FDOT Automation of Pile Driving Data Collection

Presented at

Subcommittee on Construction Meeting – August 2006

San Juan, Puerto Rico

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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
  - Easer to Use
- Next Phase – Laptops with Handhelds

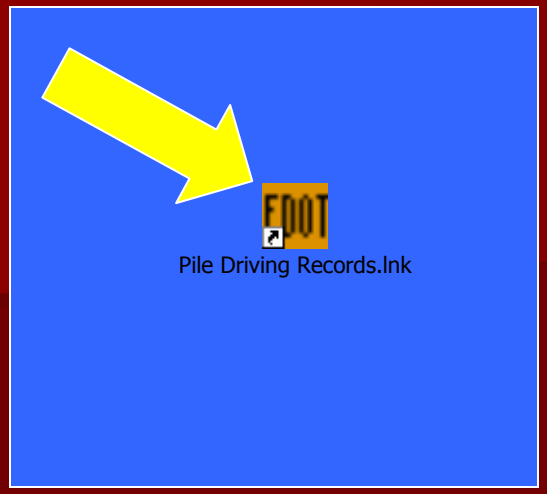
Findings

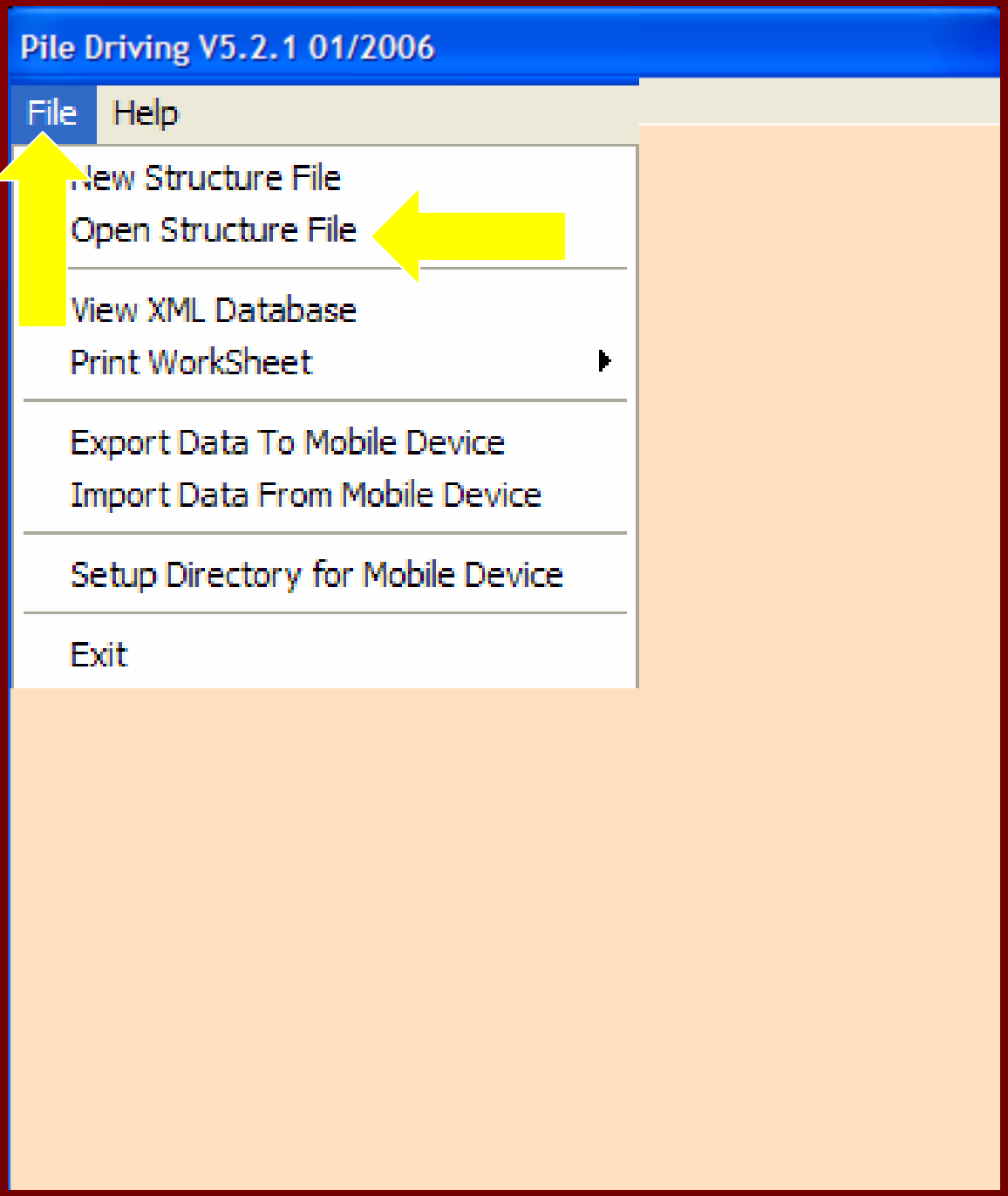
- Laptops Can be Utilized and Handhelds have some potential for use
- Program Flow Improvements
- Need for Consolidated Notes

