DYNAMIC STUDIES
ON THE
BEARING CAPACITY
OF PILES
PHASE II
VOL. 2
DYNAMIC STUDIES ON THE BEARING CAPACITY OF PILES

Volume II
Final Project Report of Phase II

July 1, 1968

by

G. G. Goble
J. J. Tomko
F. Rausche
P. M. Green

This research was sponsored by the Ohio Department of Highways and the Bureau of Public Roads. The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the State or the Bureau of Public Roads.
TABLE OF CONTENTS

Introduction to Experimental Results 1

Model Pile Test in Sand 2

Model Pile Test in Silt 37

Model Pile Test in Silt and Clay 60

Full Scale Pile 109
INTRODUCTION TO EXPERIMENTAL RESULTS

During the course of this project a considerable number of piles of both reduced and full scale have been tested statically and dynamically. Some of these tests have been reported in Reference 1. The results of all of those test piles which are complete are presented here. A complete set of data is considered to be one which contains a static load test and a set of dynamic measurements made during driving. This rather extensive collection of static and dynamic measurements could be of use to other investigators.

The equipment used in driving the small scale piles and in making the dynamic measurements is described in Reference 1 and in Volume I of this report. The dynamic measurements were digitized manually and recorded on punched cards. The data was then analyzed by digital computer and the drawings included here were made automatically. The upper curves give the variation with time of acceleration, velocity and displacement at the top of the pile. The acceleration is the measured value obtained from the oscillograph record. Velocity and displacement were obtained by integration of the acceleration record by digital computer. The lower curves give the measured force at the top of the pile and the predicted static resistance calculated from equation 1, Volume I of this report. This calculation of the resistance neglects the velocity dependent terms and is not meaningful over the early portion of the record.

The digitized results are available on punched cards and, of course, in this form are more accurate than can be obtained on the curves given here.
LOADTEST AND DYNAMIC RESULTS
FOR MODEL PILES DRIVEN IN SAND

Test Site: W. 14 and Abbey Road in Cleveland, Ohio
Figure 1  Soil Characteristics at West 14th and Abbey Road
MODEL PILE 15-3 SAND
BLOW NO. 327 DATE AUGUST 19 1965

Figure 2 Dynamic Results of Reduced-Scale Pile 15-3 at the End of Driving, Blow No. 327
Figure 3  C.R.P. Test Results of Reduced-Scale Pile 15-3, 3 hours after Driving
MODEL PILE 15-3 SAND
BLOW NO. 1-A DATE AUG. 23 1965

Figure 4 Dynamic results of Reduced-Scale Pile 15-3, Blow 1A
MODEL PILE 15-3 SAND
BLOW NO. 2-A DATE AUG. 23 1965

Figure 5  Dynamic Results of Reduced-Scale Pile 15-3,
Blow 2A
Figure 6  C.R.P. Test Results of Reduced-Scale Pile 15-3, 3 days after Driving
Figure 7 Average C.R.P. Test Results of Reduced-Scale Pile 15-3, 3 days after Driving
Figure 8  Dynamic Results of Reduced-Scale Pile 15-4,
Blow No. 348 at the End of Driving
MODEL PILE 15-4 SAND

BLOW NO. 2-A DATE OCT. 15 1965

---

Figure 9: Dynamic Results of Reduced-Scale Pile 15-4, Blow 2A
MODEL PILE 15-4 SAND
BLOW NO. 3-A DATE OCT. 15 1965

Figure 10  Dynamic Results of Reduced-Scale Pile 15-4,
Blow 3A
Figure 11  C.R.P. Test Results of Reduced-Scale Pile 15-4

3" DIA. PILE 15-4 C.R.P. RESULTS
DRIVEN ON 10/9/65 TESTED ON 10/15/65
SOIL CONDITION: MED. COARSE SAND
DEPTH OF PENETRATION: 15'-0"
Figure 12  Dynamic Results of Reduced-Scale Pile 15-6 at the End of Driving
MODEL PILE 15-6 SAND
BLOW NO. 2-A DATE MAR. 5 1966

