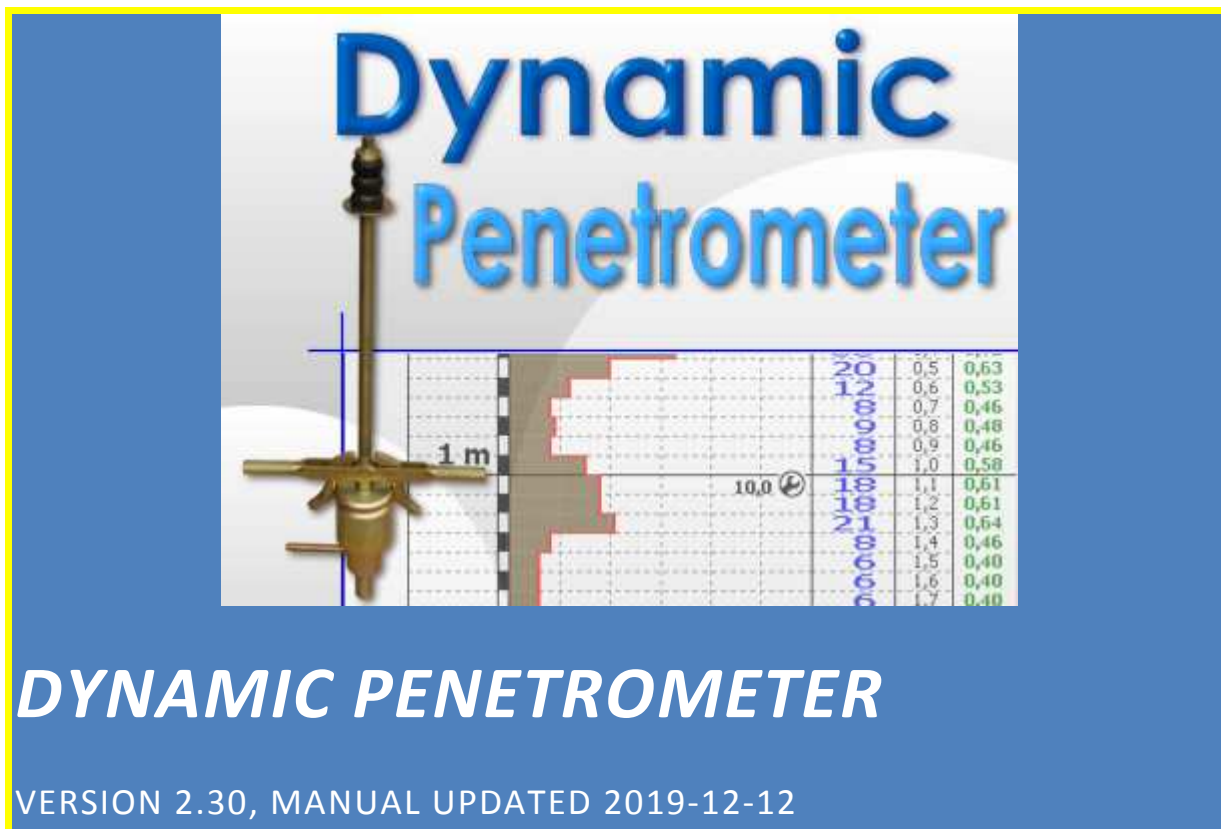


APPLICATION MANUAL



Producer

SkyRaster Software Engineering

Substantive consultation

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1. INSTALLATION OF THE PROGRAM

HAVING DOWNLOADED THE LATEST VERSION FROM THE INTERNET

To download program please visit selected link:

<http://skyraster.net/download/DynamicPenetrometerInstaller.exe>

(for installer)

<http://skyraster.net/download/DynamicPenetrometer.zip>

(for portable version)

Run the downloaded file DynamicPenetrometerInstaller.exe, which will start the installation program. If the system does not allow installation (e.g. the installer starts with an error), you should check your anti-virus/firewall settings to see if it is blocking the installation file. If the problem persists (e.g. in older versions of Windows 7), you need to manually unpack the program from the ZIP portable archive and run it (unfortunately in this case you have to create desktop shortcuts manually).