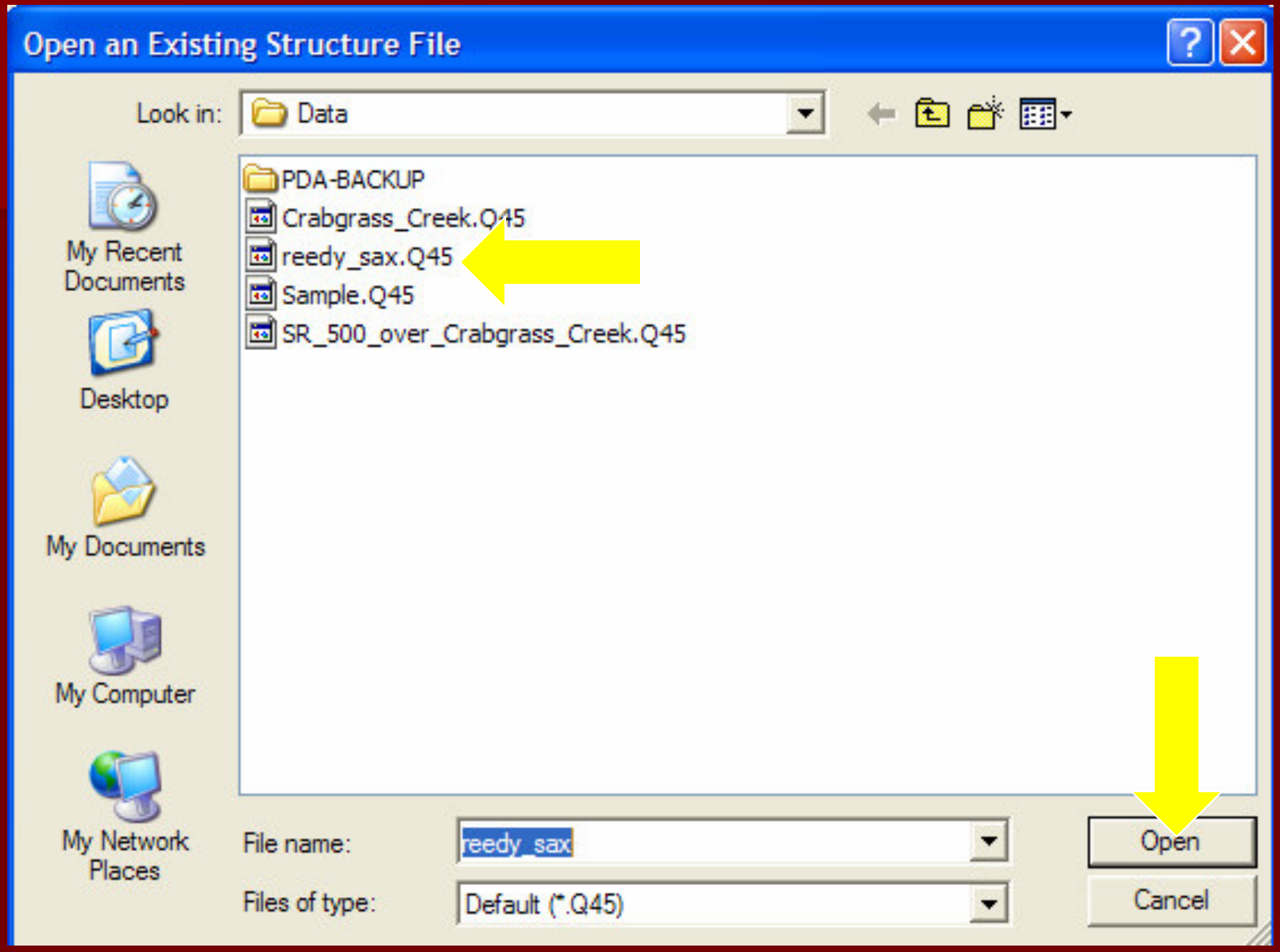
Current Status

- 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


Pile Driving Records.lnk


Pile Driving V5.2.1 01/2006
File
Help
New Structure File
Open Structure File
View XML Database
Print WorkSheet
Export Data To Mobile Device
Import Data From Mobile Device
Setup Directory for Mobile Device
Exit


Open an Existing Structure File
Look in:
Data
PDA-BACKUP
Crabgrass_Creek.Q45
reedy_sax.Q45
Sample.Q45
SR_500_over_Crabgrass_Creek.Q45
My Recent Documents
Desktop
My Documents
My Computer
My Network Places
File name:
reedy_sax
Files of type:
Default (*.Q45)
Open
Cancel

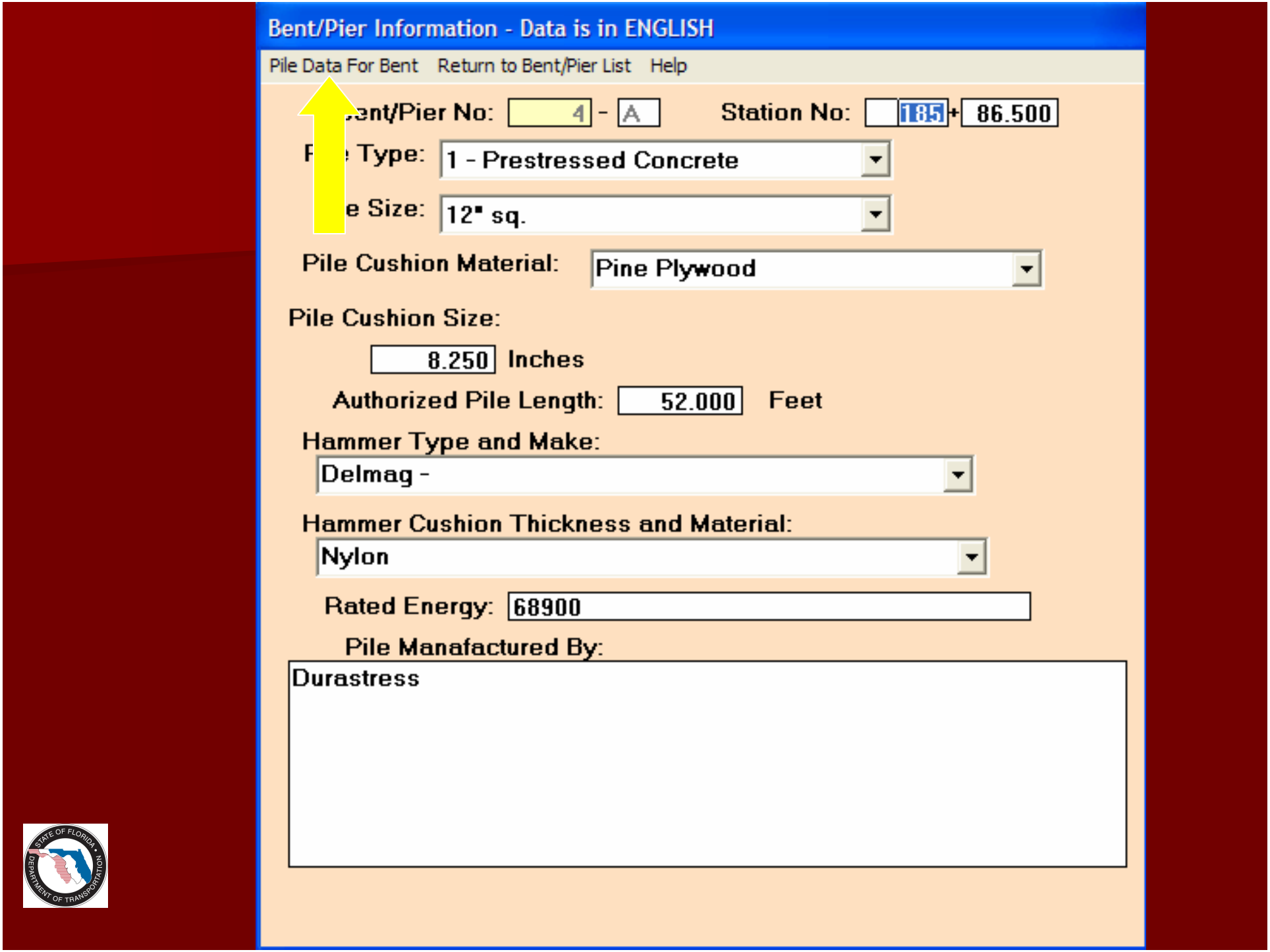
Double Click

Pile Driving V5.2.1 01/2006

File Edit Help

Bent/Pier List
BENT 004-A
BENT 005-

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.