Figure 13  Dynamic Results of Reduced-Scale Pile 15-6
Blow No. 2A

- 15 -
Figure 14  Dynamic Results of Reduced-Scale Pile 15-6, Blow No. 4A
Figure 15   Dynamic Results of Reduced-Scale Pile 15-6, Blow 9A
3" DIA. PILE 15-6 C.R.P. TEST
DRIVEN ON 3/5/66 TESTED ON 1/26/66
SOIL CONDITION: MED. COARSE SAND
DEPTH OF PENETRATION: 15'-0"

2nd TEST AT 0.0032"/MIN.
1st TEST AT 0.0182"/MIN.
FORCE AT BOTTOM OF PILE

APPLIED LOAD IN KIPS
SETTLEMENT IN INCHES

Figure 16: C.R.P. Test Results of Reduced-Scale Pile 15-6
Figure 17  Dynamic Results of Reduced-Scale Pile 15-7, at the End of Driving
3" DIA. PILE NO. 15-7 C.R.P. TEST
DRIVEN ON 1/22/66 TESTED ON 2/1/66
SOIL CONDITION: M.E.D. COARSE SAND
DEPTH OF PENETRATION: 13 FEET

Figure 18: C.R.P. Test Results of Reduced-Scale Pile 15-7
Figure 19  Dynamic Results of Reduced-Scale Pile 15-7, Blow 4A
MODEL PILE WEST 14 ST.
PILE = 1-T-10 BLOW = 115 DATE = OCT. 14 1967

Figure 20
Figure 21
Figure 22: C.R.P. Test Results of Pile 1-T-10 After Driving Pile
Figure 23: C.R.P. Test Results of Pile 1-T-10 Before Restriking Pile
MODEL PILE WEST 14 ST.
PILE=14T-10 BLOW=1-A DATE=OCT. 21 1967

---

**Figure 24**

- 26 -
MODEL PILE WEST 14 ST.
PILE = 1-T-15-20 BLOW = 4 DATE = NOV. 25 67

Figure 26
Figure 27: C.R.P. Test Results of Pile 1-T-15/20 After Driving Pile
Figure 28: C.R.P. Test Results of Pile 1-T-15/20 Before Restriking Pile
MODEL PILE WEST 14 ST.
PILE= 1-T-15-20 BLOW=1-A DATE= DEC. 2 1967

Figure 29
MODEL PILE WEST 14 STREET
PILE=2-T-15-20  BLOW=5  DATE=DEC. 28 1967

Figure 30

- 32 -
Figure 31: C.R.P. Test Results of Pile 2-T-15/20 After Driving Pile

Test Rate at 0.05 Inch/Min
Pile Driven on: 12/28/57
Pile Tested on: 12/28/57

Applied Load in Kips

Set in Inches

- Force on Top
- Force 6 Feet Below Top
- Force 12.5 Feet Below Top
- Force 19 Feet Below Top (Toe)
Figure 32: C.R.P. Test Results of Pile 2-T-15/20 Before Restriking Pile
MODEL PILE WEST 14 ST.
PILE= 2-T-15-20 BLOW=2-A DATE= JAN. 13 1968

Figure 33
MODEL PILE WEST 14 ST.
PILE = 2-T-15-20 BLOW=1-A DATE = JAN. 13 1968

Figure 34
LOADTEST AND DYNAMIC RESULTS
FOR MODEL PILES DRIVEN IN SILT

Test Site: Jennings Road in Cleveland, Ohio
### Surface Elevation at 627.0 Feet

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Agg.</th>
<th>C.S.</th>
<th>F.S.</th>
<th>Silt</th>
<th>Clay</th>
<th>W.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>59</td>
<td>40</td>
</tr>
<tr>
<td>28</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>24</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>36</td>
<td>64</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>36</td>
<td>64</td>
</tr>
<tr>
<td>16</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>47</td>
<td>52</td>
</tr>
<tr>
<td>12</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>47</td>
<td>52</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>52</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>51</td>
<td>47</td>
</tr>
</tbody>
</table>

