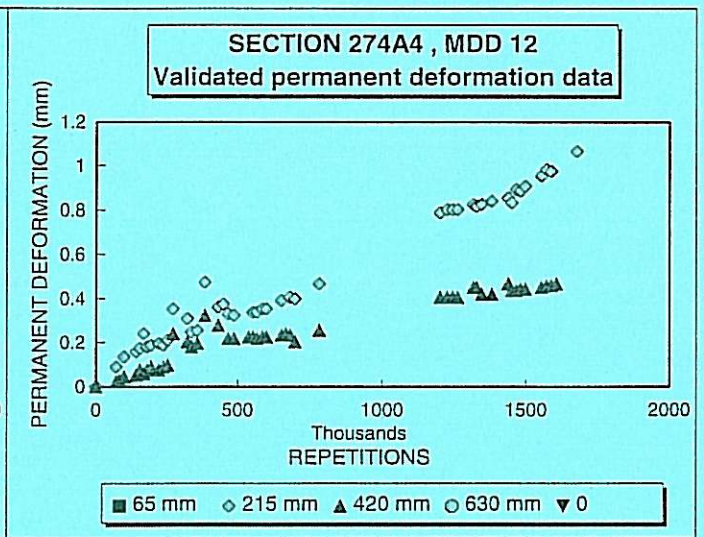
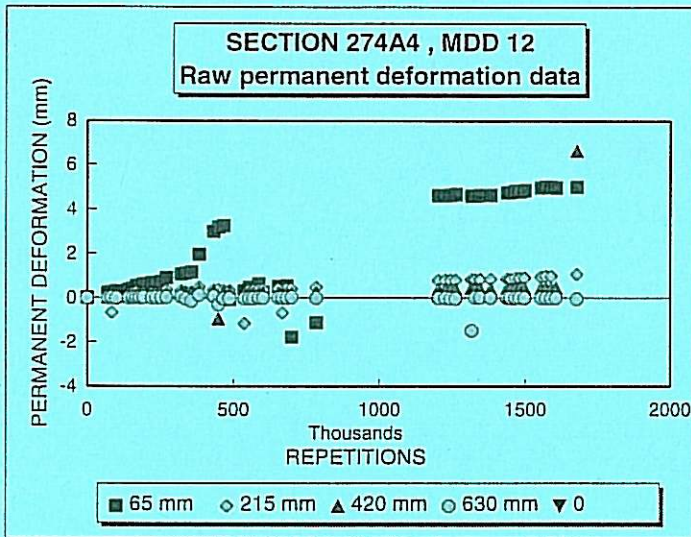
Level	Regression coefficients			
	a	b	m	Correlation
0 mm	0	0.00E+00	0.00E+00	0.00000
180 mm	0.06	5.00E-05	6.50E-07	0.98818
330 mm	0.1	1.50E-05	2.10E-07	0.98438
480 mm	0	0.00E+00	0.00E+00	0.00000
630 mm	0.025	1.20E-05	6.00E-08	0.97612

SECTION 274A4 , MDD 8
Structural layer deformation



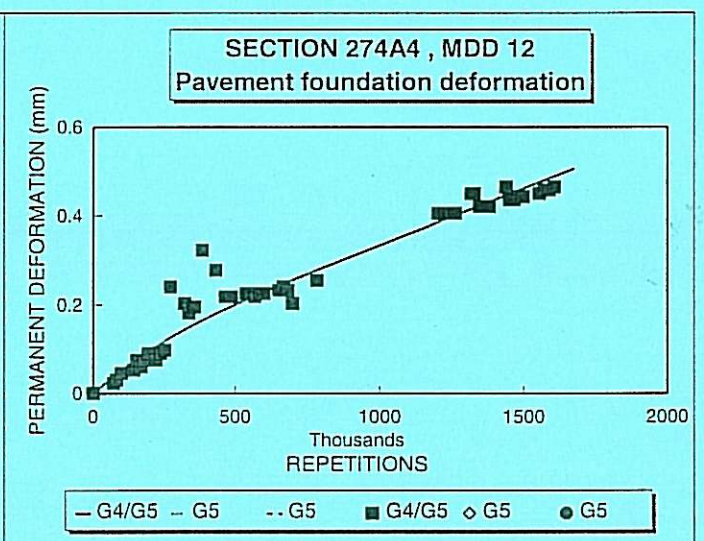
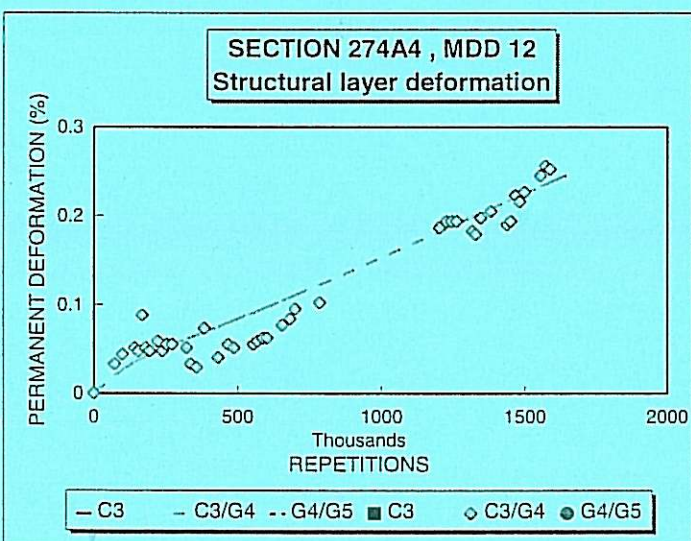
SECTION 274A4 , MDD 8
Pavement foundation deformation

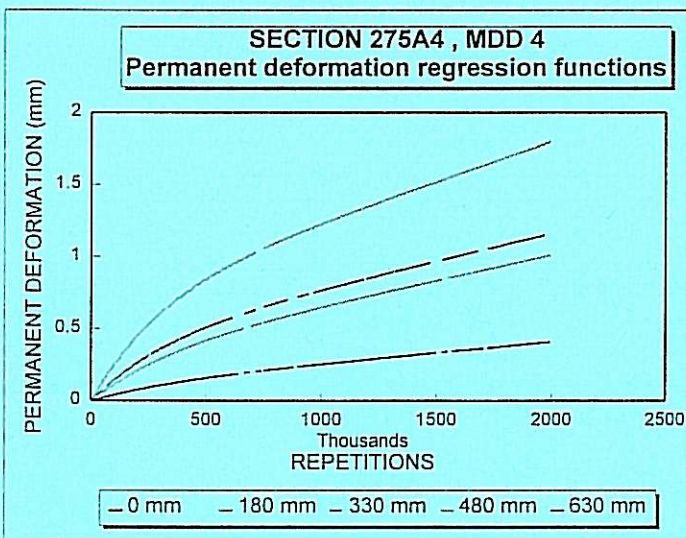
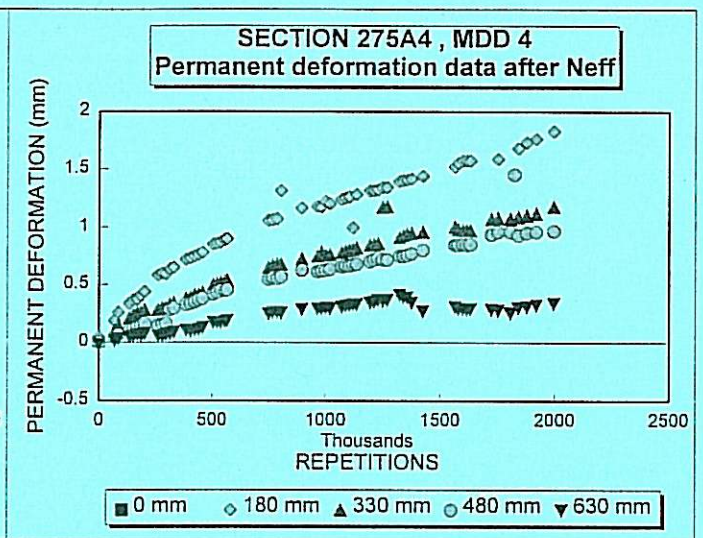
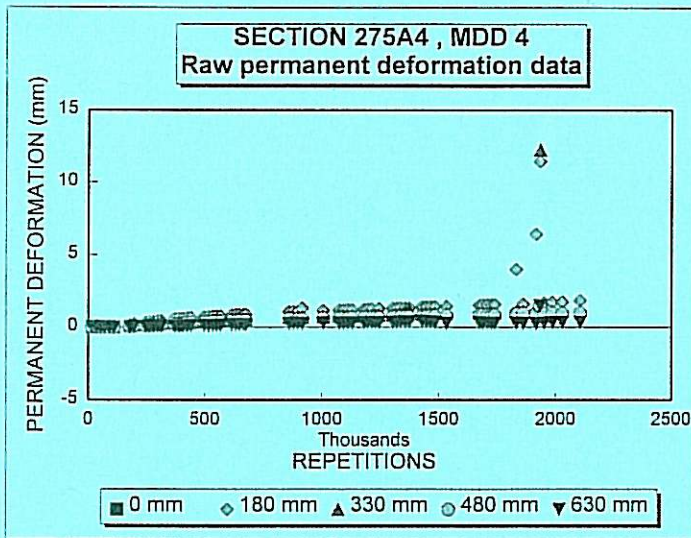




SECTION 274A4 , MDD 12

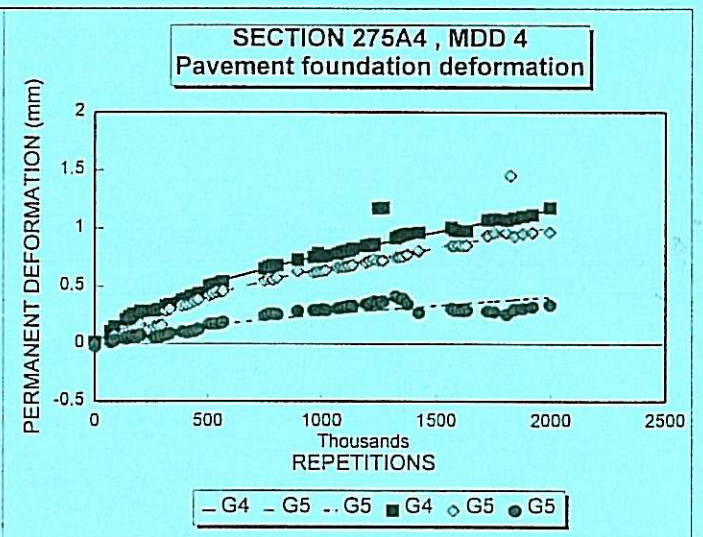
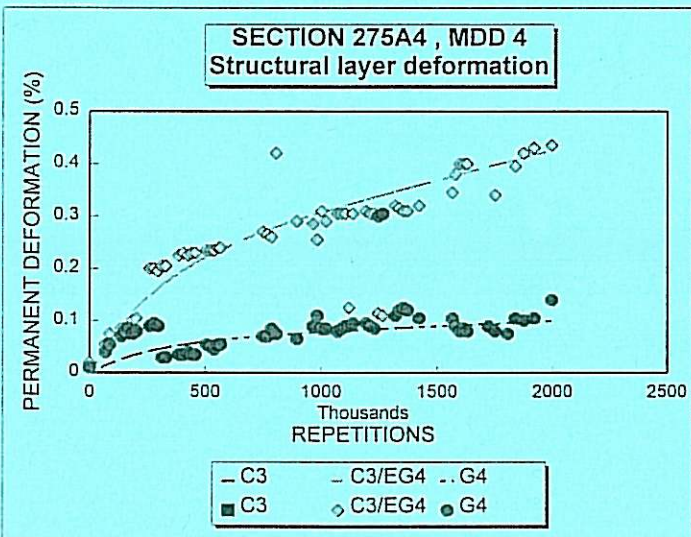
Level	Regression coefficients			
	a	b	m	Correlation
65 mm	0	0.00E+00	0.00E+00	0.00000
215 mm	0.1	1.20E-05	5.50E-07	0.97376
420 mm	0.08	7.00E-06	2.55E-07	0.93506
630 mm	0	0.00E+00	0.00E+00	0.00000
0	0	0.00E+00	0.00E+00	0.00000



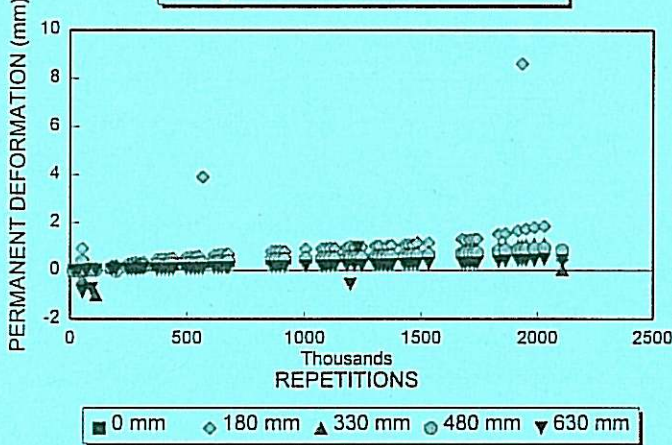


SECTION 275A4 , MDD 4

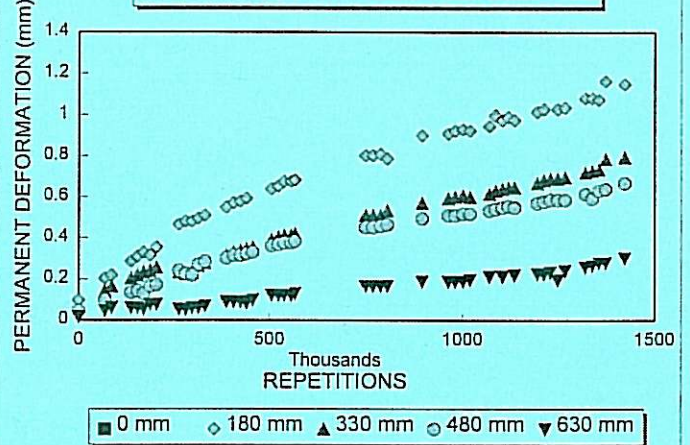
Level	Regression coefficients			
	a	b	m	Correlation
0 mm	0	0.00E+00	0.00E+00	0.00000
180 mm	0.7	4.00E-06	5.50E-07	0.98412
330 mm	0.4	4.00E-06	3.80E-07	0.96252
480 mm	0.31	4.00E-06	3.50E-07	0.93874
630 mm	0.11	4.00E-06	1.50E-07	0.79846



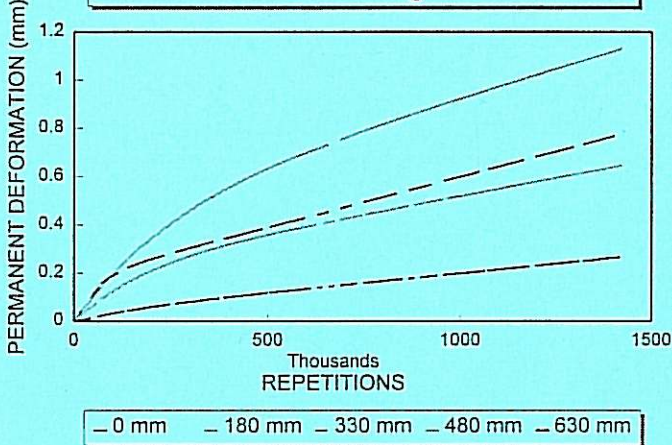
SECTION 275A4 , MDD 8
Raw permanent deformation data



SECTION 275A4 , MDD 8
Permanent deformation data after Neff



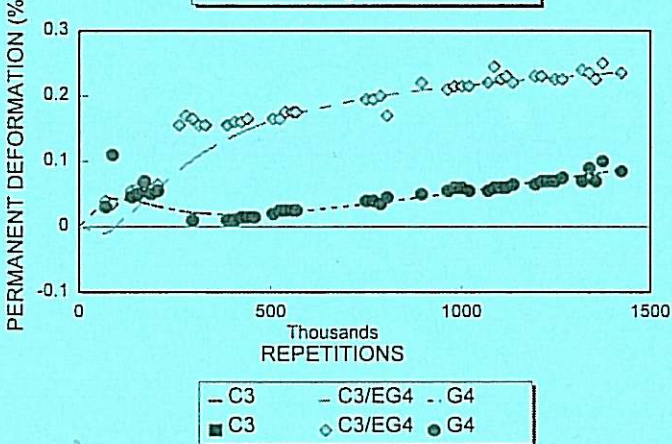
SECTION 275A4 , MDD 8
Permanent deformation regression functions



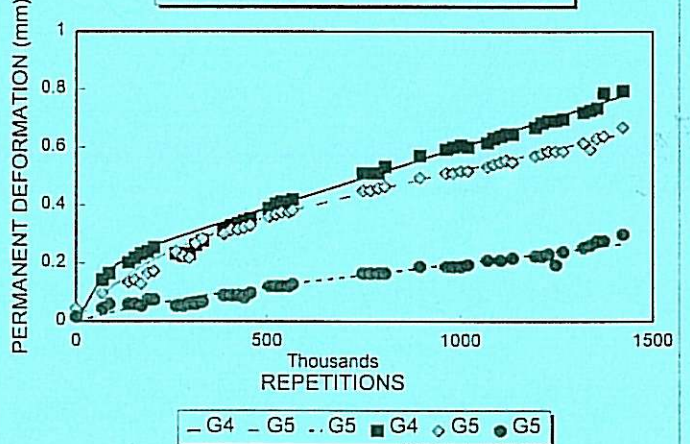
SECTION 275A4 , MDD 8

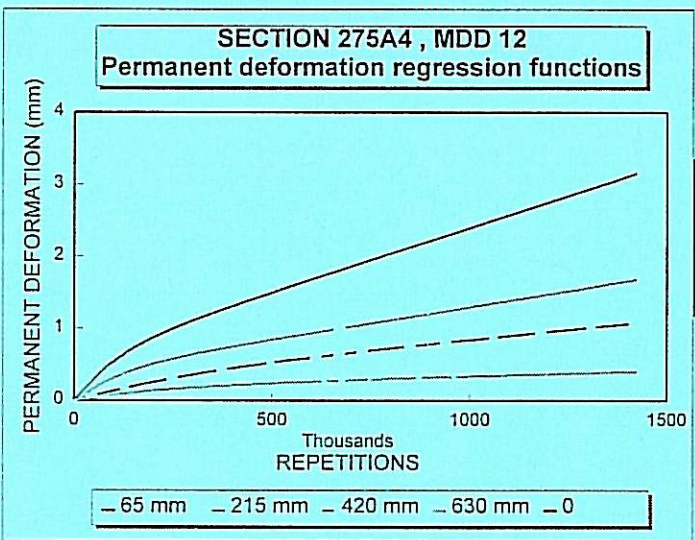
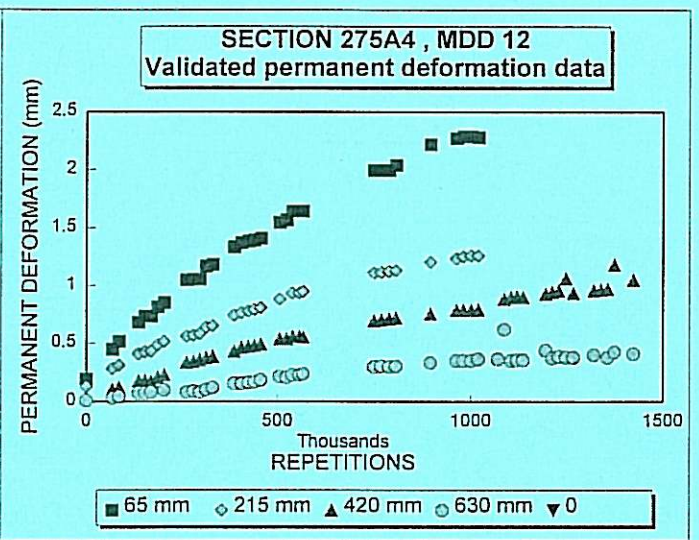
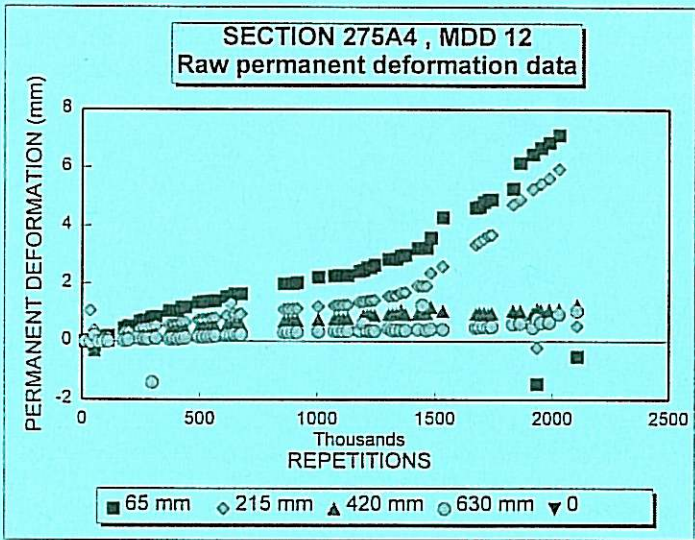
Level	Regression coefficients			
	a	b	m	Correlation
0 mm	0	0.00E+00	0.00E+00	0.00000
180 mm	0.45	5.00E-06	4.80E-07	0.93971
330 mm	0.18	2.00E-05	4.20E-07	0.98711
480 mm	0.22	7.00E-06	3.00E-07	0.98618
630 mm	0.04	9.00E-06	1.60E-07	0.95824

SECTION 275A4 , MDD 8
Structural layer deformation



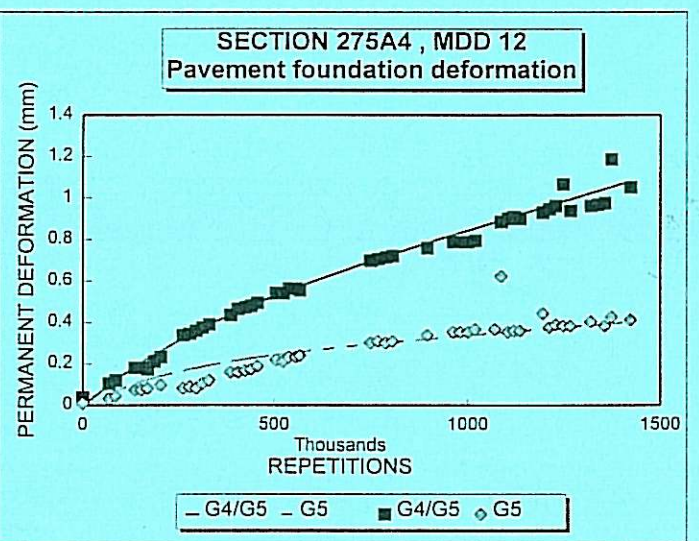
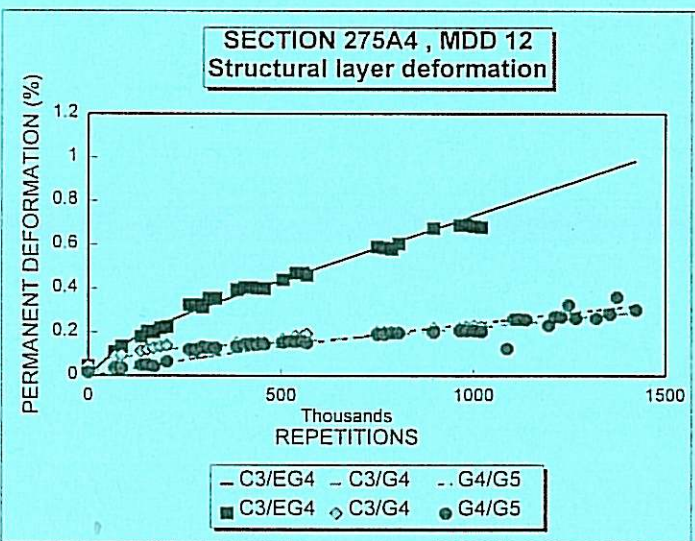
SECTION 275A4 , MDD 8
Pavement foundation deformation