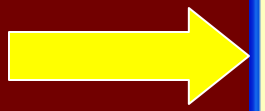

Bent/Pier Information - Data is in ENGLISH
Pile Data For Bent
Return to Bent/Pier List
Help
ent/Pier No: 4 - A
Station No: 185 + 86.500
Type: 1 - Prestressed Concrete
e Size: 12" sq.
Pile Cushion Material: Pine Plywood
Pile Cushion Size:
8.250 Inches
Authorized Pile Length: 52.000 Feet
Hammer Type and Make:
Delmag -
Hammer Cushion Thickness and Material:
Nylon
Rated Energy: 68900
Pile Manafactured By:
Durastress

Double Click

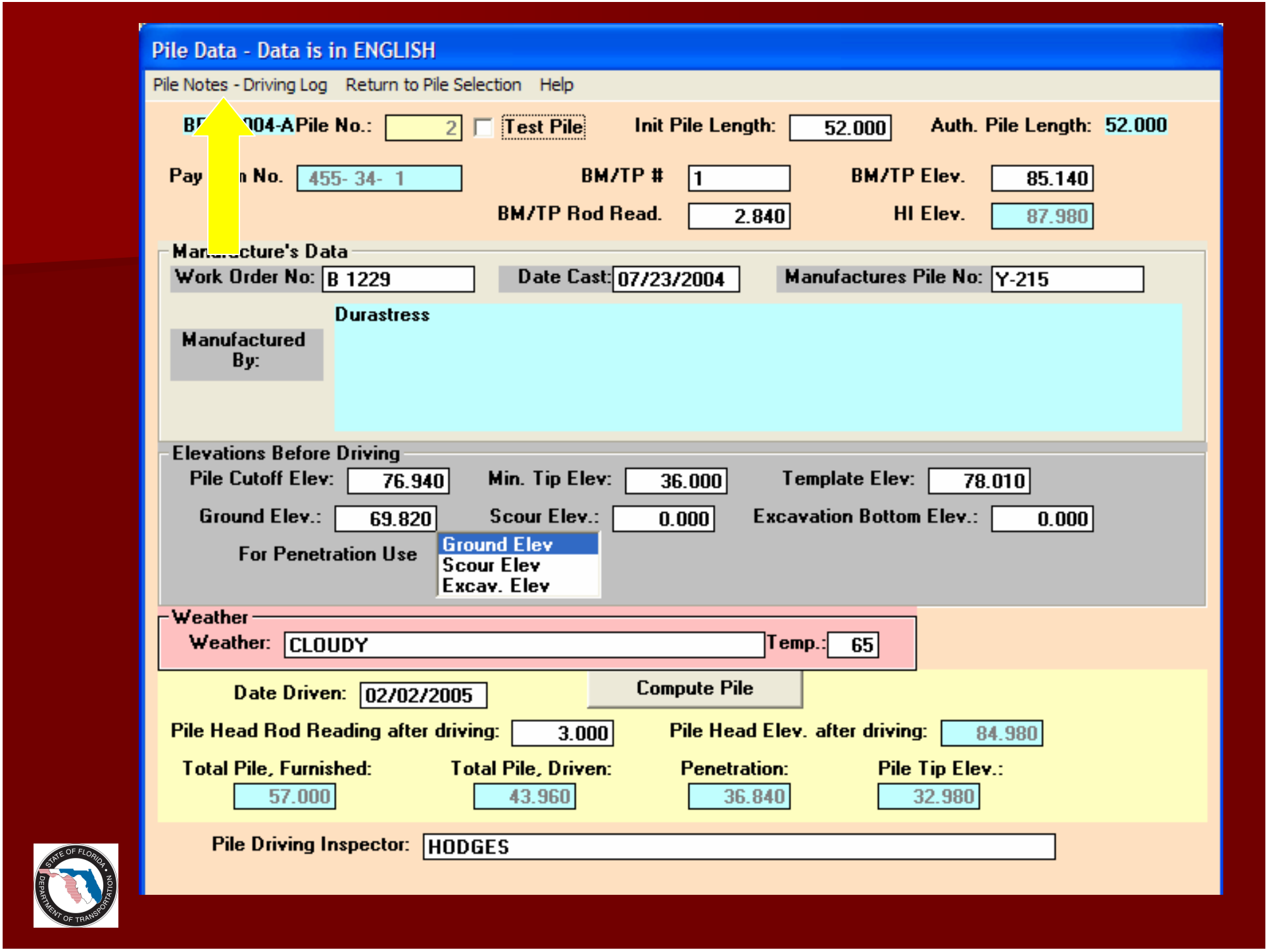
Pile List for Bent/Pier BENT 004-A

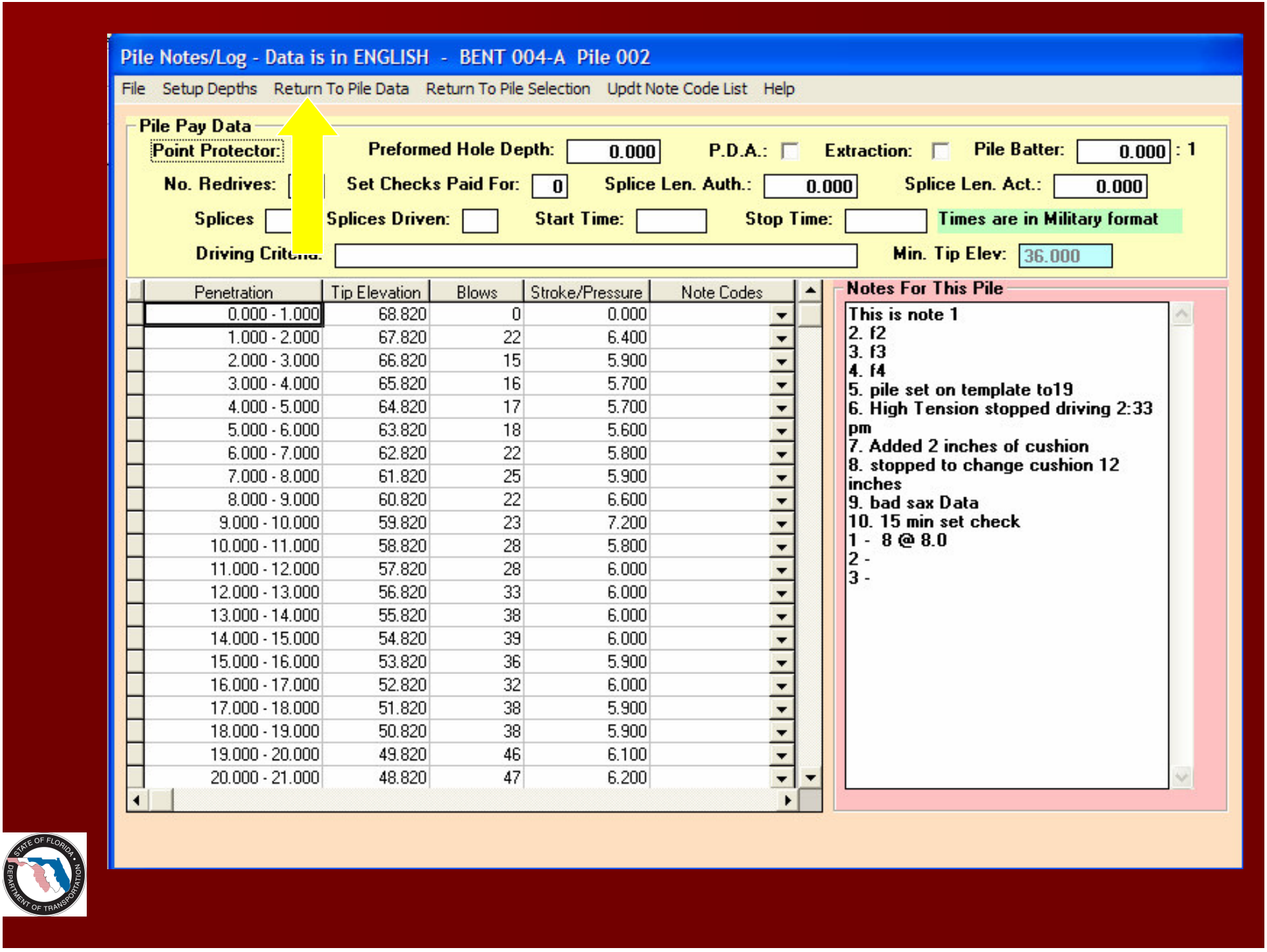
Return to Bent/Pier Help

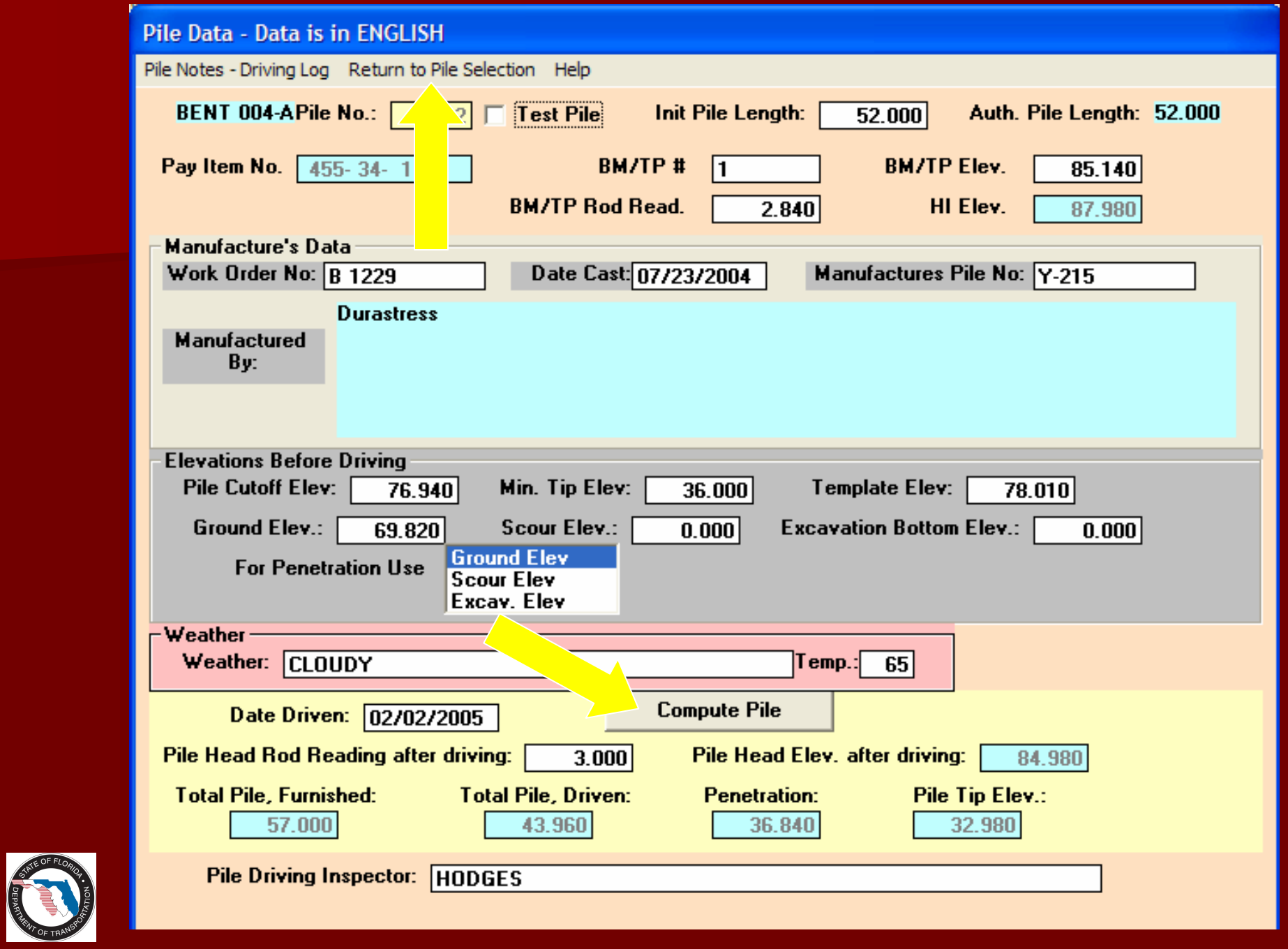
List of Piles For Bent
Pile 002
Pile 001

