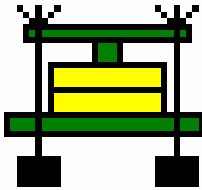


Evaluation and visualisation of oedometer tests

GGU-OEDOM

VERSION 4



Last revision: June 2018
Copyright: Prof. Dr. Johann Buß
Technical implementation and sales: Civilserve GmbH, Steinfeld

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1 Preface

The **GGU-OEDOM** program allows the evaluation and visualisation of compression tests to determine the deformation behaviour caused by changes in stress with restrained lateral strain, and to determine the constrained modulus. Alternatively to determination of the constrained modulus, an evaluation of the compression index can be performed.

The program is designed to allow simple data input. The system is permanently displayed on the screen. Every alteration to the data is shown on the screen, so that optimum control of input data is guaranteed. 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 on numerous examples from the literature and in engineering practice. 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-OEDOM** 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-OEDOM** 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-OEDOM 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 the "**File**" menu, either an existing file can be loaded by means of the "**Load**" menu item, or new tests can be entered using "**New**". After clicking "**File/New**" the type of evaluation must be selected from a dialog box. An empty form is then displayed on the screen according to the selected test type. Then, the menu bar will show five menus:

- File
- Edit
- Graphics preferences
- Output preferences
- Info

After clicking one of these menus, the so-called menu items roll down, allowing you 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-OEDOM** 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 presentation back to your current zoom, which has the default value 1.0, corresponding to an A4 format sheet.

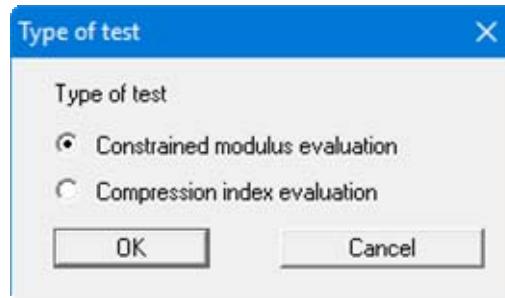
5 Theoretical principles

5.1 General

When evaluating a test we can differentiate between:

- Constrained modulus evaluation
- Compression index evaluation

You can specify the type of evaluation using the menu item "File/New".



5.2 Constrained modulus evaluation

The standard evaluation method is by means of the constrained moduli. The constrained moduli are calculated using:

$$E_s = (\sigma_i - \sigma_{i-1}) / (s_i - s_{i-1}) * h$$

σ_i = stress at loading stage i

σ_{i-1} = stress at loading stage i - 1

s_i = settlement at loading stage i

s_{i-1} = settlement at loading stage i - 1

h = sample height at loading stage i - 1

If you activate the "Calculate constrained moduli with initial height" check box in the dialog box of the "Edit/Tests" menu item, the initial height is used as "h", but this is generally unusual.

The graphical visualisation of the test results is shown in Figure 1.

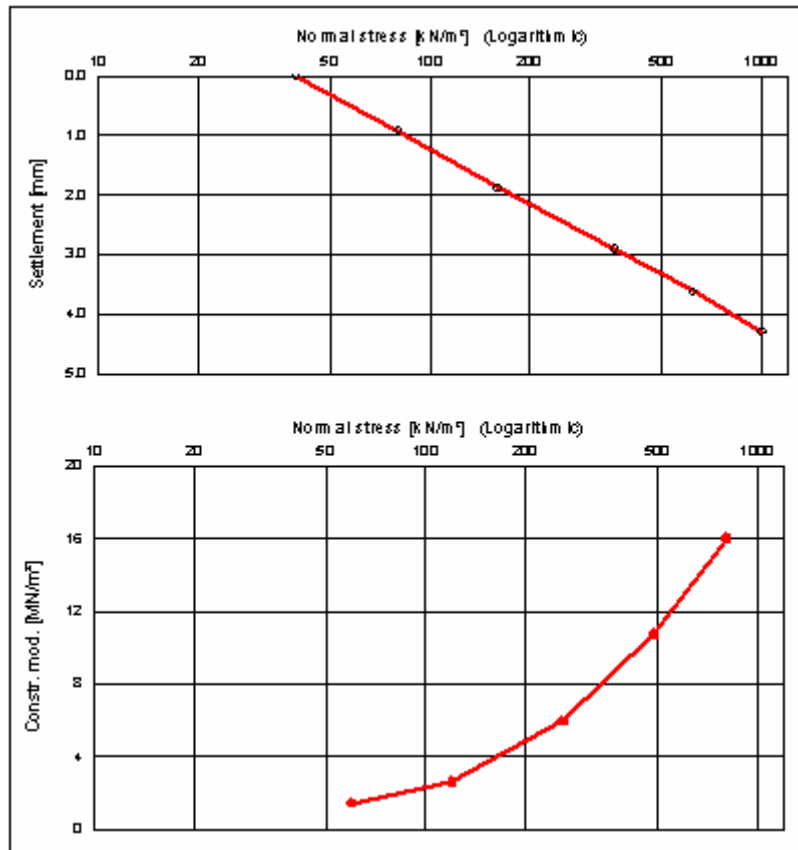


Figure 1 Constrained modulus evaluation

5.3 Compression index evaluation

This evaluation method makes use of the following data and relationships, beside the stresses and settlements of the individual loading stages:

Input data:

- h_0 = initial height
- A = sample area
- m_f = wet mass
- ρ_s = grain density
- w_0 = initial water content

Relationships:

$$\begin{aligned} \text{Mass of solid substance } m_s &= m_f / (1.0 + w_0) \\ \text{Solid volume } V_S &= m_s / \rho_s \\ \text{Void volume } V_W &= A \cdot h_0 - V_S \\ \text{Void ratio } e &= V_W / V_S \end{aligned}$$

$$\text{Compression index } CC = (e_i - e_{i-1}) * \ln(\sigma_i / \sigma_{i-1})$$

- e_i = void ratio at loading stage i
- e_{i-1} = void ratio at loading stage $i - 1$
- σ_i = stress at loading stage i
- σ_{i-1} = stress at loading stage $i - 1$

The graphical visualisation of the test results is shown in Figure 2.

