Analysis of a pile in a slope to code ZTV-Lsw 88

GGU-SLOPE-PILE

VERSION 3

Contents:

1 Preface

The **GGU-SLOPE-PILE** program system is based on the supplements to the Additional Technical Regulations and Guidelines for the Installation of Noise Abatement Walls on Roads (*Zusätzlichen Technischen Vorschriften und Richtlinien für die Ausführung von Lärmschutzwänden an Straßen* (ZTV-Lsw 88)) published by the Forschungsgesellschaft für Straßen- und Verkehrswesen (FGSV): **Design and Analysis Principles for Bored Pile Foundations and Steel Posts for Noise Abatement Walls on Roads** (*Entwurfs- und Berechnungsgrundlagen für Bohrpfahlgründungen und Stahlpfosten von Lärmschutzwänden an Straßen*) (1997 edition). The theoretical principles are described in detail in ZTV-Lsw 88, Supplements 97.

Piles in slopes are analysed in accordance with ZTV-Lsw, following a method described by Voigt in a 'Proposal for the Design of the Foundations of Noise Abatement Walls' [*Vorschlag für die Bemessung der Gründung von Lärmschutzwänden*, Geotechnik 1, 1988], which models three-dimensional passive earth pressure. Additional details can be found in Section 5, Analysis methods and verifications.

Data input is in accordance with conventional WINDOWS operations and can therefore be learned almost entirely without the use of a manual. Graphic output supports the true-type fonts supplied with WINDOWS, so that excellent layout is guaranteed. Colour output and any graphics (e.g. files in formats BMP, JPG, PSP, TIF, etc.) are supported. DXF files can also be imported by means of the integrated Mini-CAD module (see the "**Mini-CAD**" manual).

The program has been thoroughly tested. No faults have been found. Nevertheless, liability for completeness and correctness of the program and the manual, and for any damage resulting from incompleteness or incorrectness, cannot be accepted.

2 Licence protection and installation

In order to guarantee a high degree of quality, a hardware-based copy protection system is used for the **GGU-SLOPE-PILE** program.

The GGU software protected by the *CodeMeter* copy protection system is only available in conjunction with the *CodeMeter stick* copy protection component (hardware for connection to the PC, "*CM stick*"). Because of the way the system is configured, the protected software can only be operated with the corresponding CM stick. This creates a fixed link between the software licence and the CM stick copy protection hardware; the licence as such is thus represented by the CM stick. The correct Runtime Kit for the CodeMeter stick must be installed on your PC.

Upon start-up and during running, the **GGU-SLOPE-PILE** program checks that a CM stick is connected. If it has been removed, the program can no longer be executed.

For installation of GGU software and the CodeMeter software please refer to the information in the *Installation notes for GGU Software International*, which are supplied with the program.

3 Language selection

GGU-SLOPE-PILE is a bilingual program. The program always starts with the language setting applicable when it was last ended.

The language preferences can be changed at any time in the "**Info**" menu, using the menu item "**Spracheinstellung**" (for German) or "**Language preferences**" (for English).

4 Starting the program

After starting the program, you will see two menus at the top of the window**:**

- File

- Info

After clicking on the "**File**" menu, a previously calculated system can be loaded by means of the "**Load**" menu item, or a new one created using "**New**". After clicking the "**New**" menu item a dialog box opens for specifying general preferences for your new system (see Section 6.1.1). After leaving the box you then see six menus in the menu bar:

- File

- Edit

- System

- Output preferences

- Graphics preferences

- Info

After clicking one of these menus, the so-called menu items roll down, allowing access to all program functions.

The program works on the principle of *What you see is what you get*. This means that the screen presentation represents, overall, what you will see on your printer. In the last consequence, this would mean that the screen presentation would have to be refreshed after every alteration you make. For reasons of efficiency and as this can take several seconds for complex screen contents, the **GGU-SLOPE-PILE** screen is not refreshed after every alteration.

If you would like to refresh the screen contents, press either [**F2**] or [**Esc**]. The [**Esc**] key additionally sets the screen visualisation back to your current zoom, which has the default value 1.0, corresponding to an A4 format sheet.

5 Analysis methods and verifications

5.1 Implementing the safety factor approaches

Piles in slopes are analysed in accordance with ZTV-Lsw, following a method described by Voigt in a 'Proposal for the Design of the Foundations of Noise Abatement Walls' [*Vorschlag für die Bemessung der Gründung von Lärmschutzwänden*, Geotechnik 1, 1988], which models three-dimensional passive earth pressure. The method has been tried and tested for more than 20 years. Based on pile load tests a safety factor of 1.4 in Load Case 1 (global safety factor approach) was taken into consideration for the passive earth pressure. This does not coincide with the usual global safety factor approach value of 2.0 for passive earth pressure in Load Case 1. The *ZTV-Lsw* analysis envisages a reduction in cohesion by a factor of 0.5. The passive earth pressure is analysed using a wall friction angle of 0.5 x friction angle.

The reduced safety level leads to difficulties when Voigt's analysis method is transferred to the new partial safety factor approach. The new standard envisages a passive earth pressure safety factor of 1.4 in Load Case 1. In addition, the Load Case 1 actions must be increased by a safety factor of 1.3 or 1.5. Because the actions on noise abatement walls arise almost entirely from wind loads, a factor of 1.5 is adopted. This results in design situations that are more unfavourable by a factor of 1.5.

Numerous comparative analyses have shown that almost identical pile lengths, design moments and degrees of reinforcement are achieved if, when using the partial safety factor approach, the required passive earth pressure partial factors (1.4) are adopted and, for variable actions (1.5), a wall friction angle of 1.0 x friction angle is adopted and cohesion is not reduced. Accordingly, the partial safety factor procedure is adopted for analyses by the program.