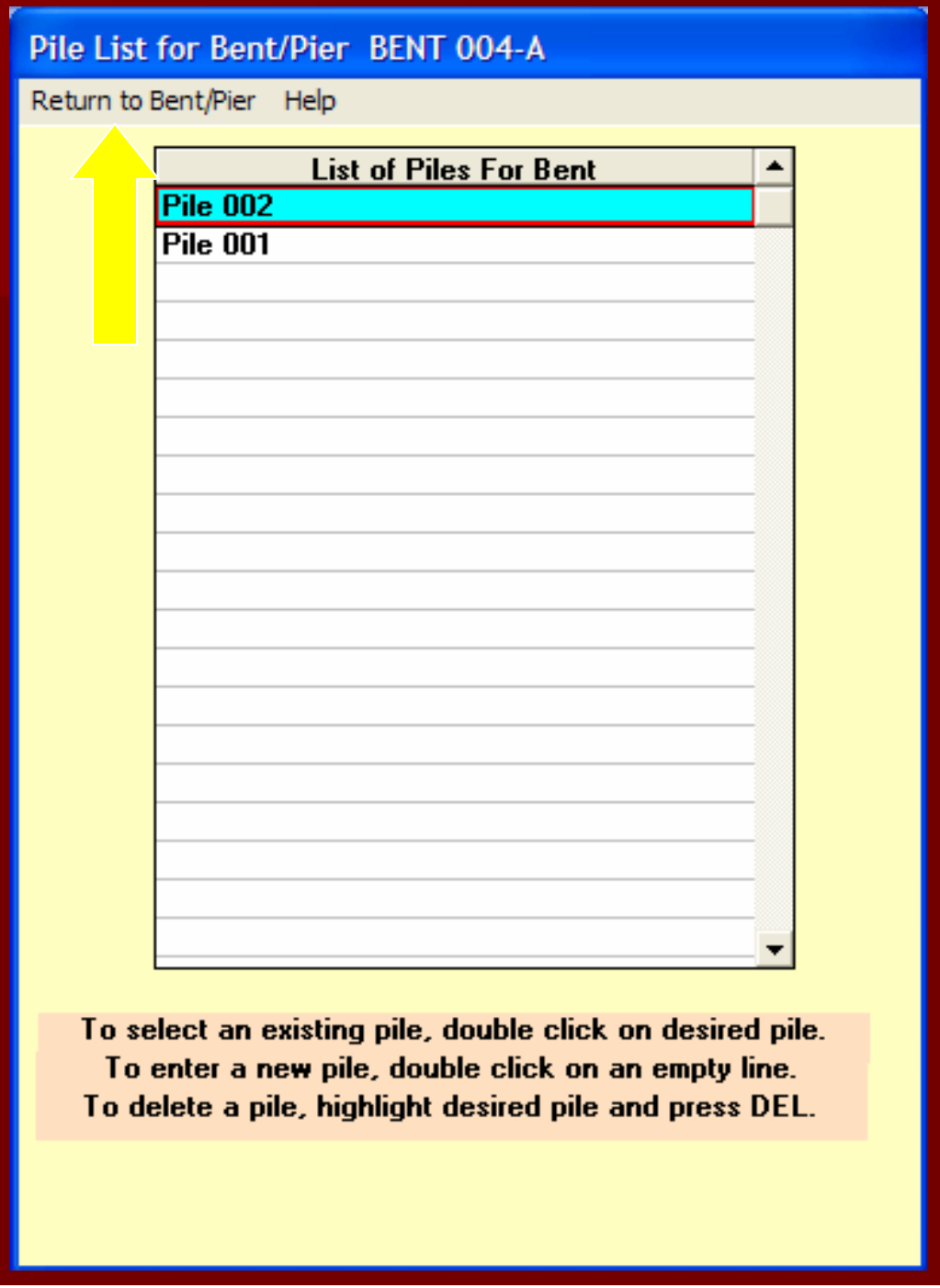


To select an existing pile, double click on desired pile.
To enter a new pile, double click on an empty line.
To delete a pile, highlight desired pile and press DEL.