**Figure 35**  Soil Characteristics at Jennings Road Site
Figure 36  Dynamic Results of Reduced-Scale Pile 10-1 Silt, at the End of Driving.
Figure 37  C.R.P. Test Results of Reduced-Scale Pile 10-1  Silt

C.R.P. @ 0.006 "/Min.
Perform on: 7/11/65
Driven on: 6/27/65
Restruck on: 7/14/65

Applied Load in Kips
Set in Inches
Figure 38  Dynamic Results of Reduced-Scale Pile 10-1 Silt,
Blow 4A
MODEL PILE 10-1 SILT
BLOW NO. 5-A DATE JULY 14 1966

Figure 39  Dynamic results of Reduced-Scale Pile 10-1 Silt,
Blow 5A
Figure 40  C.R.P. Test Results of Pile 10-2 Silt
Figure 41  Dynamic Results of Reduced-Scale Pile 10-2 Silt,
Blow 1A
Figure 42  C.R.P. Test Results of Reduced-Scale Pile 10-3 Silt
Figure 43  Dynamic Results of Reduced-Scale Pile 10-3, Blow 1A.
MODEL PILE 10-4 SILT

BLOW NO. 129  DATE AUG. 1 1966

Figure 44  Dynamic Results of Reduced-Scale pile 10-4 Silt, at the end of Driving
C.R.P. At Average Rate of 0.010 In./Min.

Driven on: 8/1/66
C.R.P. Test on: 8/4/66
Restruck on: 8/4/66

Figure 45  C.R.P. Test Results of Reduced-Scale Pile 10-4 Silt
Figure 46  Dynamic Results of Reduced-Scale Pile 10-4 Silt, Blow 1A
Figure 47. Dynamic Results of Reduced-Scale Pile 10-4 Silt, Blow 2A
MODEL PILE 10-5 SILT
BLOW NO. 4-A DATE AUG. 8 1966

Figure 48 Dynamic Results of Reduced-Scale Pile 10-5 Silt,
Blow 4A
C.R.P. @ Average Rate of 0.006 inches/Min.

Driven on: 8/3/66
C.R.P. Test on: 8/8/66
Restruck on: 8/8/66

Figure 49  C.R.P. Test Results of Reduced-Scale Pile 10-5 Silt.
MODEL PILE 15-1 SILT
BLOW NO. 276 DATE JUNE 23 1966

Figure 50 Dynamic Results of Reduced-Scale Pile 15-1 Silt at the End of Driving
Figure 51  C.R.P. Test Results of Reduced-Scale Pile 15-1  Silt

C.R.P. at Average Rate of 0.008 inches/Min.

Driven on:  6/23/66
C.R.P. Test on:  7/12/66
Restruck on:  7/14/66
Figure 52  Dynamic Results of Reduced-Scale Pile 15-1 Silt, Blow 2A
Figure 53  Dynamic Results of Reduced-Scale Pile 15-5 Silt, at the End of Driving.
Driven on: 10/22/66
C.R.P. Test on: 10/28/66
 Restruck on: 11/12/66

Average Rate of 0.010 ″/Min.

Fast Test: $P_u = 10.25$ Kips
at a Rate of 1.5 ″/Min.