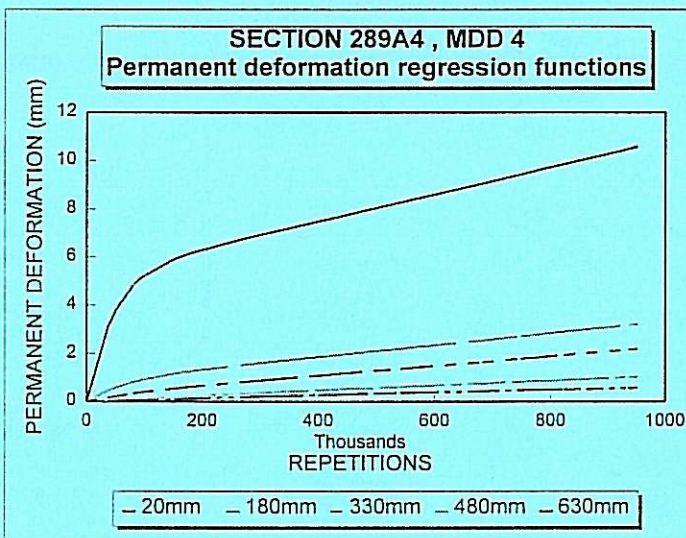
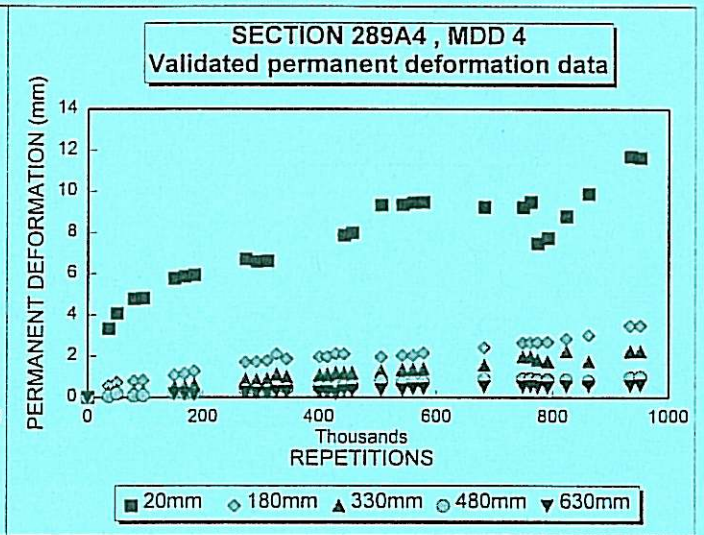
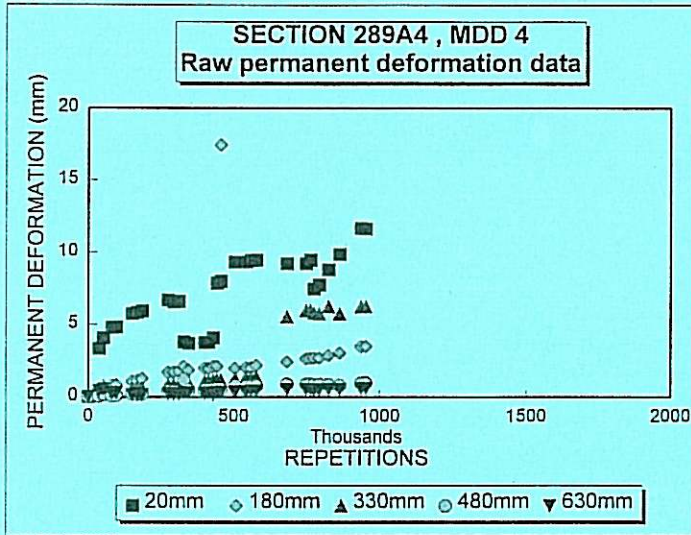




SECTION 275A4 , MDD 12

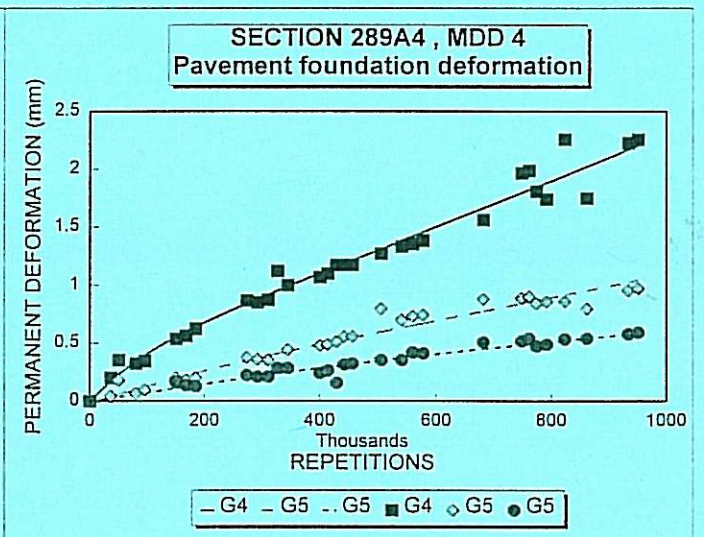
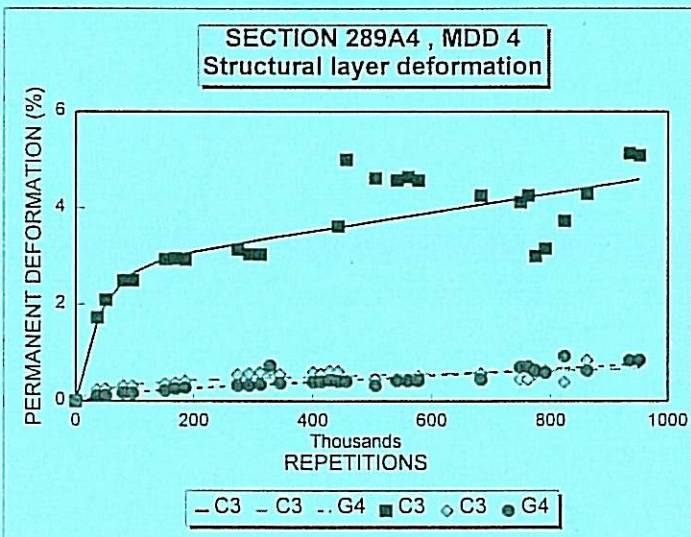
Level	Regression coefficients			
	a	b	m	Correlation
65 mm	0.61	1.18E-05	1.79E-06	0.99191
215 mm	0.4	1.04E-05	9.00E-07	0.98623
420 mm	0.3	5.00E-06	5.50E-07	0.98514
630 mm	0.19	5.00E-06	1.50E-07	0.83351
0	0	0.00E+00	0.00E+00	0.00000

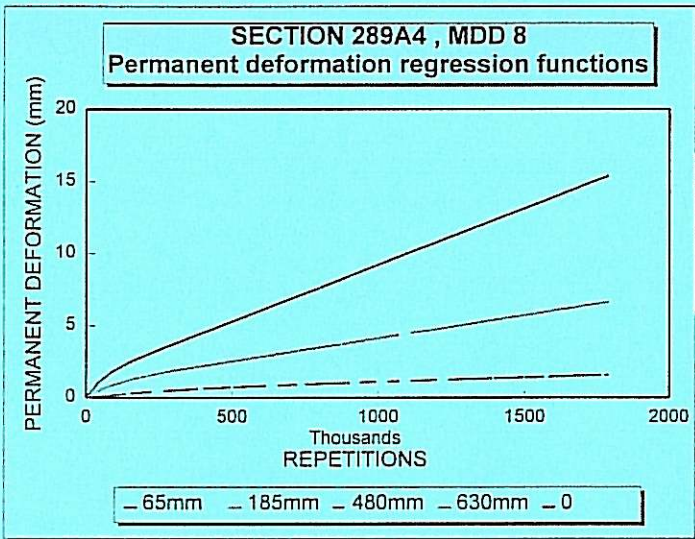
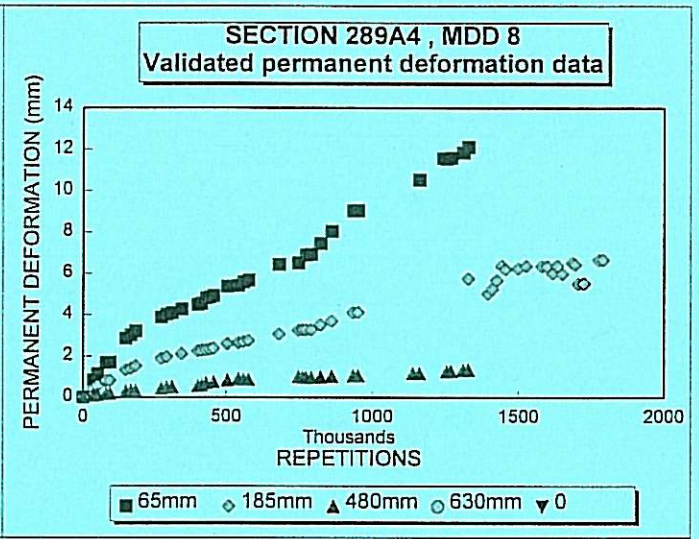
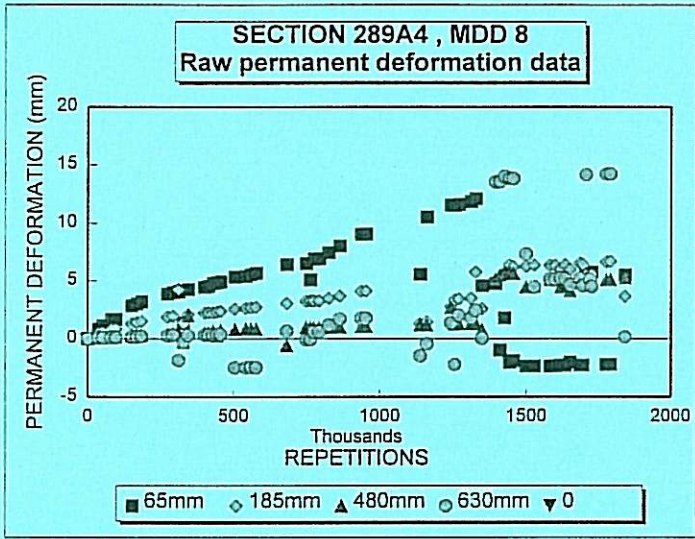




SECTION 289A4 , MDD 4

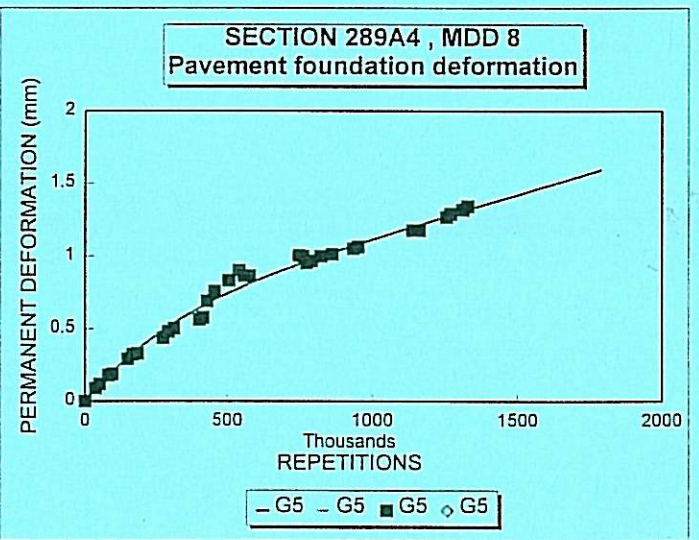
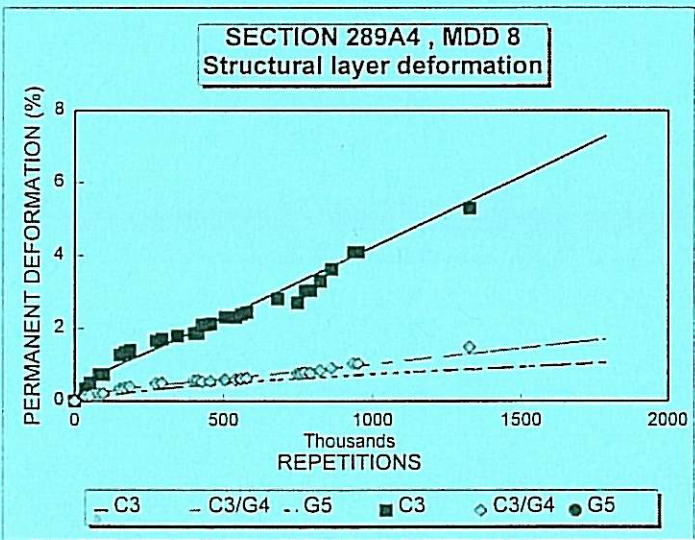
Level	Regression coefficients			Correlation
	a	b	m	
20mm	5.25	2.33E-05	5.61E-06	0.90141
180mm	0.89	1.81E-05	2.46E-06	0.96677
330mm	0.3	1.75E-05	2.00E-06	0.97154
480mm	0.1	1.05E-05	9.90E-07	0.95246
630mm	0.18	4.10E-06	4.40E-07	0.93840



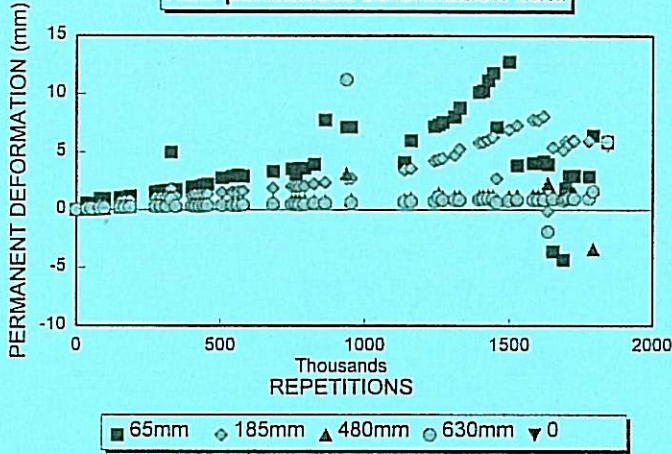


SECTION 289A4 , MDD 8

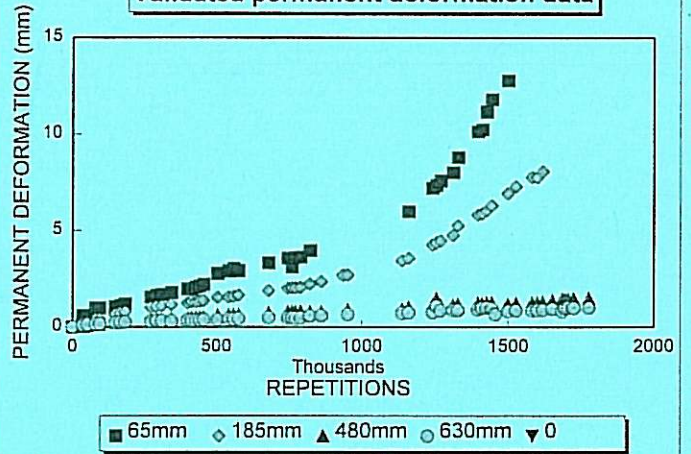
Level	Regression coefficients			
	a	b	m	Correlation
65mm	1.4	2.32E-05	7.84E-06	0.99177
185mm	0.96	1.42E-05	3.19E-06	0.97416
480mm	0.54	4.40E-06	5.90E-07	0.98770
630mm	0	0.00E+00	0.00E+00	0.00000
0	0	0.00E+00	0.00E+00	0.00000



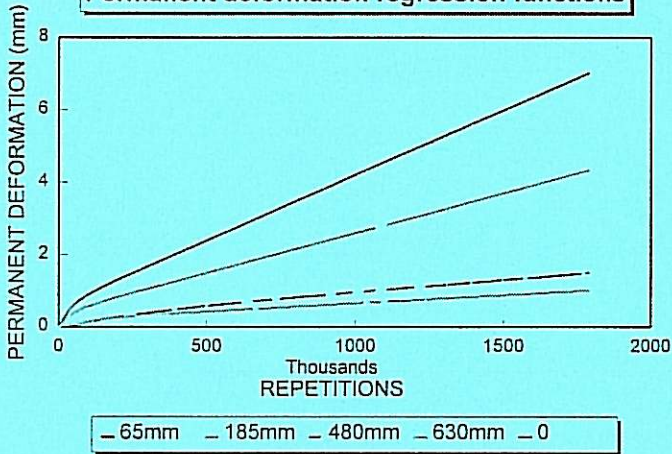
SECTION 289A4 , MDD 12
Raw permanent deformation data



SECTION 289A4 , MDD 12
Validated permanent deformation data



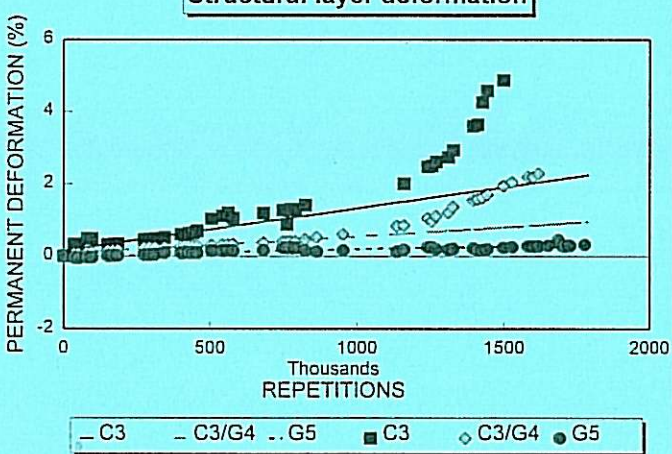
SECTION 289A4 , MDD 12
Permanent deformation regression functions



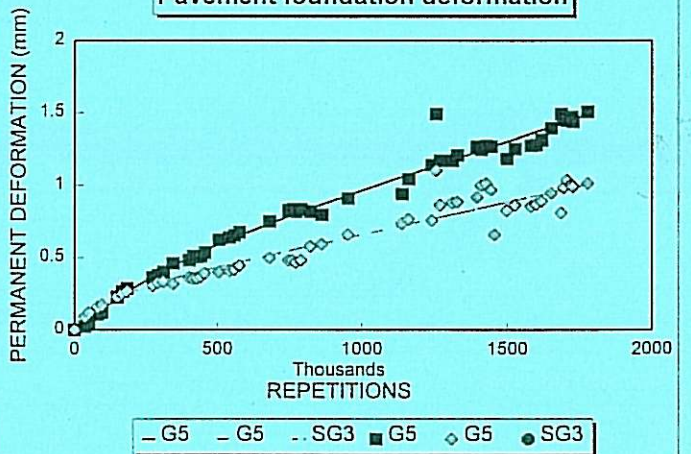
SECTION 289A4 , MDD 12

Level	Regression coefficients			
	a	b	m	Correlation
65mm	0.6	2.90E-05	3.60E-06	0.59687
185mm	0.4	2.70E-05	2.20E-06	0.57846
480mm	0.3	5.20E-06	6.70E-07	0.98099
630mm	0.21	1.04E-05	4.50E-07	0.93361
0	0	0.00E+00	0.00E+00	0.00000

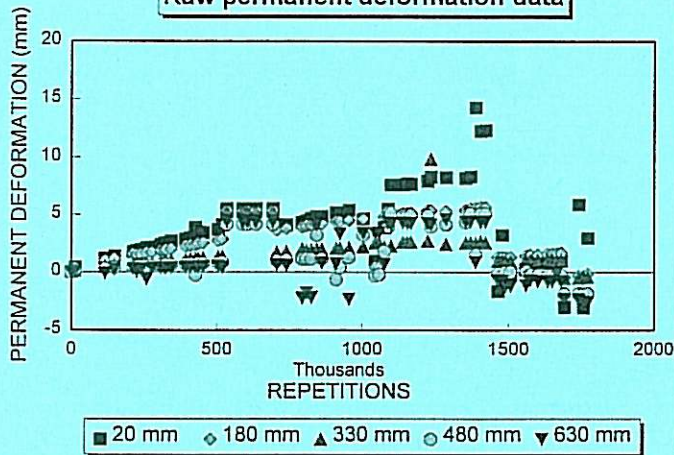
SECTION 289A4 , MDD 12
Structural layer deformation



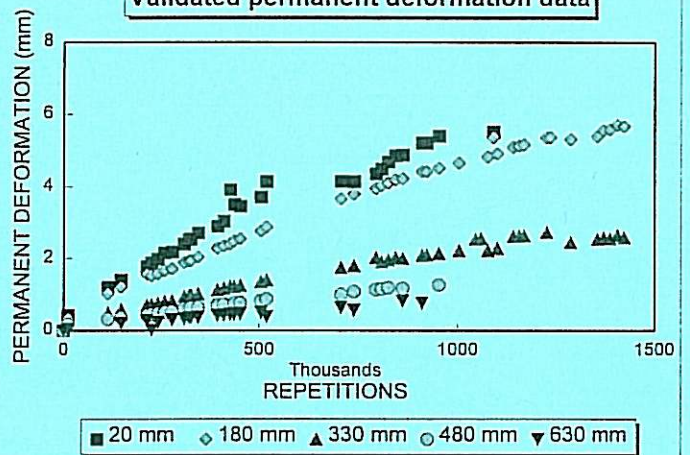
SECTION 289A4 , MDD 12
Pavement foundation deformation



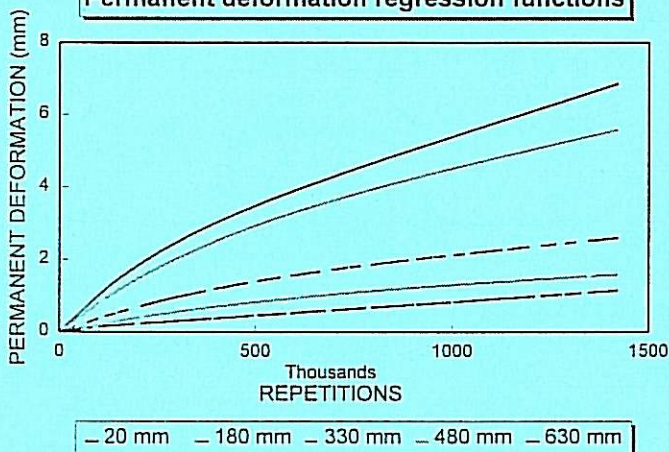
SECTION 294A4 , MDD 4
Raw permanent deformation data



SECTION 294A4 , MDD 4
Validated permanent deformation data



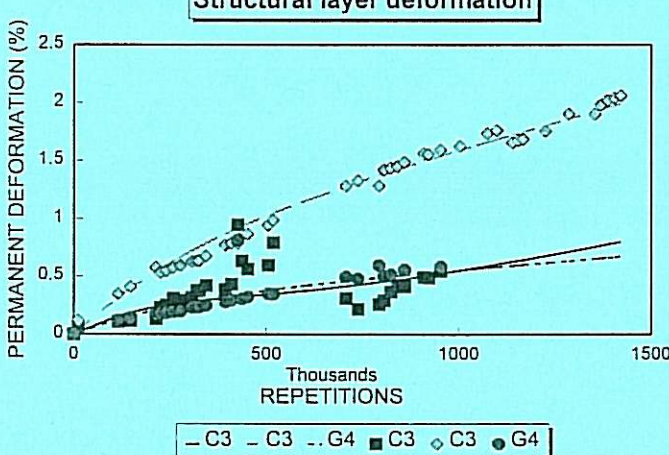
SECTION 294A4 , MDD 4
Permanent deformation regression functions



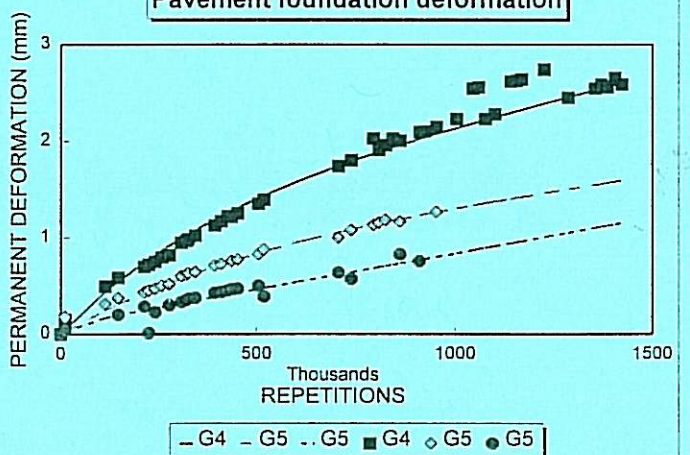
SECTION 294A4 , MDD 4

Level	Regression coefficients			
	a	b	m	Correlation
20 mm	1.94	6.00E-06	3.47E-06	0.97548
180 mm	2.2	4.00E-06	2.40E-06	0.98767
330 mm	1.2	3.50E-06	1.00E-06	0.97033
480 mm	0.83	2.80E-06	5.60E-07	0.98579
630 mm	0.09	2.80E-05	7.50E-07	0.89695

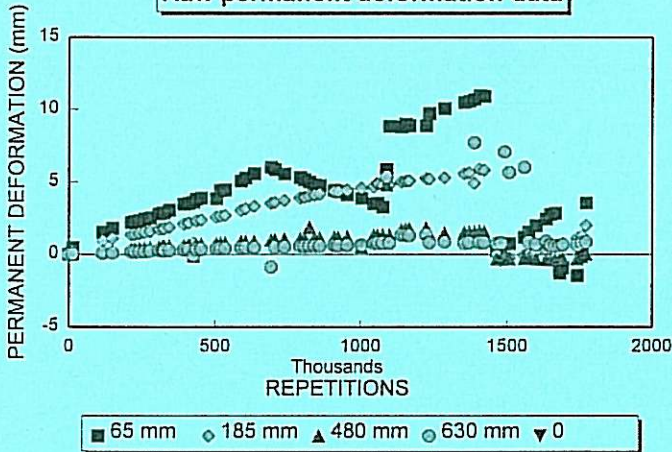
SECTION 294A4 , MDD 4
Structural layer deformation