INSTALLATION FROM A DISTRIBUTION CD

After inserting the distribution CD into the drive, start the program **Starter.exe** (if the autorun option is available, you do not need to start the program because the system will start the program automatically),

This can be done by:

- selecting the **“My Computer”** icon and then the CD-ROM drive of **the Starter program**
- **in the Start menu, select Run...**, and then type **“drive:STARTER”**, where **“drive”** is the letter of the CD drive
- select **the DYNAMIC PROBE** program for installation by clicking the appropriate button

AFTER STARTING THE INSTALLATION PROGRAM

- confirm the correct version of the operating system for which you want to install the program and press **Next**.
- having read the terms of the license agreement, press **Next**,
- set the target directory of the program and decide whether to create a shortcut to the program on the desktop, after setting these options, press **Install**,
- if the password was entered incorrectly, the user will be informed about it, then the program must be reinstalled (do not try to run the program installed that way or its uninstaller - the user does it only at his own risk!),
- the installed program can be run via **the Start menu (Programs-DynamicProbe)**, or by using the shortcut on the desktop (if one has been created),
- if you want to remove the program, you can do it in two ways:

- o select **Control Panel**, then **Add/Remove Programs**, select **Dynamic Probe** from the list and click **Remove**,
- o select **the Dynamic Probe** item in **the Start Menu**, where you can choose the uninstall option,

 **ATTENTION!!** During the deinstallation of the program the entire catalogue will be deleted - including data and license key, so if you want to retain the data, you have to copy it from the \DATA and \DATA (file StartImage.dat – license key).

1.1.1. PROGRAM ACTIVATION

By default, the program works in demo mode. Work in demo mode requires internet access.

You must purchase a license to be able to use the commercial version. After purchasing the license, there are two options:

- the user will receive information about activation and the next time the application will be started in commercial mode (in this case, when ordering, enter the code of the computer for which the license is being bought)
- the user will receive an activation code to be entered into the program (ENTER CODE field)

 *In the demo version the user can work for max. 14 days from the date of first activation.*

If a commercial license for this computer was released, the app will download a license key and save it to disk in the \DATA (LicKey.dat), a further use of the program will not require access to the Internet.

 *Entering the code resets it (it is used).*

 *If for some reason (computer replacement or a major update) the program displays information about the demo version, entering the used code will not activate it again. For this purpose, please contact the seller/manufacturer to reactivate the license.*

 **WORKSTATION ID** is displayed both in the information window about the demo version (at start) and in the purchase **information section (the ID of this computer is...)**

2. INTERFACE

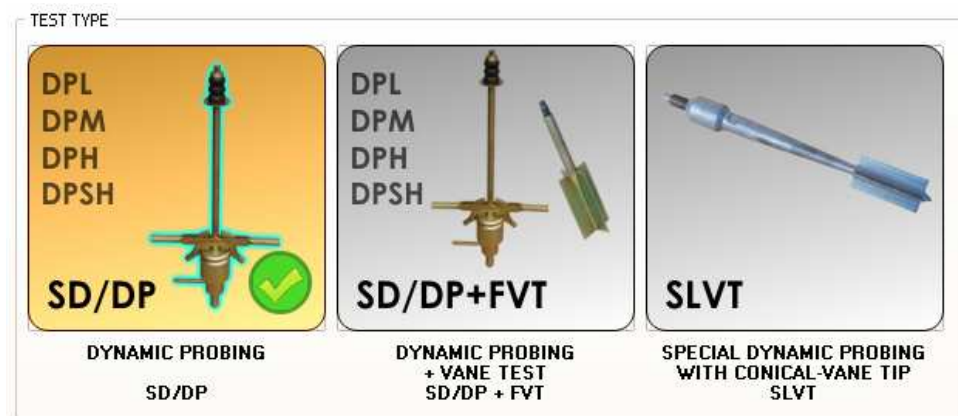
2.1. SECTION "PROBE DESCRIPTION AND TYPE"

This section is used to complete the textual description in the report and to provide the basic parameters: probe type and instructions or standards, according to which the test was performed.



2.1.1. TAB „METHOD”

The tab allows you to choose the probing method:



 The program version 2.X allows you to work in two modes: standard (dynamic probing) and extended (dynamic probing + cross-shearing) - so-called **FVT/SLVT module** (for an additional fee).