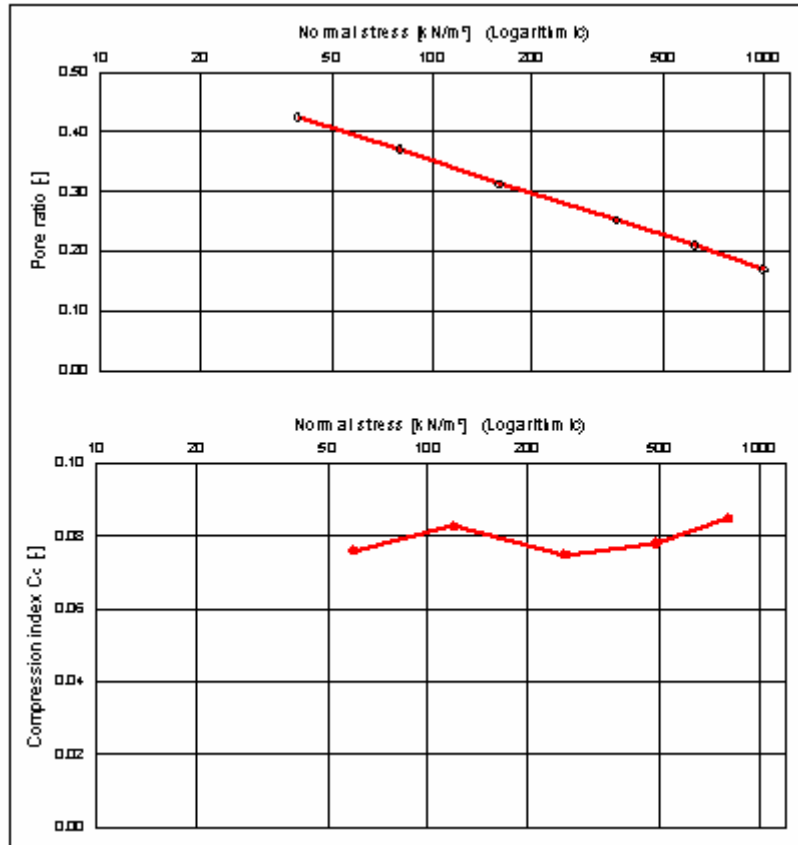


Figure 2 Compression index evaluation

In contrast to the evaluation by means of constrained moduli, the void ratio is shown in the above diagram instead of the settlement. In the lower diagram the compression indices are drawn instead of the constrained moduli.

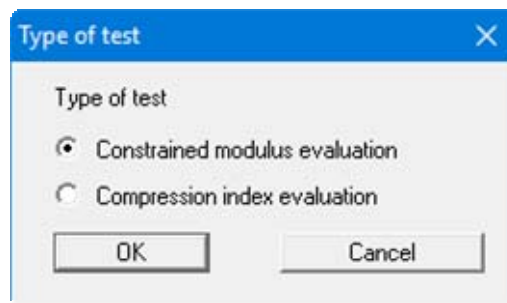
An evaluation by means of compression indices is generally very useful for normally consolidated soils, when the void ratio changes linearly with increasing stress on a semi-logarithmic scale. In this case the compression index remains constant. This makes a time-settlement analysis, for example, using compression indices, quite useful. This can be done using the **GGU-CONSOLIDATE** program, for instance.

6 Description of menu items

6.1 File menu

6.1.1 "New" menu item

To enter a new test first specify the type of test evaluation in a dialog box; the default method employs evaluation using constrained moduli.



Test data already entered can be easily adopted if the type of evaluation is changed.

6.1.2 "Load" menu item

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

6.1.3 "Save" menu item

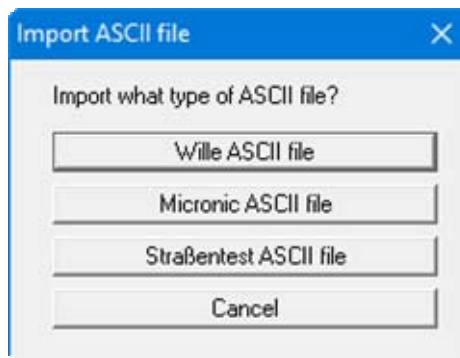
You can save data entered or edited during program use to a file, in order to have them available at a later date, or to archive them. The data is saved without prompting with the name of the current file.

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 ".dsv" 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, ".dsv" will be used automatically.

6.1.5 "Import ASCII file" menu item

It is possible to import ASCII files from selected device manufacturers using this menu item.



By clicking the respective buttons, you can automatically import either "**Wille**", "**Micronic**" or "**Straßentest**" data. If you need to read data in a format provided by a different company, please contact **CIVILSERVE** (info@civilserve.com).

6.1.6 "Export to ASCII file" menu item

The test data can be exported to an ASCII file, allowing processing in other applications.