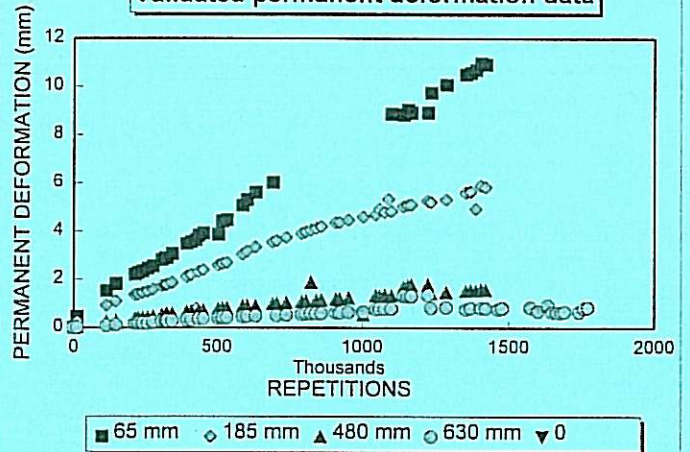
SECTION 294A4 , MDD 4
Pavement foundation deformation



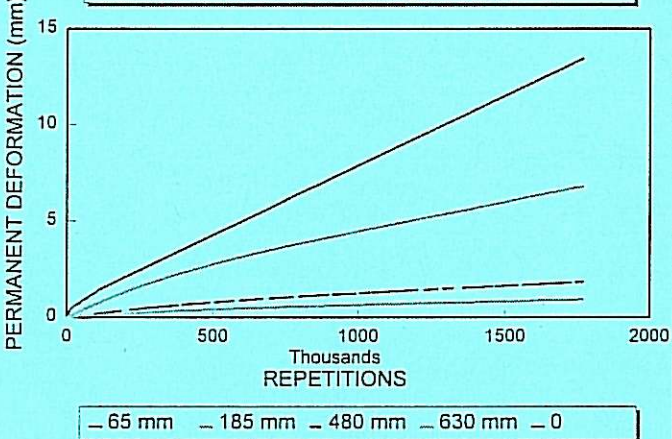
SECTION 294A4 , MDD 8
Raw permanent deformation data



SECTION 294A4 , MDD 8
Validated permanent deformation data



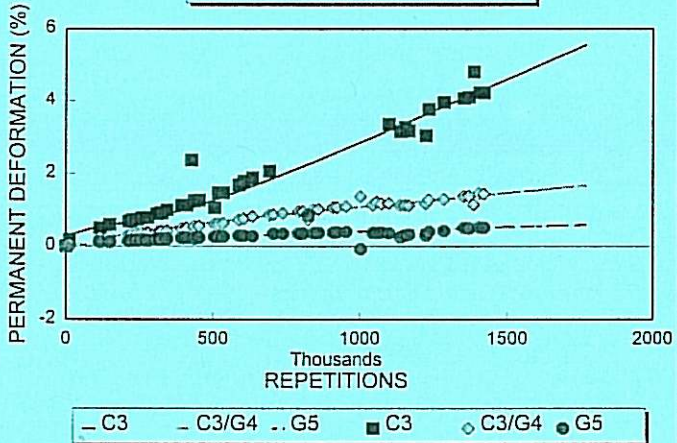
SECTION 294A4 , MDD 8
Permanent deformation regression functions



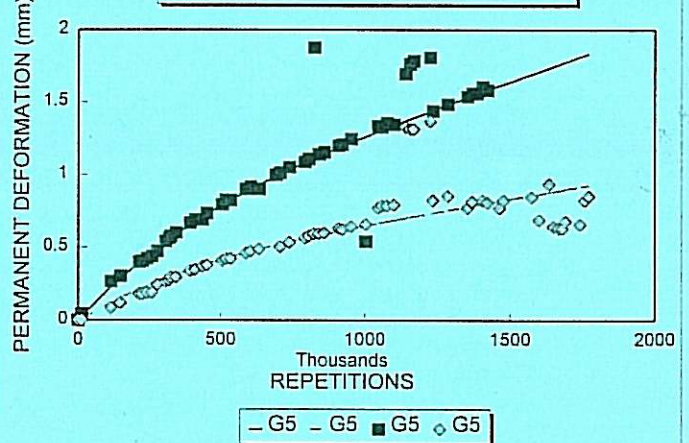
SECTION 294A4 , MDD 8

Level	Regression coefficients			
	a	b	m	Correlation
65 mm	0.65	8.07E-05	7.25E-06	0.99721
185 mm	1.5	5.00E-06	3.00E-06	0.96710
480 mm	0.6	3.50E-06	7.00E-07	0.86022
630 mm	0.33	3.50E-06	3.40E-07	0.66287
0	0	0.00E+00	0.00E+00	0.00000

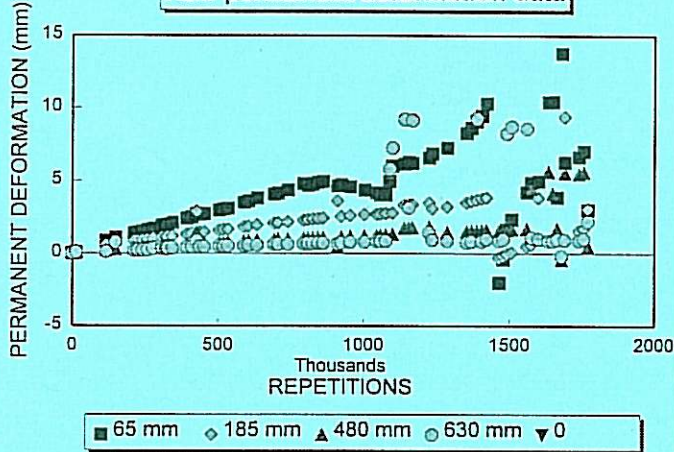
SECTION 294A4 , MDD 8
Structural layer deformation



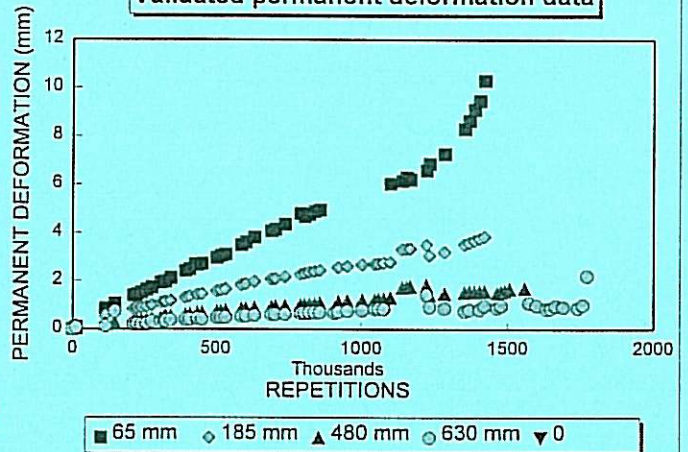
SECTION 294A4 , MDD 8
Pavement foundation deformation



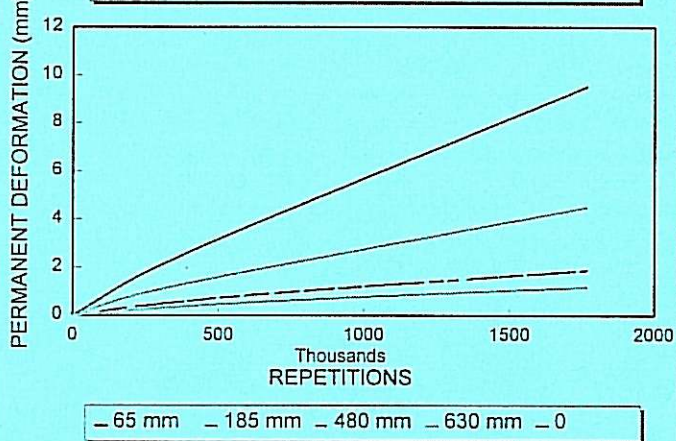
SECTION 294A4 , MDD 12
Raw permanent deformation data



SECTION 294A4 , MDD 12
Validated permanent deformation data



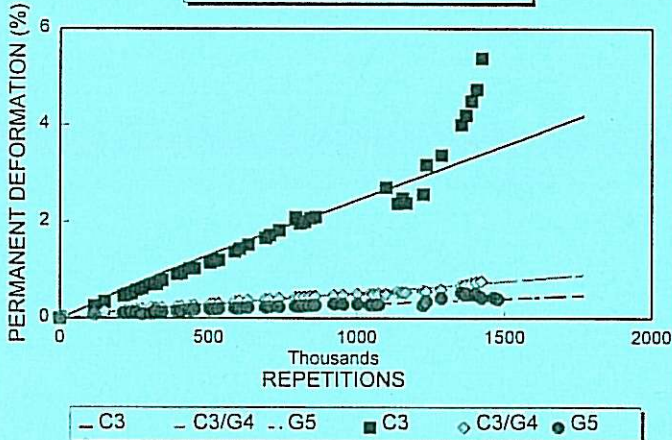
SECTION 294A4 , MDD 12
Permanent deformation regression functions



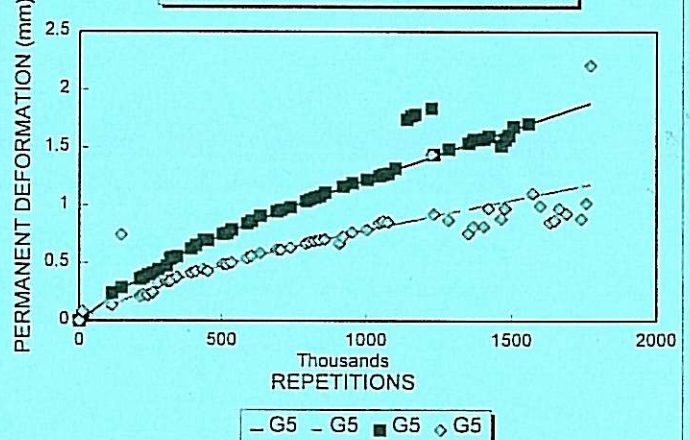
SECTION 294A4 , MDD 12

Level	Regression coefficients			
	a	b	m	Correlation
65 mm	0.7	1.00E-05	5.00E-06	0.95067
185 mm	0.48	9.70E-06	2.28E-06	0.99020
480 mm	0.38	5.00E-06	8.50E-07	0.94665
630 mm	0.3	4.00E-06	5.00E-07	0.69214
0	0	0.00E+00	0.00E+00	0.00000

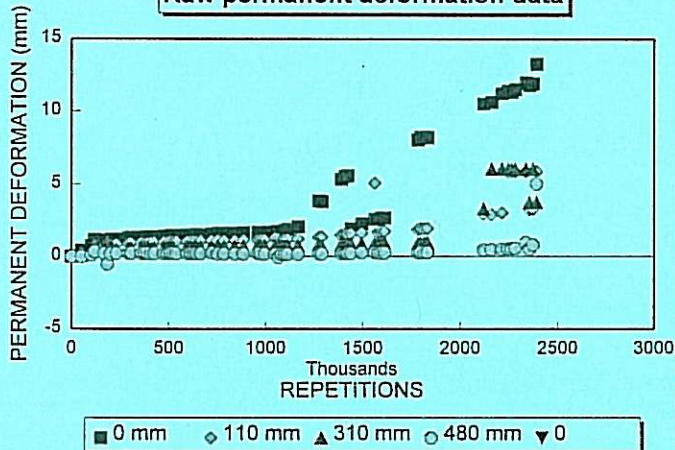
SECTION 294A4 , MDD 12
Structural layer deformation



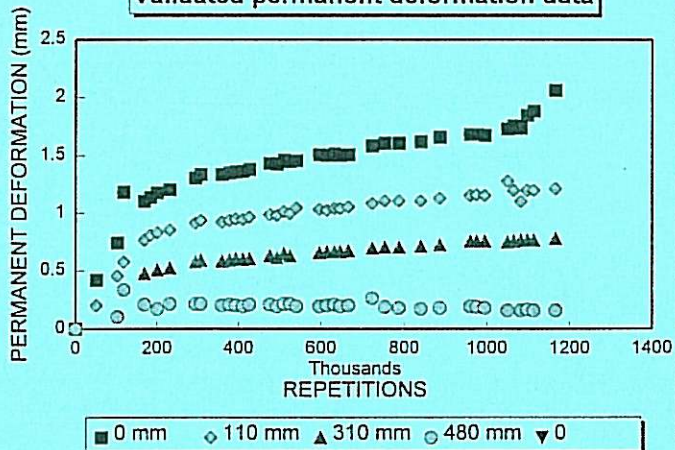
SECTION 294A4 , MDD 12
Pavement foundation deformation



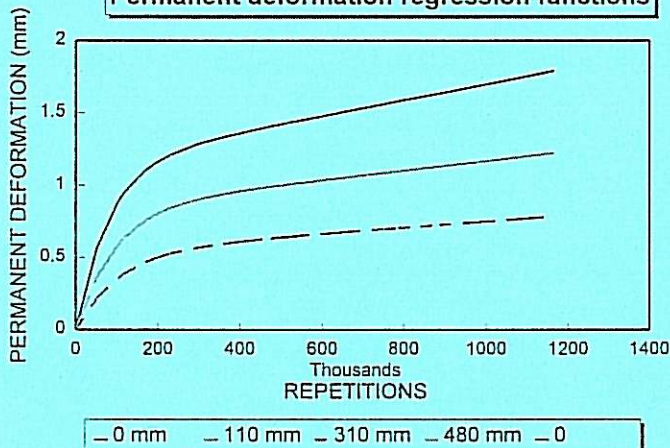
SECTION 306A4 , MDD 4
Raw permanent deformation data



SECTION 306A4 , MDD 4
Validated permanent deformation data



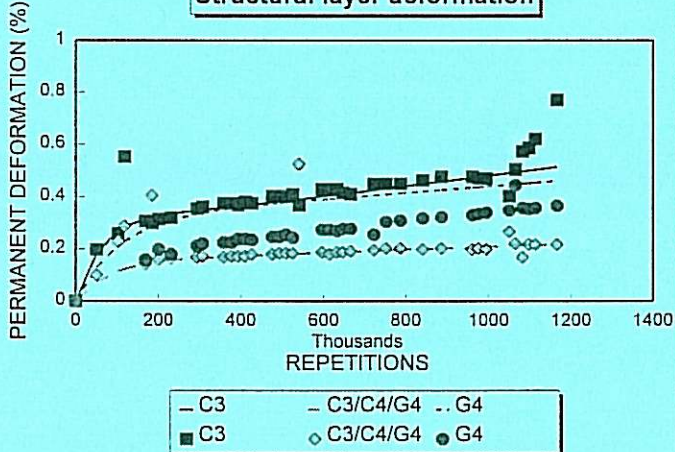
SECTION 306A4 , MDD 4
Permanent deformation regression functions



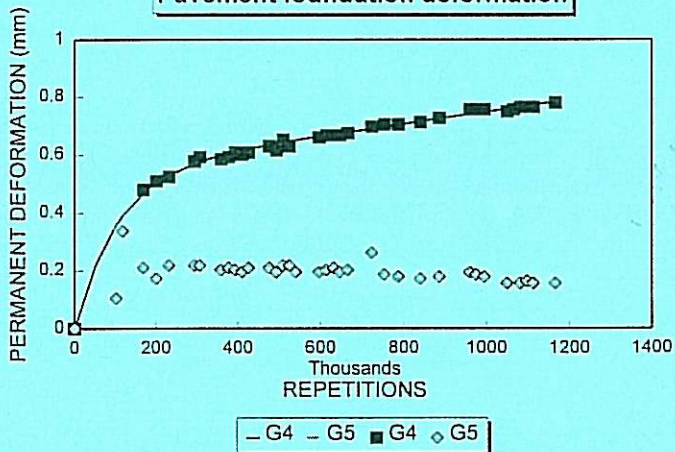
SECTION 306A4 , MDD 4

Level	Regression coefficients			Correlation
	a	b	m	
0 mm	1.15	1.30E-05	5.50E-07	0.96202
110 mm	0.84	1.10E-05	3.30E-07	0.97194
310 mm	0.54	1.00E-05	2.10E-07	0.99501
480 mm	0	0.00E+00	0.00E+00	0.00000
0	0	0.00E+00	0.00E+00	0.00000

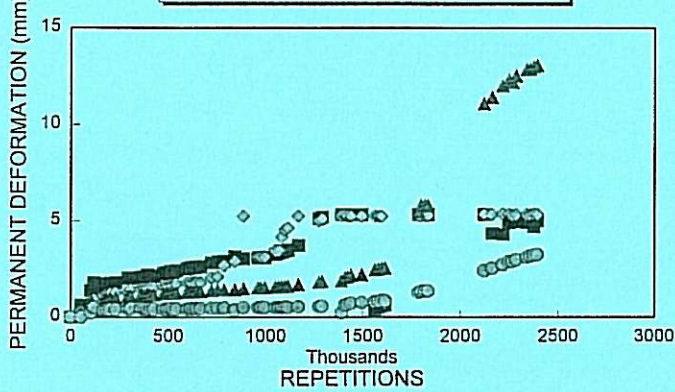
SECTION 306A4 , MDD 4
Structural layer deformation



SECTION 306A4 , MDD 4
Pavement foundation deformation

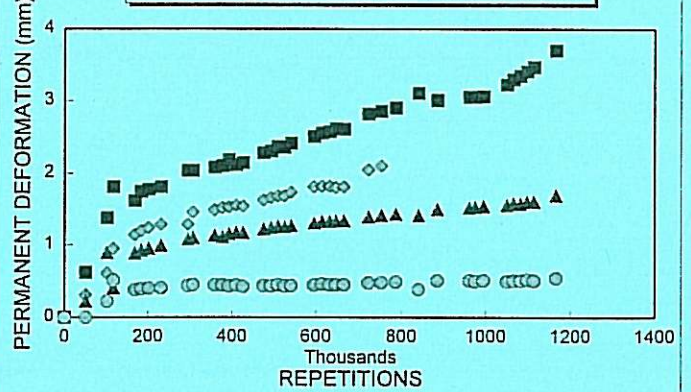


SECTION 306A4 , MDD 8
Raw permanent deformation data



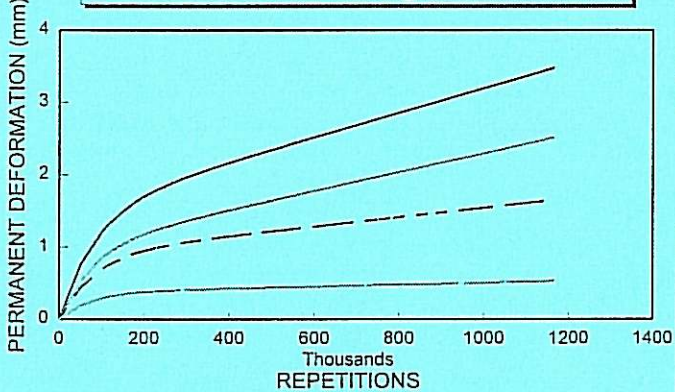
■ 0 mm ◇ 200 mm ▲ 350 mm ○ 600 mm ▼ 0

SECTION 306A4 , MDD 8
Validated permanent deformation data



■ 0 mm ◇ 200 mm ▲ 350 mm ○ 600 mm ▼ 0

SECTION 306A4 , MDD 8
Permanent deformation regression functions

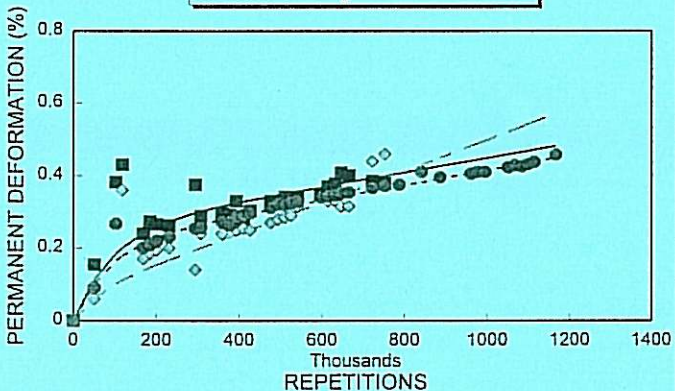


— 0 mm — 200 mm — 350 mm — 600 mm — 0

SECTION 306A4 , MDD 8

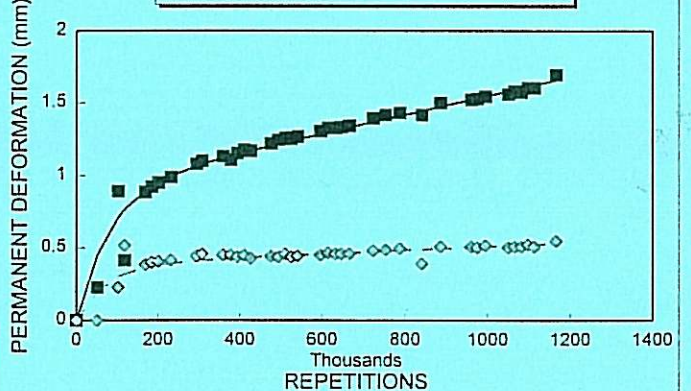
Level	Regression coefficients			
	a	b	m	Correlation
0 mm	1.5	1.30E-05	1.70E-06	0.97905
200 mm	1	1.40E-05	1.30E-06	0.97187
350 mm	0.9	1.30E-05	6.50E-07	0.95671
600 mm	0.38	1.40E-05	1.30E-07	0.80211
0	0	0.00E+00	0.00E+00	0.00000

SECTION 306A4 , MDD 8
Structural layer deformation



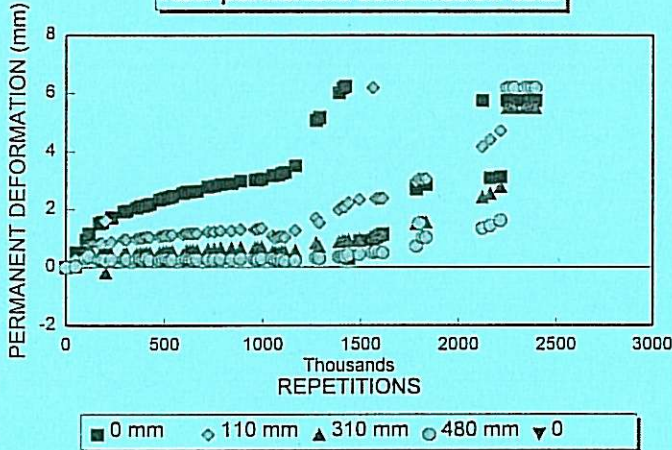
— C3 — C4/G4 — G4/G5 ■ C3 ◇ C4/G4 ● G4/G5

SECTION 306A4 , MDD 8
Pavement foundation deformation

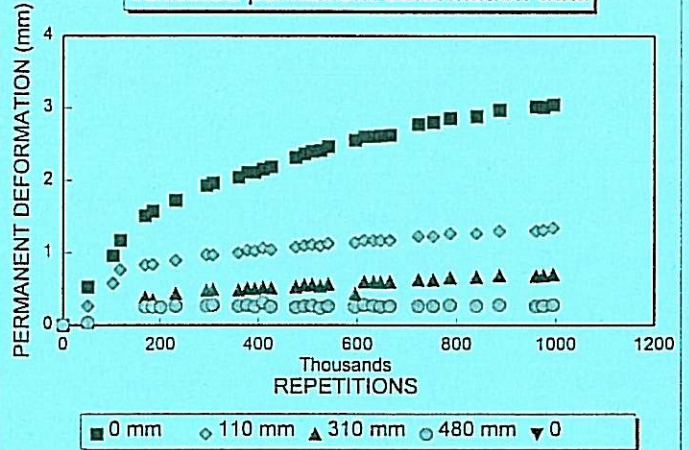


— G4/G5 — G5 ■ G4/G5 ◇ G5

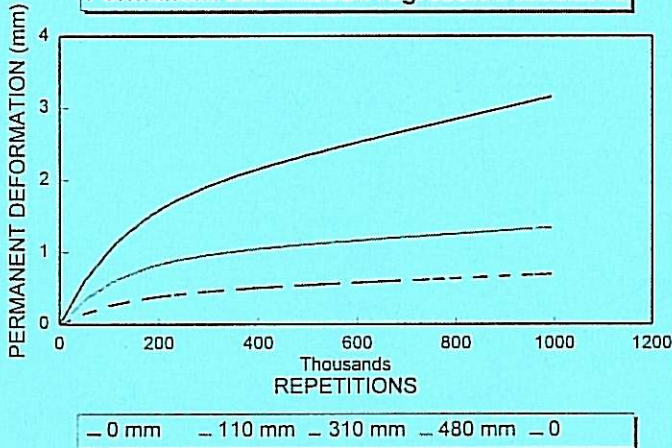
SECTION 306A4 , MDD 12
Raw permanent deformation data



SECTION 306A4 , MDD 12
Validated permanent deformation data



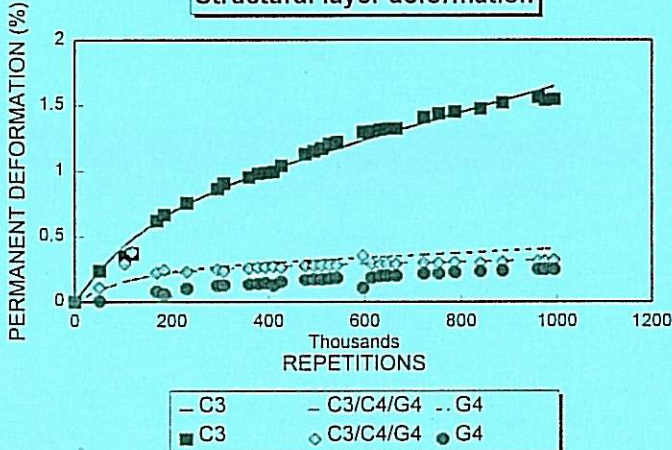
SECTION 306A4 , MDD 12
Permanent deformation regression functions