Figure 54 C.R.P. Test Results of Reduced-Scale Pile 15-5
MODEL PILE 15-5 SILT
BLOW NO. 1-A DATE NOVEMBER 12 1966

---

Figure 55  Dynamic Results of Reduced-Scale Pile 15-5 Silt, Blow 1A

- 58 -
Figure 56  Dynamic Results of Reduced-Scale Pile 15-5 Silt
Blow 3A
LOADTEST AND DYNAMIC RESULTS
FOR MODEL PILES DRIVEN IN SILT AND CLAY

Test Site: Northfield and Aurora Road
North Randall, Ohio
### Surface Elevation at 1045.0 Feet

<table>
<thead>
<tr>
<th>Depth Below Grade in Ft.</th>
<th>Description</th>
<th>Sample No.</th>
<th>Agg.</th>
<th>C.S.</th>
<th>F.S.</th>
<th>Silt</th>
<th>Clay</th>
<th>W.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Gravel, Silt and Clay</td>
<td>10</td>
<td>19</td>
<td>4</td>
<td>9</td>
<td>28</td>
<td>40</td>
<td>19</td>
</tr>
<tr>
<td>28</td>
<td>Gravel, Sandy Silt and Clay</td>
<td>9</td>
<td>20</td>
<td>9</td>
<td>15</td>
<td>32</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>24</td>
<td>Sandy Silt and Clay</td>
<td>8</td>
<td>7</td>
<td>8</td>
<td>12</td>
<td>36</td>
<td>37</td>
<td>14</td>
</tr>
<tr>
<td>20</td>
<td>Sandy Silt and Clay</td>
<td>7</td>
<td>11</td>
<td>15</td>
<td>11</td>
<td>29</td>
<td>34</td>
<td>14</td>
</tr>
<tr>
<td>16</td>
<td>Silt and Clay</td>
<td>6</td>
<td>9</td>
<td>6</td>
<td>9</td>
<td>40</td>
<td>36</td>
<td>14</td>
</tr>
<tr>
<td>12</td>
<td>Silt and Clay</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>7</td>
<td>39</td>
<td>40</td>
<td>17</td>
</tr>
<tr>
<td>12</td>
<td>Silt and Clay</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>18</td>
<td>50</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td>8</td>
<td>Fine Sand, Silt and Clay</td>
<td>3</td>
<td>9</td>
<td>20</td>
<td>14</td>
<td>25</td>
<td>32</td>
<td>23</td>
</tr>
<tr>
<td>4</td>
<td>Gravelly Sand and Clay</td>
<td>2</td>
<td>20</td>
<td>29</td>
<td>10</td>
<td>12</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>Silt and Clay</td>
<td>1</td>
<td>10</td>
<td>6</td>
<td>10</td>
<td>47</td>
<td>27</td>
<td>12</td>
</tr>
</tbody>
</table>

**Figure 57**: Soil Characteristics at Randall Yard Site
Figure 58  Dynamic Results of Reduced-Scale Pile 1-R-10 at the End of Driving
Figure 59  C.R.P. Test Results of Pile 1-R-10, One Week after Driving
Figure 60 Dynamic Results of Reduced-Scale Pile 1-R-10 Upon Restriking, Blow 1A
MODEL PILE 1-R-10 SILT AND CLAY
BLOW NO. 2-A DATE MARCH 11 1967

Figure 61  Dynamic Results of Reduced-Scale Pile 1-R-10
Upon Restriking, Blow 2A
Figure 62  Dynamic Results of Reduced-Scale Pile 1-R-15 at the End of Driving
Figure 63  C.R.P. Test Results of Pile 1-R-15 Before Restriking Pile

Applied Load in Kips

16
14
12
10
8
6
4
2
0

.02
.04
.06
.08
.10
.12
.14

Set in Inches

3/18/67
4/6/67
4/6/67

C.R.P. Test on:
Pile Driven on:
C.R.P. Test on:
Restruck on:
C.R.P. Test Rate at 0.015 Inches/Min.
MODEL PILE 1-R-15 SILT AND CLAY
BLOW NO. 1-A DATE APRIL 6 1967

