



List of Major Changes and Updates for GRLWEAP 2005

Static Analysis Method:

- A new static analysis method based on the soil description and classification has been added, called Soil Type-Based Method (ST). Refer to the GRLWEAP Manual Section 3.13.2 for a complete description of this new method.
- Improvement has been made to the existing static analysis method based on SPT N-value, called SPT N-Value Method (SA), to consider different effective pressures on the top and bottom of a soil layer, which will improve the accuracy in the computation of soil resistance distribution for soil layers with larger thickness inputs. Refer to the GRLWEAP Manual Section 3.13.3 for a complete description of this method.
- Both static analysis methods are available for all analysis options.
- In addition to soil resistance distribution and soil dynamic parameters, both methods also compute capacity based on given pile perimeter and toe area. For Bearing Graph and Inspector's Chart analyses, these methods also update the percentage of the shaft resistance.
- Since Pile Perimeter and Toe Area are used in the static analyses, warning messages have been added if these parameters have zero values or are changed to assure that users are aware of which parameters are affected.
- The static methods will use the most recently inputted pile length if the static method has not been invoked in the same session. (In previous versions, the very initial default length was used).
- The appearance of static analysis method input dialog boxes has been changed, including a move of layer property after site property and an addition of a grey area above the surface if overburden pressure is considered.
- When the static analysis is finished for the Driveability analysis, the Soil Parameter Replacement Confirmation dialog box appears and allows the selection of which soil parameters to replace.

Depth/Modifier Input Form (D):

- Copy and paste features have been added to this form to share driving depths and modifiers between GRLWEAP and other applications, such as Excel. See menu: Edit->Copy Special-> Depths and Modifiers and Edit->Paste Special->Depths and Modifiers. A new dialog box was added to show the original text in clipboard, to allow selection of delimiters for parsing text, and to preview the results. The user can modify the original text in this dialog box.
- The default depth increment, which was 1 foot or 0.25 meter, will now be determined based on 10 steps and 5 feet or 2 meters.
- Instead of automatically generating input lines for different depths when initially entering this form, now a Reset button has been added to let user decide to: 1) remove all inputs except for the 1st one; 2) automatically generate inputs based on the given depth increment.
- Entered new depth values will now be checked to make sure that the value is less than or equal to the temporary pile length and total pile length.

Resistance Distribution Input Forms (S1 and S2):

- Copy and paste features have been added to these forms to share soil distribution data between GRLWEAP and other applications, such as Excel. See menu: Edit->Copy Special->Soil Distribution and



Edit->Paste Special->Soil Distribution. A new dialog box was added to show the original text in clipboard, to allow selection of delimiters for parsing text, and to preview the results. The user can modify the original text in this dialog box.

Hammer Data File:

- The hammer information is now contained in two separate hammer database files: the PDI hammer file and a user generated hammer file. This will prevent the user hammer information from getting overwritten when PDI updates their hammer files. The PDI generated hammer files (hammer2003.gw and ram2003.gw) holds hammer information provided by PDI with ID numbers being 2,000 or less and the user generated hammer files (hammer2003user.gw and ram2003user.gw) will hold the hammer information entered by users with ID number greater than 2,000.
- Added the following hammers:
 - Berminghammer Models: B3005, B6005, B6505 C, B6505
 - BSP Models: SL 20, SL 30, CX 40, CX 50, CX 60, CX75, CX 85, CX 110, CX 165, CX 180, CX 210, CX 240, CX 270, CX 300, CG 180, CG 210, CG 240, CG 270, CG 300
 - FEC D-18
 - ICE Models: 125, 14RF, 14-23, 22-23V, 22-30 23RF, 1412BT, 23-40, 28-35, 28RF-35, V360, V360 T, 44-30V, 44-70, 66-70, 7RF, 66-70HS, 66-80HS, 423
 - J&M Models: 115 HIH, 160 HIH, 220 HIH, 275 HIH, 345 HIH
 - JUNTAN Models: HHK 3A, HHK 4A, HHK 6A, HHK 7S, HHK 9S, HHK 12S, HHK 14S, HHK 16S, HHK 18S, HHK20S, HHK 25S, HHK 36S, HHU 5A, HHU 7A, HHU 9A, HHU 12A, HHU 14A, HHU 16A
 - MAIT Models: 34, 42, 54, 68, 120
 - Menck Models: MH 68, MH 96, MH 145
 - MGF Models: RBH 80, RBH 140, RBH 200, RBH 320, RBH460, RBH1050, RBH 1575
 - Müller Models: MS-16 HF, MS-25 H2, MS-25 H3, MS-50 H2, MS-50 H3, MS-25 HHF, MS-50 HHF, MS-100 HHF, MS-120 HHF, MS-200 HHF, MS-10 HFV, MS-16 HFV, MS-24 HFV, MS-32 HFV, MS-48 HFV, MS-62 HV
 - Pileco Models: D8-22, D12-42, D19-42, D25-32, D30-32, D36-32, D46-32, D62-22, D80-23, D100-13, D125-32, D160-32
 - PVE Models: 14M, 23M, 25M, 27M, 38M, 50M, 52M, 105M, 110M, 200M, 2307, 1420, 2315, 2520, 2310VM, 2315VM, 2316VM, 2319VM, 2323VM, 2332VM, 2335VM, 40VM, 50VM

Driving System Help:

- The fields, Pile Type and Pile Size, have been added and are used when obtaining help for the Driving System. Now when selecting Manufacturer's recommended driving system, only the recommendations for specified Hammer Model, Pile Type and Pile Size are listed first. Then users can choose to show the recommendations for a specified hammer maker or all recommendations.
- New information has been added for BSP hammers: SL, CX and CG models.