 If the license does not include the FVT/SLVT module, FVT/SLVT icons will not be active.

CHOICE OF A CALCULATION STANDARD

In the “Method” tab, select the standard used for calculations – the application will display to what extent it is supported.

The program allows you to choose the following calculation standards:

- PN-B-04452
- Instructions for Testing the Soil of Road and Bridge Structures
- PN-EN ISO 22476-2 / PN-EN 1997-2
- Use – conversion parameters (a and b) can be determined manually:

As an empirically determined value, the IS compaction index is calculated based on the ID according to the formula of M. Borowczyk, Z. Frankowski (1981) as well as W. Bojanowski, M. Kubiczek (1995).

Noteworthy is the method of analyzing compliance with the standard – the application provides two modes:

- **Strict mode** – based on a specific soil profile, probe type and standard type, the application selects the appropriate conversion formulas for the ID (e.g. for areas above/below the water level). In the absence of the described soil profile, the application suspends calculations.
- **Simplified mode** – in the absence of a soil profile, the application adopts default formulas for a given probe type. In this mode, the values may be approximate, so it should be treated only as a guide. Ultimately, the soil profile should be properly filled in allowing the application to select optimal conversion formulas.

Please note that the application supports a correction factor which can be turned on or off next to the data entry table. The correction factor converts the N10/N20 value according to the standard.

2.1.2. TAB „DESCRIPTION”

The tab is used to enter basic textual data regarding the order for which the report will be prepared.

When entering data, it is recommended to use the ENTER key.

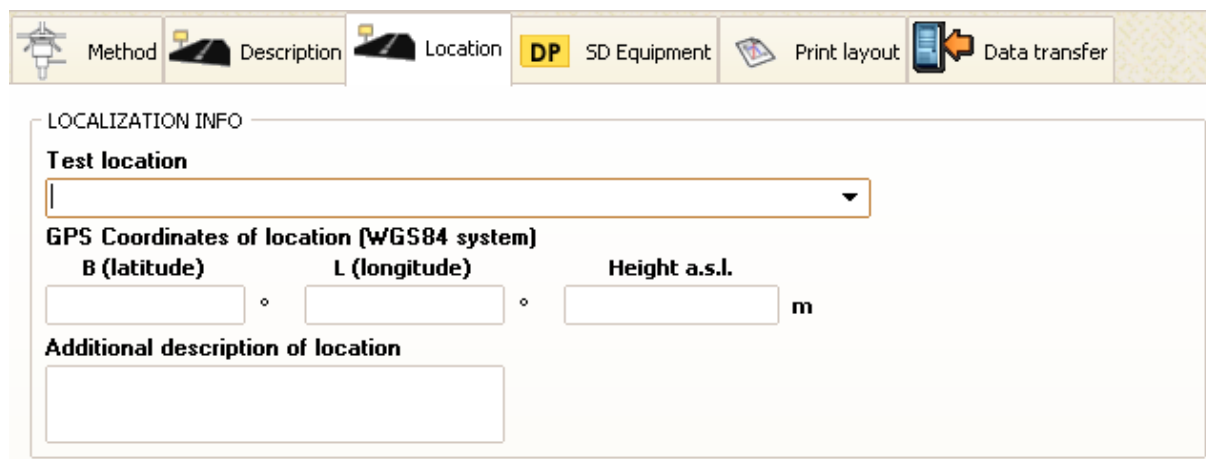
The “**Today**” button will automatically specify the place and time (part: header data) or the date of the probing (part of the order).

In the case of drop-down boxes , pressing ENTER will save the current name and add it to the drop-down box. This will allow you to quickly recall this value later (or in the next opinion).

Using the “**Change page number**” fields allows you to impose a different page numbering, which is useful if you are preparing an opinion that is part of a larger work.

2.1.3. TAB „LOCATION”

The tab is used to specify the probing location. The data in this location can be entered manually; it can also be obtained with the help of the PowerGPS Android application (see the “Synchronization” tab).