5.2 Analysis of Sum V

The ZTV-Lsw analysis approach does not include an analysis of the vertical forces. This is an important analysis if a considerably increased wall friction angle is adopted and has therefore been implemented. The analysis of Sum V can be performed using pile skin friction as described in the Recommendations of the Working Group on Piles (*EAP*) or using at-rest earth pressure:

a) Analysis with input of the skin friction $q_{s,k}$ (using data from EAP, for example)

The program analyses the restraining force using the entered skin friction. Because adopting the skin friction in the upper pile zone may prove to be dubious, the skin friction may only be adopted below a certain depth.

b) Analysis using at-rest earth pressure

The skin friction is calculated from:

$$q_{s,k} = \mu \cdot k_0 \cdot \sigma_z \cdot \tan(\varphi_k)$$

where

μ = any applied reduction
k_0 = at-rest earth pressure coefficient (= $1 - \sin\varphi$)
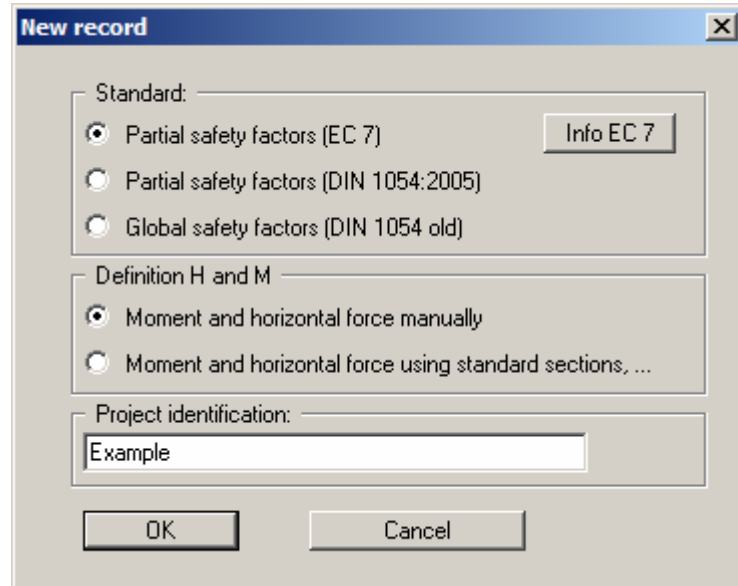σ_z = vertical stress at depth z
φ_k = soil friction angle

The effective circumference in terms of skin friction is calculated from the areas of the sides perpendicular to the loading direction and is therefore generally 0.5 · the true circumference.

6 Description of menu items

6.1 *File menu*

6.1.1 "New" menu item

Use this menu item to create a new system.

In the upper group box of this dialog box select the safety factor concept for analysing your new system. Specify how to define the moment and the horizontal force in the middle drop-down list box (also see the "**Edit/System parameters**" menu item, Section 6.2.2).

You may elect to enter a descriptive project identification, which will subsequently be displayed in the *File name legend* (see Section 6.4.1).

6.1.2 "Load" menu item

You can load a file with system data, which was created and saved at a previous session, and then edit the system.

6.1.3 "Save" menu item

You can save data entered or edited during program use to a file, in order to have them available at a later date, or to archive them. The data is saved <u>without prompting</u> with the name of the current file.

6.1.4 "Save as" menu item

You can save data entered during program use to an existing file or to a new file, i.e. using a new file name. For reasons of clarity, it makes sense to use "**.pfa_boe**" as file suffix, as this is the suffix used in the file requester box for the menu item "**File/Load**". If you choose not to enter an extension when saving, "**.pfa_boe**" will be used automatically.

6.1.5 "Printer preferences" menu item

You can edit printer preferences (e.g. swap between portrait and landscape) or change the printer in accordance with WINDOWS conventions.

6.1.6 "Print and export" menu item

You can select your output format in a dialog box. You have the following possibilities:

- "**Printer**"
  allows graphic output of the current screen contents. to the WINDOWS standard printer or to any other printer selected using the menu item "**File/Printer preferences**". But you may also select a different printer in the following dialog box by pressing the "**Printer prefs./change printer**" button.
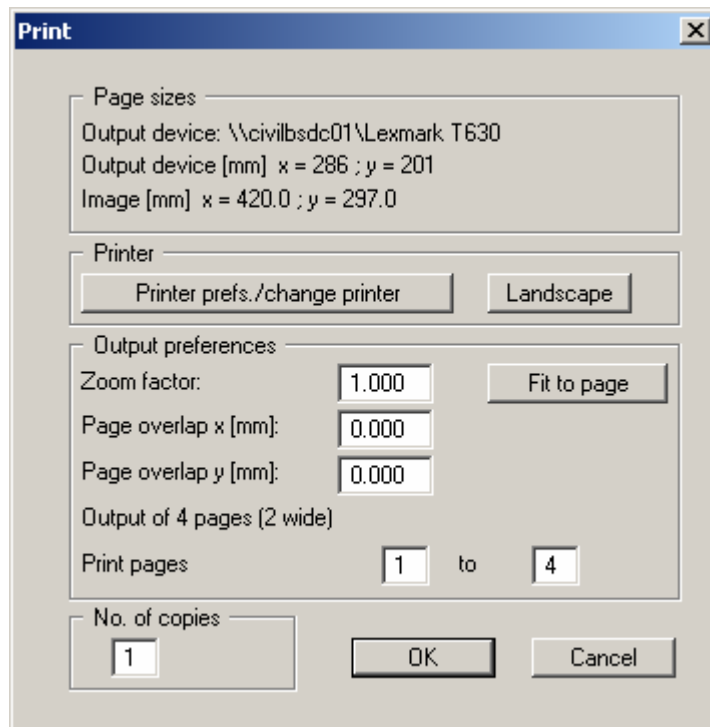
In the upper part of the dialog box, the maximum dimensions which the printer can accept are given. Below this, the dimensions of the image to be printed are given. If the image is larger than the output format of the printer, the image will be printed to several pages (in the above example, 4). In order to facilitate better re-connection of the images, the possibility of entering an overlap for each page, in x and y direction, is given. Alternatively, you also have the possibility of selecting a smaller zoom factor, ensuring output to one page ("**Fit to page**" button). Following this, you can enlarge to the original format on a copying machine, to ensure true scaling. Furthermore, you may enter the number of copies to be printed.