Graphical Presentation of Pile/Soil Model:

- The pile is drawn with shading and color to reflect different pile material and type for a more realistic appearance; the background is drawn with color to reflect sky and ground.



- The hammer image will change to reflect the hammer type selected. When a Vibratory hammer is selected, the plot will replace the hammer cushion, driving system, and corresponding values with the clamp weight.
- If Soil Type (ST) based static analysis method is used along with Simple Resistance Distribution option, a simple soil type plot will be shown in addition to the soil resistance distribution.
- Water table depth is indicated in the main plot.
- Printing for the pile/soil model plot has been improved.

Input and Help:

- The computations for default soil parameters such as Skin Quake, Toe Quake, Skin Damping and Toe Damping have been improved to consider pile size and soil type if the related inputs such as Toe Area and Perimeter have been entered and a static method has been used to specify soil type.
- Help (F3 function) for Soil Parameters has been expanded to generate suggested estimate values for the Skin Quake, Toe Quake, Skin Damping and Toe Damping.
- Help for the Cushion Information will display material properties for either the hammer or the pile, not both simultaneously.
- The option Save Input File As was added to allow the user to save the data in formats compatible with earlier versions of the GRLWEAP program.
- The input files, *.gww and *.gws, have been combined into one file *.gww.
- Toe Area and Top Perimeter have been moved to the Pile Information section and are also active for the Bearing Graph and Inspector's Chart analyses (was previously just available for the Drivability analysis), since they are used for static analyses which are available for all analysis options.
- The Strength/Yield field was removed from the Main Input form (can be found on the Pile Input Form).
- Toe Area and Top Perimeter have also been included in the New Project Input Wizard.
- Assembly Weight input was added to Hammer Override Dialog box to allow easy override of assembly weight for external combustion hammers.
- The Edit menu was added to provide access to submenus for copy/paste related commands, and the Settings menu has changed to a submenu under the Tools menu.
- When the hammer is sorted by name (manufacturer and model), it will now be sorted by the manufacturer name first and the energy second (instead of model name).
- An additional heading line was added in Slack/Splice Information Input dialog box to help distinguish between the tension slack and the compression splice input.
- If the analysis window is still open, for example the user forgets to "press any key" to close the analysis window after an analysis is completed, the window will automatically close when the user tries to perform another analysis.
- The label Circumference has been changed to Perimeter throughout the whole program.
- In the New Project Input Wizard, the Soil Damping options are limited to only Smith and Smith Viscous since this wizard is intended for simple analysis.
- A message was added when Two Pile option is selected to remind the user that the Hammer and Pile gravities should be set to zero.
- In the previous version, when changing the RSA option in Options->General Option->Numerical, the program would display a message to check the damping option and then return to the Main Input form. The program now takes the user to the damping option page so that a change can be made directly.
- For easy and quick access, the menus, Open 2002 or Later File (*.GWW) and Open Pre 2002 Input File (*.GWI), were moved directly under File menu.
- The Residual Stress Analysis indicator field was moved from the Pile Information section to the right



column.

- When using the Area Calculator to change pile section area, all related fields, such as Pile Type, Pile Size, Toe Area and Perimeter, update even if they are nonzero. In previous version, only zero values were updated. The TaperTube pile type was added and additional Sheet Piles entries have been included.

Bearing Graph Program:

- The resistance distribution plot has been improved when soil resistance distribution input exceeds the pile toe depth, and a check is now performed to control the resistance plot up to toe.
- When the unit of measure for Blow Count is changed to "mm/10 blow" (in/10 blow), label of "Blow Count" will be replaced with "Set" in the plot and table. The selection of unit of measure for Blow Count is stored in the Windows registry and will be used for subsequent runs of the program.
- The determination of number of decimal digits displayed for plot labels has been improved for a more appropriate display.
- 2-Pile plot has been improved to avoid confusion about pile attachment positions. Now the pile model and resistance are plotted separately with both pile length and pile top area. If the Read 2nd File is used to read a second file, only the information for the first pile from each file is displayed.
- Improvements have also been made to distinguish the curves and markers and to incorporate better scaling for Two File plots.

List of Corrections for GRLWEAP

- The "Server busy" message was removed when using the Area Calculator feature.
- When using soil segment input, a modification of the toe quake or toe damping was not reflected in the analysis, unless the user accessed the Soil Segment input dialog. The program now always uses the modified values for analysis.
- For 2nd pile, there is no penetration input, so it is set equal to the pile length.
- The previous versions of GRLWEAP did not retain the sorting of the hammer list after the user had performed an analysis. This version of GRLWEAP maintains the user-selected sorting post-analysis.