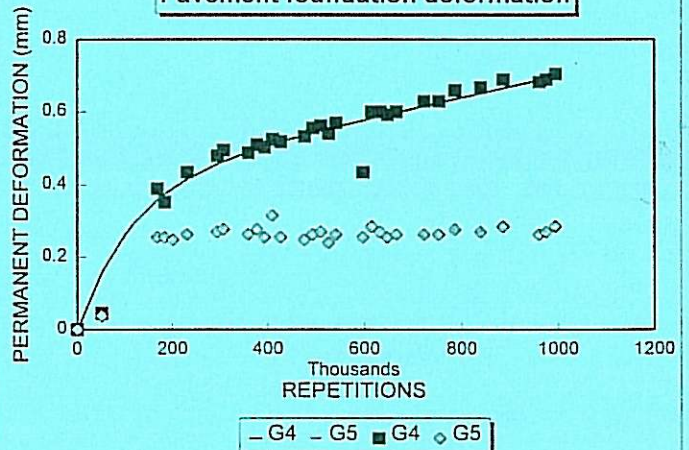
SECTION 306A4 , MDD 12

Level	Regression coefficients			
	a	b	m	Correlation
0 mm	1.58	9.10E-06	1.59E-06	0.99511
110 mm	0.89	9.40E-06	4.60E-07	0.98675
310 mm	0.4	9.40E-06	3.00E-07	0.94923
480 mm	0	0.00E+00	0.00E+00	0.00000
0	0	0.00E+00	0.00E+00	0.00000

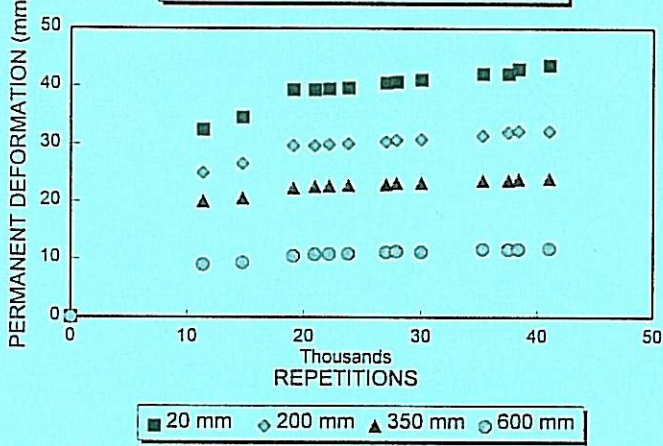
SECTION 306A4 , MDD 12
Structural layer deformation



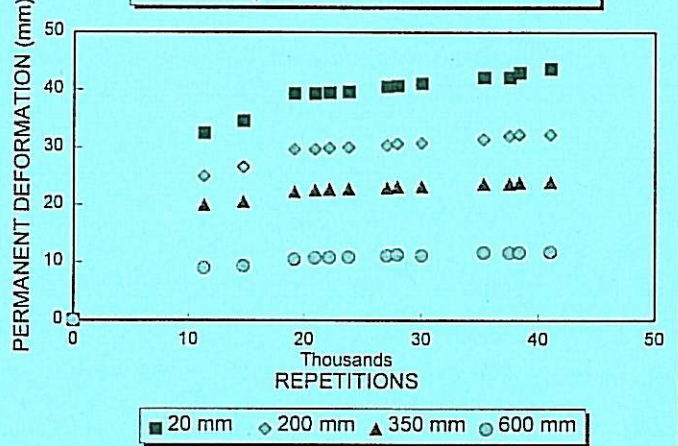
SECTION 306A4 , MDD 12
Pavement foundation deformation



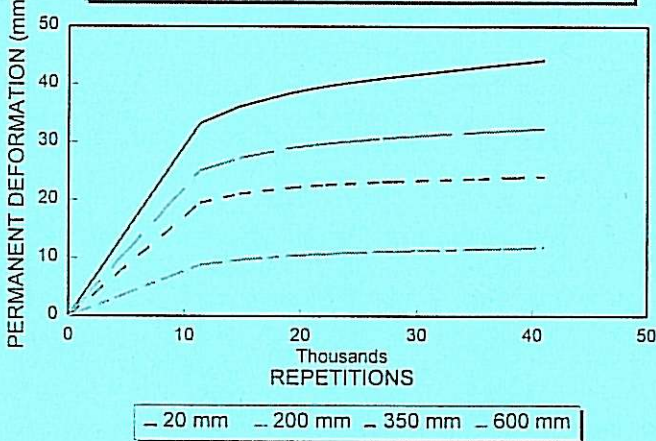
SECTION 309A4 , MDD 6
Raw permanent deformation data



SECTION 309A4 , MDD 6
Validated permanent deformation data



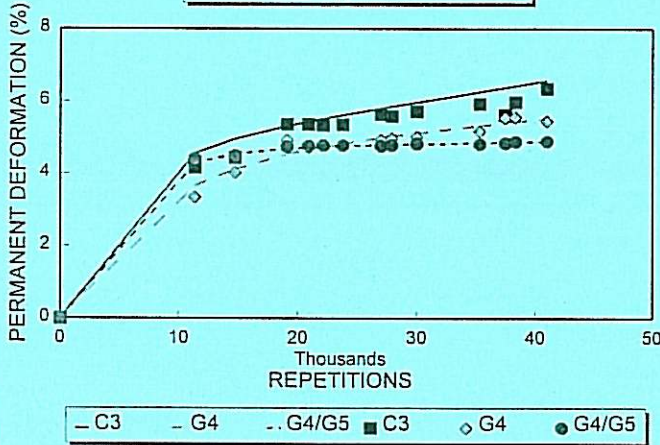
SECTION 309A4 , MDD 6
Permanent deformation regression functions



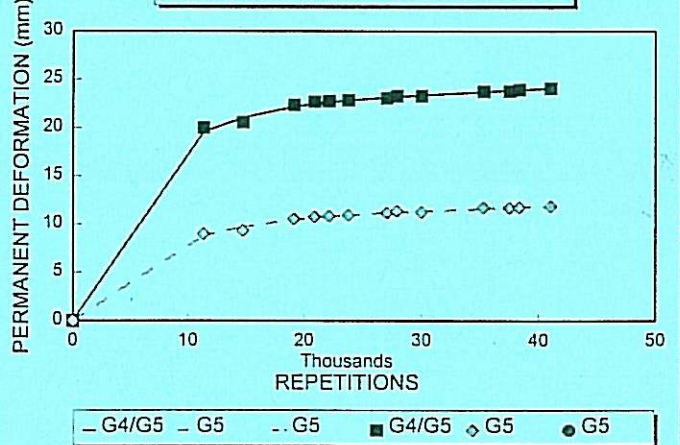
SECTION 309A4 , MDD 6

Level	Regression coefficients			
	a	b	m	Correlation
20 mm	36	1.80E-04	2.00E-04	0.99485
200 mm	28.2	1.70E-04	1.02E-04	0.99847
350 mm	21.9	1.80E-04	5.30E-05	0.99888
600 mm	10.4	1.50E-04	3.60E-05	0.99803
	0	0.00E+00	0.00E+00	0.00000

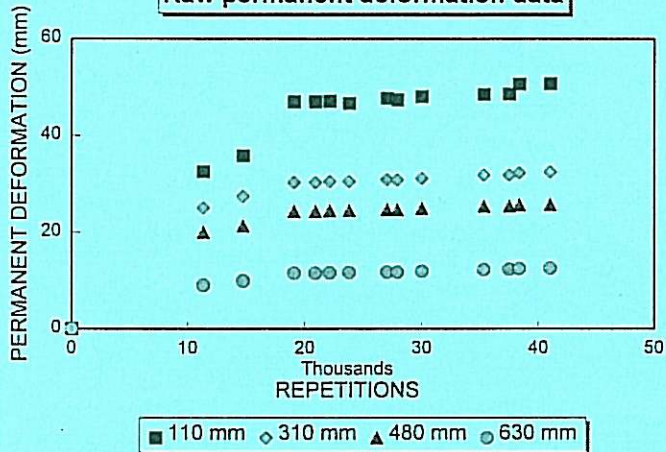
SECTION 309A4 , MDD 6
Structural layer deformation



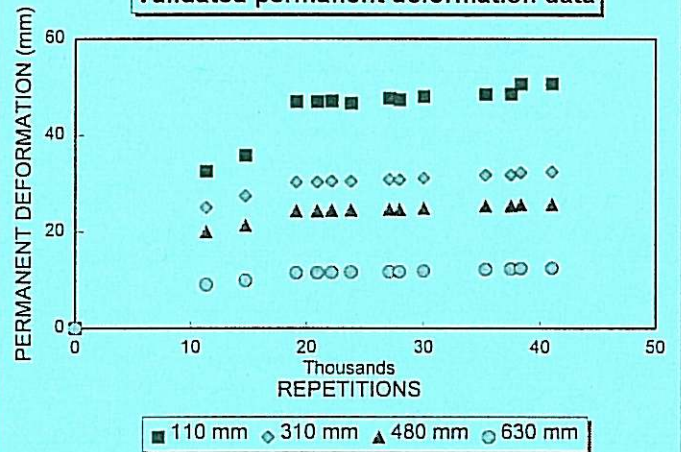
SECTION 309A4 , MDD 6
Pavement foundation deformation



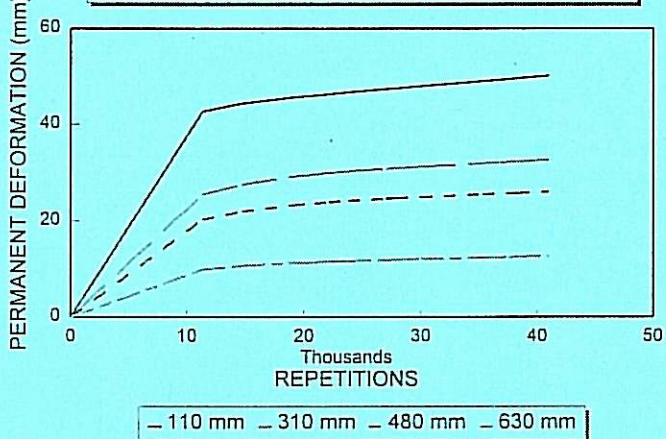
SECTION 309A4 , MDD 10
Raw permanent deformation data



SECTION 309A4 , MDD 10
Validated permanent deformation data



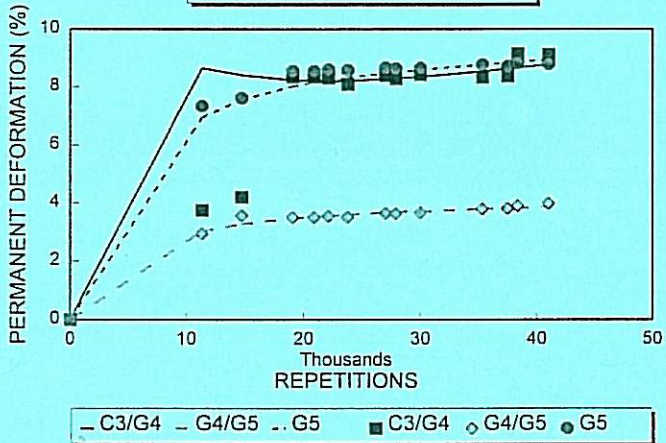
SECTION 309A4 , MDD 10
Permanent deformation regression functions



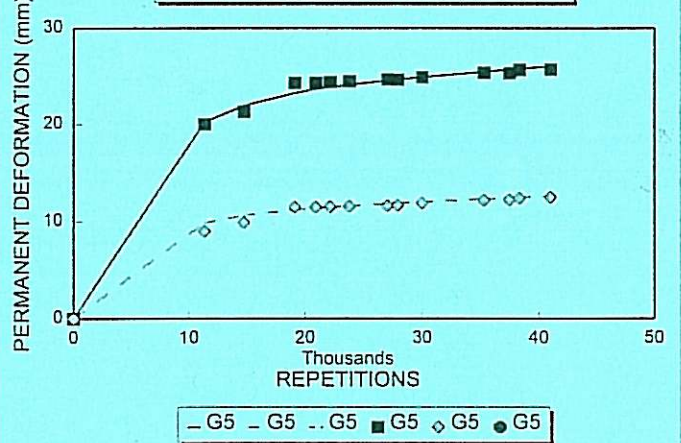
SECTION 309A4 , MDD 10

Level	Regression coefficients			
	a	b	m	Correlation
110 mm	42	3.00E-04	2.00E-04	0.92009
310 mm	28	1.80E-04	1.14E-04	0.99747
480 mm	22.3	1.80E-04	9.20E-05	0.99532
630 mm	10.6	1.90E-04	5.00E-05	0.98815
	0	0.00E+00	0.00E+00	0.00000

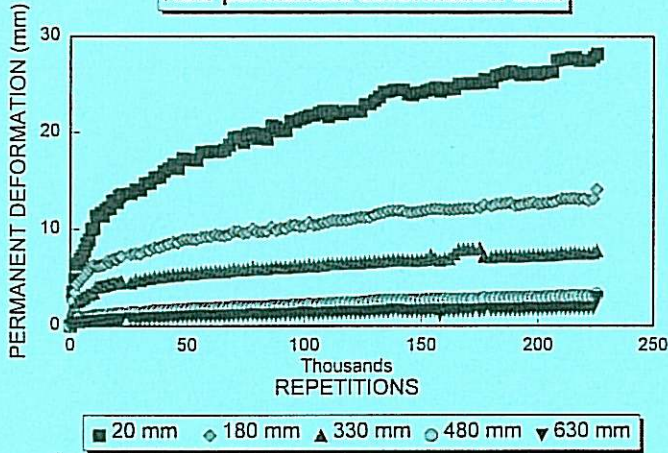
SECTION 309A4 , MDD 10
Structural layer deformation



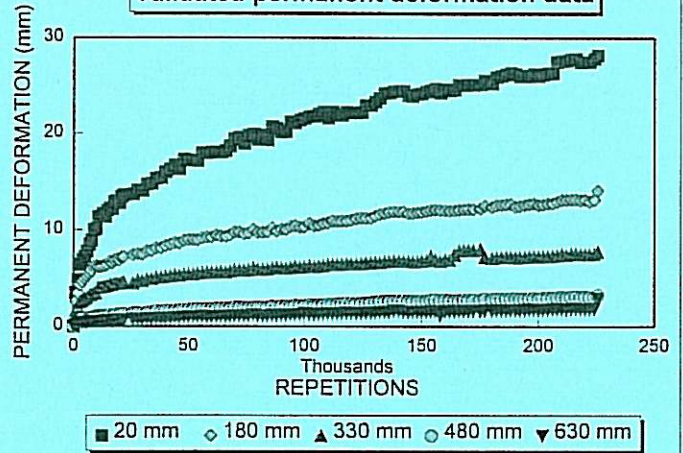
SECTION 309A4 , MDD 10
Pavement foundation deformation



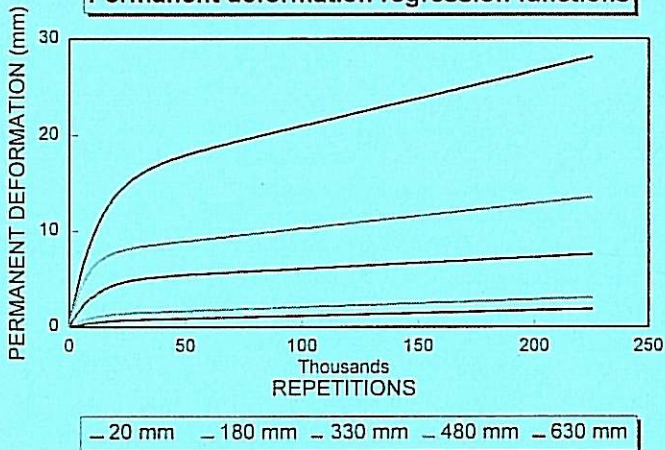
SECTION 338A4 , MDD 4
Raw permanent deformation data



SECTION 338A4 , MDD 4
Validated permanent deformation data



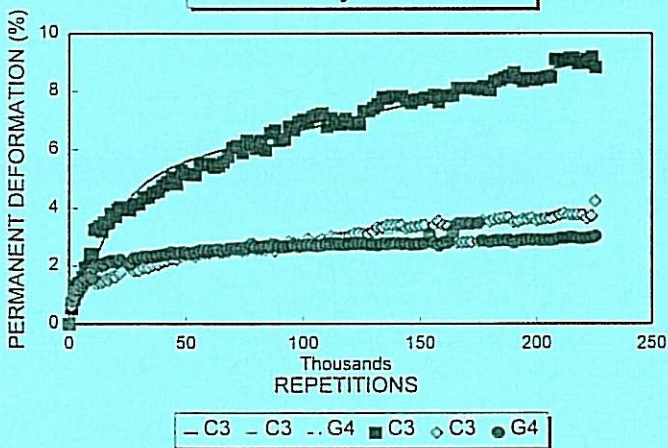
SECTION 338A4 , MDD 4
Permanent deformation regression functions



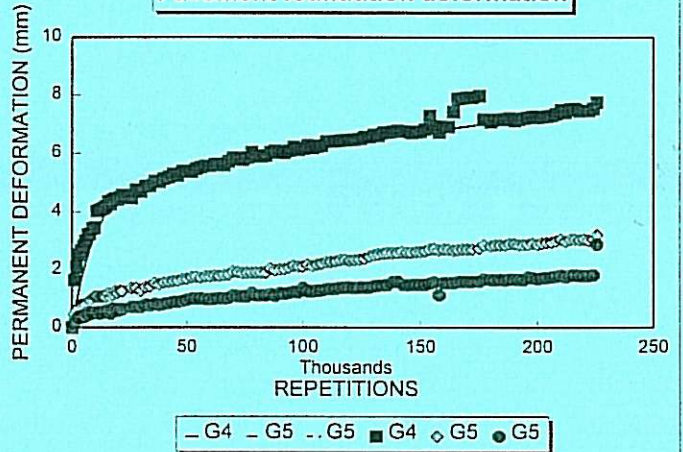
SECTION 338A4 , MDD 4

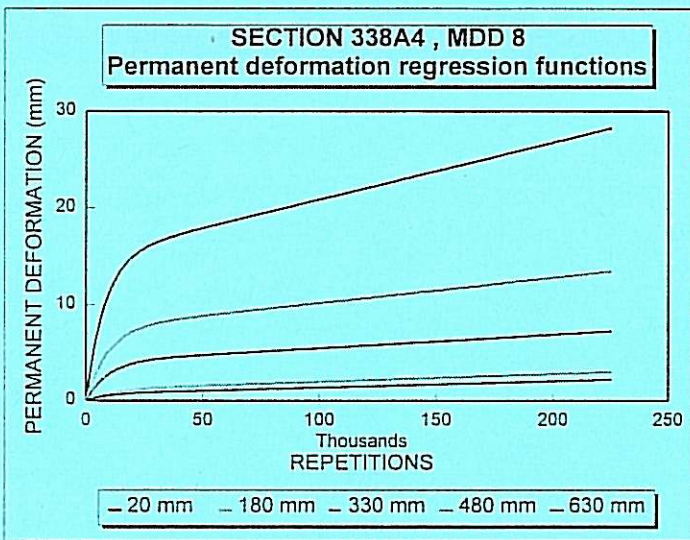
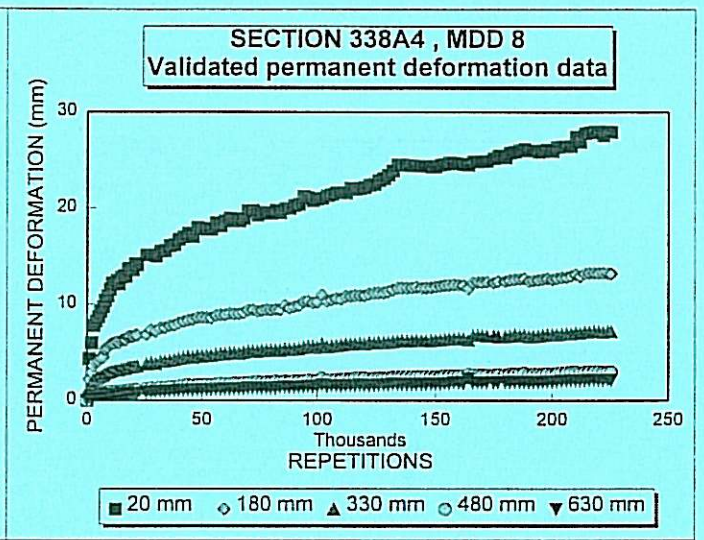
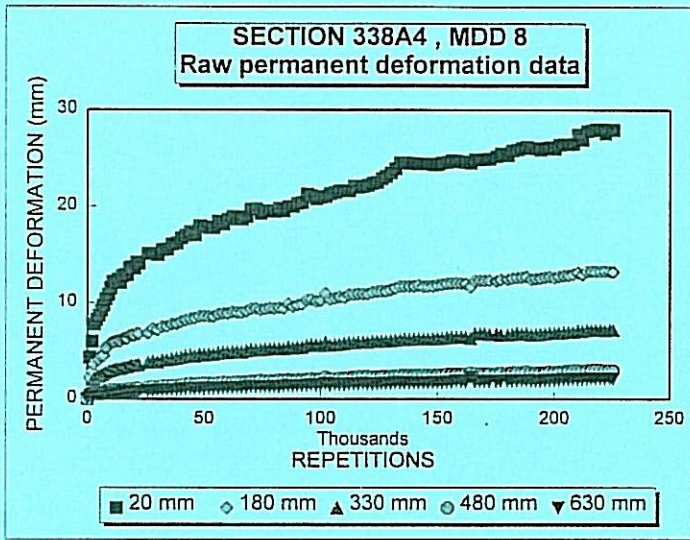
Level	Regression coefficients			Correlation
	a	b	m	
20 mm	15.3	9.00E-05	5.70E-05	0.98323
180 mm	7.7	1.50E-04	2.60E-05	0.97128
330 mm	4.9	1.00E-04	1.20E-05	0.94163
480 mm	1.3	1.30E-04	8.00E-06	0.97940
630 mm	0.65	1.10E-04	5.50E-06	0.94449

SECTION 338A4 , MDD 4
Structural layer deformation



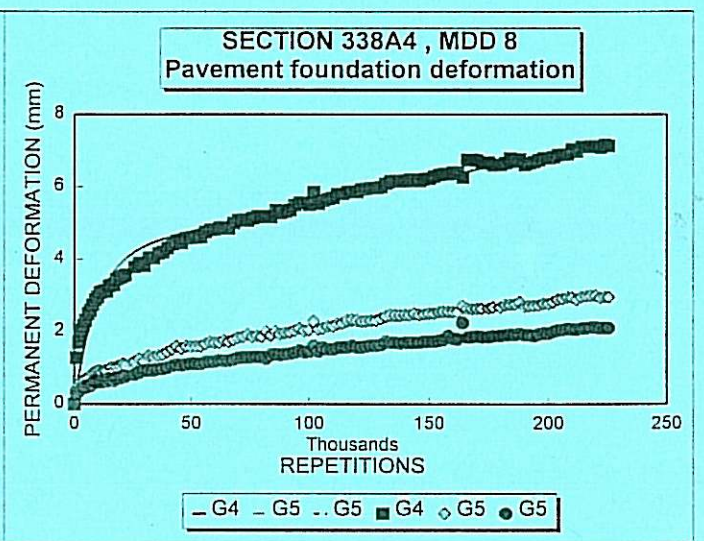
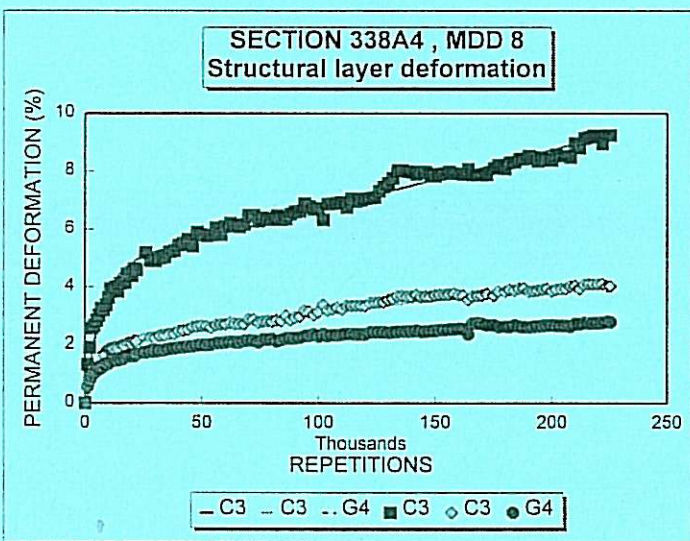
SECTION 338A4 , MDD 4
Pavement foundation deformation