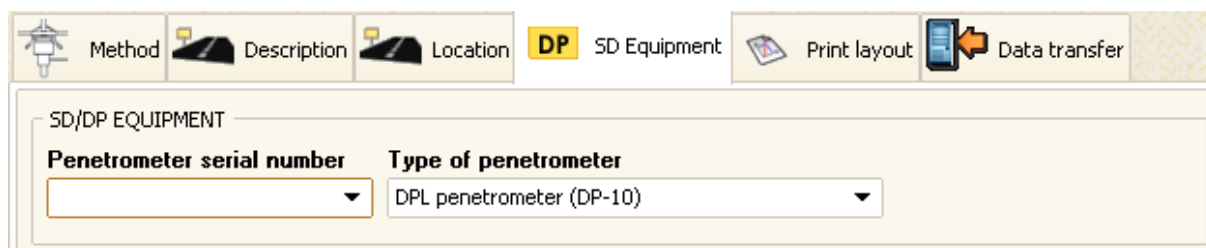
The screenshot shows the 'LOCATION' tab selected in the top navigation bar. The interface includes a toolbar with icons for Method, Description, Location, DP, SD Equipment, Print layout, and Data transfer. The main content area is titled 'LOCALIZATION INFO' and contains the following fields:

- Test location:** A dropdown menu.
- GPS Coordinates of location (WGS84 system):**
 - B (latitude):** A text input field.
 - L (longitude):** A text input field.
 - Height a.s.l.:** A text input field followed by a unit 'm'.
- Additional description of location:** A large text area.

2.1.4. TAB „SD EQUIPMENT”

This tab allows you to choose the probe type:

- DPL – light probe SD-10
- DPM – medium probe SD-30
- DPH – heavy probe SD-50
- DPSH_A – very heavy probe SD-63,5
- DPSH_B – very heavy probe SD-63,5



The screenshot shows the 'SD EQUIPMENT' tab selected in the top navigation bar. The interface includes the same toolbar as the previous tab. The main content area is titled 'SD/DP EQUIPMENT' and contains the following fields:

- Penetrometer serial number:** A text input field.
- Type of penetrometer:** A dropdown menu with 'DPL penetrometer (DP-10)' selected.

2.1.5. TAB „FVT EQUIPMENT”

This tab is available only for the “**DYNAMIC PROBING + CROSS-SHEARING SD/DP+FVT**” measurement mode. It allows the determination of relevant parameters that affect the calculation under this method.

 Method	 Description	 Location	DP SD Equipment	FVT FVT Equipment	 Print layout	 Data transfer
--	---	--	------------------------	--------------------------	--	---

TORQUE WRENCH PARAMETERS for FVT survey

Penetrometer serial number	Test range	Wrench measurement precision	
			Nm

TORQUE WRENCH POSITION

☒ in the rod axis
☐ outside rod axis

Correction coefficient α

Last calibration date

VANE PARAMETERS

Used vane type	Diameter	Height
FVT 40/80	40	80

2.1.6. TAB „SLVT EQUIPMENT”

This tab is available only for the “**PROBING WITH AN SLVT PROBE**”. It allows the determination of relevant parameters that affect the calculation under this method.

 Method	 Description	 Location	DP SD Equipment	SLVT SLVT Equipment	 Print layout	 Data transfer
--	---	--	------------------------	----------------------------	--	---

