FDOT Automation of Pile Driving Data Collection

Presented at
Subcommittee on Construction Meeting – August 2006
San Juan, Puerto Rico

Presented by:
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State Construction Systems Engineer
Florida Department of Transportation
Automated Pile Data Collection

- Why Automate
- Project Approach
- Findings
- Current Status
- Demonstration
Why Automate Data Collection?

- Manual Process
  - Time Consuming
  - Data not readily Available
  - Potential for Missed Data

- Proposed Automated Process
  - Fully Automated (Saximeter interface also)
  - Data Available Electronically
  - Less Errors
Project Approach

- First Project Proposed Use of Handhelds
  - Palm Pilots
  - PocketPCs
- Laptop Computers
  - More Adaptable to Users
  - Larger Screens
  - Easier to Use
- Next Phase – Laptops with Handhelds
Findings

- Laptops Can be Utilized and Handhelds have some potential for use
- Program Flow Improvements
- Need for Consolidated Notes
Current Status

- **Current Project – Using Laptops**
  - Fully Functional Program
    - Now – Paper is still being allowed
    - July 2007, Automated Use Required.
  - Data Archived to Central Data Repository
  - Printed Reports Available

- **Future Work** –
  - More experiments with Handheld
  - Interface to SiteManager for Payment Quantity
  - Implementing Auger Cast
  - Proposing for Drill Shafts as well
Program Demonstration
To select an existing bent/pier, double click on desired bent/pier.
To enter a new bent/pier, double click on an empty line.
To delete a bent/pier, highlight desired Bent/Pier and press DEL.
Bent/Pier No: 4 - A  Station No: 1AB5 + 86.500

Pile Type: 1 - Prestressed Concrete
Pile Size: 12" sq.
Pile Cushion Material: Pine Plywood

Pile Cushion Size: 8.250 Inches
Authorized Pile Length: 52.000 Feet

Hammer Type and Make: Delmag

Hammer Cushion Thickness and Material: Nylon
Rated Energy: 68900

Pile Manufactured By: Durastress
<table>
<thead>
<tr>
<th>List of Piles For Bent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile 002</td>
</tr>
<tr>
<td>Pile 001</td>
</tr>
</tbody>
</table>

To select an existing pile, double click on desired pile.
To enter a new pile, double click on an empty line.
To delete a pile, highlight desired pile and press DEL.
### Pile Data - Data is in ENGLISH

#### Pile Notes - Driving Log

- **Pile No.**: 2
- **BM/TP #**: 1
- **BM/TP Elev.**: 85.140
- **BM/TP Rod Read.**: 2.840
- **HI Elev.**: 87.980
- **Test Pile**: [Check box]
- **Init Pile Length**: 52.000
- **Auth. Pile Length**: 52.000
- **Payment No.**: 455-34-1

#### Manufacture's Data

- **Work Order No.**: B 1229
- **Date Cast**: 07/23/2004
- **Manufactures Pile No.**: Y-215

#### Durastress

- **Manufactured By**: [Blank]

#### Elevations Before Driving

- **Pile Cutoff Elev.**: 76.940
- **Min. Tip Elev.**: 36.000
- **Template Elev.**: 78.010
- **Ground Elev.**: 69.820
- **Scour Elev.**: 0.000
- **Excavation Bottom Elev.**: 0.000

#### Weather

- **Weather**: CLOUDY
- **Temp.**: 65

#### Date Driven

- **Date Driven**: 02/02/2005

#### Compute Pile

- **Pile Head Rod Reading after driving**: 3.000
- **Pile Head Elev. after driving**: 84.980
- **Total Pile, Furnished**: 57.000
- **Total Pile, Driven**: 43.960
- **Penetration**: 36.840
- **Pile Tip Elev.**: 32.980

#### Pile Driving Inspector

- **HODGES**
## Pile Notes/Log - Data is in ENGLISH - BENT 004-A Pile 002

**Point Protector:**

- **Preformed Hole Depth:** 0.000
- **P.D.A.:**
- **Extraction:**
- **Pile Batter:** 0.000

**No. Redrives:**
- **Set Checks Paid For:** 0
- **Splice Len. Auth.:** 0.000
- **Splice Len. Act.:** 0.000

**Splices**
- **Splices Driven:**
- **Start Time:**
- **Stop Time:**
- **Times are in Military format

**Driving Criteria:**

- **Min. Tip Elev:** 36.000

<table>
<thead>
<tr>
<th>Penetration</th>
<th>Tip Elevation</th>
<th>Blows</th>
<th>Stroke/Pressure</th>
<th>Note Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.000 - 1.000</td>
<td>68.820</td>
<td>0</td>
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<tr>
<td>1.000 - 2.000</td>
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<td>5.800</td>
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<td>11.000 - 12.000</td>
<td>57.820</td>
<td>28</td>
<td>6.000</td>
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<td>12.000 - 13.000</td>
<td>56.820</td>
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<td>14.000 - 15.000</td>
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<tr>
<td>15.000 - 16.000</td>
<td>53.820</td>
<td>36</td>
<td>5.900</td>
<td></td>
</tr>
<tr>
<td>16.000 - 17.000</td>
<td>52.820</td>
<td>32</td>
<td>6.000</td>
<td></td>
</tr>
<tr>
<td>17.000 - 18.000</td>
<td>51.820</td>
<td>38</td>
<td>5.900</td>
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<tr>
<td>18.000 - 19.000</td>
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<td>19.000 - 20.000</td>
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<tr>
<td>20.000 - 21.000</td>
<td>48.820</td>
<td>47</td>
<td>6.200</td>
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</tr>
</tbody>
</table>

### Notes For This Pile
- This is note 1
- f2
- f3
- f4
- 5. pile set on template to 19
- 6. High Tension stopped driving 2:33 pm
- 7. Added 2 inches of cushion
- 8. stopped to change cushion 12 inches
- 9. bad sax Data
- 10. 15 min set check
- 1 - 8 @ 8.0
- 2 -
- 3 -
### Pile Data

**BENT 004-A**

- **Pile No.:** 455-34-1
- **Init Pile Length:** 52.000
- **Auth. Pile Length:** 52.000

**Pay Item No.:** B 1229

**BM/TP #:** 1

**BM/TP Elev.:** 85.140

**BM/TP Rod Read.:** 2.840

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**Sample Report**

State Of Florida  
Department Of Transportation  
Pile Driving Records  

Report Date: 07/28/2006  
Report Time: 13:52:34  

PilePgm FDOT V5.2 July/2006  

Contract No.: 1234  
FIN No.: 1234567890  
Structure ID.: 550102  

Structure Location:  
I-4 over Reedy Creek  

Structure Description:  
I-4 West bound over I-4 piles on north  
side of structure  

<table>
<thead>
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<tbody>
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<td>02/02/2005</td>
<td>1</td>
<td>52.000</td>
<td>69.820</td>
<td>76.940</td>
<td>81.090</td>
<td>29.090</td>
<td>0.0001</td>
<td>10</td>
<td>47.850</td>
<td>52.000</td>
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**Driving Log**  

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ANY QUESTIONS?

AUTOMATED PILE DATA COLLECTION SYSTEM