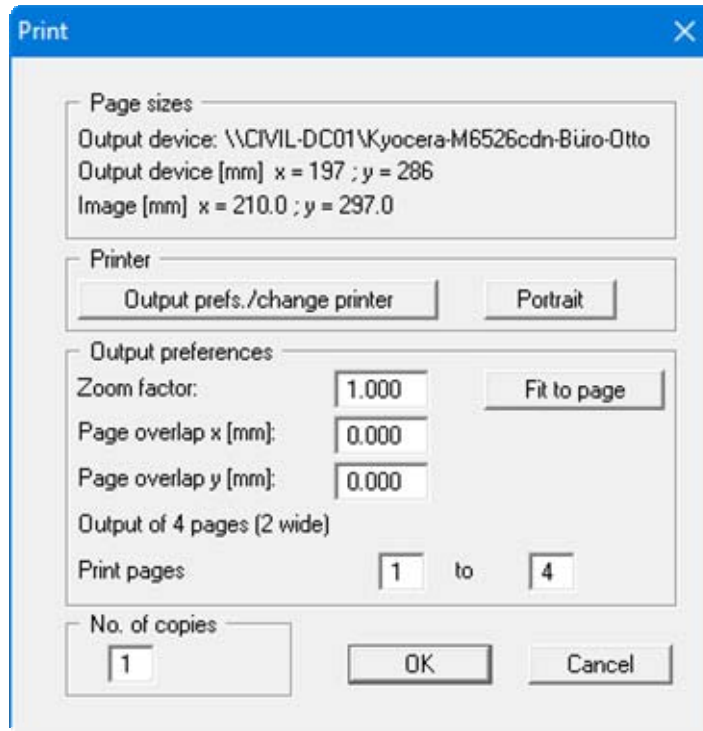
6.1.7 "Output preferences" menu item

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

6.1.8 "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 to the WINDOWS default printer or to any other printer selected using the menu item **"File/Output preferences"**. But you may also select a different printer in the following dialog box by pressing the **"Output prefs./change printer"** button.



In the upper group 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 DXF file. DXF is a common file format for transferring graphics between a variety of applications.
- **"GGU-CAD file"**
allows output of the graphics to a file, in order to enable further processing with the **GGU-CAD** 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.

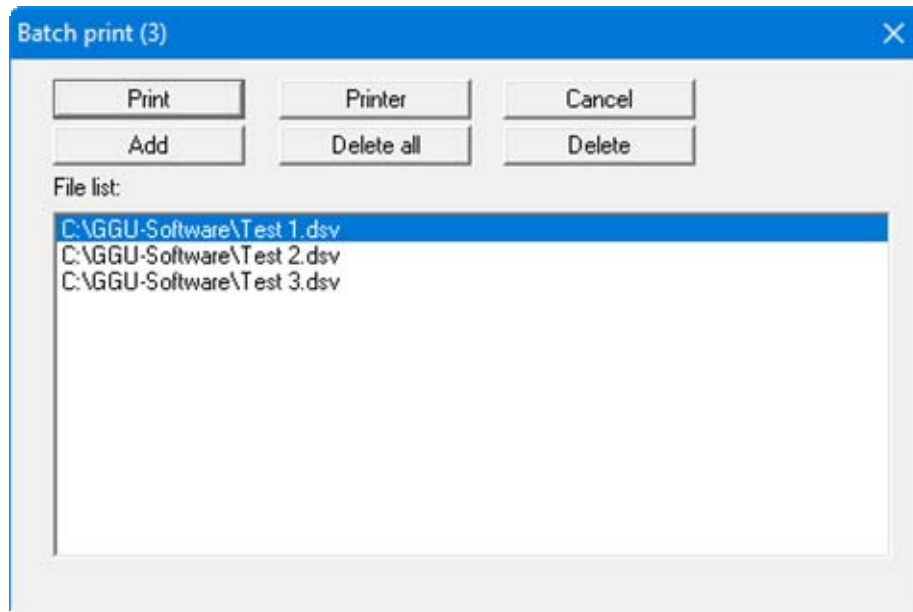
If you select the **"Copy/print area"** tool  from the toolbar, you can copy parts of the graphics to the clipboard or save them to an EMF file. Alternatively you can send the marked area directly to your printer (see **"Tips and tricks"**, Section 7.3).

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

- **"Mini-CAD"**
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.

6.1.9 "Batch print" menu item

If you would like to print several files 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 output 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.

6.1.10 "Exit" menu item

After a confirmation prompt, you can quit the program.

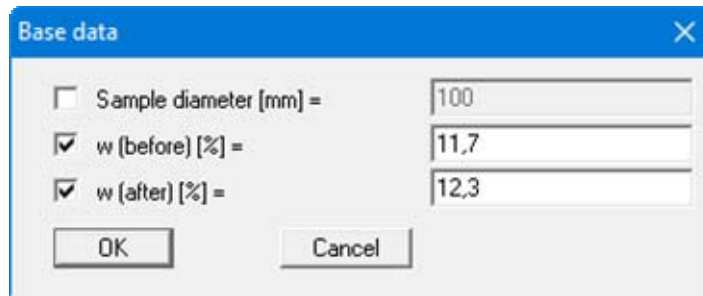
6.1.11 "1, 2, 3, 4" menu items

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 Edit menu

6.2.1 "Base data" menu item

This menu item can only be selected when using constrained moduli. The following dialog box opens:

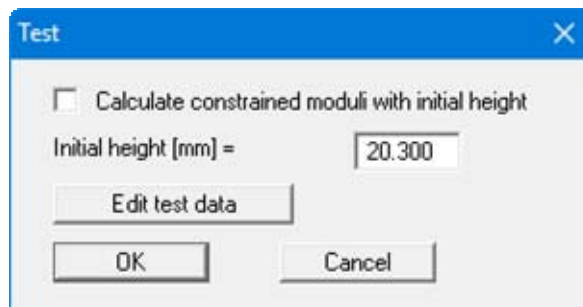


The dialog box titled "Base data" has a blue header bar with a close button (X). It contains three rows of input fields, each with a checkbox to its left. The first row has an unchecked checkbox and the text "Sample diameter [mm] =", followed by a text box containing "100". The second row has a checked checkbox and the text "w (before) [%] =", followed by a text box containing "11,7". The third row has a checked checkbox and the text "w (after) [%] =", followed by a text box containing "12,3". At the bottom of the dialog are two buttons: "OK" and "Cancel".