- "**DXF file**"
  allows output of the graphics to a XF file. DXF is a common file format for transferring graphics between a variety of applications.

- "**GGUCAD file**"
  allows output of the graphics to a file, in order to enable further processing with the **GGUCAD** program. Compared to output as a DXF file this has the advantage that no loss of colour quality occurs during export.

- "**Clipboard**"
  The graphics are copied to the WINDOWS clipboard. From there, they can be imported into other WINDOWS programs for further processing, e.g. into a word processor. In order to import into any other WINDOWS program you must generally use the "*Edit/Paste*" function of the respective application.

- "**Metafile**"
  allows output of the graphics to a file in order to be further processed with third party software. Output is in the standardised EMF format (Enhanced Metafile format). Use of the Metafile format guarantees the best possible quality when transferring graphics.

  If you select the "**Copy/print area**" tool from the toolbar, you can copy parts of the graphics to the clipboard or save them to an EMF file. Alternatively you can send the marked area directly to your printer (see "**Tips and tricks**", Section 7.3).

  Using the "**Mini-CAD**" program module you can also import EMF files generated using other GGU applications into your graphics.

- "**MiniCAD**"
  allows export of the graphics to a file in order to enable importing to different GGU applications with the **Mini-CAD** module.

- "**GGUMiniCAD**"
  allows export of the graphics to a file in order to enable processing in the **GGUMiniCAD** program.

- "**Cancel**"
  Printing is cancelled.

6.1.7 "Batch print" menu item

If you would like to print several appendices at once, select this menu item. You will see the following dialog box:
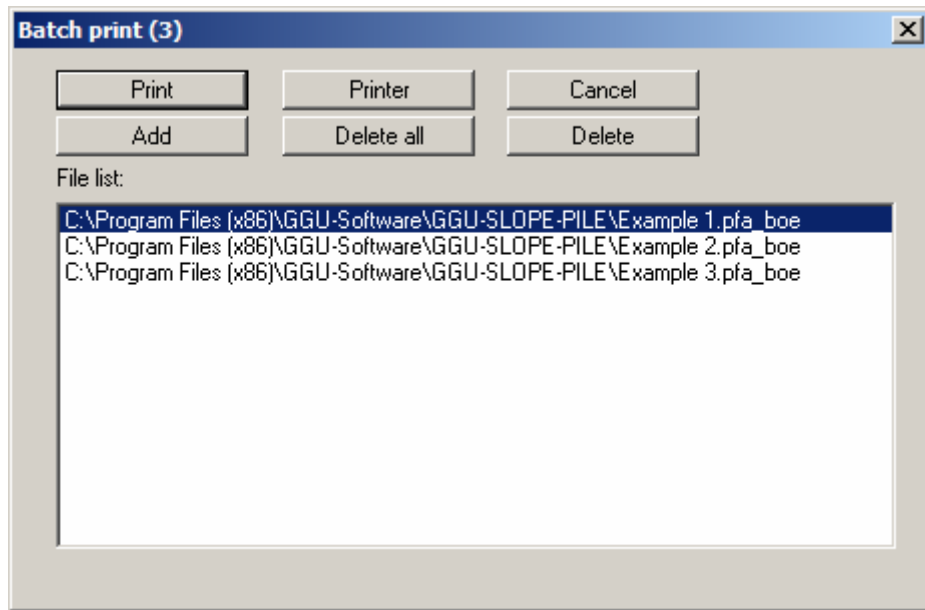
Create a list of files for printing using "**Add**" and selecting the desired files. The number of files is displayed in the dialog box header. Using "**Delete**" you can mark and delete selected individual files from the list. After selecting the "**Delete all**" button, you can compile a new list. Selection of the desired printer and printer preferences is achieved by pressing the "**Printer**" button.

You then start printing by using the "**Print**" button. In the dialog box which then appears you can select further preferences for printer output such as, e.g., the number of copies. These preferences will be applied to all files in the list.

6.1.8 "Exit" menu item

After a confirmation prompt, you can quit the program.

6.1.9 "1, 2, 3, 4" menu items

The "**1, 2, 3, 4**" menu items show the last four files worked on. By selecting one of these menu items the listed file will be loaded. If you have saved files in any other folder than the program folder, you can save yourself the occasionally onerous *rummaging* through various sub-folders.

6.2.1   "Analysis options" menu item

The safety factor concept, and the moment and horizontal force input mode can be altered using this menu item. You will see the same dialog box as for the menu item "**File/New**" (see Section 6.1.1).

6.2.2   "System parameters"

The relevant system data are entered using this menu item. If the *partial safety factor concept* is adopted the following dialog box opens:


In the dialog box shown the settings proposed by the program when the partial safety factor approach is adopted can be seen. Descriptions of the proposed values for both the global and the partial safety factor approach can be found in Section 5.1, Implementing the safety factor approaches.