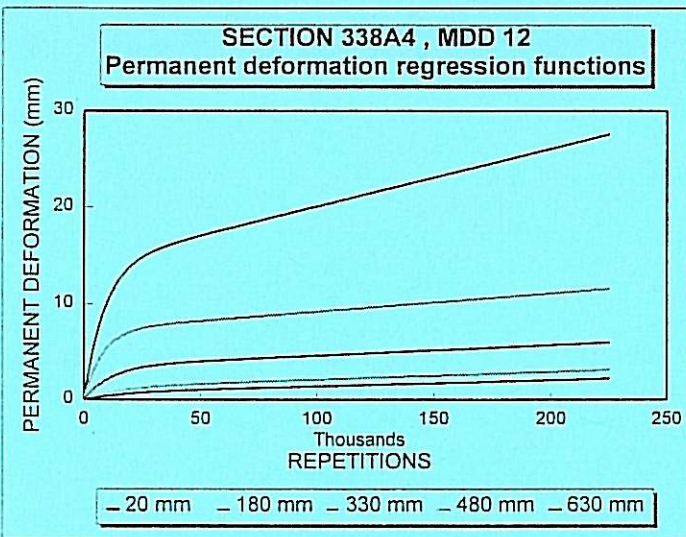
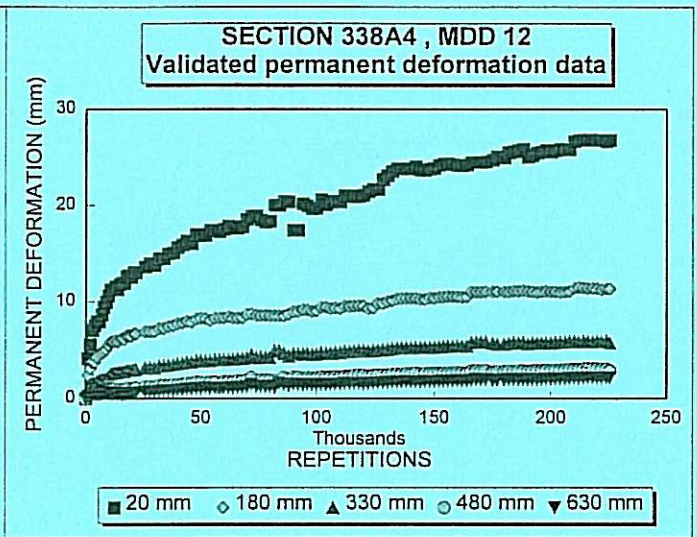
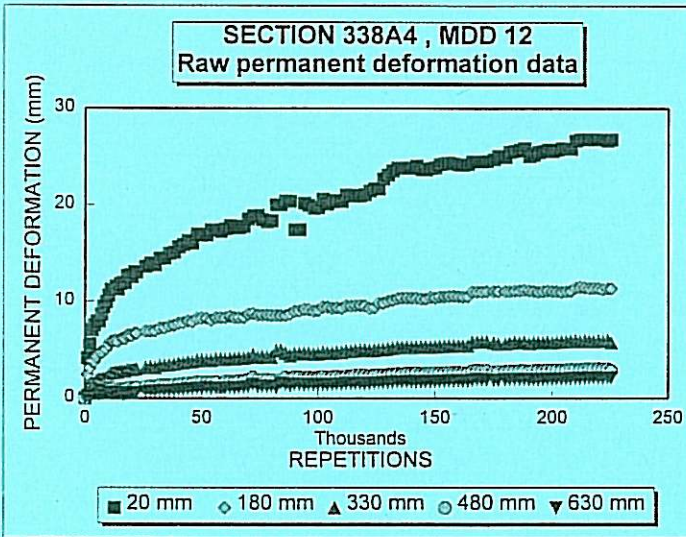




SECTION 338A4 , MDD 8

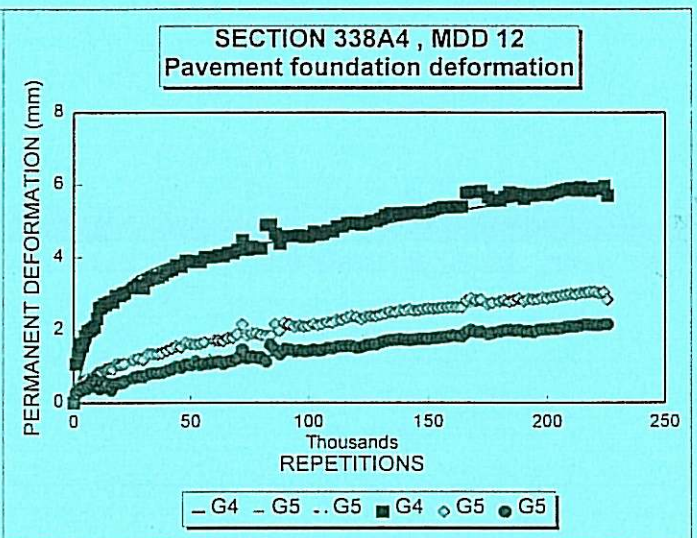
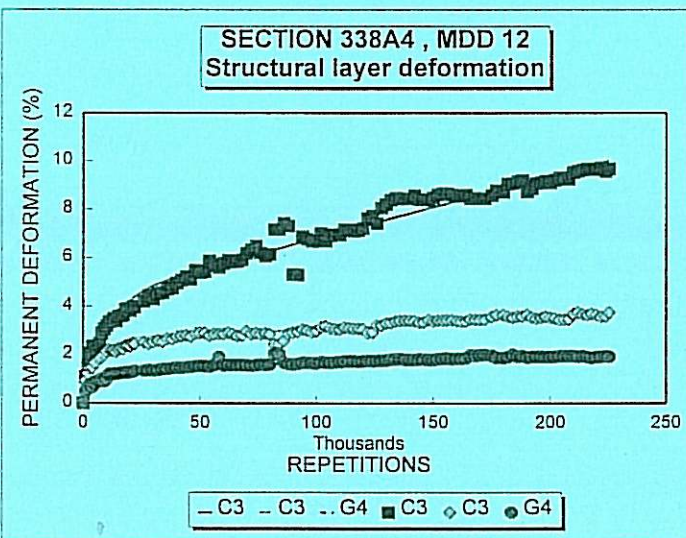
Level	Regression coefficients			
	a	b	m	Correlation
20 mm	15	1.30E-04	5.90E-05	0.98313
180 mm	7.6	1.10E-04	2.60E-05	0.97578
330 mm	4.1	1.10E-04	1.40E-05	0.97383
480 mm	1.2	1.00E-04	8.00E-06	0.97845
630 mm	0.75	1.30E-04	6.50E-06	0.97859



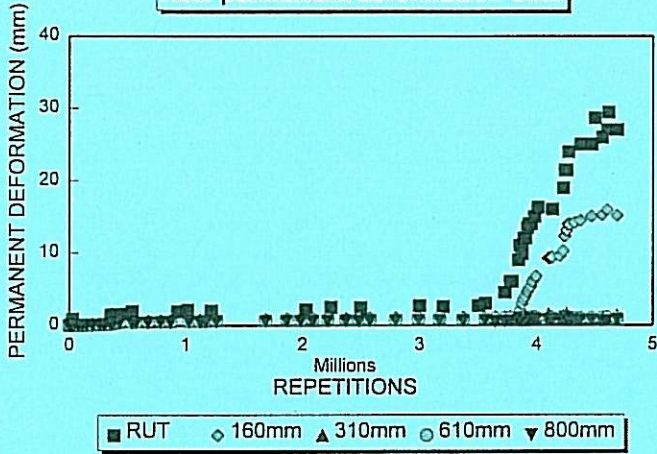


SECTION 338A4 , MDD 12

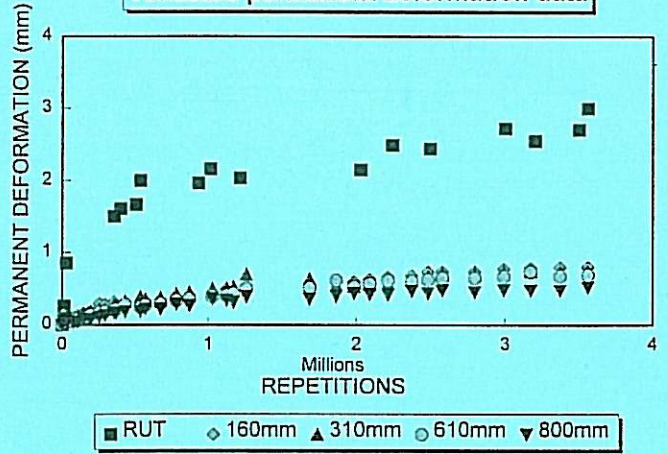
Level	Regression coefficients			
	a	b	m	Correlation
20 mm	14.1	1.20E-04	6.00E-05	0.97796
180 mm	7.3	1.30E-04	1.90E-05	0.97010
330 mm	3.5	9.00E-05	1.10E-05	0.96879
480 mm	1.3	7.00E-05	8.00E-06	0.97894
630 mm	0.75	7.00E-05	6.50E-06	0.97473



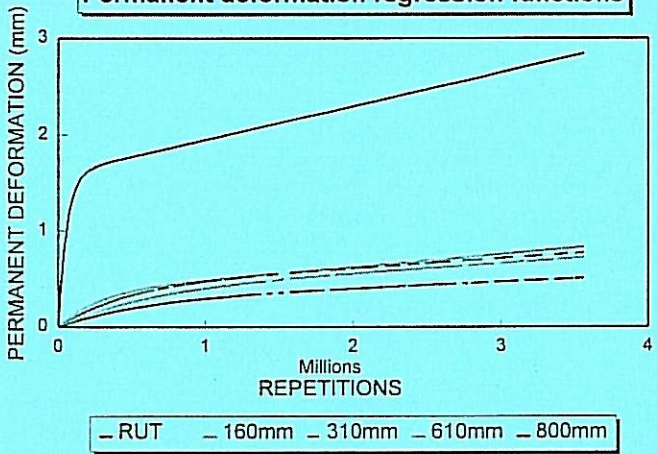
SECTION 339A4 , MDD 4
Raw permanent deformation data



SECTION 339A4 , MDD 4
Validated permanent deformation data



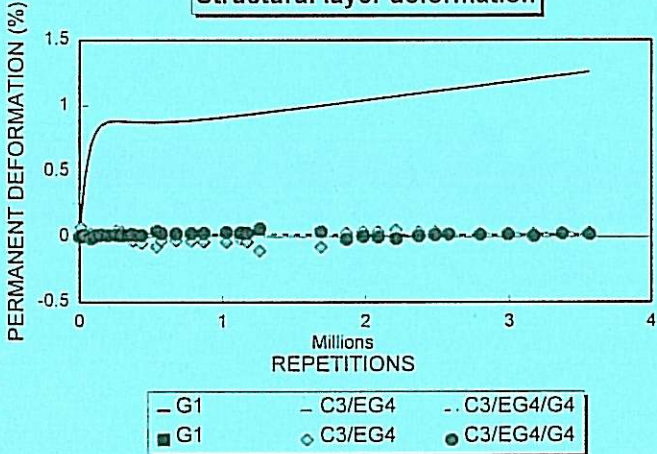
SECTION 339A4 , MDD 4
Permanent deformation regression functions



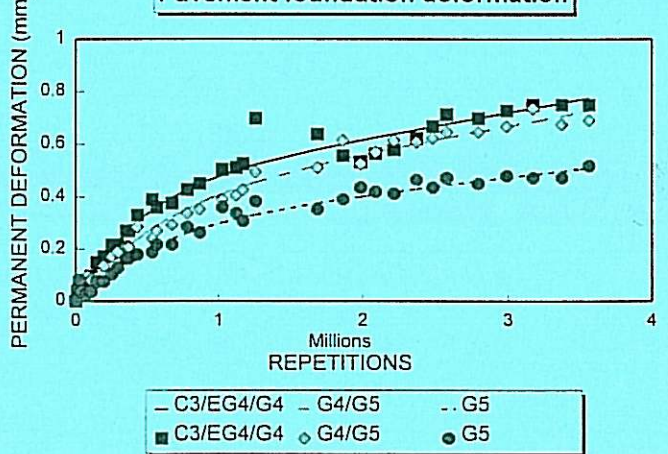
SECTION 339A4 , MDD 4

Level	Regression coefficients			
	a	b	m	Correlation
RUT	1.6	1.80E-05	3.50E-07	0.97723
160mm	0.37	4.00E-06	1.30E-07	0.95570
310mm	0.42	2.50E-06	1.00E-07	0.96864
610mm	0.37	2.00E-06	1.00E-07	0.98695
800mm	0.28	2.00E-06	6.50E-08	0.97719

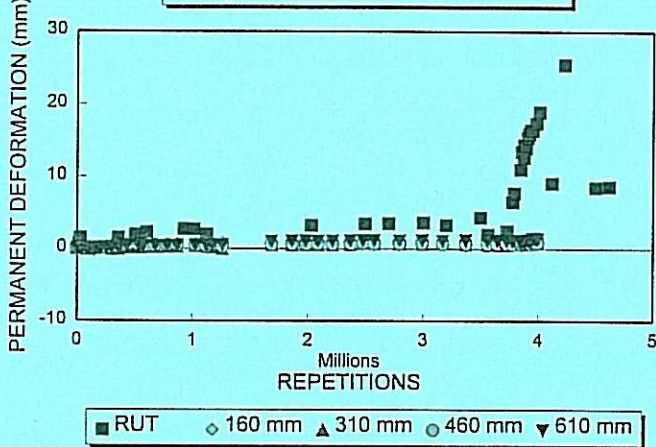
SECTION 339A4 , MDD 4
Structural layer deformation



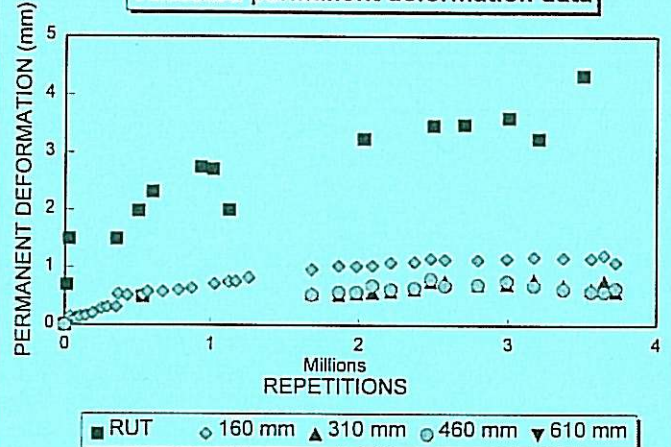
SECTION 339A4 , MDD 4
Pavement foundation deformation



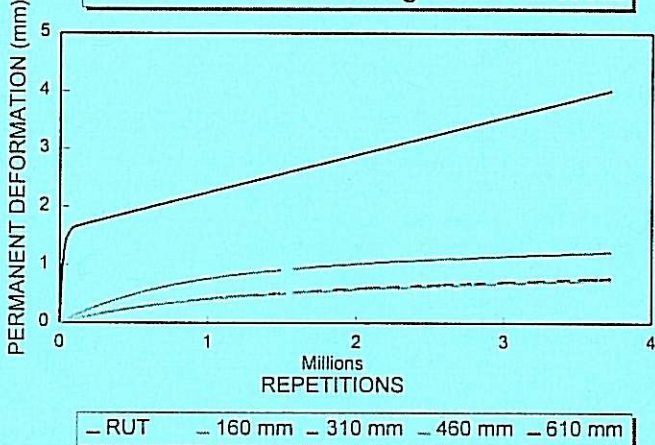
SECTION 339A4 , MDD 8
Raw permanent deformation data



SECTION 339A4 , MDD 8
Validated permanent deformation data



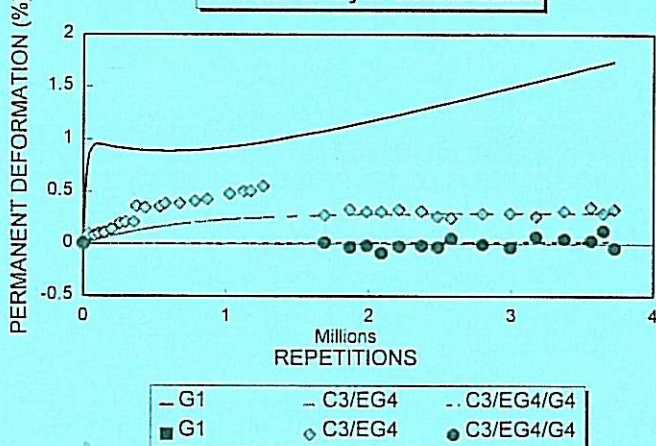
SECTION 339A4 , MDD 8
Permanent deformation regression functions



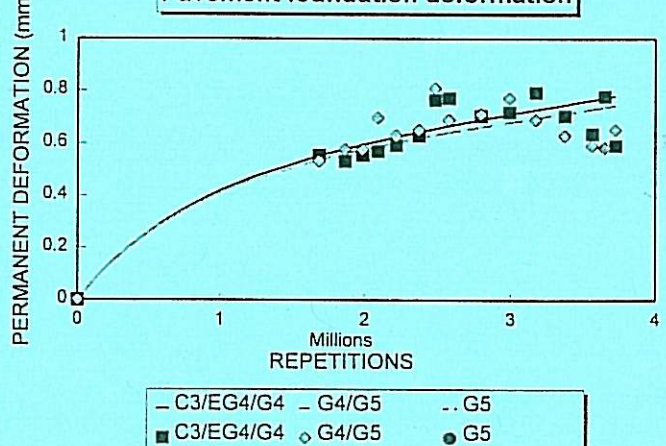
SECTION 339A4 , MDD 8

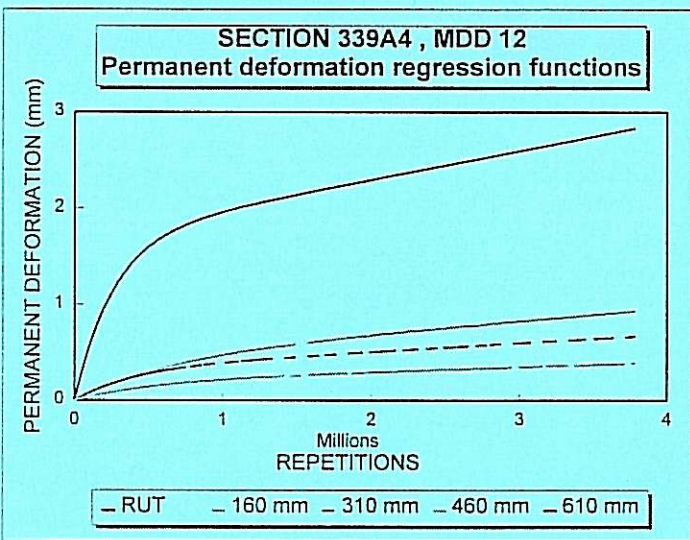
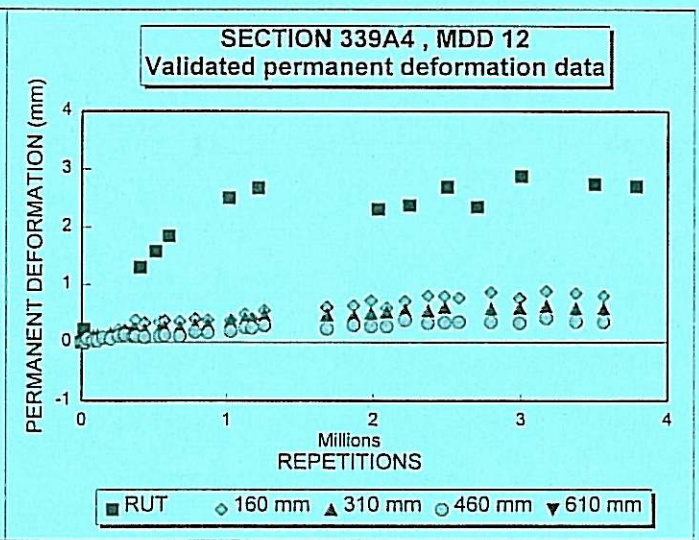
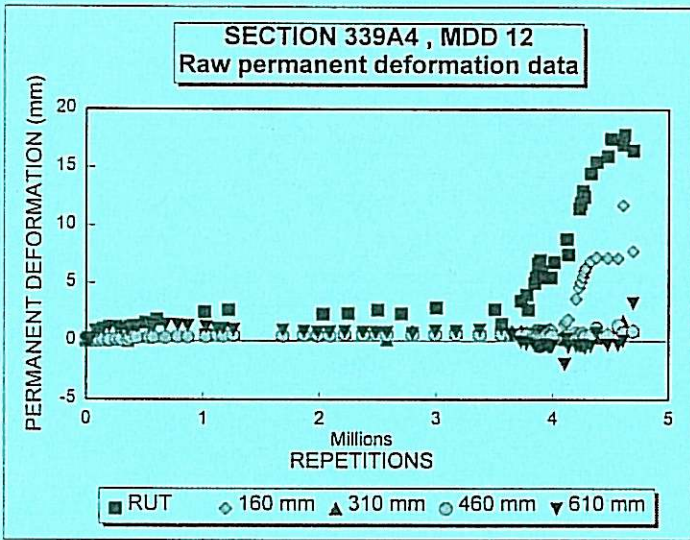
Level	Regression coefficients			
	a	b	m	Correlation
RUT	1.6	5.50E-05	6.50E-07	0.87329
160 mm	0.9	1.50E-06	9.00E-08	0.98440
310 mm	0.45	1.50E-06	9.00E-08	0.83221
460 mm	0.45	1.50E-06	8.00E-08	0.75862
610 mm	0	0.00E+00	0.00E+00	0.00000

SECTION 339A4 , MDD 8
Structural layer deformation



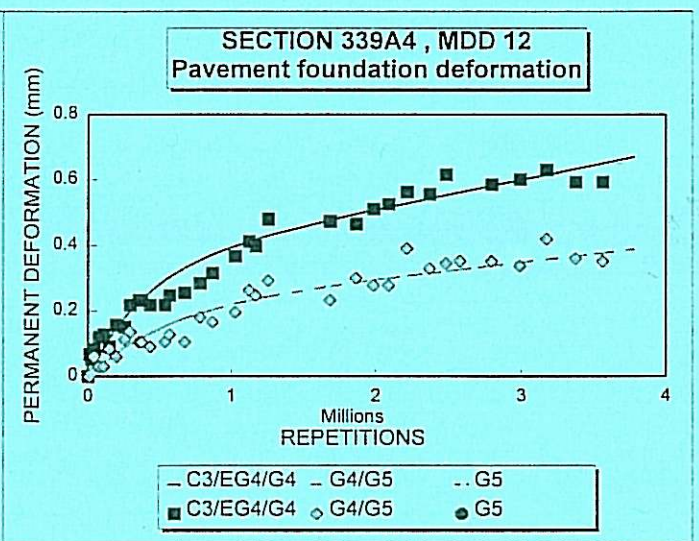
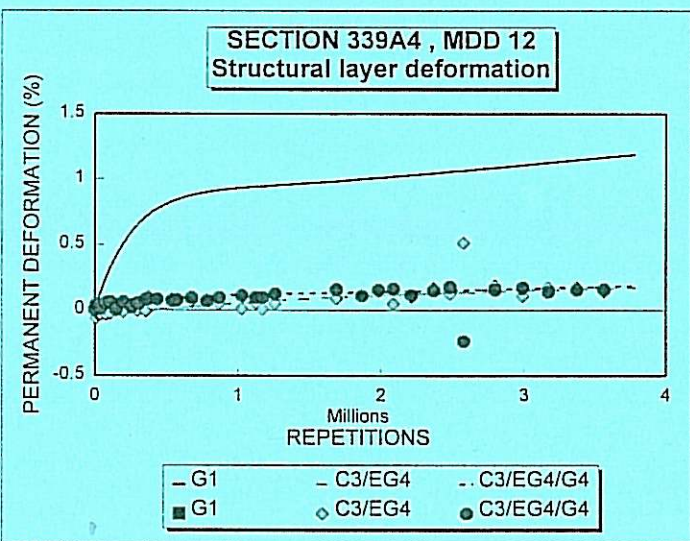
SECTION 339A4 , MDD 8
Pavement foundation deformation



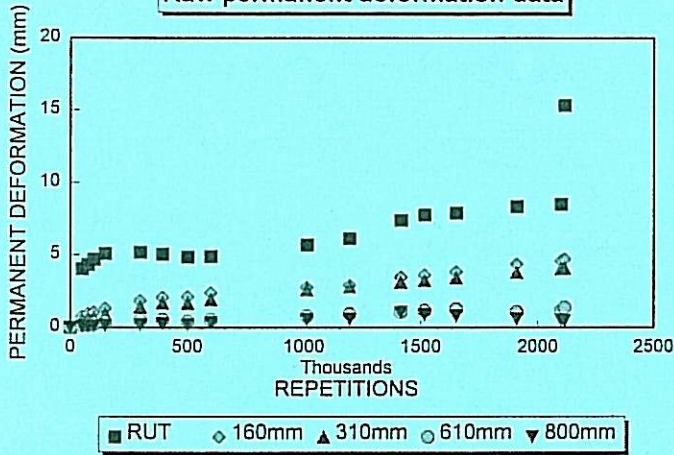


SECTION 339A4 , MDD 12

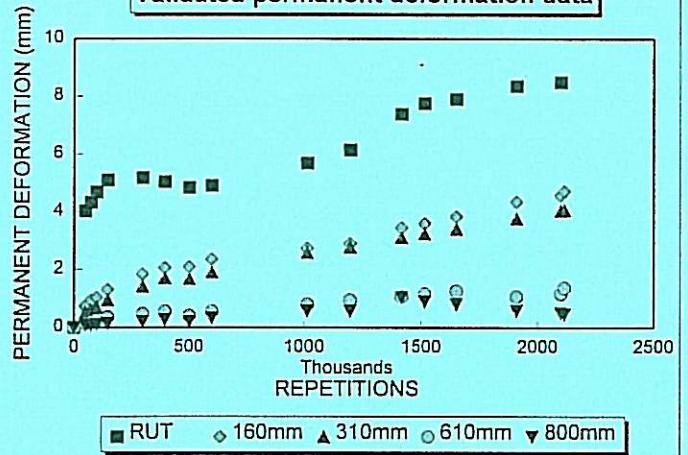
Level	Regression coefficients			
	a	b	m	Correlation
RUT	1.7	4.00E-06	3.00E-07	0.91731
160 mm	0.44	1.80E-06	1.30E-07	0.96503
310 mm	0.33	2.80E-06	9.00E-08	0.69478
460 mm	0.2	2.10E-06	5.00E-08	0.93484
610 mm	0	0.00E+00	0.00E+00	0.00000