TORQUE WRENCH PARAMETERS for SLVT test

Penetrometer serial number	Test range	Wrench measurement precision	
			Nm

TORQUE WRENCH POSITION

☒ in the rod axis
☐ outside rod axis

Correction coefficient α

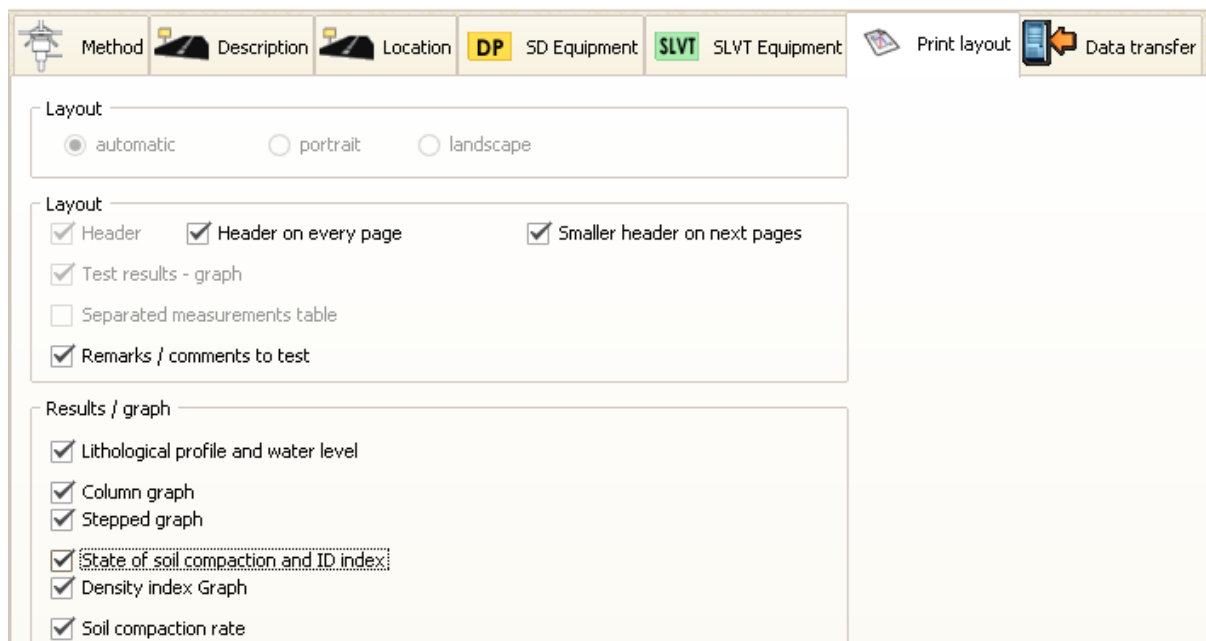
Last calibration date

VANE PARAMETERS

Used vane type	Diameter	Height
FVT 40/80	40	80

2.1.7. TAB „PRINT LAYOUT”

The tab common to the sections is used to select items to appear on the printout.



The screenshot shows the 'PRINT LAYOUT' tab selected in the software interface. The tab bar at the top includes icons for Method, Description, Location, DP (Dynamic Penetrometer), SD Equipment, SLVT (Soil Layer Test), and SLVT Equipment. The 'Print layout' icon is highlighted. The main content area is divided into three sections:

- Layout:** Contains three radio buttons: 'automatic' (selected), 'portrait', and 'landscape'.
- Layout:** Contains several checkboxes:
 - ☒ Header
 - ☒ Header on every page
 - ☒ Smaller header on next pages
 - ☒ Test results - graph
 - ☐ Separated measurements table
 - ☒ Remarks / comments to test
- Results / graph:** Contains several checkboxes:
 - ☒ Lithological profile and water level
 - ☒ Column graph
 - ☒ Stepped graph
 - ☒ State of soil compaction and ID index
 - ☒ Density index Graph
 - ☒ Soil compaction rate

2.2. SECTION „LITHOLOGICAL PROFILE”

This section is used to determine the soil layer profile (lithological profile), allowing for accurate (compliant with the standard) analysis and presentation of the data on the probe card.



LITHOLOGICAL PROFILE TABLE

Save Load... Clear (remove) profile

Layer start depth	Soil type (of layer)	well grained	Coeff. CU (uniformity)	Coeff. CC (curvature)	Used in test	Soil parameters	Corr. coeff.
0,00 m	nN				SD	unknown	1,00
0,30 m	P[d]				SD	non-cohesive	1,00
2,00 m	P[d]				SD	non-cohesive	1,00
2,20 m	FSa				SD	non-cohesive	1,00

Add soil level

Edit Remove selected

Profile parameters

Profile ends at depth 2,7

Water level (groundwater)  

In this tab you can fill in all the necessary data needed for analysis of compliance with the standard (also regarding the correct grain size and U and C_U indicators).

The application stores information about the layers, **remembering their initial level and depth of the entire profile.** Based on this data, the sizes of individual layers are calculated and do not need to be entered separately.

The **“Add soil layer”** button allows you to add a single layer through a special dialog box. The **“Edit”** button (or **ENTER** key) also allows you to change the value in the above-mentioned window.