Pile Data - Data is in ENGLISH
Pile Notes - Driving Log
Return to Pile Selection
Help
Pile No.: 2
Test Pile
Init Pile Length: 52.000
Auth. Pile Length: 52.000
No.
455- 34- 1
BM/TP #
1
BM/TP Elev.
85.140
BM/TP Rod Read.
2.840
HI Elev.
87.980
Work Order No:
B 1229
Date Cast:
07/23/2004
Manufactures Pile No:
Y-215
Durastress
Manufactured By:
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
For Penetration Use
Ground Elev
Scour Elev
Excav. Elev
Weather
Weather:
CLOUDY
Temp.:
65
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
File
Setup Depths
Return To Pile Data
Return To Pile Selection
Updt Note Code List
Help
Pile Pay Data
Point Protector:
Preformed Hole Depth: 0.000
P.D.A.:
Extraction:
Pile Batter: 0.000 : 1
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
Penetration
Tip Elevation
Blows
Stroke/Pressure
Note Codes
0.000 - 1.000 68.820 0 0.000
1.000 - 2.000 67.820 22 6.400
2.000 - 3.000 66.820 15 5.900
3.000 - 4.000 65.820 16 5.700
4.000 - 5.000 64.820 17 5.700
5.000 - 6.000 63.820 18 5.600
6.000 - 7.000 62.820 22 5.800
7.000 - 8.000 61.820 25 5.900
8.000 - 9.000 60.820 22 6.600
9.000 - 10.000 59.820 23 7.200
10.000 - 11.000 58.820 28 5.800
11.000 - 12.000 57.820 28 6.000
12.000 - 13.000 56.820 33 6.000