The sample diameter and the water content before and after the test can be entered in the input boxes. These values are displayed on the output sheet. They serve no purpose in the evaluation. Texts can be altered or input boxes can be switched off such as " **Sample diameter [mm] =**" as shown in the above dialog box by going to the menu item "Output preferences/Texts" button "Base data table" (see Section 6.4.3.3).

6.2.2 "Tests" menu item (using Constrained modulus evaluation)

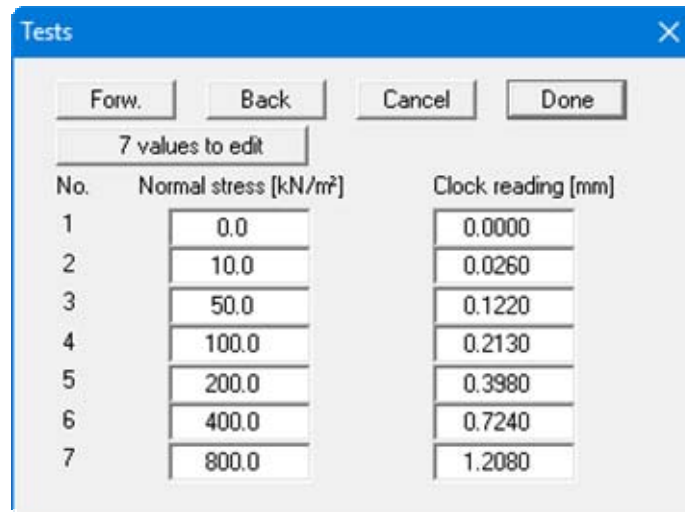
If the *constrained moduli* evaluation method is selected, the following dialog box opens immediately after clicking this menu item:



The dialog box titled "Test" has a blue header bar with a close button (X). It contains a checkbox with the text "Calculate constrained moduli with initial height" which is unchecked. Below this is a text box with the label "Initial height [mm] =" and the value "20.300". Below the text box is a button labeled "Edit test data". At the bottom of the dialog are two buttons: "OK" and "Cancel".

There are different opinions on whether the constrained moduli must be calculated using the initial height for every loading stage or using the height at the beginning of each respective loading stage. Using the "Calculate constrained moduli with initial height" check box you can bring to life your own personal judgment on this.

The central data input box is reached by pressing the "Edit test data" button. The following dialog box opens for the example given above:



The screenshot shows a dialog box titled "Tests" with a close button (X) in the top right corner. At the top, there are four buttons: "Forw.", "Back", "Cancel", and "Done". Below these buttons is a label "7 values to edit". The main content is a table with three columns: "No.", "Normal stress [kN/m²]", and "Clock reading [mm]". The table contains 7 rows of data.

No.	Normal stress [kN/m ²]	Clock reading [mm]
1	0.0	0.0000
2	10.0	0.0260
3	50.0	0.1220
4	100.0	0.2130
5	200.0	0.3980
6	400.0	0.7240
7	800.0	1.2080

The test results relevant to the calculation of deformations and constrained moduli, the normal stress [kN/m²] and the corresponding gauge readings [mm] are entered in this dialog box.

In the example used here 7 value pairs have already been entered. By pressing the "**x values to edit**" button you arrive at a further dialog box for editing the number of value pairs. If no values have been entered (new test), the box will contain a **0**. Value pairs are added by increasing the number, and existing value pairs deleted by decreasing the number.

A maximum of 12 value pairs can be represented. If more data pairs than this are used the list can be navigated using the "**Forw.**" and "**Back**" buttons. Return to the previous dialog box without saving the changes using "**Cancel**". Input is accepted by clicking the "**Done**" button.

6.2.3 "Tests" menu item (using Compression index evaluation)

The following dialog box opens for evaluation using **compression indices**:

Test

Compression index Cc with logarithm to base 10

Initial height [mm] = 32.500

Sample area [cm²]: 25.000

Wet mass [g]: 151.830

Grain density [g/cm³]: 2.674

Initial water content [-]: 0.347

Edit test data

OK Cancel

Frist, enter the test base data here in accordance with the theoretical principles discussed in Section 5.3 and then enter or edit the test data via the **"Edit test data"** button in analogy to the dialog box for evaluation using constrained moduli (see Section 6.2.2).

6.2.4 "Show test data" menu item

A dialog box opens showing the test data entered and the calculated settlements and *constrained moduli*.

Test data

Forw. Back Done

Go to no.: 1

No.	sigma [kN/m ²]	Clock [mm]	s [mm]	Es [MN/m ²]
1	0.0	0.000	0.000	7.81
2	10.0	0.026	0.026	8.45
3	50.0	0.122	0.122	11.09
4	100.0	0.213	0.213	10.86
5	200.0	0.398	0.398	12.21
6	400.0	0.724	0.724	16.18
7	800.0	1.208	1.208	

You can navigate through the list using **"Forw."** and **"Back"**. You can move directly to a test number by entering the corresponding number and clicking **"Go to no.:"**.

When evaluating using *Compression indices* a column for the compression index Cc appears in the dialog box in place of the constrained modulus Es.

6.2.5 "Delete all tests" menu item

After a security request, all tests will be deleted. After this, you can enter a new test using the "Edit/Tests" menu item (see Section 6.2.2 or Section 6.2.3).

6.2.6 "General" menu item

Go to this menu item to enter general data such as the project identification, report number, annex number, etc. This data is displayed in the correct elements of the output sheet.