Figure 64  Dynamic Results of Reduced-Scale Pile 1-R-15 Upon Restriking, Blow 1A
Figure 65  Dynamic Results of Reduced-Scale Pile 1-R-15, Upon Restriking, Blow 2A
Figure 66 Dynamic Results of Reduced-Scale Pile 2-R-10, At the End of Driving, Blow 130
Figure 67 Dynamic Results of Reduced-Scale Pile 2-R-10, At the End of Driving, Blow 131.
Figure 68  C.R.P. Test Results of Pile 2-R-10 After Driving Pile
Figure 69 C.R.P. Test Results of Pile 2-R-10 Before Restriking Pile
Figure 70  Dynamic Results of Reduced-Scale Pile 2-P-10, Upon Restriking, Blow 1-A
MODEL PILE 2-R-10 SILT AND CLAY
BLOW NO. 4-A DATE AUG. 1 1967

Figure 71  Dynamic Results of Reduced-Scale Pile 2-R-10, Upon Restriking, Blow 4-A
Figure 72  Dynamic Results of Reduced-Scale Pile 2-R-15, At the End of Driving, Blow 214.
Figure 73  Dynamic Results of Reduced-Scale Pile 2-R-15, At the End of Driving, Blow 215.
Figure 74: C.R.P. Test Results of Pile 2-R-15 After Driving Pile
Figure 75: C.R.P. Test Results of Pile 2-R-15 Before Restriking Pile
Figure 76 Dynamic Results of Reduced-Scale Pile 2-R-15, Upon Restriking, Blow 2-A
Figure 77 Dynamic Results of Reduced Scale Pile 2-R-15, Upon Restriking, Blow 3-A
Figure 78  Dynamic Results of Reduced Scale Pile 2-R-15, Upon Restriking, Blow 5-A
Figure 79 Dynamic Results of Reduced Scale Pile 2-R-20, At the End of Driving, Blow 315.
Figure 80  Dynamic Results of Reduced Sale Pile 2-R-20, At the End of Driving, Blow 316.
Average Rate at 0.01 Inches/Min.

Pile Driven on: 8/4/68
Pile Tested on: 8/4/68

Figure 81 C.R.P. Test Results of Pile 2-R-20 After Driving Pile
Figure 82: M.L. Test Result of Pile 2-R-20 Before C.R.P. Test and Then Restriking of Pile

Pile Driven on: 8/4/67
Pile Tested on: 8/8/67
Pile Restruck on: 8/9/67
Figure 83: C.R.P. Test Result of Pile 2-R-20 Before Restriking Pile
Figure 84  Dynamic Results of Reduced-Scale-Pile 2-R-20, Upon Restriking, Blow 4-A.
MODEL PILE 2-R-20 SILT AND CLAY
BLOW NO. 7-A DATE AUG. 9 1967

Figure 85 Dynamic Results of Reduced-Scale Pile 2-R-20, Upon Restriking Blow 7-A.
MODEL PILE 2-R-20 SILT AND CLAY
BLOW NO. 9-A DATE AUG. 9 1967

Figure 85 Dynamic Results of Reduced-Scale Pile 2-R-20, Upon Restriking,
Blow 3-A
Figure 87: Dynamic Results of Reduced-Scale Pile 3-R-10, At the End of Driving, Blow 129.
MODEL PILE 3-R-10 SILT AND CLAY
BLOW NO. 124 DATE AUG. 18 1967

Figure 88 Dynamic Results of Reduced-Scale Pile 3-R-10, At the End of Driving, Blow 124.
Test Rate at 0.01 Inches/Min.

Pile Driven on: 8/18/67
Pile Tested on: 8/18/67

Figure 89: C.R.P. Test Result of Pile 3-R-10 After Driving Pile
Figure 90: C.R.P. Test Result of Pile 3-R-10 Before Restriking Pile
Figure 91 Dynamic Results of Reduced-Scale Pile 3-R-10, Upon Restriking, Blow 1-A.
Figure 92 Dynamic Results of Reduced-Scale Pile 3-R-10, Upon Restriking, Blow 2-A
MODEL PILE 3-R-15 SILT AND CLAY
BLOW NO. 199 DATE AUG. 22 1967

Figure 93 Dynamic Results of Reduced-Scale Pile 3-R-15, At the End of Driving, Blow 199.
Figure 94 Dynamic Results of Reduced-Scale Pile 3-R-15, At the End of Driving, Blow 200
Test Rate at 0.01 Inches/Min.