13.000 - 14.000 55.820 38 6.000
14.000 - 15.000 54.820 39 6.000
15.000 - 16.000 53.820 36 5.900
16.000 - 17.000 52.820 32 6.000
17.000 - 18.000 51.820 38 5.900
18.000 - 19.000 50.820 38 5.900
19.000 - 20.000 49.820 46 6.100
20.000 - 21.000 48.820 47 6.200
Notes For This Pile
This is note 1
2. f2
3. f3
4. f4
5. pile set on template to19
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 - Data is in ENGLISH
Pile Notes - Driving Log
Return to Pile Selection
Help
BENT 004-A
Pile No.:
Test Pile
Init Pile Length:
52.000
Auth. Pile Length:
52.000
Pay Item No.
455- 34- 1
BM/TP #
1
BM/TP Elev.
85.140
BM/TP Rod Read.
2.840
HI Elev.
87.980
Manufacture's Data
Work Order No:
B 1229
Date Cast:
07/23/2004
Manufactures Pile No:
Y-215
Manufactured By:
Durastress
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
For Penetration Use
Ground Elev
Scour Elev
Excav. Elev
Weather
Weather:
CLOUDY
Temp.:
65
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 List for Bent/Pier BENT 004-A
Return to Bent/Pier
Help
List of Piles For Bent
Pile 002
Pile 001
To select an existing pile, double click on desired pile.
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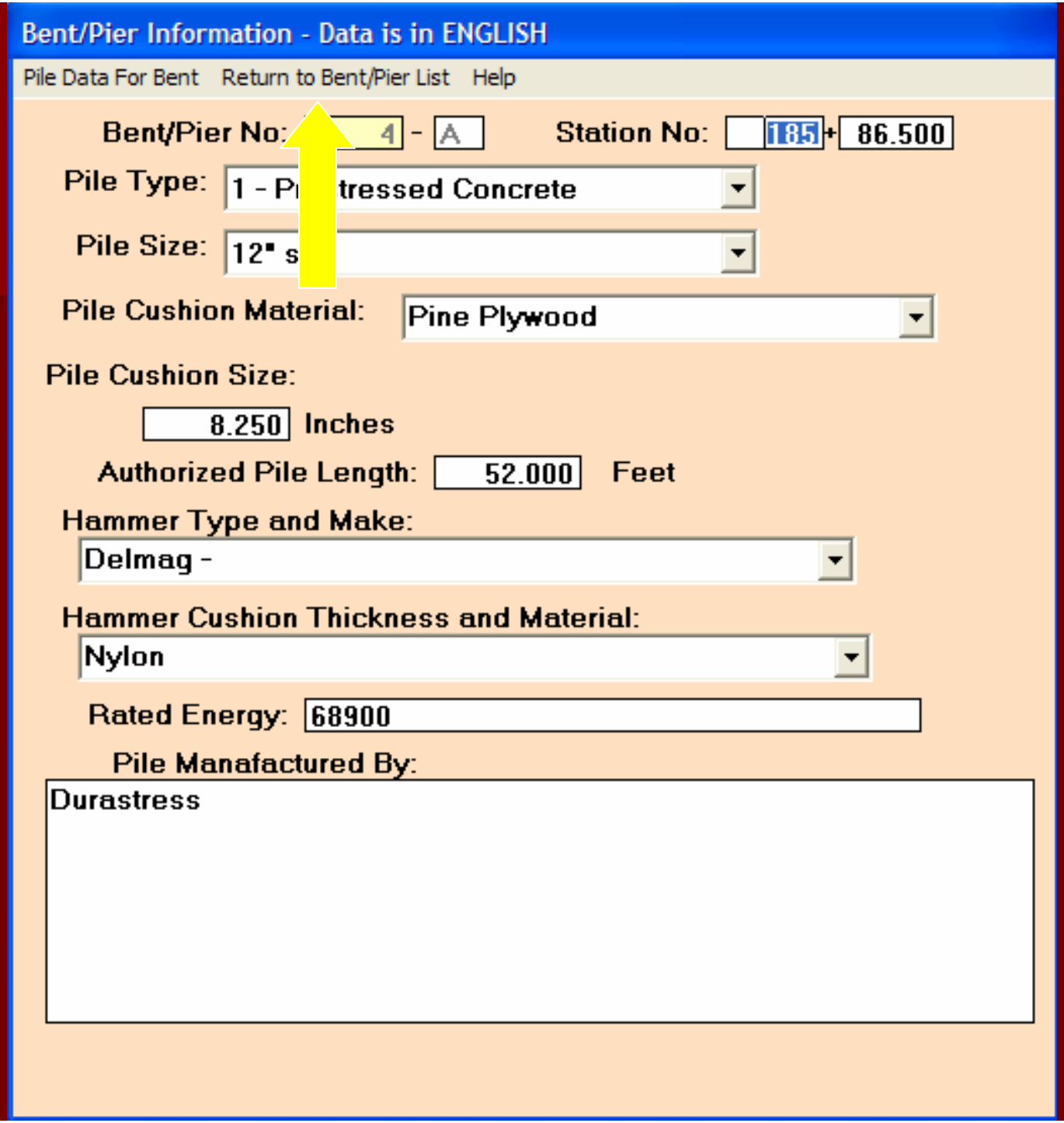
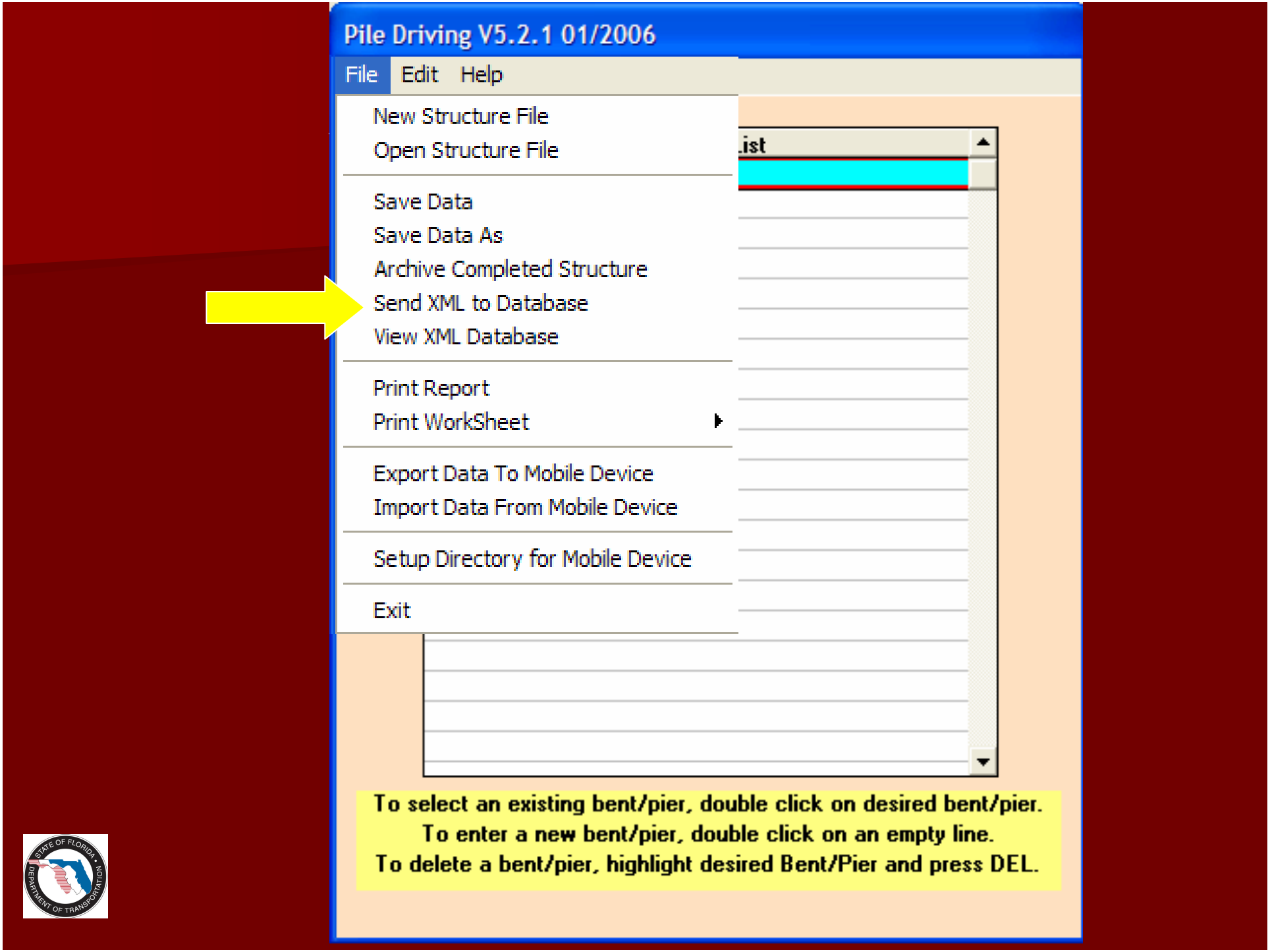