Label	Value
Project (1st line):	Example City
Project (2nd line):	123 For Instance Road
Project (3rd line):	
Edited by:	Buss
Edit date:	30.11.2017
Test number:	
Sampling point:	Axis A - 7
Depth:	Subgrade
Soil type:	Clay, silty
Type of sampling:	undisturbed
Date of sampling:	29.11.2017
Report:	2018
Annex:	1

The marked texts in the dialog box also appear in the output sheet. Input boxes can be altered or switched off such as "Test number:" as shown in the above dialog box by going to the menu item "Output preferences/Texts" button "Output sheet" (see Section 6.4.3.1).

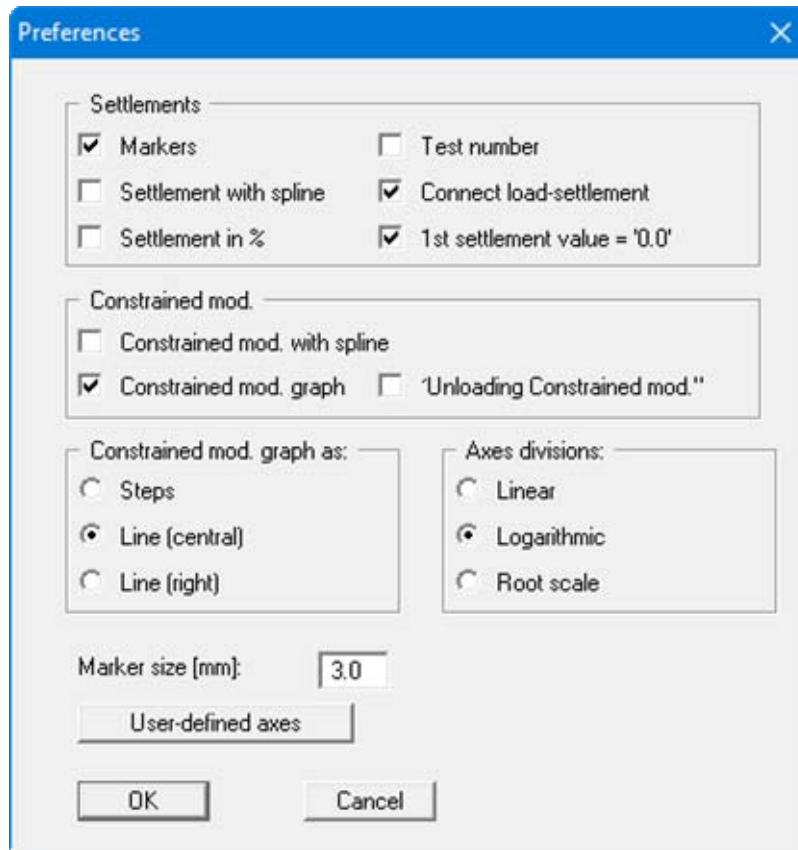
6.2.7 "Company" menu item

You can enter your company address in four lines. These lines will be entered at the top left of the output sheet.

6.3 Graphics preferences menu

6.3.1 "Preferences" menu item

This menu item allows settings to be specified for the graphics. The following dialog box opens for *constrained modulus* evaluation. The dialog group boxes are adapted to suit the corresponding evaluation diagrams when evaluating using *compression indices*.



- **"Settlements"** group box:
The use of markers or test numbers for the data points is specified by activating the appropriate check box. The marker size or font size of the test numbers is user-defined. If neither of these check boxes are selected the measured data will not be marked.

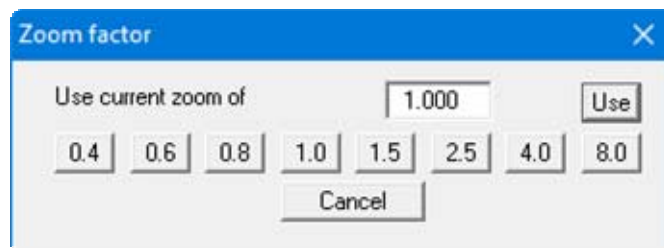
Activate the **"Connect load-settlement"** check box to get a graph. The graph can be displayed as a spline, the settlement in either [mm] or in [%]. When evaluating using *compression indices* the void ratio can be visualised as an alternative to the settlements
- **"Constrained modulus"** group box:
If the **"Constrained modulus graph"** check box is activated the graph is also visualised here with or without a spline. In addition, the unloading can be visualised. When evaluating using *compression indices* the **"Compression index"** group box is visible here, with the same options as the constrained modulus visualisation
- **"Constrained mod. graph as:"** group box:
A number of visualisation types can be selected (**"Steps"**, **"Line (central)"** and **"Line (right)"**). The position of the marker in the graphics is appropriately adapted. Graph settings can be specified here when evaluating using *compression indices*.

- **"Axes divisions"** group box:
The required axes divisions for visualisation of the normal stress can be selected in this group box. The type of visualisation selected always applies to all displayed diagrams.
- **"User-defined axes"** button:
The program automatically selects a sensible axes scale for the graphical visualisation of the evaluation diagram. If this button is clicked a dialog box opens in which the check box **"Use the following axes values"** must be activated. The required minimum and maximum values can then be entered.

6.3.2 "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.

6.3.3 "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.

6.3.4 "Legend font selection" menu item

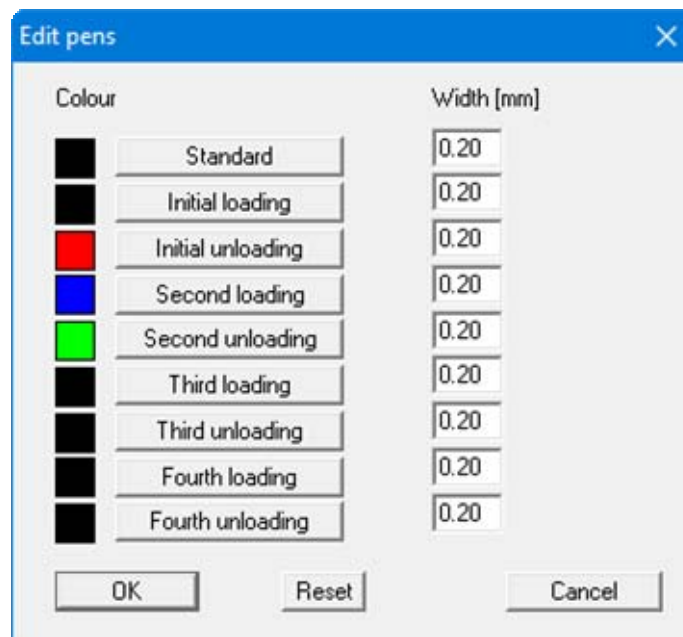
With this menu item you can switch to a different true-type font. All available true-type fonts are displayed in the dialog box.