Layer depth and rise

Profile starts at

Layer thickness

Soil type

Layer type

Geological layer

Layer fine gr

Target for survey

☒ DYNAMIC P

☐ VANE SHEA

COATED SOILS	MINERAL SOILS
nN - embankment (PN)	ll[pi] - silt clay (PN)
nB - construction embankment (PN)	siCl - silt clay (ISO)
Zl - slag (PN)	l - clay (PN)
zl - slag (ISO)	Cl - clay (ISO)
C - brick (PN)	ll[p] - sand clay (PN)
c - brick (ISO)	saCl - sand clay (ISO)
	sasiCl - sand silt clay (ISO)
	G[piz] - sand silt clay hard
	G[z] - sand silt hard (PN)
	G[pz] - sand clay hard (PN)
	G[pi] - sand clay silt (PN)
	sacISi - sand clay silt (ISO)
	G - clay (PN)
	G[p] - sand clay (PN)
	PI - silt (PN)
	Si - silt (ISO)
	PI[p] - sand silt (PN)
	saSi - sand silt (ISO)
	clSi - clay silt (ISO)

ORGANIC SOILS
H - humus (PN)
H - humus (ISO)
Nm - silt (PN)
T - peat (PN)
T - peat (ISO)

UNUSUAL SOILS
Kr - chalk (PN)
kr - chalk (ISO)
kp - writing chalk (ISO)
Gy - gyttja (PN)
gy - gyttja (ISO)
l[hi] - oil shale (PN)

The soil profile editing window allows you to specify the thickness and type of the profile layer.

After pressing the **“Add soil”** button, a menu is expanded from which you can select the desired soil type.

Additionally, in the window you can specify parameters for interpreting this data (e.g. indicate the prevailing characteristics [e.g. sand/sand]) and change the colour of the layer.

Layer type

☐ surface soil / fill earth (not used in calculations)

☒ defined soil layer:

Geological layer parameters

☒ sand

☐ sand+gravel

☐ other

Uniformity coefficient CU

Curvature coefficient CC

Layer fine grained: ☐ yes ☐ no

Color on graph

Target for survey

☒ DYNAMIC PROBING

☐ VANE SHEAR

Data for FVT/SLVT survey

☐ organic ☐ cohesive ☐ unknown

☒ non-cohesive

Correction coefficient

The “**Layer type**” section allows you to specify whether the layer should be taken into account during calculations or whether it is a soil layer that should not be analyzed according to the standard. In the window, you can enter soil parameters that will affect calculations at individual profile depths. Beginning with series II, the program includes parameters that affect the FVT/SLVT calculations.

Returning to the interface with the profile representation, by **selecting the “Delete”** button you delete the selected profile.

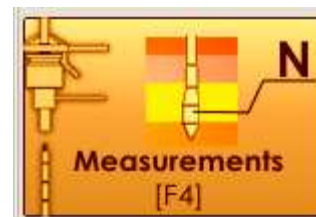
Profile values can also be changed in the table by clicking on a layer and immediately entering a different value and accepting it with ENTER:

P[d]

2.3. SECTION „MEASUREMENTS”

This section is used to enter the number of strokes for each blow of the probe at specific depths.

The data is entered in the table **“Number of strokes”** and **“Torque wrench reading”**. The **“Number of strokes”** [Nkor] column is a calculated column; the figures shown are readings to be corrected. To turn off the correction, clear the **“Correction factor”** box:



☐ Correction coefficient by IBPG

Correction coefficient due to water level

☐ User correction coefficient

Setup correction coefficient value

Starting from version 1.28, it is possible to set the correction factor according to user parameters:

After selecting this option with the button, you can set correction parameters for individual depths or a universal correction factor for the entire depth range that can be corrected (0-0,5m).

Test
 Print layout
 Data transfer

SURVEY - MEASUREMENTS TABLE

Import from clipboard
 Import from CSV
 Export to CSV

Depth	DP Blows count [N10]	DP Torque wrench value [Nm]	DP Blows count [corr.]
0,10 m			
0,20 m			
0,30 m			
0,40 m			
0,50 m			

Depending on the method chosen, a standard or extended field set is used – starting from the common columns:

	DP	DP	DP
Depth	Blows count [N10]	Torque wrench value [Nm]	Blows count [corr.]

for methods associated with FVT we receive the following additional columns:

FVT	FVT	FVT	FVT	FVT	FVT	FVT	FVT	FVT
MMax [Nm]	MRMax [Nm]	Speed	Time to shear	tau min-max	IR	ILavg	IL min-max	μ

for SLVT methods:

SLVT	SLVT	SLVT	SLVT	SLVT	SLVT	SLVT	SLVT	SLVT
MMax [Nm]	MRMax [Nm]	Speed	Time to shear	tau min-max	IR	ILavg	IL min-max	μ

2.4. BUTTON „CALCULATE & REPORT”



Calculation buttons allow you to make calculations and preview the opinion (which can also be printed on a printer or to a PDF¹ file).