Bent/Pier Information - Data is in ENGLISH
Pile Data For Bent
Return to Bent/Pier List
Help
Bent/Pier No: 4 - A
Station No: 185 + 86.500
Pile Type: 1 - P tressed Concrete
Pile Size: 12" s
Pile Cushion Material: Pine Plywood
Pile Cushion Size:
8.250 Inches
Authorized Pile Length: 52.000 Feet
Hammer Type and Make:
Delmag -
Hammer Cushion Thickness and Material:
Nylon
Rated Energy: 68900
Pile Manafactured By:
Durastress


Pile Driving V5.2.1 01/2006
File
Edit
Help
New Structure File
Open Structure File
Save Data
Save Data As
Archive Completed Structure
Send XML to Database
View XML Database
Print Report
Print WorkSheet
Export Data To Mobile Device
Import Data From Mobile Device
Setup Directory for Mobile Device
Exit
ist
To select an existing bent/pier, double click on desired bent/pier.
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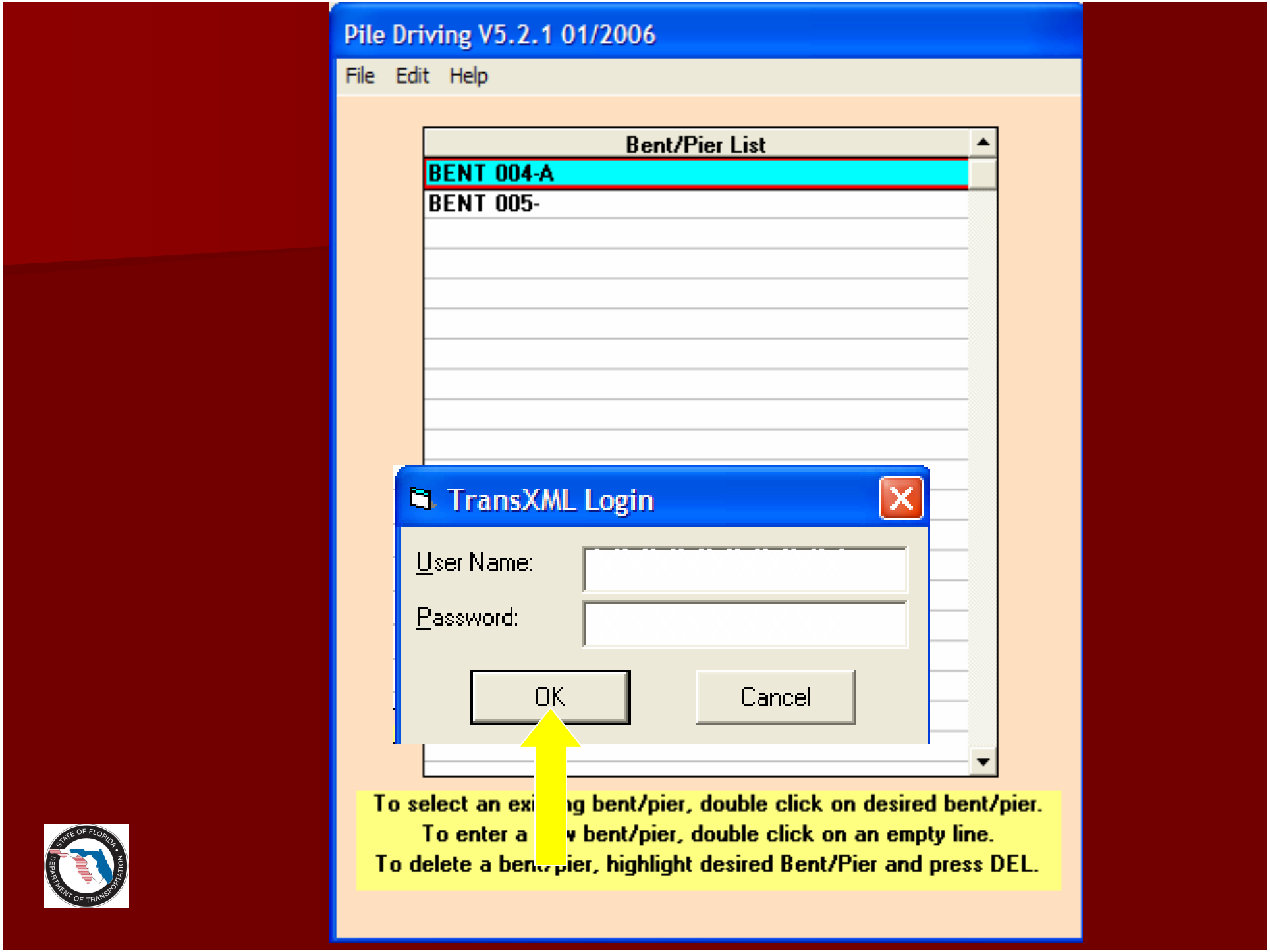
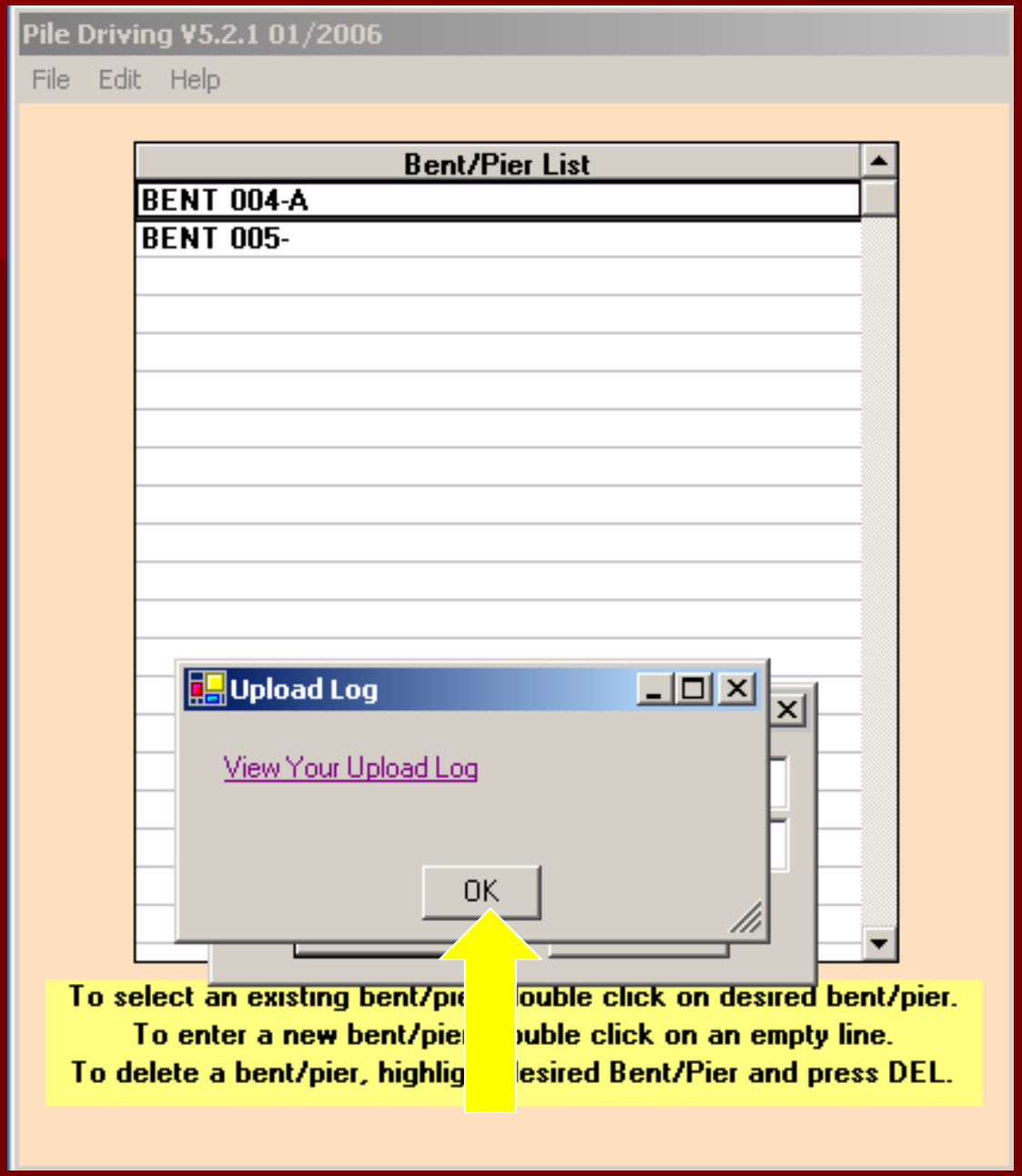

Pile Driving V5.2.1 01/2006
File
Edit
Help
Bent/Pier List
BENT 004-A
BENT 005-
TransXML Login
User Name:
Password:
OK
Cancel
To select an exi g bent/pier, double click on desired bent/pier.
To enter a bent/pier, double click on an empty line.
To delete a bent/pier, highlight desired Bent/Pier and press DEL.


Pile Driving V5.2.1 01/2006
File
Edit
Help
Bent/Pier List
BENT 004-A
BENT 005-
Upload Log
View Your Upload Log
OK
To select an existing bent/pie ouble click on desired bent/pier.
To enter a new bent/pie ouble click on an empty line.
To delete a bent/pier, highlig esired Bent/Pier and press DEL.

Sample Report

View Report

Help Print Exit

State Of Florida

Department Of Transportation

Pile Driving Records

Report Date: 07/28/2006

Report Time: 13:52:34

PilePgm FDOT V5.4.2 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

PilePgm FDOT V5.4.2 July/2006 Pile Driving Records Report Date: 07/28/2006 Time: 13:52:34 Page No.: 2
Struct Id.: 550102 Bent/Pier No.: 4-A Pile No.: 1 Values are in ENGLISH

Pile Type: 1 - Prestressed Concrete Pile Size: 12" sq. Authorized Length: 52.000
Pile Cushion Size: 8.250 Inspector(s): HENRICHS

Date Driven	Pile No.	Initial Length	Ground Elev.	Cutoff Elev.	Pile Top Elev.	Pile Tip Elev.	Batter	Buildup Auth.	Buildup Act.	Pile Furn.	Pile Driven
02/02/2005	1	52.000	69.820	76.940	81.090	29.090	0.000:1			57.000	47.850
								Authorized Pile Length =		52.000	
								Cutoff = 1 @ 5 =		5.000	

Driving Log

	Penetration	Tip Elev	Blows	Stroke/Pressure	Note Codes
0001	0.000 - 1.000	68.820	0		

ANY QUESTIONS?