In the "**Partial factors**" group box the partial factors for the various load cases given in
DIN 1054:2005 and EC 7 can be adopted by pressing the "**Default values**" button. The load case
designations were altered for the EC 7 partial safety factor concept:

- Load Case 1 is now DS-P: Persistent Design Situation

- Load Case 2 is now DS-T: Transient Design Situation

- Load Case 3 is now DS-A: Accidental Design Situation

In addition, there is a seismic design situation (DS-E). In the DS-E design situation all partial
factors = '**1,0**'.

Enter the values for moment and horizontal force in the "**Pile loading**" group box. By pressing the
"**Analyse**" button a dialog box opens, allowing the state variables to be determined using standard
sections compliant with ZTV-Lsw:
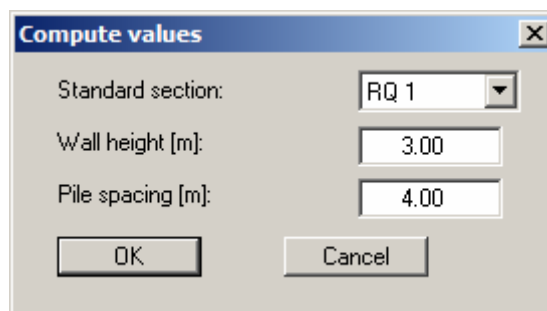
If the "**Moment and horizontal force using standard sections, ..**" option was selected from the
outset under "**File/New**" or "**Edit/Analysis options**", the necessary input boxes are displayed
directly in the "**Pile loading**" group box.

After activating the "**Analyse 'Sum V'**" check box the self-weight of the pile can be defined in the
lower group box. Immediately following the analysis a dialog box opens for selecting whether
further analysis should be performed using the skin friction or the at-rest earth pressure (also see
the descriptions in Section 5.2, Analysis of Sum V).

If the system has already been analysed the modifications for analysis of Sum V can be made
using the menu item "**System/Analysis of Sum V**", because the system then need not be analysed
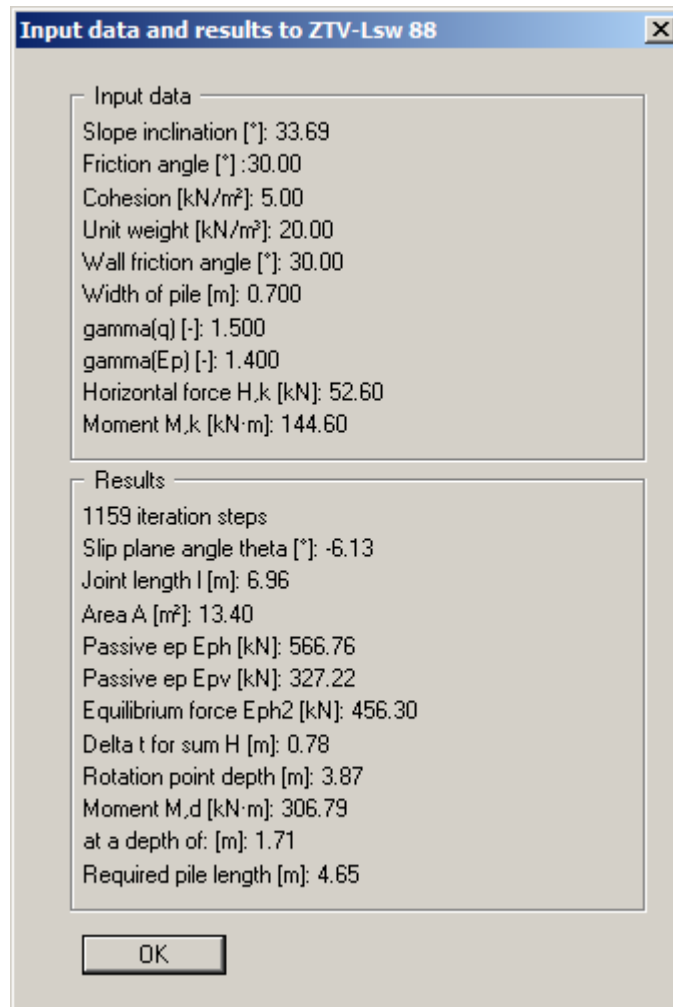once again (see Section 6.3.3).

All system parameters entered using this menu item are displayed in a legend on the output sheet
(see menu item "**Output preferences/Input data legend**", Section 6.4.3).

6.3.1   "Analyse" menu item

This menu item starts the analysis to ZTV-Lsw 88. Alternatively, press the [**F5**] function key or click the *calculator* in the tool bar. First, the input data are checked. A warning message is produced if errors are identified.

Once the analysis is complete information on the data entered and on the analysis results is displayed, as shown in the following box.

Input data and results to ZTV-Lsw 88

Input data
Slope inclination [°]: 33.69
Friction angle [°] : 30.00
Cohesion [kN/m²]: 5.00
Unit weight [kN/m³]: 20.00
Wall friction angle [°]: 30.00
Width of pile [m]: 0.700
gamma(q) [-]: 1.500
gamma(Ep) [-]: 1.400
Horizontal force H,k [kN]: 52.60
Moment M,k [kN·m]: 144.60

Results
1159 iteration steps
Slip plane angle theta [°]: -6.13
Joint length l [m]: 6.96
Area A [m²]: 13.40
Passive ep Eph [kN]: 566.76
Passive ep Epv [kN]: 327.22
Equilibrium force Eph2 [kN]: 456.30
Delta t for sum H [m]: 0.78
Rotation point depth [m]: 3.87
Moment M,d [kN·m]: 306.79
at a depth of: [m]: 1.71
Required pile length [m]: 4.65

OK

If analysis of sum V is activated, the dialog box for defining the settings for analysis of sum V opens after confirming by pressing '**OK**'. The sum V results are then also displayed in a message box. The input and result data are then displayed in three legends on the screen. In addition, the analysis results are displayed graphically in a system sketch.