Pile Driven on: 8/22/67
Pile Tested on: 8/22/67

Figure 95: C.R.P. Test Results of Pile 3-R-15 After Driving Pile
Figure 96: C.R.P. Test of Pile 3-R-15 Before Restriking Pile
Figure 97  Dynamic Results of Reduced-Scale Pile 3-R-15, Upon Restriking, Blow G-A
Figure 98  Dynamic Results of Reduced-Scale Pile 3-R-15, Upon Restriking, Blow 7-A
Figure 99 Dynamic Results of Reduced-Scale Pile 3-R-20, At the End of Driving, Blow 268.

- 103 -
MODEL PILE 3-R-20 SILT AND CLAY
BLOW NO. 271 DATE AUG. 30 1967

Figure 100 Dynamic Results of Reduced-Scale Pile 3-R-20, At the End of Driving, Blow 271
Figure 101: C.R.P. Test Results of Pile 3-R-20 After Driving Pile
MODEL PILE 3-R-20 SILT AND CLAY
BLOW NO. 1-A DATE SEP. 5 1967

Figure 103 Dynamic Results of Reduced-Scale Pile 3-R-20, Upon Restriking, Blow 1-A
MODEL PILE 3-R-20 SILT AND CLAY
BLOW NO. 3-A DATE SEP. 5 1967

Figure 104 Dynamic Results of Reduced-Scale Pile 3-R-20, Upon Restriking, Blow 3-A

- 108 -
LOADTEST AND DYNAMIC RESULTS
FOR FULL SCALE PILES

Test Sites:  Cleveland
             Youngstown
             Uhrichville
             Toledo
             Canton
             Akron
             Cincinnati
Figure 105  Dynamic Results of Full-Scale Pile No. 113, North Pier at the End of Driving
Figure 106  M.L. Test Results for Full-Scale Pile No. 113, N. Pier; Performed by Ohio Highway Department Personnel
Figure 107  Dynamic Results of Full-Scale Pile No. 138, Pier No. 4 near the End of Driving (76' below grade).
C.R.P. TEST AT AN AVERAGE RATE OF 0.022"/MIN. PERFORMED 3 HRS. AFTER REBOUND

M.L. TEST RESULTS

M.L. TEST RESULTS NOT INCLUDING SET DUE TO CREEP BETWEEN LOAD INCREMENTS

Figure 108 M.L. and C.R.P. Test Results of Full-Scale Pile 138 of Pier No. 4
Figure 109  M.L. Test Results of Full-Scale Pile A of Pier No. 5

12" Dia. Pile at 210 Gage
Pile A of Pier No. 5
Driven on:  4/22/66
M.L. Test On:  5/9/66
Soil Condition:  Sandy Silt
Figure 110  Dynamic Results of Full-Scale Pile A of Pier 5, Blow 12A upon Restriking Pile
Figure 111 Dynamic Results of Full-Scale Pile A of Pier 5, Blow 13A upon Restriking Pile.
M.L. TEST RESULTS NEGLIGENT CREEP BETWEEN LOAD INCREMENTS

M.L. RESULTS INCLUDING CREEP BETWEEN LOAD INCREMENTS

12" DIA. PILE AT 210 GAGE
PILE NO. 103 OF PIER NO. 2 BR. NO. CUY 290-0040
DRIVEN ON 5/2/66 M.L. TEST ON 5/9/66 TO 5/10/66
SOIL CONDITION: SAND 8 SILT
DEPTH OF PENETRATION: 74'-0"

Figure 113  M.L. Test Results of Full-Scale Pile 103 of Pier No. 2
Figure 114  Dynamic Results of Full-Scale Pile 103 of Pier No. 2, Blow 1A
Figure 115  Dynamic Results of Full-Scale Pile 103 of Pier No. 2, Blow No. 2A
Figure 116  Dynamic Results of Full-Scale Pile 103 of Pier No. 2, Blow 9A
Figure 117  C.R.P. and M.L. Test Results of Full-Scale Pile A of Wall 91A
Figure 118  Dynamic Results of Full-Scale Pile A of Wall 91A upon Restriking Blow 1A