6.3.5 "Font size selection" menu item

You can edit font sizes of texts [in mm] within the various input areas.

6.3.6 "Pen colour and width" menu item

For reasons of clarity, different colours are used as default for graphic presentation of the different lines. With this menu item you can alter the preferences to suit your wishes.



The pen widths can be edited for the lines of the different loading stages and, after clicking the appropriate buttons, the pen colours be adapted.

The "Standard" colour, for example, is used to represent the data entered using "Edit/Company" and "Edit/General". Use "Reset" to restore the default pen colours.

On *monochrome printers* (e.g. laser printers), colours are shown in a corresponding grey scale. Graphic elements employing very light colours may be difficult to see. In such cases it makes sense to edit the colour preferences.

6.3.7 "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.

6.3.8 "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-OEDOM.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 can be activated from the normal menu items.



"Zoom out"

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



"Zoom (-)"/"Zoom (+)"

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



"Undo move object"

If you have previously edited the position or size of an element on the output sheet ([F11] or used **"Output preferences/Move objects"**), you can undo the last changement with this tool.



"Restore move object"

If you have previously undone a changement, you can restore with this tool.



"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).

6.3.9 "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.

6.3.10 "Save graphics preferences" menu item

Some of the preferences you made with the menu items of the **"Graphics preferences"** menu as well as the inputs using the **"Edit/Company"** menu item can be saved to a file. If you select **"GGU-OEDOM.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"**.

6.4 Output preferences menu

6.4.1 General note

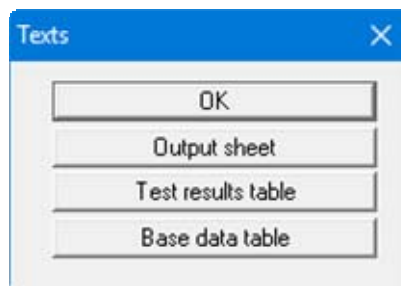
The design of the output sheet can be defined by the user. After selecting the type of evaluation a variety of tables with test data and test results are available, as well as the different evaluation diagrams, for example the load-settlement graph or the constrained modulus graph. Choose A4 or A3 format for the output sheet, depending on the diagrams to be displayed, and arrange the tables and diagrams as required.

6.4.2 "Page size" menu item

The default page set-up is A4 (portrait) when the program is started. You can edit the page size in the dialog box.

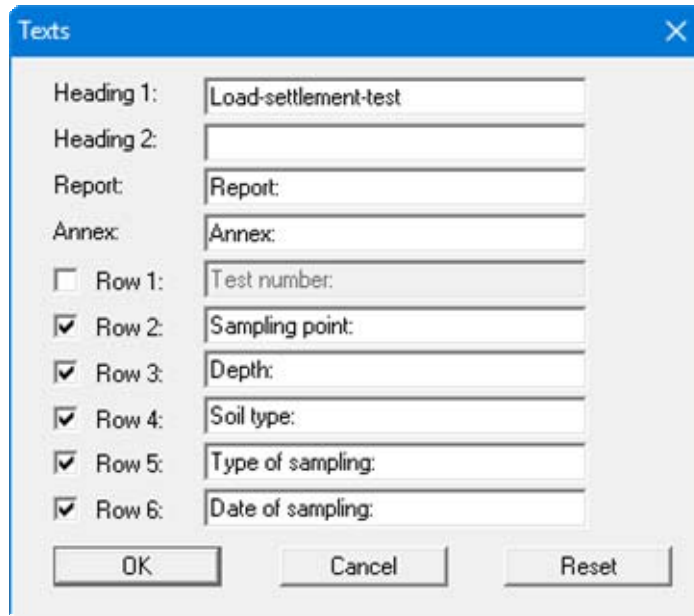
6.4.3 "Texts" menu item

The default labelling of some output sheet elements can be edited in this menu item's dialog box. Among other things, the name of the output sheet can be specified here. An option box opens in which the various fields can be selected for editing using the correspondingly labelled buttons.



6.4.3.1 "Output sheet" button

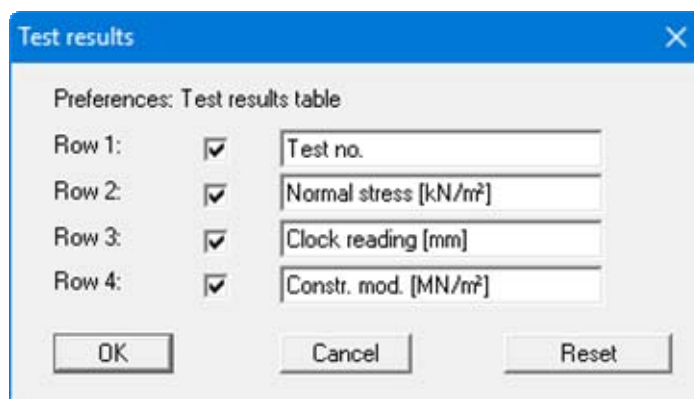
After clicking "Output sheet" the following dialog box opens:



Your input in rows 1 to 6 of the above dialog box, as well as the input for "Report:" and "Annex:" also represent the designations for the input boxes in the "Edit/General" menu item dialog box. If rows are deactivated in the above dialog box, the corresponding input boxes in the "Edit/General" menu item dialog box are also deactivated (see Section 6.2.6). Use "Reset" to restore the default labelling settings.