6.3.2 "Design" menu item

If a system using partial safety factors has been analysed, the following dialog box opens via this menu item or by pressing the [**F6**] key to edit reinforced concrete design preferences:

Design to DIN 1045-1

Concrete C 30/37   Steel BSt 500/550

M,d [kN·m]:   306.789

d1 [m]   0.075

(Pile diameter = 0.700 m)

Crack width verification

☑ Verify

M,(g+q) [kN·m]:   204.526   N,(g+q) [kN]:   0.000

Critical crack width [mm]   0.300

Diameter of longitudinal reinforcement [mm]   14

☑ Include comprehensive output table in legend

OK   Cancel

Select the reinforcement in the upper group box. The crack width analysis can be activated below this. The design results are displayed first in a message box and then in the *Reinforced concrete legend* (see Section 6.4.6).

6.3.3 "Analysis of Sum V" menu item

Using this menu item it is possible to analyse Sum V for a previously analysed system. In the subsequent dialog box the type of analysis or the effective circumference may be modified for the analysed system. This dialog box always opens immediately following analysis if analysis of Sum V is activated:
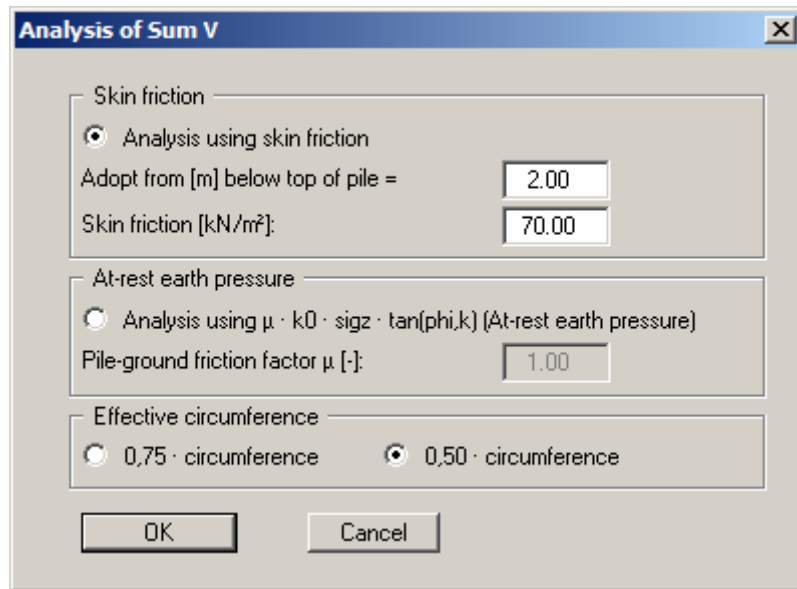

After confirming the changes, the results are first displayed in a message box and then in the *Sum V legend* on the screen (see Section 6.4.5).

6.4.1   "File name legend" menu item

If the "**Show legend**" check box is activated in this menu item's dialog box, shape and appearance of a legend containing the file name can be altered. Any project identification entered (see Section 6.1.1) will be shown automatically in the legend.
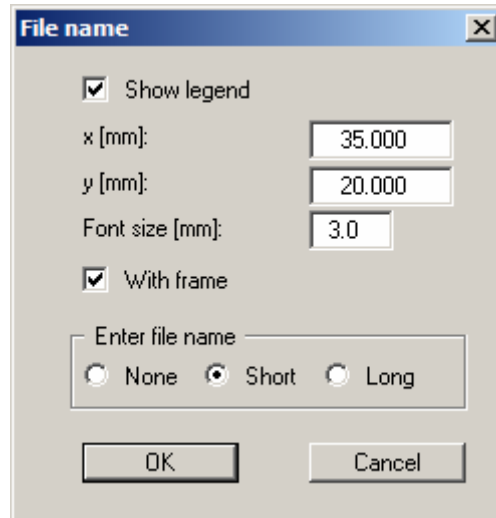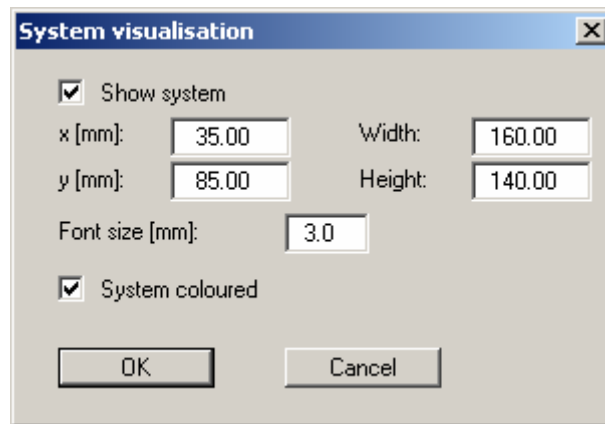

You can define and edit the position of the legend using the values "**x**" and "**y**". You control the size of the legend using "**Font size**". The fastest way to modify the position of the legend is to press the [**F11**] function key and then to pull the legend to the new position with the left mouse button pressed.

The legend can be displayed with a frame. By activating the "**Short**" or "**Long**" option buttons the current file name can be shown in the legend, either with or without the path. Selecting "**None**" automatically means that the legend will **not** be displayed.