- 123 -
Figure 119  Dynamic Results of Full-Scale Pile A of Wall 91A upon Restriking Blow 3A
Figure 120

C.R.P. and M.L. Test results of Full-Scale Pile 692 in Youngstown, Ohio
Figure 121 Dynamic Results of Full-Scale Pile 692 in Youngstown, Ohio; Blow 12A
Figure 122 Dynamic Results of Full-Scale Pile 692 upon re-striking, Blow 15A
Figure 123  C.R.P. and M.L. Test Results of Pile 506 in Uhrichville, Ohio
FULL SCALE PILE UHRICHVILLE
BLOW NO. 2-A  DATE SEP. 13 1966

Figure 124  Dynamic Results of Full-Scale Pile 506 in
Uhrichville, Ohio, Blow No. 2A
FULL SCALE PILE UHRICHVILLE
BLOW NO. G-A DATE SEP. 13 1966

Figure 125 Dynamic Results of Full-Scale Pile 506 in Uhrichville, Ohio, Blow No. 6A
Figure 126
C.R.P. Test Results of Full-Scale Pile in Toledo, Ohio
Figure 127  Dynamic Results of Full-Scale Pile in Toledo, Ohio upon Restriking, Blow 22A
Figure 12C  Dynamic Results of Full-Scale Pile in Toledo, Ohio upon Restriking, Blow 23A
Figure 129

C.R.P. Test Results of Full-Scale Pile Cl in Canton, Ohio
Figure 130  Dynamic Results of Full-Scale Pile C1, Canton, Ohio: Blow 2A
Figure 131

C.R.P. Test Results of Full-Scale Pile 534, in Canton, Ohio
FULL SCALE PILE CANTON
PILE 534 BLOW NO. 1-A DATE APRIL 11 1967

Figure 132  Dynamic Results of Full-Scale Pile 534, Blow 1A
Figure 134  Dynamic Results of Full-Scale Pile 531-70, Blow 1A upon Restriking
Yield Point as Defined by Ohio Highway Dept. Specifications

C.R.P. Rate at 0.010 "/Min.

C.R.P. Rate at 0.020 "/Min.

Figure 135  C.R.P. Test Results of Pile 531-70 after a 3-Day Set-up Period
FULL SCALE PILE CANTON
PILE 531-70 BLOW NO. 31-A DATE APRIL 17 1967

Figure 136 Dynamic Results of Pile 531-70 Blow 31A
upon Restriking on 4/17/67
Figure 137 Dynamic Results of Pile 531-70, Blow 33A upon Restriking on 4/17/67
Figure 139 Dynamic Results of Pile 531-76, Blow 3A on 4/18/67
Figure 140  Dynamic Results of Pile 531-76, Blow 5A  
on 4/18/67
Figure 141  C.R.P. Test Results of Pile 531-83 upon Completion of Driving

Yield Point as Defined by Ohio Highway Dept. Specifications

C.R.P. Rate at 0.010 "/Min.
C.R.P. Rate at 0.020 "/Min.

Applied Load in Tons
Set in Inches
Figure 142  Dynamic Results of Pile 531-83, Blow No. 5 at the End of Driving
FULL SCALE PILE AKRON
PILE F-30 BLOW NO. 13 DATE JUNE 21 1967

Figure 143 Dynamic Results of Full-Scale Pile F-30, Akron, Ohio at the End of Driving
Figure 144: Dynamic Results of Full-Scale Pile F-30 Akron, Ohio at the End of Driving
Figure 148  Typical Mechanically Recorded Deflection at the Top of Full-Scale Pile F-50 at the Completion of Driving
Figure 146  C.R.P. Test of Full-Scale Pile F-30 in Akron, Ohio after Completion of Driving
Figure 147  M.L. Test Results Performed on Full-Scale Pile F-30 in Akron, Ohio