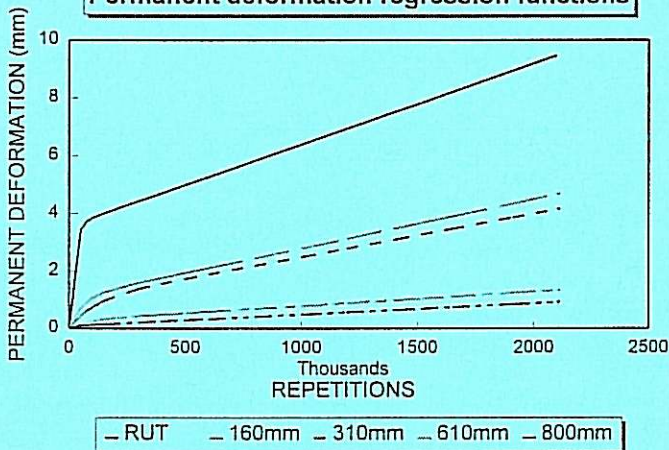
SECTION 340A4 , MDD 4
Raw permanent deformation data



SECTION 340A4 , MDD 4
Validated permanent deformation data



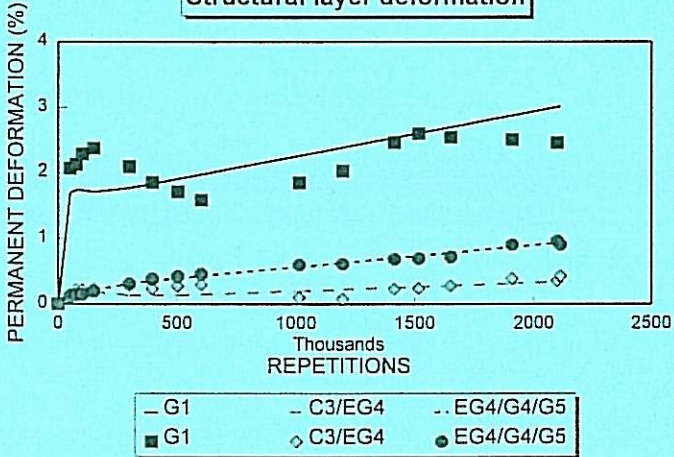
SECTION 340A4 , MDD 4
Permanent deformation regression functions



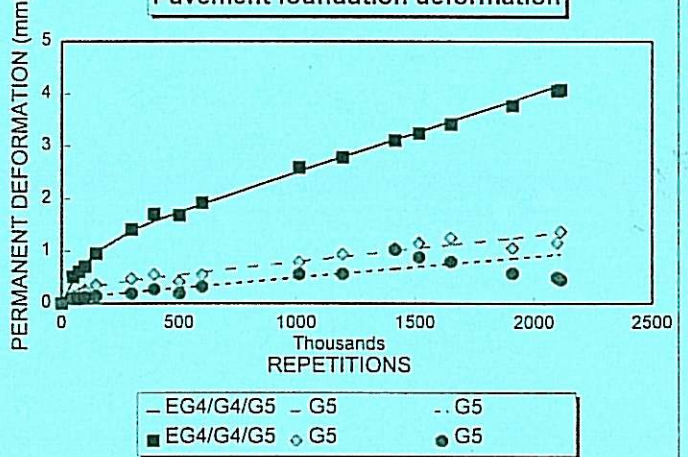
SECTION 340A4 , MDD 4

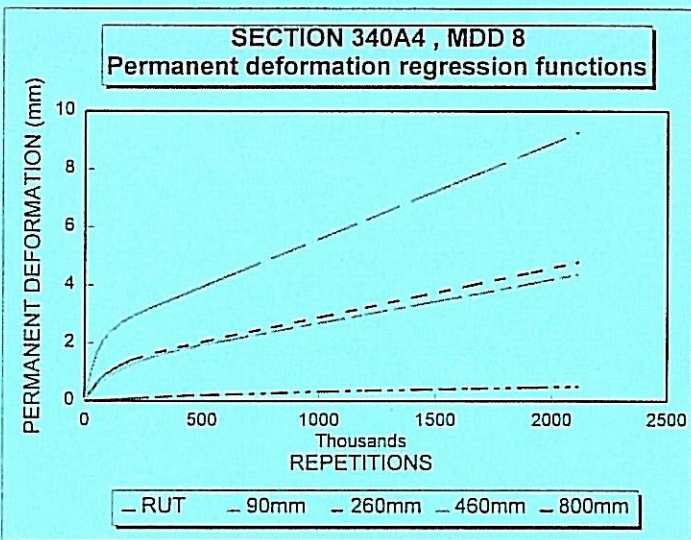
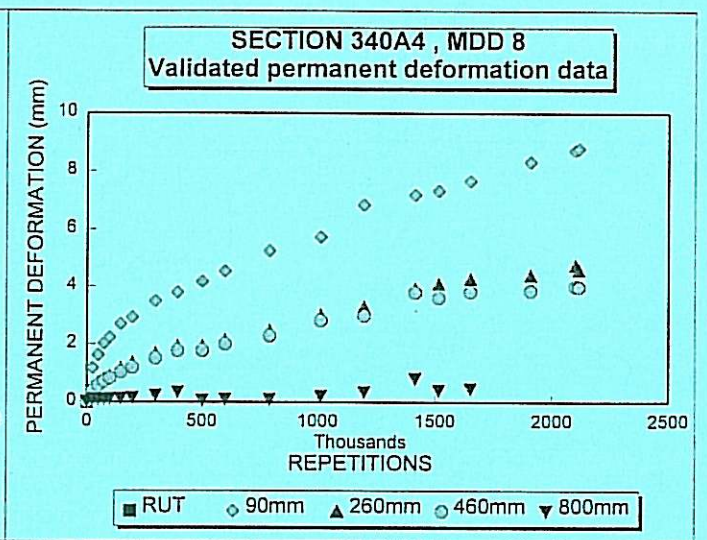
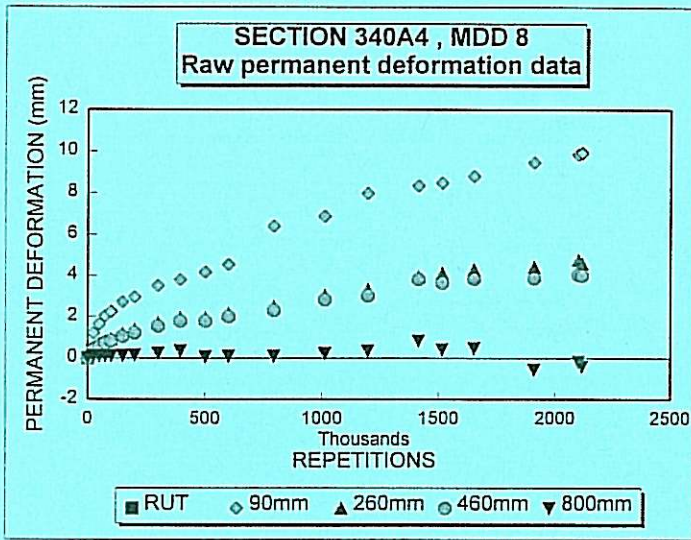
Level	Regression coefficients			Correlation
	a	b	m	
RUT	3.6	4.99E-05	2.80E-06	0.90970
160mm	1.1	1.89E-05	1.70E-06	0.99065
310mm	1	1.09E-05	1.50E-06	0.99761
610mm	0.3	1.50E-05	5.00E-07	0.95616
800mm	0.1	1.44E-04	4.00E-07	0.53078

SECTION 340A4 , MDD 4
Structural layer deformation



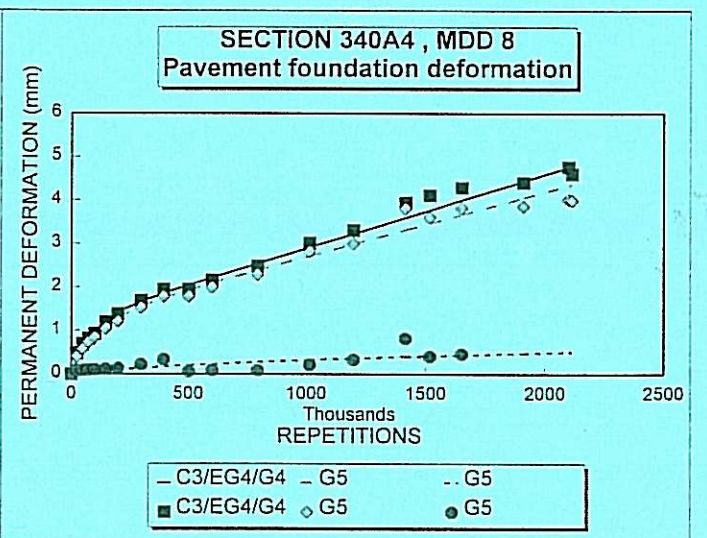
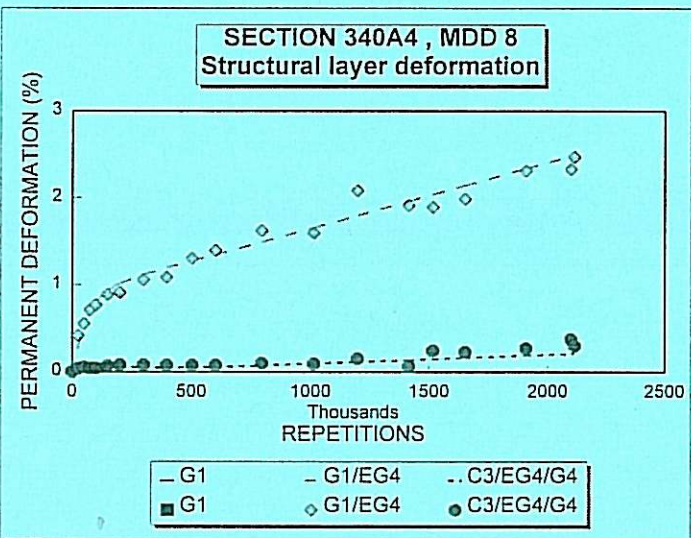
SECTION 340A4 , MDD 4
Pavement foundation deformation

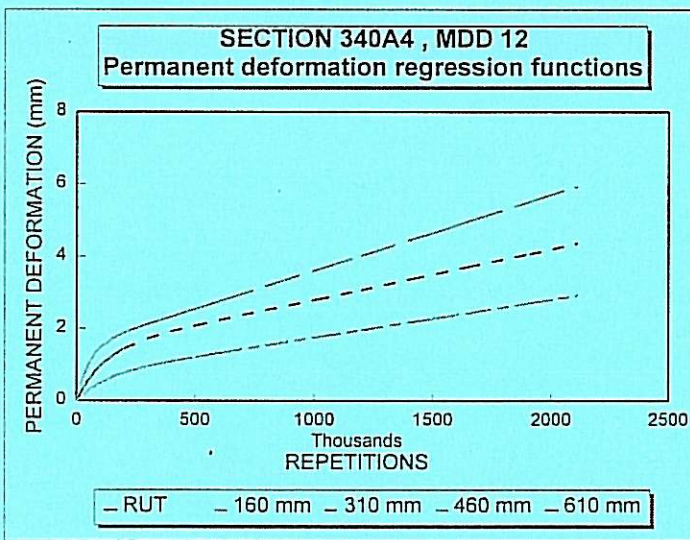
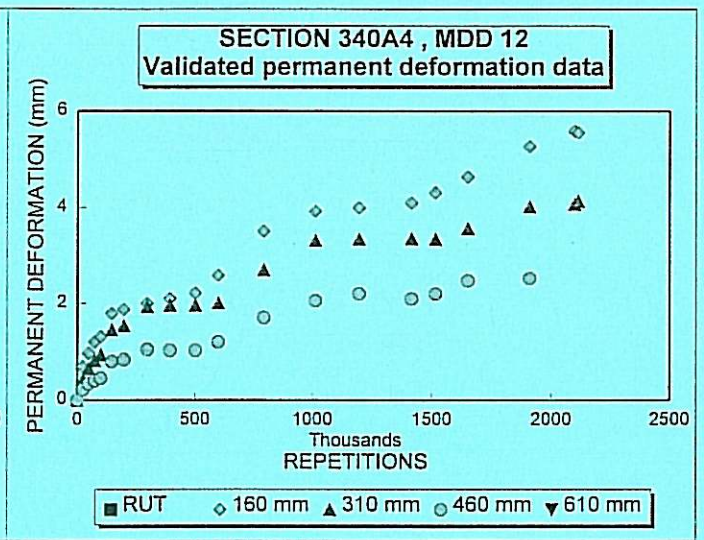
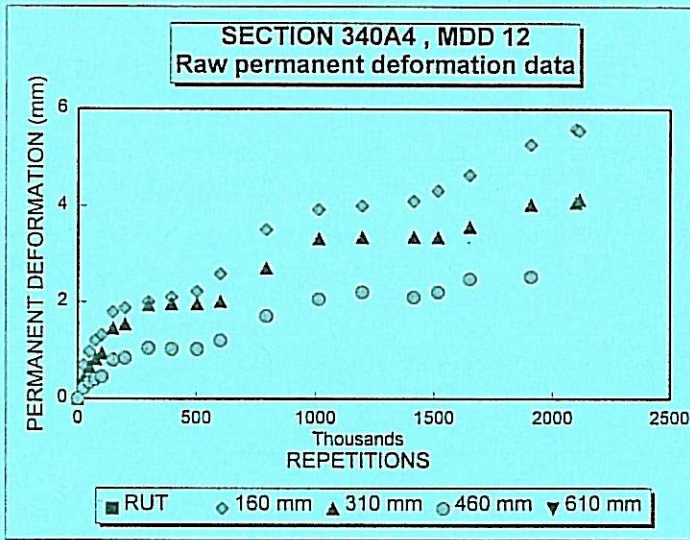




SECTION 340A4 , MDD 8

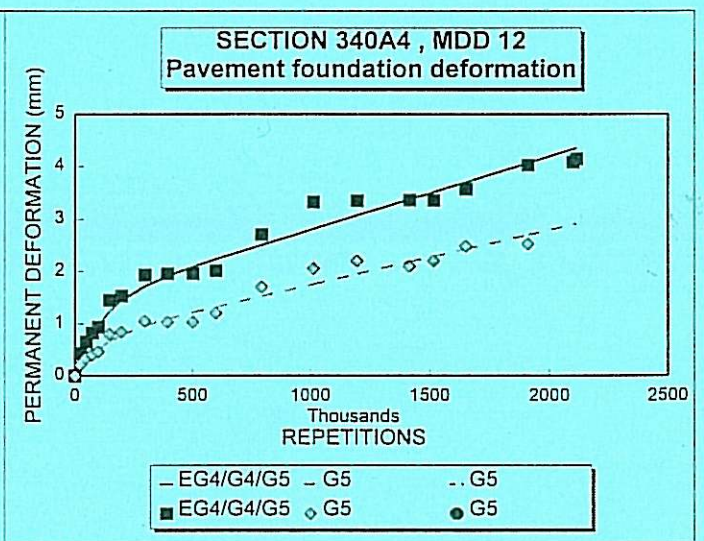
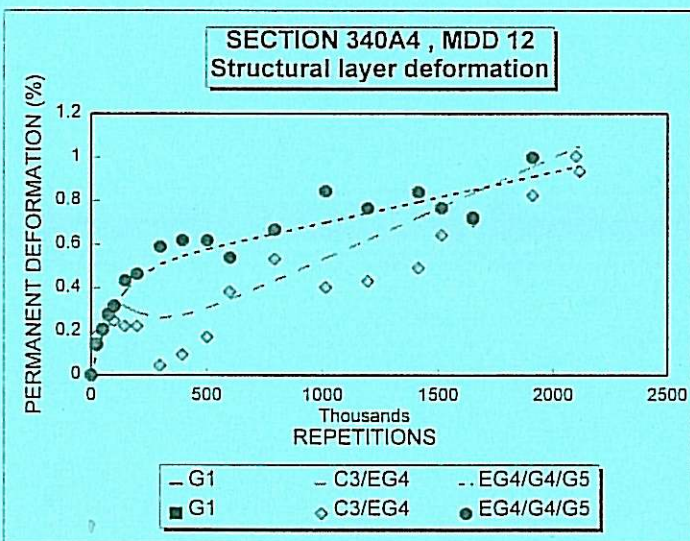
Level	Regression coefficients			
	a	b	m	Correlation
RUT	0	0.00E+00	0.00E+00	0.00000
90mm	2.73	1.51E-05	2.98E-06	0.99472
260mm	1.2	1.29E-05	1.70E-06	0.99074
460mm	1.2	9.90E-06	1.50E-06	0.98137
800mm	0.2	2.90E-06	1.50E-07	0.51783



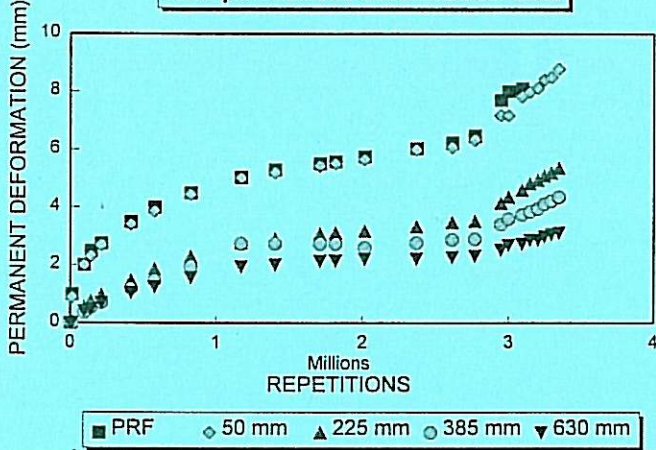


SECTION 340A4 , MDD 12

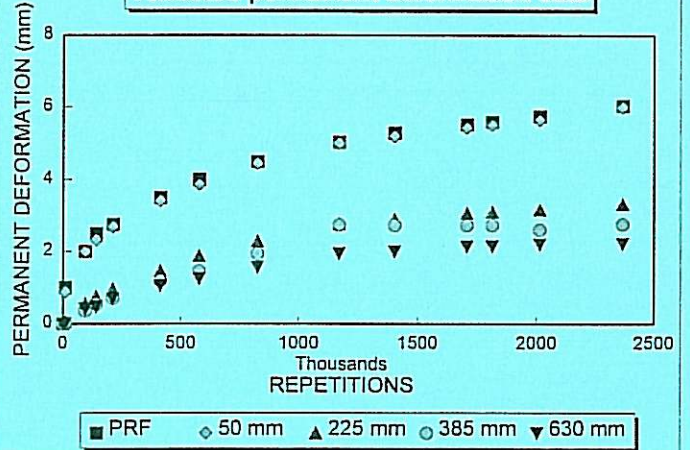
Level	Regression coefficients			Correlation
	a	b	m	
RUT	0	0.00E+00	0.00E+00	0.00000
160 mm	1.5	2.00E-05	2.10E-06	0.96503
310 mm	1.4	1.00E-05	1.40E-06	0.97816
460 mm	0.7	1.00E-05	1.05E-06	0.97313
610 mm	0	0.00E+00	0.00E+00	0.00000



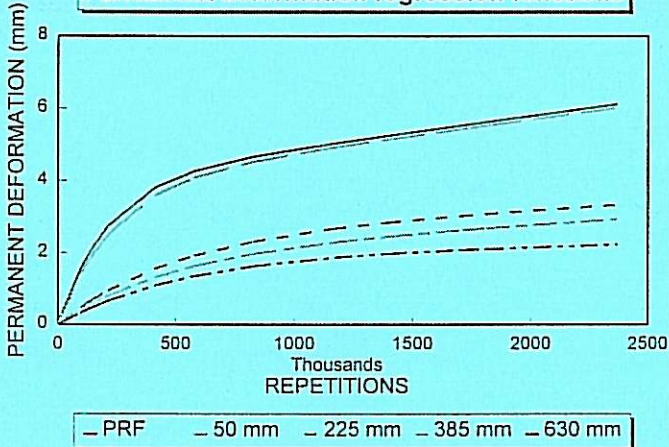
SECTION 346A4, MDD 4
Raw permanent deformation data



SECTION 346A4, MDD 4
Validated permanent deformation data



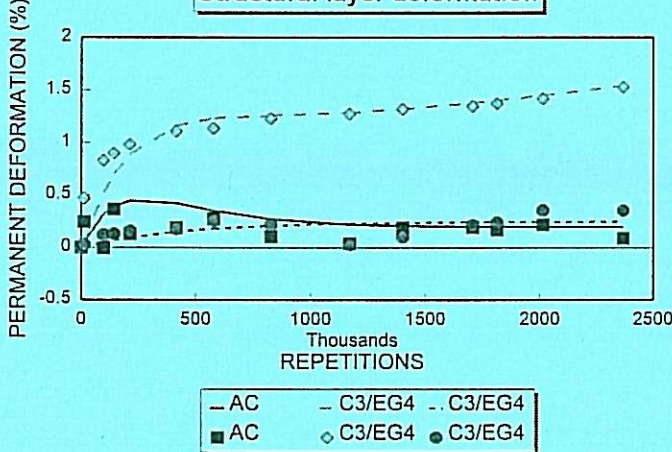
SECTION 346A4, MDD 4
Permanent deformation regression functions



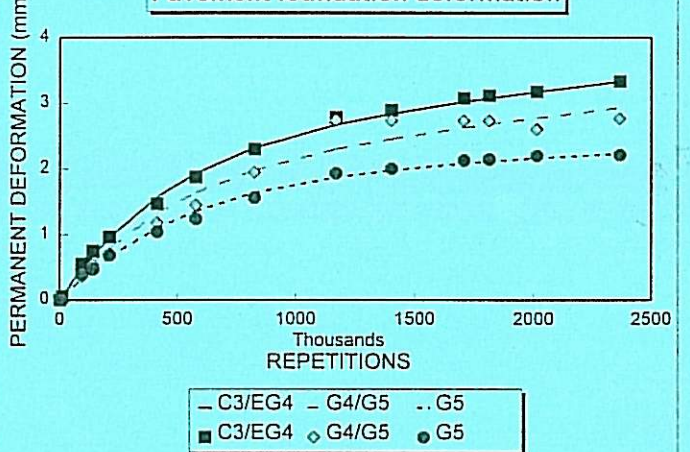
SECTION 346A4, MDD 4

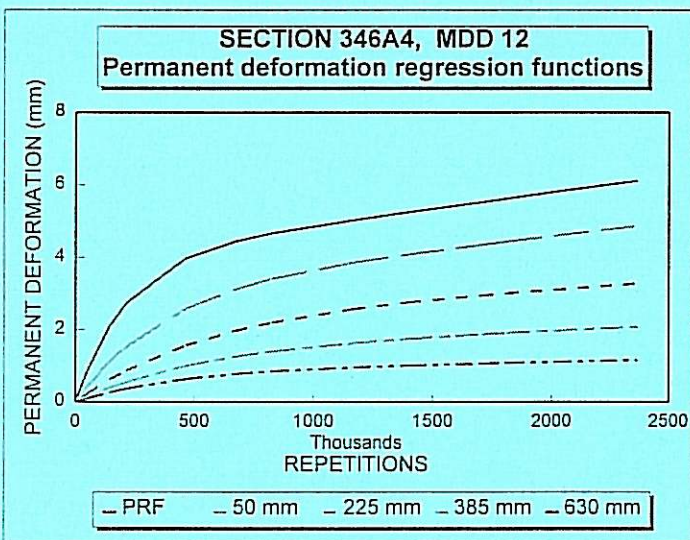
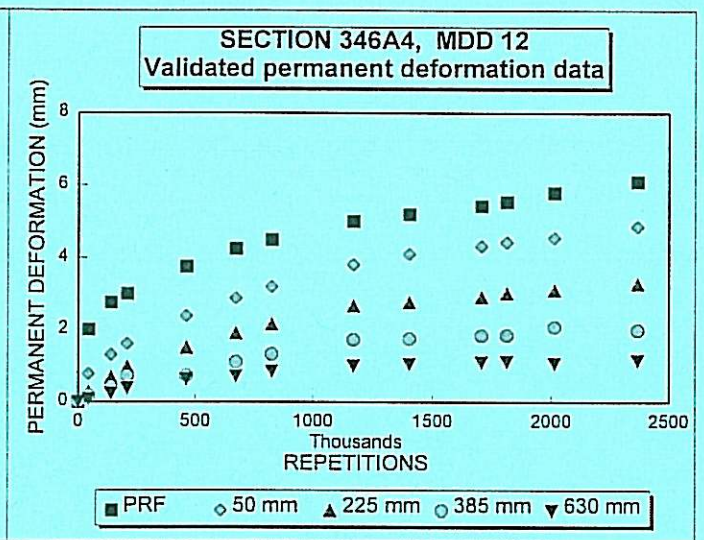
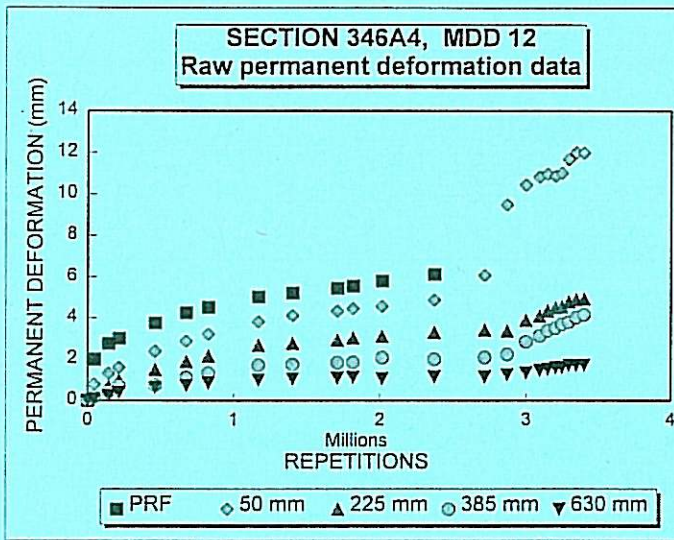
Level	Regression coefficients			Correlation
	a	b	m	
PRF	4	5.00E-06	9.00E-07	0.97550
50 mm	3.9	4.50E-06	9.00E-07	0.97590
225 mm	2.4	2.30E-06	4.00E-07	0.99775
385 mm	2	2.30E-06	4.00E-07	0.97514
630 mm	1.9	2.00E-06	1.50E-07	0.99557