6.4.2 "System visualisation" menu item

The system is graphically represented if you have activated the "**Show system**" check box. You can alter the shape and appearance of the system visualisation..
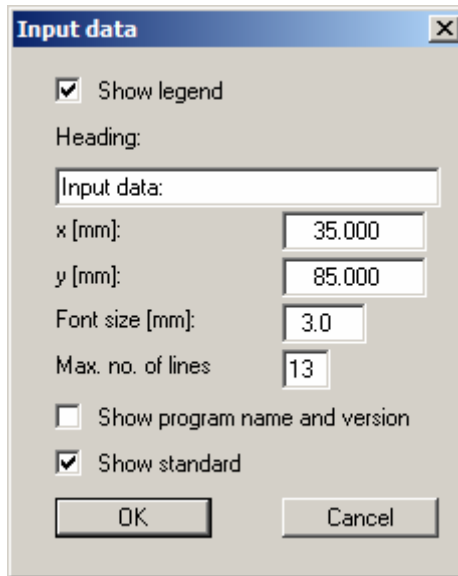

You can define and edit the position of the legend using the values "**x**" and "**y**". The fastest way to modify the position of the legend is to press the [**F11**] function key and then to pull the legend to the new position with the left mouse button pressed.

The labelling font size can be altered to suit user requirements. If the "**System coloured**" check box is activated the soil and the pile are shown in the system visualisation in the colours defined in menu item "**Graphics preferences/Pens + colours**" (see Section 6.5.4).

6.4.3 "Input data legend" menu item

If you activate the "**Show legend**" check box, a legend with input data will be displayed. You can alter the position and appearance of the legend.

A text can be specified as legend header. You can define and edit the position of the legend using the values "**x**" and "**y**". You control the size of the legend using "**Font size**" and "**Max. no. of lines**"; where necessary, several columns are used. The fastest way to modify the position of the legend is to press the [**F11**] function key and then to pull the legend to the new position with the left mouse button pressed.

Additional information on the program (name and version) and the adopted standard can also be activated in the legend.

6.4.4 "Results legend" menu item

If you have analysed your system the detailed analysis results can be shown in a legend by activating the "**Show legend**" check box. You can alter the position and appearance analogous to the input data legend.

A text can be specified as legend header. You can define and edit the position of the legend using the values "**x**" and "**y**". You control the size of the legend using "**Font size**" and "**Max. no. of lines**"; where necessary, several columns are used. The fastest way to modify the position of the legend is to press the [**F11**] function key and then to pull the legend to the new position with the left mouse button pressed.

6.4.5 "Sum V legend" menu item

Once sum V has been verified following analysis, the results can be shown in a legend by activating the "**Show legend**" check box. You can alter the position and appearance analogous to the input data legend.

A text can be specified as legend header. You can define and edit the position of the legend using the values "**x**" and "**y**". You control the size of the legend using "**Font size**" and "**Max. no. of lines**"; where necessary, several columns are used. The fastest way to modify the position of the legend is to press the [**F11**] function key and then to pull the legend to the new position with the left mouse button pressed.

6.4.6 "Reinforced concrete legend " menu item

Following reinforced concrete design the design results can be shown in a legend by activating the "**Show legend**" check box. You can alter the position and appearance analogous to the input data legend.

A text can be specified as legend header. You can define and edit the position of the legend using the values "**x**" and "**y**". You control the size of the legend using "**Font size**" and "**Max. no. of lines**"; where necessary, several columns are used. The fastest way to modify the position of the legend is to press the [**F11**] function key and then to pull the legend to the new position with the left mouse button pressed.

6.4.7 "Page size and margins" menu item

The program uses A4 format as default. You can edit the page format in the following dialog box.
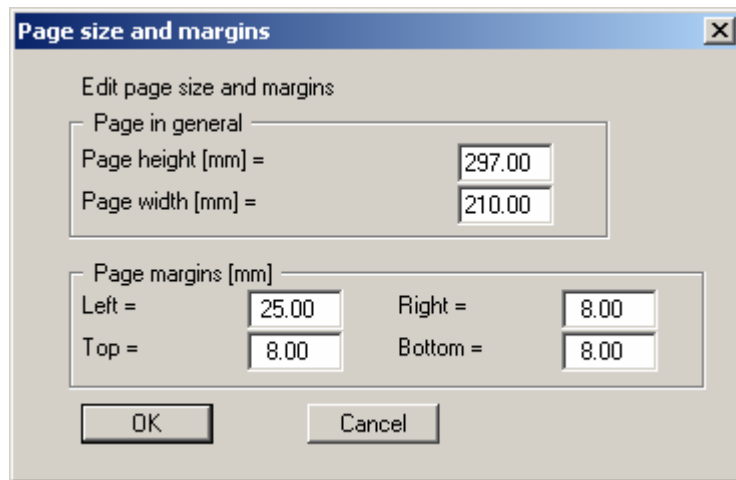
"**Page in general**" defines the size of the output sheet. The A4 format is set as default. The program automatically draws thin cutting borders around the page, which are required when using a plotter on paper rolls. The borders can be switched off using the menu item "**Output preferences/With borders**" (see Section 6.4.8).

- "**Page margin**" defines the position of a frame as a distance to the margins. This frame encloses the subsequent diagram.

In order to achieve 1:1 output on an A4 printer the borders must be switched off and the page height and page margins be adapted to the printable area of the printer.

6.4.8 "With borders" menu item

The program automatically draws thin cutting borders around the page, which are required when using a plotter on paper rolls. You can switch off the lines by deactivating this menu item.