6.4.3.2 "Test results table" button

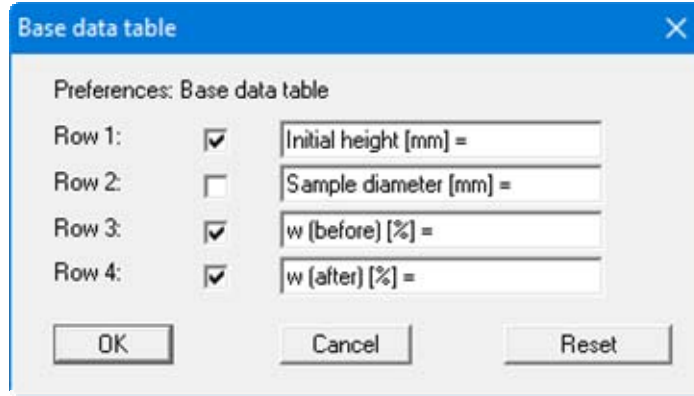
If the "Test results table" button is clicked in the above option box the following dialog box opens, allowing labelling of the test data input boxes and the test results output table:



If rows are deactivated in the dialog box, the texts are not displayed in the table on the output sheet. In order to hide the table completely the element must be deactivated using the menu item "Output preferences/Test results" (see Section 6.4.12).

6.4.3.3 "Base data table" button

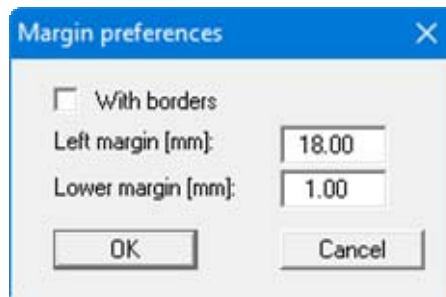
If evaluation using constrained moduli is selected, labelling of the input boxes for the base data and of the base data table on the output sheet can be edited. Press the "**Base data table**" button in the above combo box.



If rows are deactivated in the dialog box, the texts are not displayed in the table on the output sheet. In order to hide the table completely the element must be deactivated using the menu item "**Output preferences/Base data table**" (see Section 6.4.9).

6.4.4 "Margins" menu item

In the default program preferences the form is shown with cutting borders. For output to an A4 printer, a reduction of the printer output is generally necessary, as proprietary printers cannot fully cover an A4 page. The margin preferences can be defined in the following dialog box.



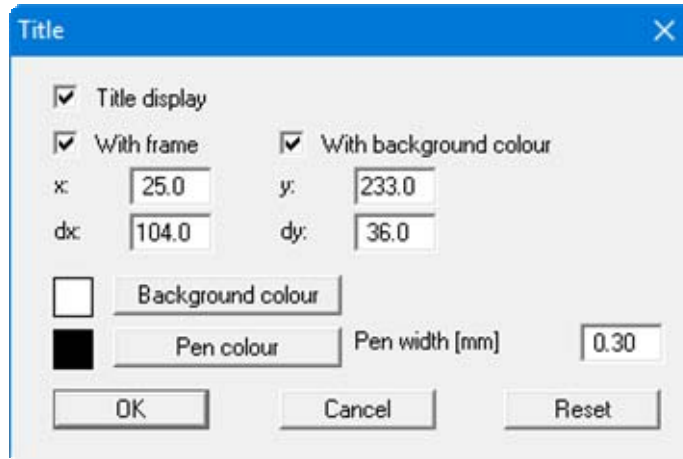
By deactivating the "**With borders**" check box and with an appropriate choice of left and lower margins, it is generally possible to create a non-reduced printer output. It is necessary to also adapt the page height and width (see Section 6.4.2).

6.4.5 "Position info" menu item

The positions and layout of the individual elements on the output sheet can be altered using the following menu items. This menu item provides information on the options for altering the position and layout more quickly using the mouse.

6.4.6 "Title (change position)" menu item

The position and layout of the title element can be altered via the dialog box for this menu item, if the "Title display" check box is activated.



The position of the element on the output sheet and its size can be defined or edited by means of the variables "x" and "y", "dx" and "dy". The element can be provided with a frame and a background colour to suit your personal requirements. If the element needs to be returned to its original condition, this can be done using the "Reset" button. Alternatively, you can alter the size and shape of the element using the mouse (see menu item "Output preferences/Move objects", Section 6.4.19).

The heading "Load-settlement test" shown in the title element can be edited in the menu item "Output preferences/Texts" button "Output sheet" (see Section 6.4.3.1). The texts "Project (1st line)" and "Project (2nd line)" are entered immediately after double-clicking the element or using the menu item "Edit/General" (see Section 6.2.6).

6.4.7 "Load-settlement graph" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the "Output preferences/Title (change position)" menu item (see Section 6.4.6). Proceed as described there to alter the position or layout of the "Load-settlement graph" element.

6.4.8 "Constrained modulus graph" menu item

This menu item is only active if you have selected test evaluation using *constrained moduli*. Almost exactly the same dialog box opens with the same preference options as that described in the "Output preferences/Title (change position)" menu item (see Section 6.4.6). Proceed as described there to alter the position or layout of the "Constrained modulus graph" element.

6.4.9 "Base data table" menu item

This menu item is only active if you have selected test evaluation using *constrained moduli*. Almost exactly the same dialog box opens with the same preference options as that described in the "**Output preferences/Title (change position)**" menu item (see Section 6.4.6). Proceed as described there to alter the position or layout of the "**Base data table**" element.