SECTION 346A4, MDD 4
Structural layer deformation



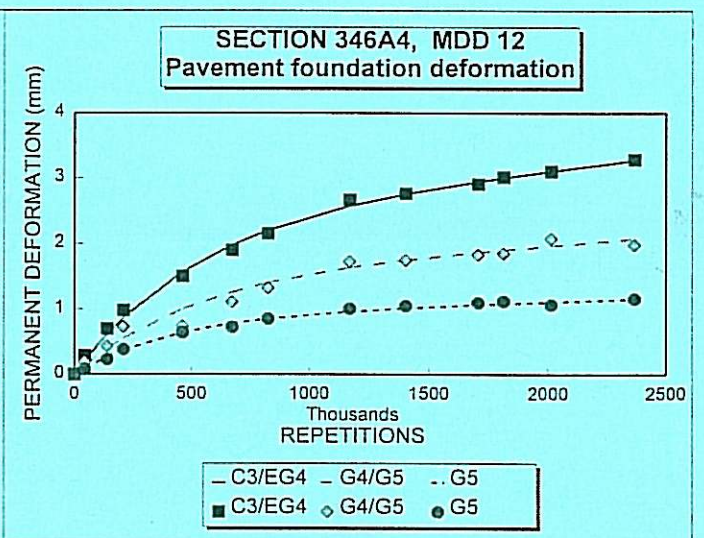
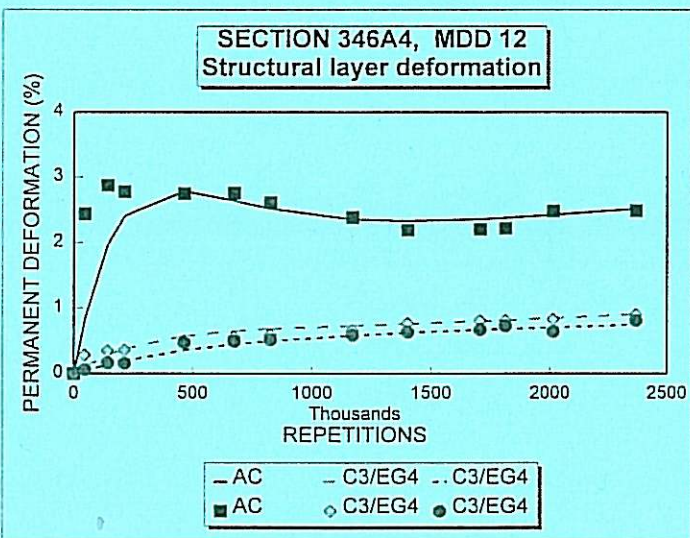
SECTION 346A4, MDD 4
Pavement foundation deformation



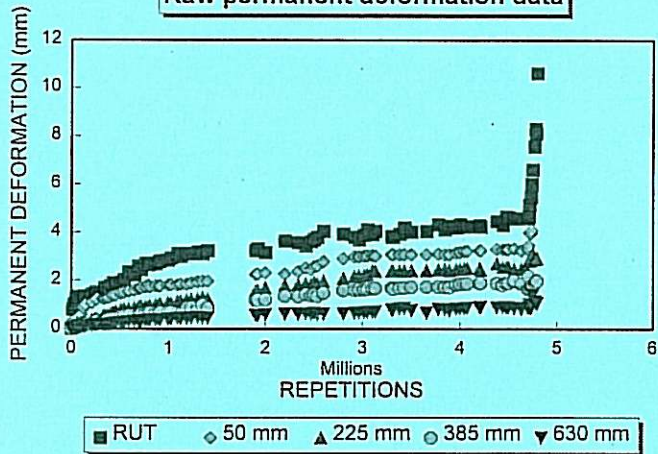


SECTION 346A4, MDD 12

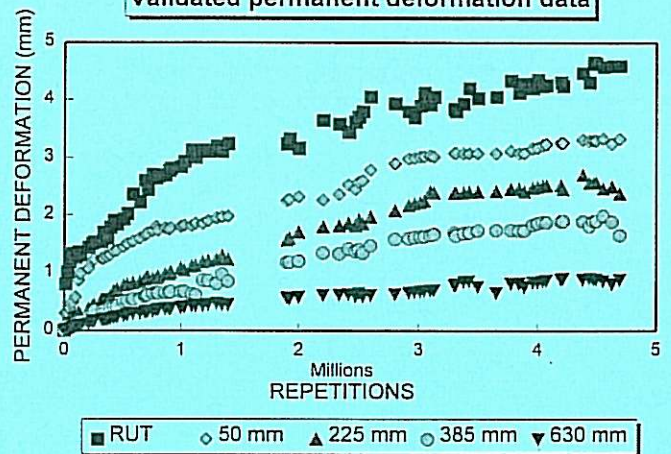
Level	Regression coefficients			
	a	b	m	Correlation
PRF	4	5.00E-06	9.00E-07	0.94518
50 mm	3.1	3.00E-06	7.50E-07	0.98848
225 mm	2.35	2.10E-06	4.00E-07	0.99691
385 mm	1.5	2.10E-06	2.50E-07	0.97373
630 mm	0.86	2.60E-06	1.30E-07	0.99337



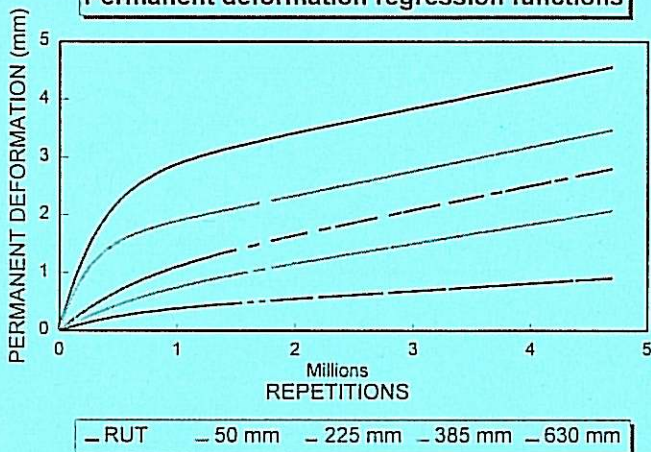
SECTION 347A4, MDD 4
Raw permanent deformation data



SECTION 347A4, MDD 4
Validated permanent deformation data



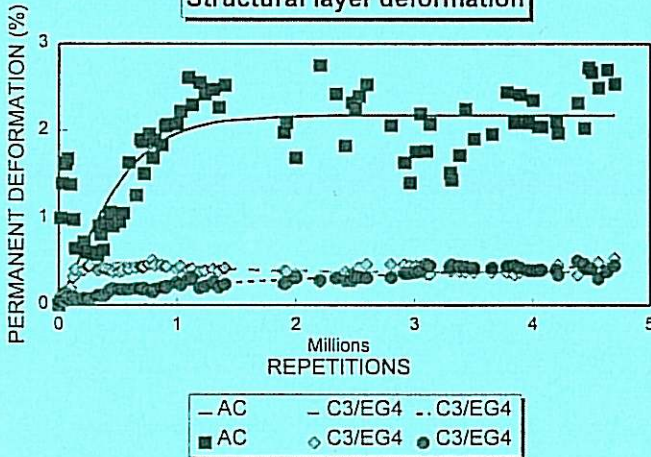
SECTION 347A4, MDD 4
Permanent deformation regression functions



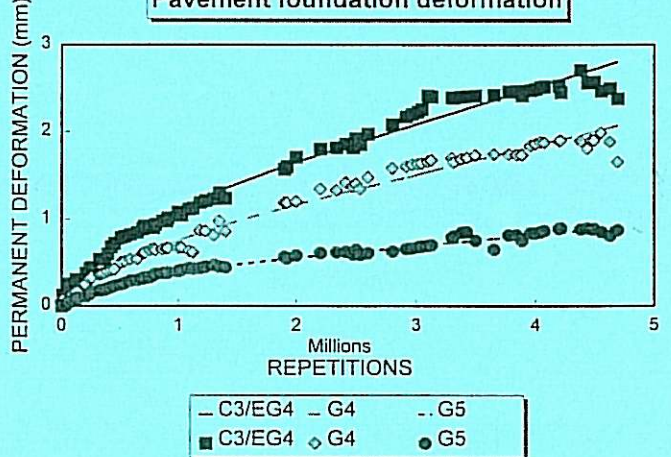
SECTION 347A4, MDD 4

Level	Regression coefficients			Correlation
	a	b	m	
RUT	2.59	3.20E-06	4.20E-07	0.95195
50 mm	1.5	4.60E-06	4.20E-07	0.98319
225 mm	0.83	2.20E-06	4.20E-07	0.98358
385 mm	0.52	2.20E-06	3.30E-07	0.98240
630 mm	0.3	2.40E-06	1.30E-07	0.98664

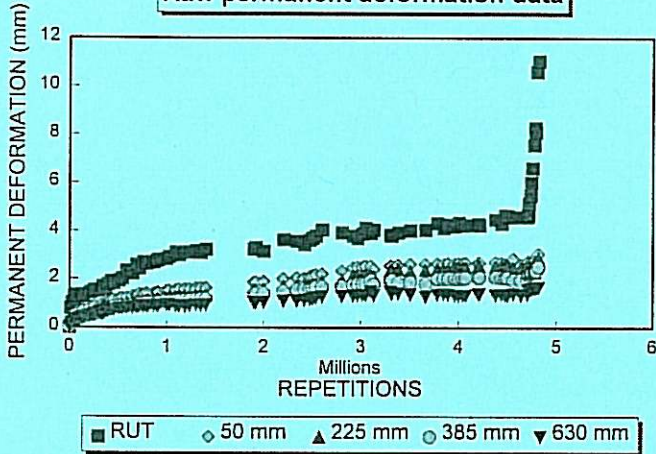
SECTION 347A4, MDD 4
Structural layer deformation



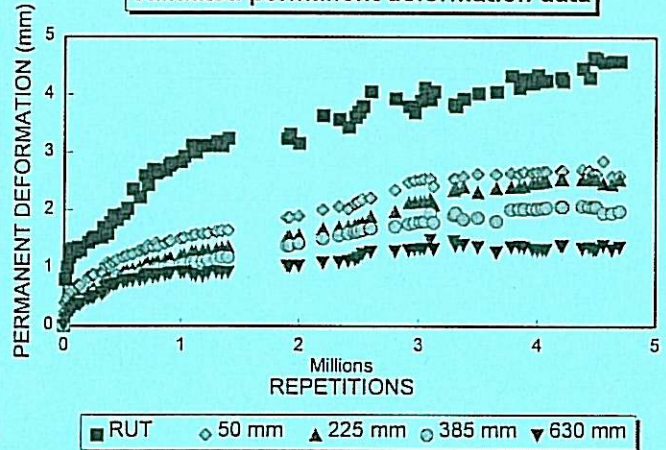
SECTION 347A4, MDD 4
Pavement foundation deformation



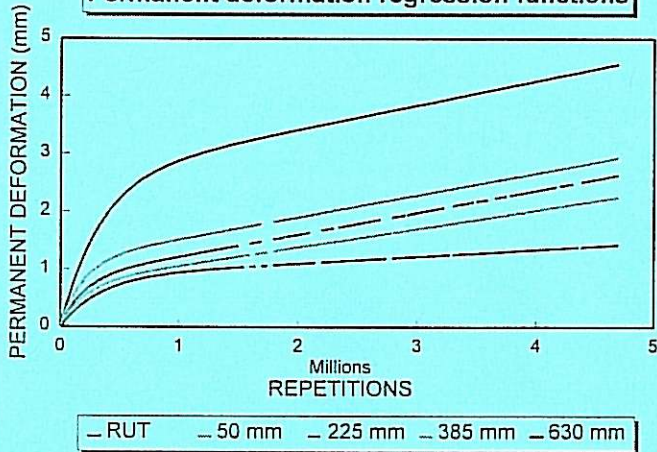
SECTION 347A4, MDD 12
Raw permanent deformation data



SECTION 347A4, MDD 12
Validated permanent deformation data



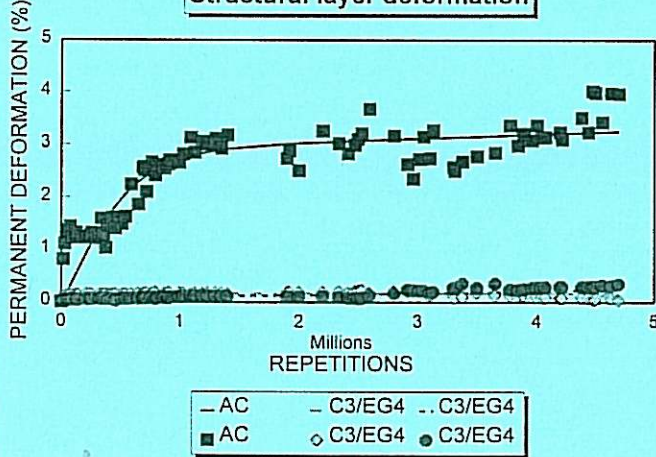
SECTION 347A4, MDD 12
Permanent deformation regression functions



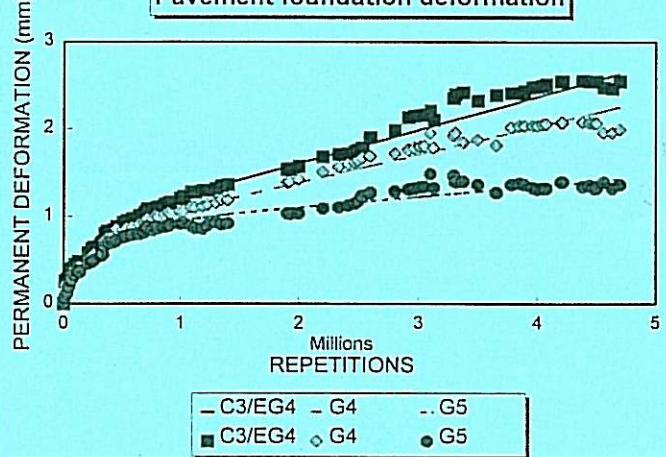
SECTION 347A4, MDD 12

Level	Regression coefficients			
	a	b	m	Correlation
RUT	2.59	3.20E-06	4.20E-07	0.95159
50 mm	1.15	5.60E-06	3.80E-07	0.97129
225 mm	0.85	5.60E-06	3.80E-07	0.98211
385 mm	0.75	5.20E-06	3.20E-07	0.97373
630 mm	0.87	3.20E-06	1.20E-07	0.96374

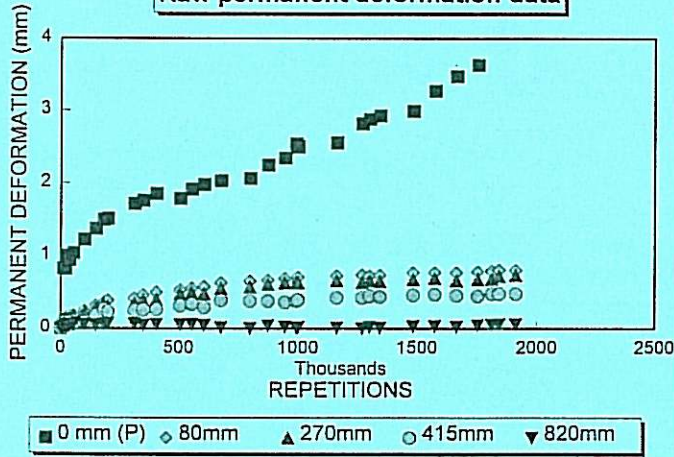
SECTION 347A4, MDD 12
Structural layer deformation



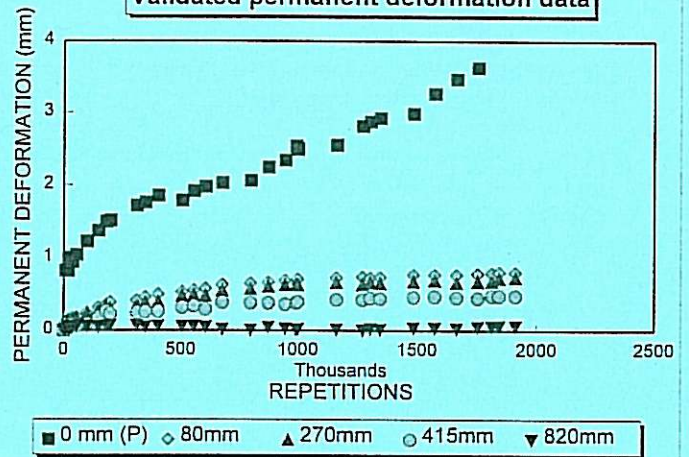
SECTION 347A4, MDD 12
Pavement foundation deformation



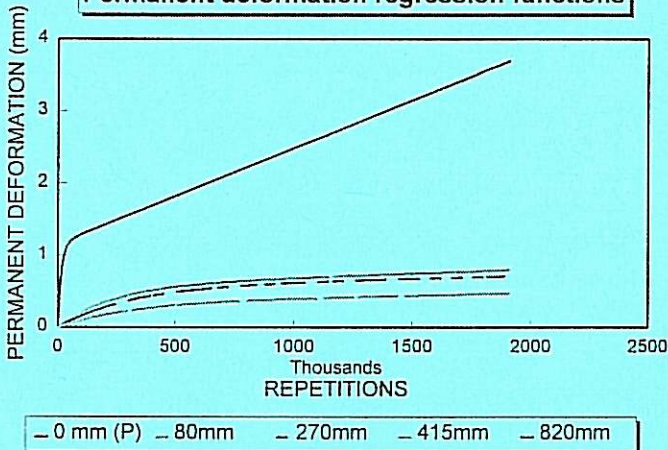
SECTION 348A4, MDD 4
Raw permanent deformation data



SECTION 348A4, MDD 4
Validated permanent deformation data



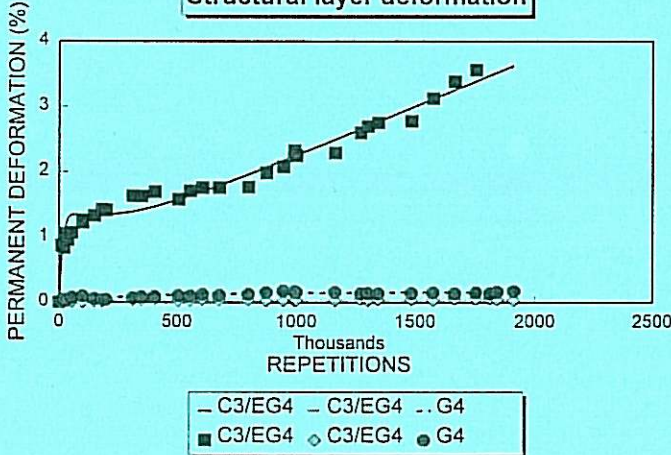
SECTION 348A4, MDD 4
Permanent deformation regression functions



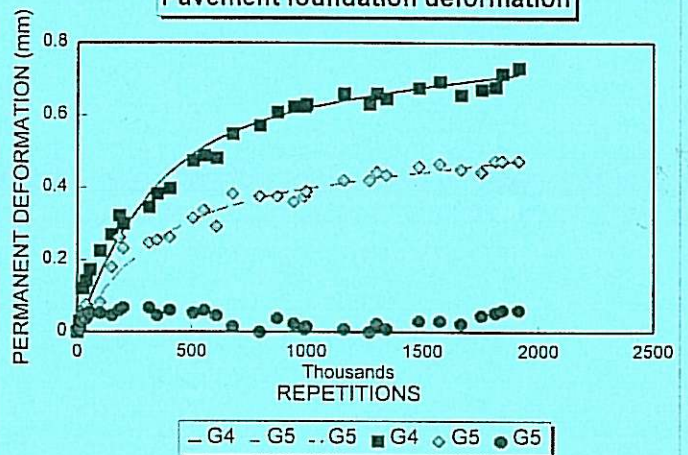
SECTION 348A4, MDD 4

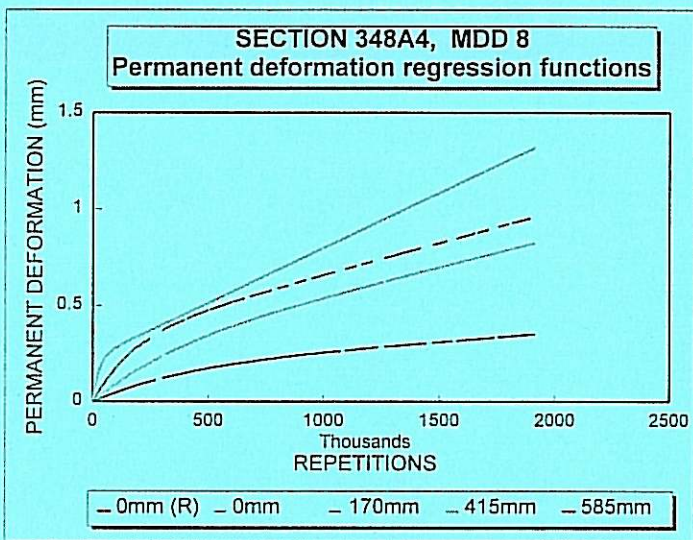
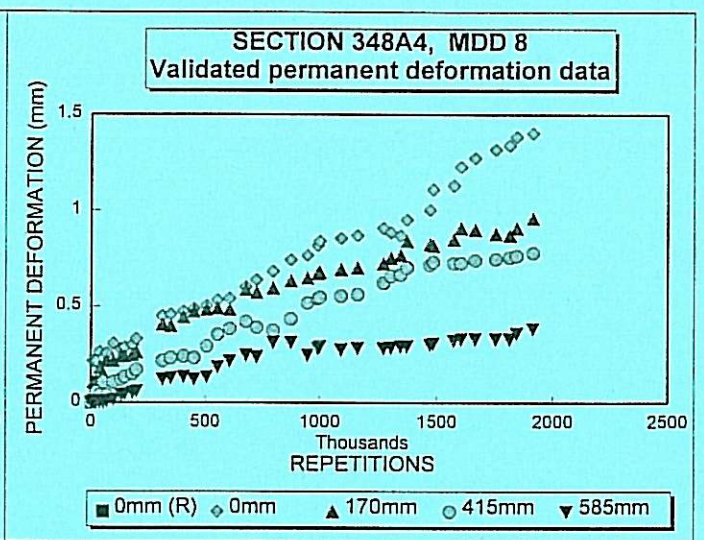
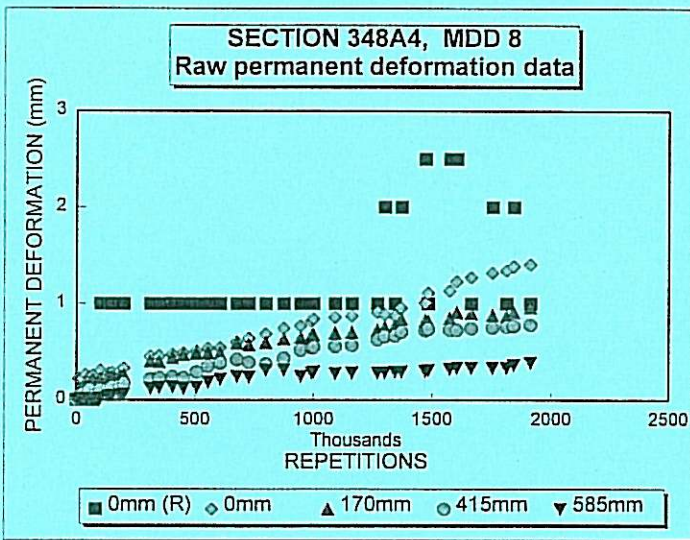
Level	Regression coefficients			Correlation
	a	b	m	
0 mm (P)	1.16	7.00E-05	1.33E-06	0.98521
80mm	0.57	4.50E-06	1.20E-07	0.97594
270mm	0.56	3.40E-06	8.00E-08	0.97193
415mm	0.34	3.50E-06	7.00E-08	0.96920
820mm	0	0.00E+00	0.00E+00	0.00000