Length of Pile:  33'
Depth Below Grade:  31'
Date Driven   6/21/67
Date of M.L. Test  6/25/67
Length of Pile: 33'
Length Below Grade: 31'
Date Driven on: 6/28/67
Date of C.R.P. Test 6/28/67

Figure 148  C.R.P. Test Results of F-30 a Few Hours after Completion of M.L. Test
Figure 149 Dynamic Results of Full-Scale Pile F-30, Blow 5A of Restriking.
Figure 150  Dynamic Results of Full-Scale Pile F-30, Blow 6A of Restriking.
Figure 151: C.R.P. Test Results of Pile F-50 upon Completion of Driving.
Figure 152  Dynamic Results of Pile F-50, Blow 19 at the End of Driving
Figure 153  Dynamic Results of Pile F-50, Blow 20, at the End of Driving
Figure 154  M.L. Test Results of Pile F-50 after a 5-Day Set-up Period

Length of Pile: 51.5'
Length Below Grade: 50'
Date Driven: 6/28/67
Date of M.L. Test: 7/3/67
Figure 155 C.R.R.P. Test Results of Pile F-50 after Completion of the M.L. Test
Figure 156  Dynamic Results of Pile F-50, Blow 13A of Restriking
Figure 157 C.R.P. Test Results of Pile F-60 upon Completion of Driving

Length of Pile: 60.5'
Length Below Grade: 59'
Date Driven: 7/7/77
Date of C.R.P. Test: 7/7/77

Applied Load in Kips

C.R.P. at a Rate of 0.020"/Min.

Set in Inches
Figure 158  Dynamic Results of Pile F-60 at the End of Driving
Length of Pile: 60.5'
Length Below Grade: 59'
Date Driven: 7/7/67
Date on M.L. Test: 7/12/67

Figure 159 M.L. Test Results of Full-Scale Pile F-60 after a 5-Day Set-up Period
Length of Pile: 60.5'
Length Below Grade: 59'
Date Driven: 7/7/67
Date of C.R.P. Test: 7/20/67

C.R.P. at 0.020"/Min.
C.R.P. at a Rate of 0.040"/Min.

Figure 160 C.R.P. Test Results of Full-Scale Pile F-60
One Week after M.L. Test

- 165 -
Figure 161 Dynamic Results of Pile F-60 Blow 26A Upon Restriking
Figure 162: C.R.P. Test Results for Full-Scale Pile in Hamilton County of Bridge No. Ham-27-1799
Figure 163  Dynamic Results of Full-Scale Pile in Cincinnati, Upon Restriking Pile, Blow 3.
FULL SCALE PILE CINCINNATI
BLOW NO. 4 DATE JAN. 4 1968

Figure 164 Dynamic Results of Full-Scale Pile in Cincinnati, Upon Restriking Pile, Blow 4.
Results of M.L. Test
Neglecting Creep Between
Load Increments

M.L. Test Results Including
Creep Between Load Increments

12" Dia. Pile at #7 Gage
M.L. Test on: 4/15/68
Pile Driven on: 4/10/68
Soil Condition: Gray Clayey Silt
Depth of Penetration: 51 Feet.

Figure 165: M.L. Test Result for Full-Scale Pile 272 of Bridge No. Luc-75-0427 Performed by Ohio Highway Personnel
Figure 166: C.R.P. Test Results for Full-Scale Pile No. 272 of Bridge No. Luc-75-0427
Figure 167 Dynamic Results of Pile 272 in Toledo, Upon Restriking, Blow 11-A.
Figure 168 Dynamic Results of Pile 272 in Toledo, Upon Restriking, Blow 12-A.
Figure 169 Dynamic Results of Pile 272 in Toledo, Upon Restriking, Blow 14-A.
Figure 170  Dynamic Results of Pile 272 in Toledo, Upon Restriking, Blow 17-A.