The input for this element can be edited via the menu item "**Edit/Base data**" (see Section 6.2.1). For this element you also have the option of adapting the texts in front of the input boxes to suit your needs. Go to the menu item "**Output preferences/Texts**" button "**Base data table**" (see Section 6.4.3.3).

6.4.10 "Compression graph" menu item

This menu item is only active if you have selected test evaluation using *compression indices*. Almost exactly the same dialog box opens with the same preference options as that described in the "**Output preferences/Title (change position)**" menu item (see Section 6.4.6). Proceed as described there to alter the position or layout of the "**Compression graph**" element.

6.4.11 "Test data" menu item

This menu item is only active if you have selected test evaluation using *compression indices*. Almost exactly the same dialog box opens with the same preference options as that described in the "**Output preferences/Title (change position)**" menu item (see Section 6.4.6). Proceed as described there to alter the position or layout of the "**Test data**" element.

The input for this element can be edited via the menu item "**Edit/Tests**" (see Section 6.2.3).

6.4.12 "Test results" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the "**Output preferences/Title (change position)**" menu item (see Section 6.4.6). Proceed as described there to alter the position or layout of the "**Test results**" element.

6.4.13 "Symbol descriptions" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the "**Output preferences/Title (change position)**" menu item (see Section 6.4.6). Proceed as described there to alter the position or layout of the "**Symbol descriptions**" element.

6.4.14 "Company" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the "**Output preferences/Title (change position)**" menu item (see Section 6.4.6). Simply proceed as described there to edit the "**Company**" element.

The input for this element can be edited immediately after double-clicking on the element or via the menu item "**Edit/Company**" (see Section 6.2.7).

6.4.15 "Test no., etc." menu item

Almost exactly the same dialog box opens with the same preference options as that described in the "**Output preferences/Title (change position)**" menu item (see Section 6.4.6). To edit the "**Test number etc.**" element, simply proceed as described there.

The input for this element can be edited immediately after double-clicking on the element or via the menu item "**Edit/General**" (see Section 6.2.6). For this element you also have the option of adapting the texts in front of the input boxes to suit your needs. Go to the menu item "**Output preferences/Texts**" button "**Output sheet**" (see Section 6.4.3.1).

6.4.16 "Annex and report" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the "**Output preferences/Title (change position)**" menu item (see Section 6.4.6). To edit the "**Annex and report**" element, simply proceed as described there.

The input for this element can be edited immediately after double-clicking on the element or via the menu item "**Edit/General**" (see Section 6.2.6). For this element you also have the option of adapting the texts in front of the input boxes to suit your needs. Go to the menu item "**Output preferences/Texts**" button "**Output sheet**" (see Section 6.4.3.1).

6.4.17 "Output table" menu item

Almost exactly the same dialog box opens with the same preference options as that described in the "**Output preferences/Title (change position)**" menu item (see Section 6.4.6). Proceed as described there to alter the position or layout of the "**Output table**" element.


6.4.18 "Reset all" menu item

With this button, all preferences for the aforementioned elements, which may have been edited with the previous menu item, will be reset to the program defaults.


6.4.19 "Move objects" menu item

When you go to this item you can move the various objects with the aid of the mouse. Move the mouse over the object to be moved. When you are located above a moveable object the mouse pointer appears in the shape of a cross. You can now press and hold the left mouse button and drag the object to the required position.

After going to this menu item only one object at a time can be moved using the mouse or its size be altered.

In order to move or edit several objects, this function can be more quickly activated by pressing [F11] or the  icon.

The size of an object can also be altered using this menu item or the [F11] key. If you move over the frame of a changeable object after activating this function the mouse assumed the shape of a double-headed arrow. Hold the left mouse button and move the frame until the object has reached the required size. To retain the ratio of the sides, pull at one corner only. If on one side only is pulled the object will become higher or wider.

The last change made in the position or size of an object can be undone using [Back] or by clicking the  icon.

6.5 Info menu

6.5.1 "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-OEDOM**.

6.5.2 "Maxima" menu item

Information on the maximum number of tests allowed by the program is displayed in a message box.

6.5.3 "Help" menu item

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

6.5.4 "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>.

6.5.5 "GGU support" menu item

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

6.5.6 "What's new?" menu item

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

6.5.7 "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.

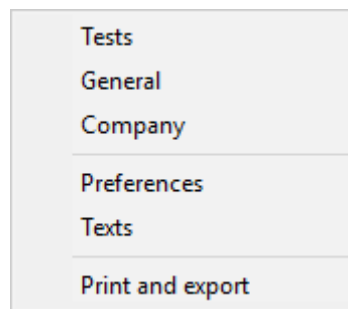
7 Tips and tricks

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 output sheet elements or **Mini-CAD** objects, the editor for the selected object immediately opens, allowing it to be edited. By double-clicking output sheet elements while holding the [**Shift**] key, the preferences for the position, size and appearance of the element open for editing in the editor.

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 or A3). 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.
- [**F11**] activates the menu item "**Output preferences/Move objects**".

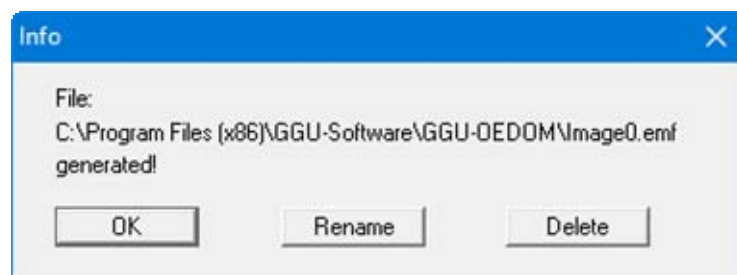
7.3 "Copy/print area" icon

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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