SECTION 348A4, MDD 4
Structural layer deformation



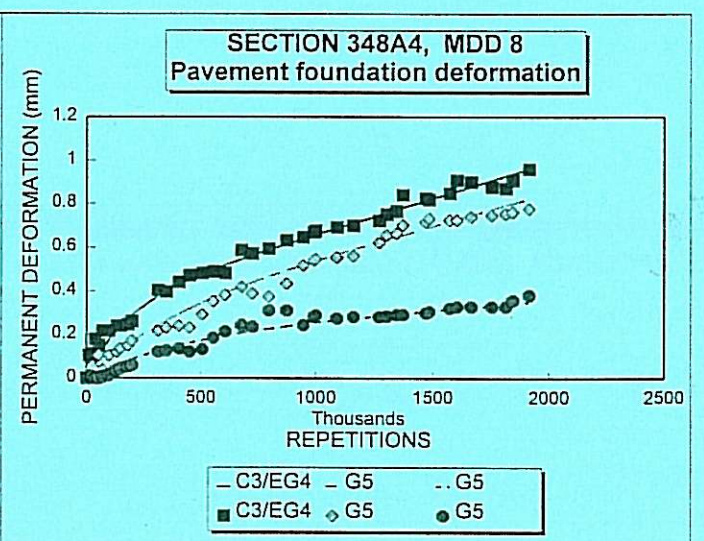
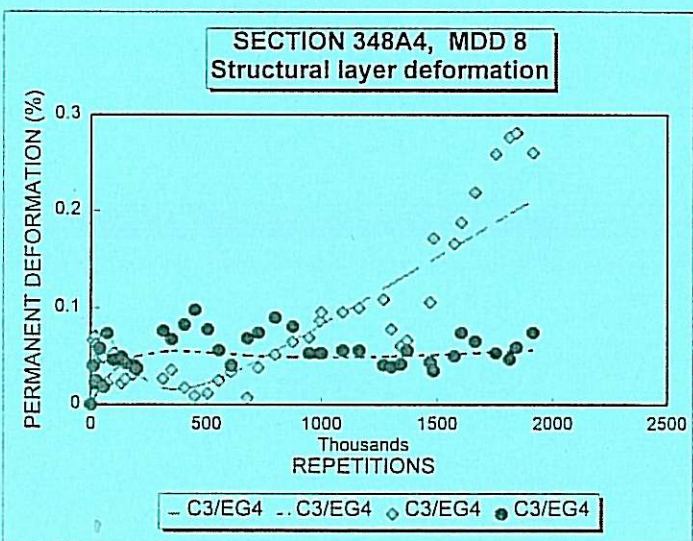
SECTION 348A4, MDD 4
Pavement foundation deformation



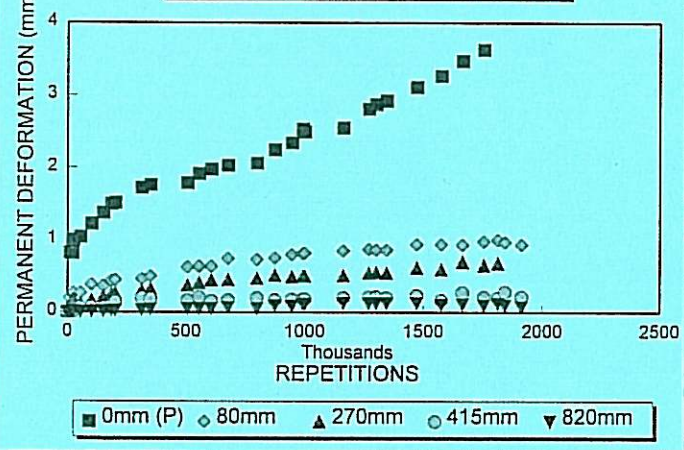


SECTION 348A4, MDD 8

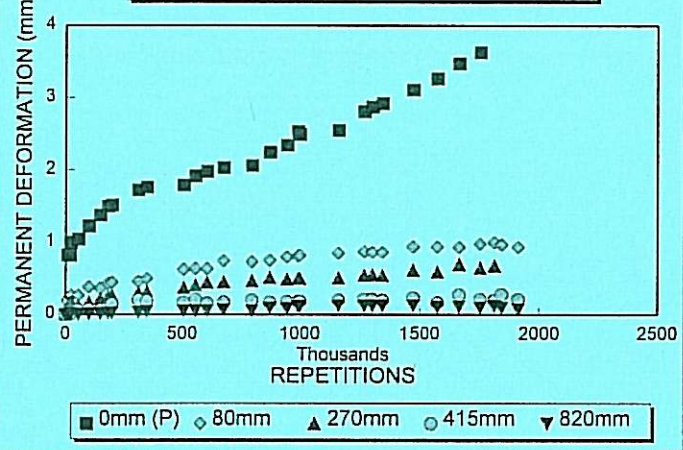
Level	Regression coefficients			
	a	b	m	Correlation
0mm (R)	0	0.00E+00	0.00E+00	0.00000
0mm	0.23	4.07E-05	5.70E-07	0.97897
170mm	0.33	6.70E-06	3.30E-07	0.98269
415mm	0.25	4.00E-06	3.00E-07	0.98254
585mm	0.18	3.00E-06	9.00E-08	0.95773



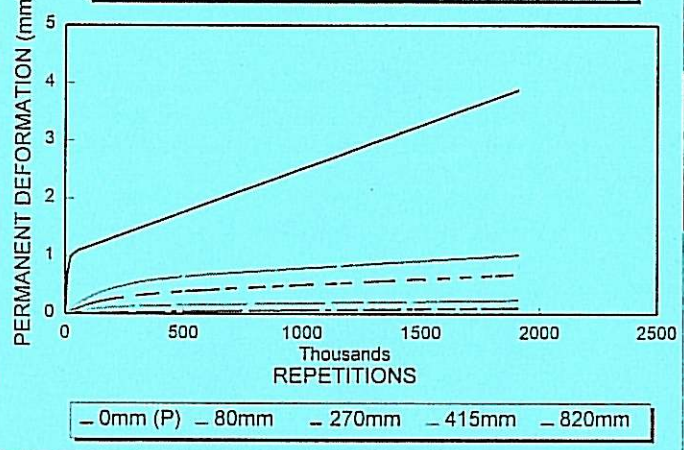
SECTION 348A4, MDD 12
Raw permanent deformation data



SECTION 348A4, MDD 12
Validated permanent deformation data



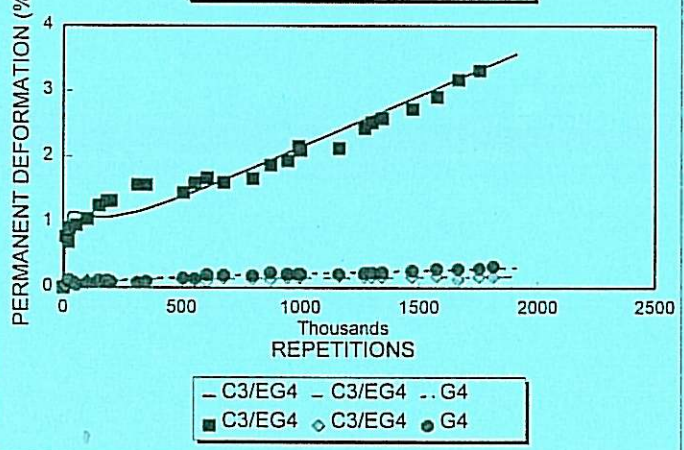
SECTION 348A4, MDD 12
Permanent deformation regression functions



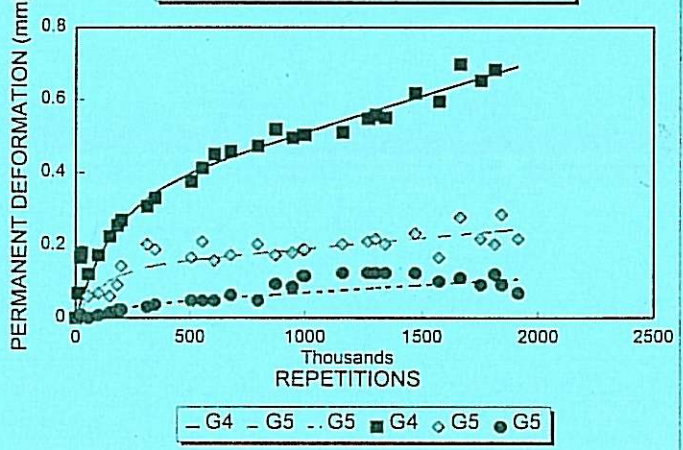
SECTION 348A4, MDD 12

Level	Regression coefficients			
	a	b	m	Correlation
0mm (P)	1.02	1.22E-04	1.50E-06	0.98204
80mm	0.55	7.00E-06	2.50E-07	0.93827
270mm	0.31	7.00E-06	2.00E-07	0.95735
415mm	0.13	9.00E-06	6.00E-08	0.97373
820mm	0.03	6.00E-06	4.00E-08	0.73874

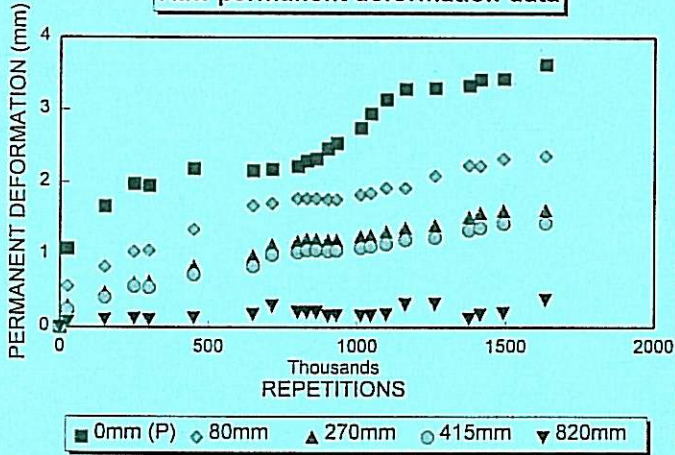
SECTION 348A4, MDD 12
Structural layer deformation



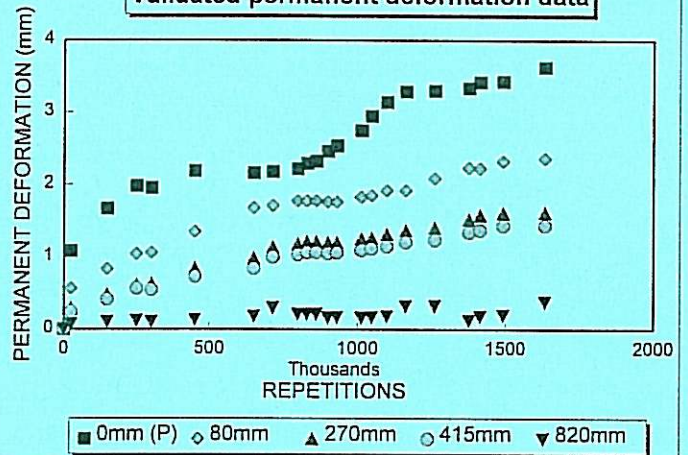
SECTION 348A4, MDD 12
Pavement foundation deformation



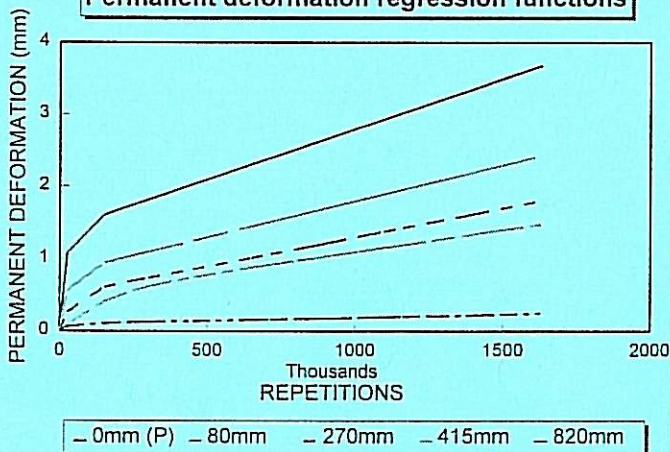
SECTION 349A4 , MDD 4
Raw permanent deformation data



SECTION 349A4 , MDD 4
Validated permanent deformation data



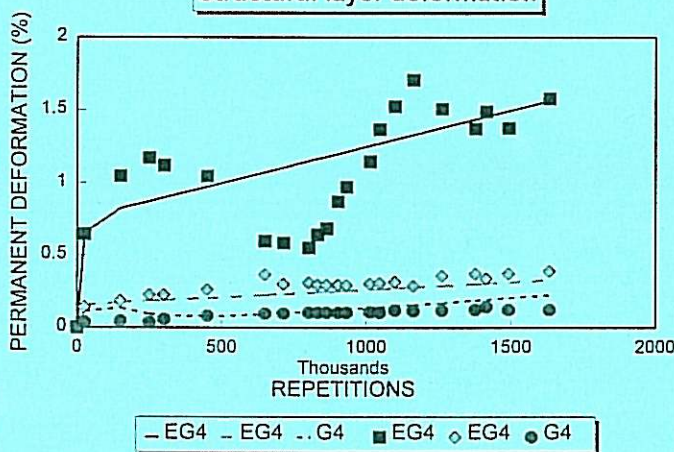
SECTION 349A4 , MDD 4
Permanent deformation regression functions



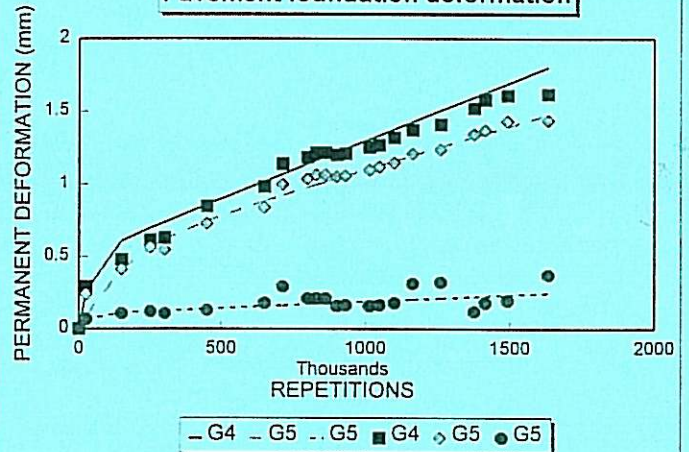
SECTION 349A4 , MDD 4

Level	Regression coefficients			Correlation
	a	b	m	
0mm (P)	1.4	5.60E-05	1.40E-06	0.95989
80mm	0.8	4.50E-05	1.00E-06	0.97319
270mm	0.5	2.80E-05	8.00E-07	0.96922
415mm	0.5	8.00E-06	6.00E-07	0.98445
820mm	0.1	4.30E-05	9.00E-08	0.50175

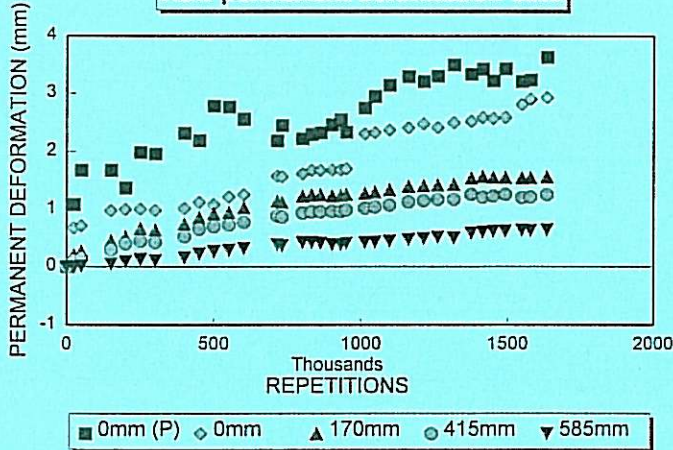
SECTION 349A4 , MDD 4
Structural layer deformation



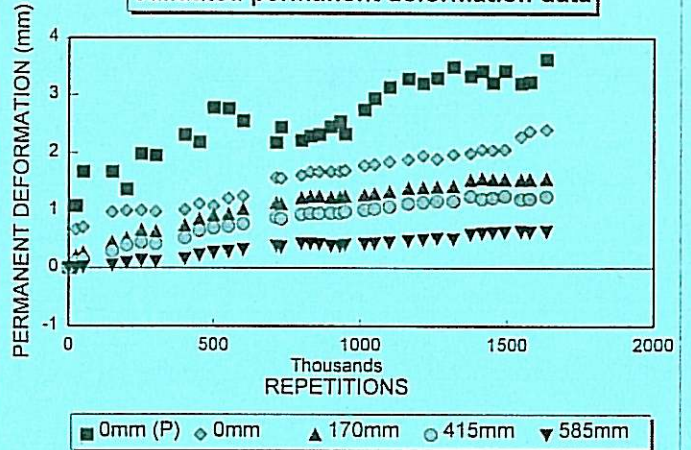
SECTION 349A4 , MDD 4
Pavement foundation deformation



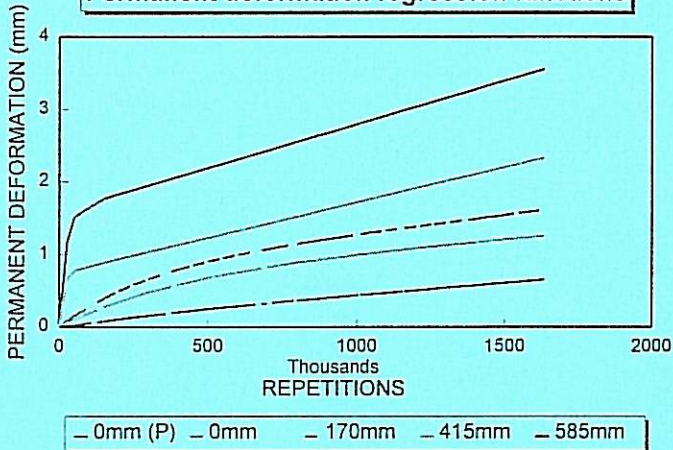
SECTION 349A4 , MDD 8
Raw permanent deformation data



SECTION 349A4 , MDD 8
Validated permanent deformation data



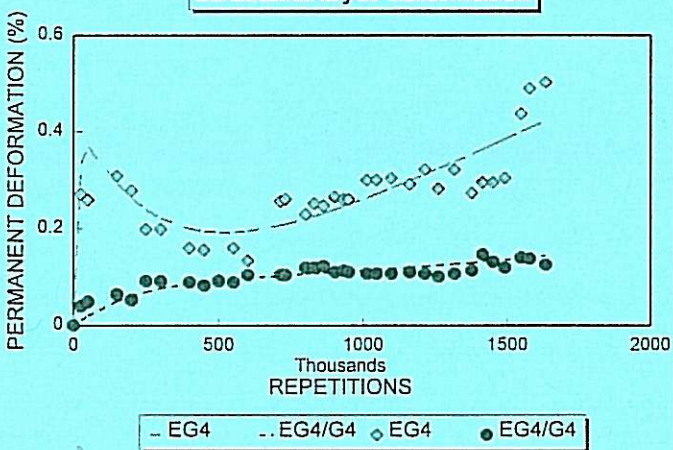
SECTION 349A4 , MDD 8
Permanent deformation regression functions



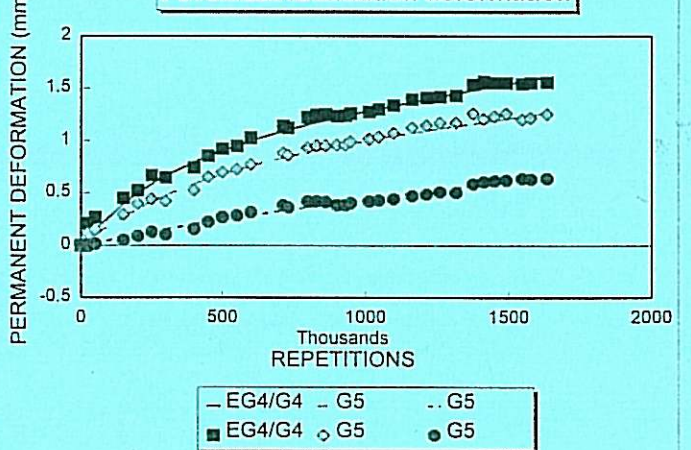
SECTION 349A4 , MDD 8

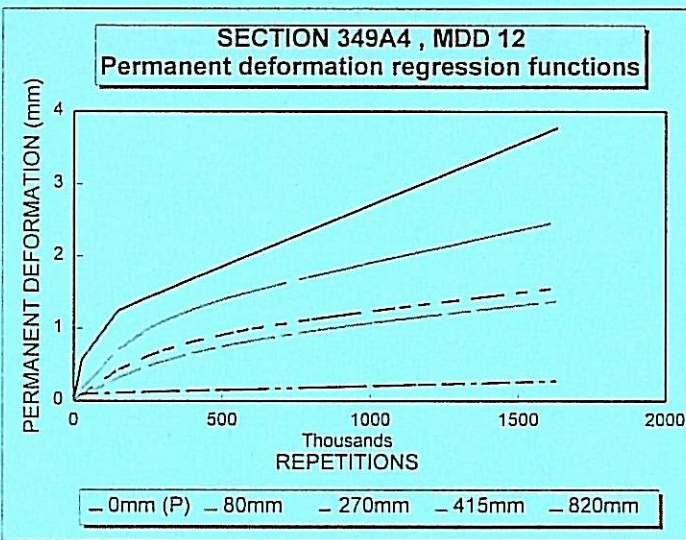
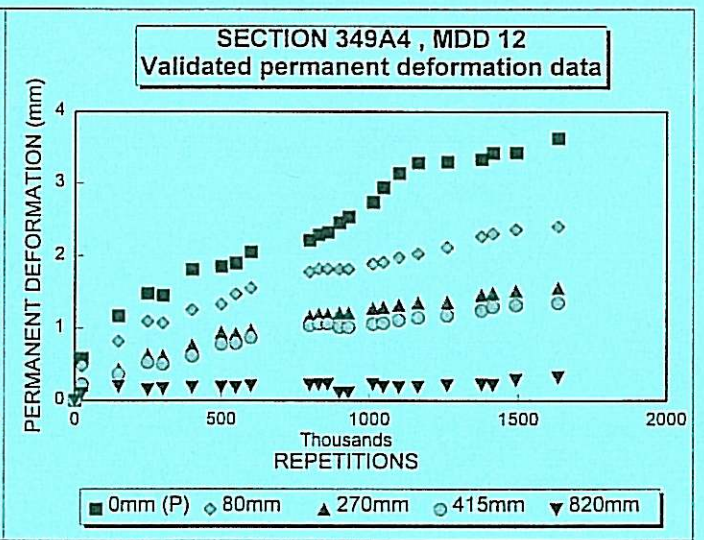
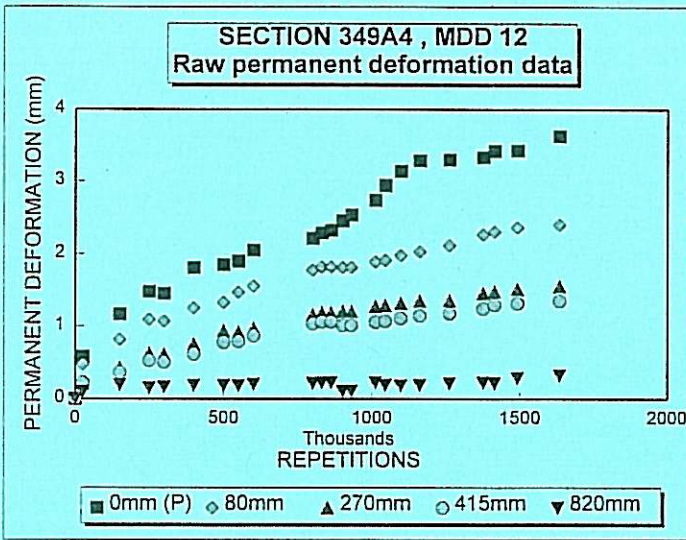
Level	Regression coefficients			
	a	b	m	Correlation
0mm (P)	1.59	5.08E-05	1.21E-06	0.89960
0mm	0.75	7.22E-05	9.70E-07	0.97956
170mm	0.8	4.00E-06	5.00E-07	0.98715
415mm	0.7	3.00E-06	3.50E-07	0.98826
585mm	0.1	5.00E-06	3.40E-07	0.98087

SECTION 349A4 , MDD 8
Structural layer deformation



SECTION 349A4 , MDD 8
Pavement foundation deformation





SECTION 349A4 , MDD 12

Level	Regression coefficients			
	a	b	m	Correlation
0mm (P)	1.01	3.10E-05	1.70E-06	0.98285
80mm	1.01	6.50E-06	9.00E-07	0.98131
270mm	0.75	5.00E-06	5.00E-07	0.99024
415mm	0.65	4.00E-06	4.50E-07	0.98096
820mm	0.1	1.19E-04	1.10E-07	0.56373