6.4.9 "Move objects" menu item

Select this menu item in order to position the legend or other graphical elements at the desired position on the output sheet. You can also move objects by pressing [**F11**] and then positioning the legend box with the left mouse button pressed. In that case an info-box appears no more.

6.5 Graphics preferences menu

6.5.1 "Refresh and zoom" menu item

The program works on the principle of *What you see is what you get*. This means that the screen presentation represents, overall, what you will see on your printer. In the last consequence, this would mean that the screen presentation would have to be refreshed after every alteration you make. For reasons of efficiency and as this can take several seconds for complex screen contents, the screen is not refreshed after every alteration.

If, e.g., after using the zoom function (see below), only part of the image is visible, you can achieve a complete view using this menu item.
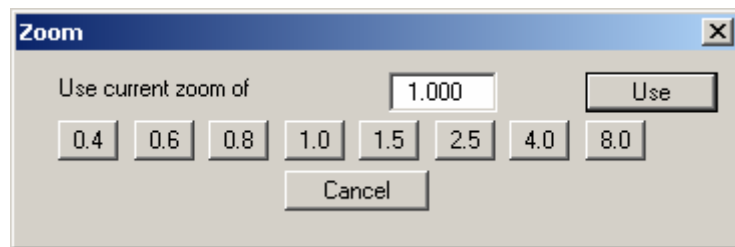
A zoom factor between 0.4 and 8.0 can be entered in the input box. By then clicking on "**Use**" to exit the box the current factor is accepted. By clicking on the "**0.4**", "**0.6**", etc. buttons, the selected factor is used directly and the dialog box closed.

It is much simpler, however, to get a complete overview using [**Esc**]. Pressing [**Esc**] allows a complete screen presentation using the zoom factor specified in this menu item. The [**F2**] key allows screen refreshing without altering the coordinates and zoom factor.

6.5.2 "Zoom info" menu item

By clicking two diametrically opposed points you can enlarge a section of the screen in order to view details better. An information box provides information on activating the zoom function and on available options.

6.5.3 "Legend font selection" menu item

With this menu item you can switch to a different true-type font. All available true-type fonts are displayed in the dialog box.

6.5.4 "Pens + colours" menu item

The soil and pile colours for the coloured visualisation of the system can be edited in this menu item's dialog box.
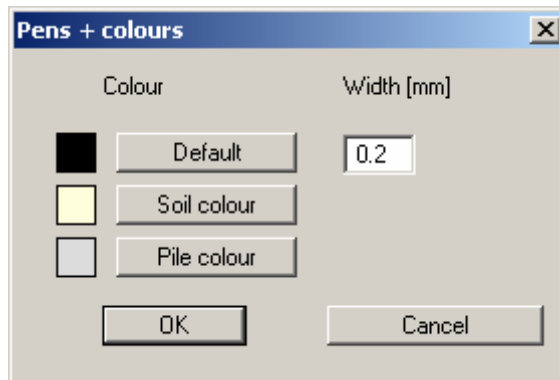
The pen widths for the elements shown in the dialog box can be edited and/or; by clicking on the button with the element designation, the pen or fill colours can also be edited.

6.5.5 "Mini-CAD toolbar" menu item

Using this menu item you can add free text to the graphics and add lines, circles, polygons and images (e.g. files in formats BMP, JPG, PSP, TIF, etc.). A pop-up menu opens, the icons and functions used are described in more detail in the **Mini-CAD** manual provided.

Objects created with the "**Mini-CAD**" tool are based on the page format (in mm). This makes you independent of the coordinate system and keeps you in the same position on the page. You should select the "**Mini-CAD toolbar**" if you wish to place general information on the drawing (company logo, report numbers, plan numbers, stamp etc.). Once you have saved the header information to disk (see **Mini-CAD** user manual), you can load it into completely different systems (with different system coordinates). The saved header information will appear in exactly the same position on the page, which greatly simplifies the creation of general page information.

6.5.6 "Toolbar preferences" menu item

After starting the program a horizontal toolbar for menu items appears below the program menu bar. If you would rather work with a popup window with several columns, you can specify your preferences using this menu item. The smart icons can also be switched off.

At the bottom of the program window you find a status bar with further information. You can also activate or switch off the status bar here. The preferences will be saved in the "**GGU-SLOPE-PILE.alg**" file (see menu item "**Graphics preferences/Save graphics preferences**") and will be active at the next time the program is started.

By clicking on the tools (smart icons) for the menu items you can directly reach most of the program functions. The meaning of the smart icons appears as a text box if you hover with the mouse pointer over the tools. Some of the tool functions cannot be activated from the normal menu items.

[image: Zoom out icon] "**Zoom out**"

If you have previously *zoomed in*, this tool returns to a full screen display.

[image: Zoom (-) and Zoom (+) icons] "**Zoom (-)**"/"**Zoom (+)**"

With the zoom functions you can zoom in or out of parts of the image, by clicking the left mouse button.

[image: Copy/print area icon] "**Copy/print area**"

Use this tool to copy only parts of the graphics in order to paste them, e.g. to a report. You will see information on this function and can then mark an area, which is copied to the clipboard or can be saved in a file. Alternatively you can send the marked area directly to your printer (see "**Tips and tricks**", Section 7.3).

[image: Colour on/off icon] "**Colour on/off**"

If you prefer to do without colour in the system visualisation, e.g. to create a black and white printout, use this on/off switch.

6.5.7 "Load graphics preferences" menu item

You can reload a graphics preferences file into the program, which was saved using the "**Graphics preferences/Save graphics preferences**" menu item. Only the corresponding data will be refreshed.