Print preview

DYNAMIC PROBING TEST REPORT LIGHT DYNAMIC PENETROMETER (DP-10)

Executor: _____ Zielona Góra, date 18.11.2019

Subject number: _____ A/2012/001/01-2

Location: _____ Order no.: _____ X1112/334

Customer: _____ Height a.s.l.: _____ GPS Coordinates (BL) - location: _____

220,00 m 51,0000000 ° 17,0000000 °

Test number: _____ 10

Type of penetrometer: _____ Identification of penetrometer: _____ Test date: _____ Additional description of test: _____

Light probe DPL Sonda nr 2 14-01-2013 Distance 1.2m from test site

In acc. with Polish standard PN-B-04452

DPT [m]	Lithological profile	Depth [m] BGL	Number of blows* 10 20 30 40 50	Readings N10 DPT[m]	idx I _p	Graph of density index I _p	C.f. I _s	I _p avg. I _s avg. for layers
0,1	water level	---	---	90	0,1	0,91	1,02	0,96
0,2				60	0,2	0,83	1,01	
0,3				60	0,3	0,83	1,01	
0,4				33	0,4	0,72	0,98	
0,5				20	0,5	0,63	0,96	
0,6				12	0,6	0,53	0,96	

Test results - graph Layout

☒ Lithological profile and water level

☒ Column graph

☒ Stepped graph

☒ State of soil compaction and ID index

☒ Density index Graph

☒ Soil compaction rate

Print Print to PDF Print current page Printer settings

Zoom in Zoom out Zoom all

Close

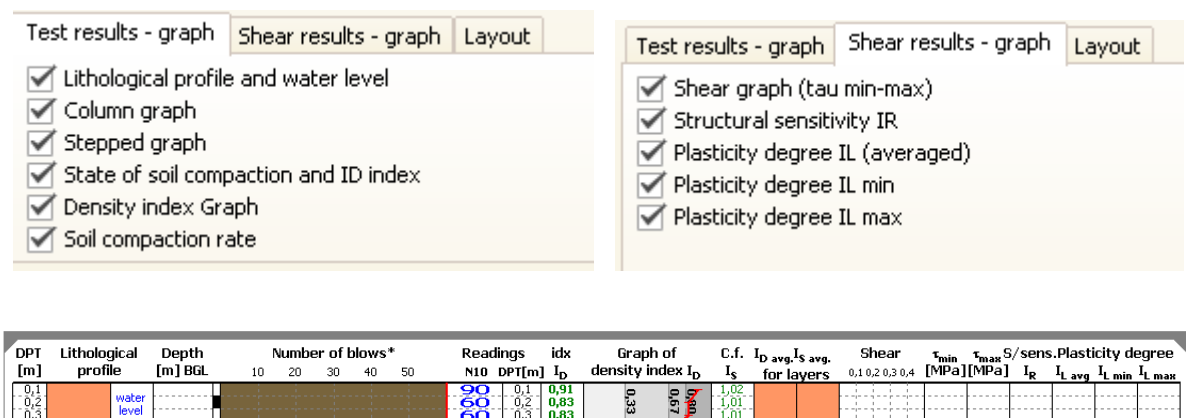
The “Printer settings” button allows you to set print settings (the Print button sends the opinions to the printer immediately, while “Print to PDF” sends them to the "PDF Creator" virtual printer in order to create a PDF file).

¹ You have to install PDF CREATOR application if you want to print results to the PDF format

The “**Zoom In**” and “**Zoom Out**” buttons (as well as the mouse wheel) allow you to adjust the sheet's magnification. Switching between pages is done by pressing the page names.

The “**Close**” button closes the opinion preview window.

The “**Probing results**” tab allows you to select the appropriate items to include on the sheet. If the selected method is FVT or SLVT - an additional tab will appear to enable/disable additional columns.