6.5.8 "Save graphics preferences" menu item

Some of the preferences you made with the menu items of the "**Graphics preferences**" menu can be saved to a file. If you select "**GGU-SLOPE-PILE.alg**" as file name, and save the file on the same level as the program, the data will be automatically loaded the next time the program is started and need not be entered again.

If you do not go to "**File/New**" upon starting the program, but open a previously saved file instead, the preferences used at the time of saving are shown. If subsequent changes in the general preferences are to be used for existing files, these preferences must be imported using the menu item "**Graphics preferences/Load graphics preferences**".

6.6.1   "Copyright" menu item

You will see a copyright message and information on the program version number.

The "**System**" button shows information on your computer configuration and the folders used by **GGU-SLOPE-PILE**.

6.6.2   "Help" menu item

The **GGU-SLOPE-PILE** manual is opened as a PDF document. The help function can also be accessed using the [**F1**] function key.

6.6.3   "GGU on the web" menu item

Using this menu item you can access the GGU Software website: www.ggu-software.com.
Keep in touch with new program versions and the regular *download* offers.

If you would like to be automatically notified about program innovations, please register for the Newsletter in our Knowledge Base. Go to the following website: http://kbase.civilserve.com.

6.6.4   "GGU support" menu item

This menu item takes to the GGU-Software Support area at www.ggu-software.com.

6.6.5   "What's new" menu item

You will see information on program improvements in comparison to older versions.

6.6.6   "Language preferences" menu item

This menu item allows you to switch the menus and the graphics from German to English and vice versa. To work in German, deactivate the two check boxes "**Dialoge + Menüs übersetzen (translate dialogues, menus)**" und "**Graphiktexte übersetzen (translate graphics)**".

Alternatively, you can work bilingually, e.g. with German dialog boxes but with graphic output in English. The program always starts with the language setting applicable when it was last ended.

7 Tips and tricks

7.1 Keyboard and mouse

You can scroll the screen with the keyboard using the cursor keys and the [**Page up**] and [**Page down**] keys. By clicking and pulling with the mouse, with [**Ctrl**] pressed, you activate the zoom function, i.e. the selected section will fill the screen. Furthermore you can use the mouse wheel to zoom in/out or scrolling the screen presentation. The following mouse wheel functions are available:

- Mouse wheel up = move screen image up
- Mouse wheel down = move screen image down
- [**Ctrl**] + mouse wheel up = enlarge screen image (zoom in)
- [**Ctrl**] + mouse wheel down = shrink screen image (zoom out)
- [**Shift**] + mouse wheel up = move screen image right
- [**Shift**] + mouse wheel down = move screen image left

If you click the right mouse button anywhere on the screen a context menu containing the principal menu items opens.
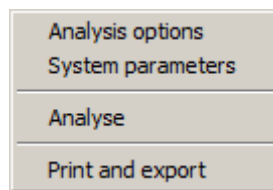
By double-clicking the left mouse button on legends, diagrams or **Mini-CAD** objects, you will immediately move to the editor for the selected object and can then edit it.

7.2 Function keys

Some of the function keys are assigned program functions. The allocations are noted after the corresponding menu items. The individual function key allocations are:

- [**Esc**] refreshes the screen contents and sets the screen back to the given format (A4). This is useful if, for example, you have used the zoom function to display parts of the screen and would like to quickly return to a complete overview.
- [**F1**] opens the manual file.
- [**F2**] refreshes the screen without altering the current magnification.
- [**F5**] opens the menu item "**System/Analyse**".
- [**F6**] opens the menu item "**System/Design**".
- [**F11**] activates the menu item "**Output preferences/Move objects**".

7.3 "Copy/print area" icon

A dialog box opens when the "**Copy/print area**" icon in the menu toolbar is clicked, describing the options available for this function. For example, using this icon it is possible to either copy areas of the screen graphics and paste them into the report, or send them directly to a printer.

In the dialog box, first select where the copied area should be transferred to: "**Clipboard**", "**File**" or "**Printer**". The cursor is displayed as a cross after leaving the dialog box and, keeping the left mouse button pressed, the required area may be enclosed. If the marked area does not suit your requirements, abort the subsequent boxes and restart the function by clicking the icon again.

If "**Clipboard**" was selected, move to the MS Word document (for example) after marking the area and paste the copied graphics using "*Edit/Paste*".

If "**File**" was selected, the following dialog box opens once the area has been defined:
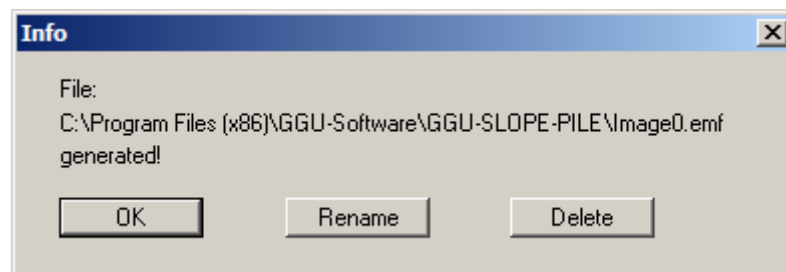
The default location of the file is the folder from which the program is started and, if several files are created, the file is given the file name "**Image0.emf**" with sequential numbering. If the "**Rename**" button in the dialog box is clicked, a file selector box opens and the copied area can be saved under a different name in a user-defined folder. Saving can be aborted by pressing the "**Delete**" button.

If the "**Printer**" button was pressed in the first dialog box, a dialog box for defining the printer settings opens after marking the area. Following this, a dialog box for defining the image output settings opens. After confirming the settings the defined area is output to the selected printer.

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