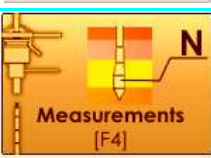
Using the “**Layout**” tab, you can set how the opinion and the header are displayed.

Test results - graph **Shear results - graph** **Layout**

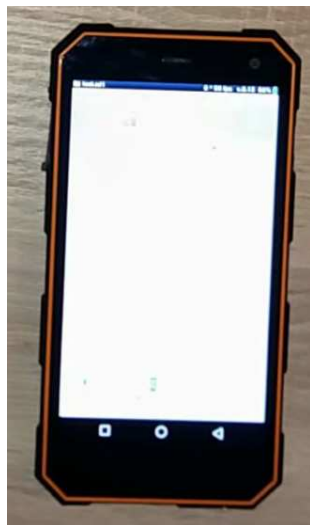
- ☒ Header ☐ Header on every page ☒ Smaller header on next page
- ☒ Test results - graph
- ☒ Separated measurements table
- ☒ Remarks / comments to test

If errors appear when calculation started, you can go back to the main window and check tab **Errors** which contains reason of the errors.

3. KEYBOARD SHORTCUTS & ICONS

Icon	Shortcut	Place	Description
 New	Ctrl+N	main window	Reset sheet and allow to create new report
 Open	Ctrl+O	main window	Allow to load previously stored report/sheet
 Save	Ctrl+S	main window	Write data to the current file (file must be opened or saved earlier)
 Save as ...	-	main window	Write data to the file under selected name
 Probe setup [F2]	F2	main window	Switch to PROBE SETUP section
 Lithological profile [F3]	F3	main window	Switch to LITHOLOGICAL PROFILE section
 Measurements [F4]	F4	main window	Switch to MEASUREMENTS section
 Report	F5	main window	Show the preview of the report (run calculations)
 Authors	-	main window	Show info about authors and title screen
 Help [F1]	F1	main window	Show application manual in PDF format
	Ctrl+F9	main window	Toggle language to PL
	Ctrl+F10	main window	Toggle language to EN

4. DATA TRANSFER



Beginning with version 2.05, the program can synchronize (download) data from an Android mobile controller and RTK PowerGPS II application, which has also been enabled to build a database of the data obtained in dynamic probing.

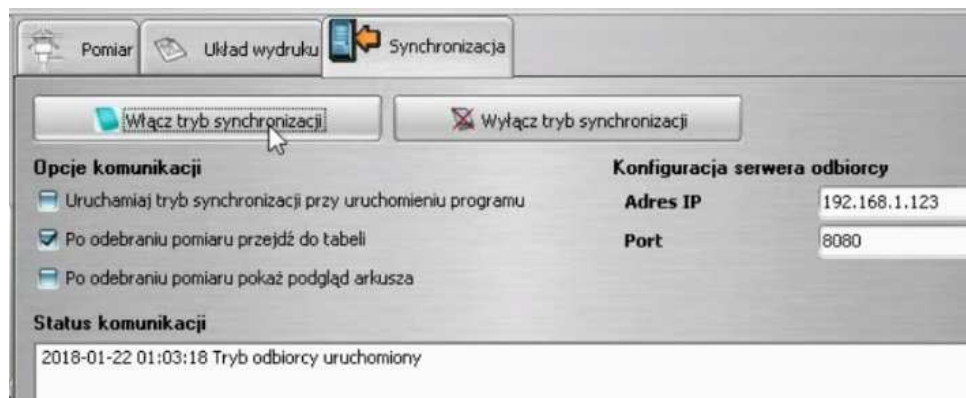
To transfer data, the connection needs to be configured. Since the connection is based on network access via an IP address, this method is applicable if the smartphone is connected to the network via WIFI or GSM, while the PC has an IP address available for the Android controller.



- 💡 *If the PC is behind NAT (computer in the local network), the obtained IP address will probably be the local address, and it will be impossible to connect e.g. via a GSM.*
- ✍ *The best method is to set up a WIFI network in the office and connect a smartphone to it (the PC does not have to connect via a WIFI wireless connection; it can have a cable connection to a router).*

The “Synchronization” tab usually looks as follows:

After pressing the **“Turn on synchronization mode”**, an attempt is made to set up a server:



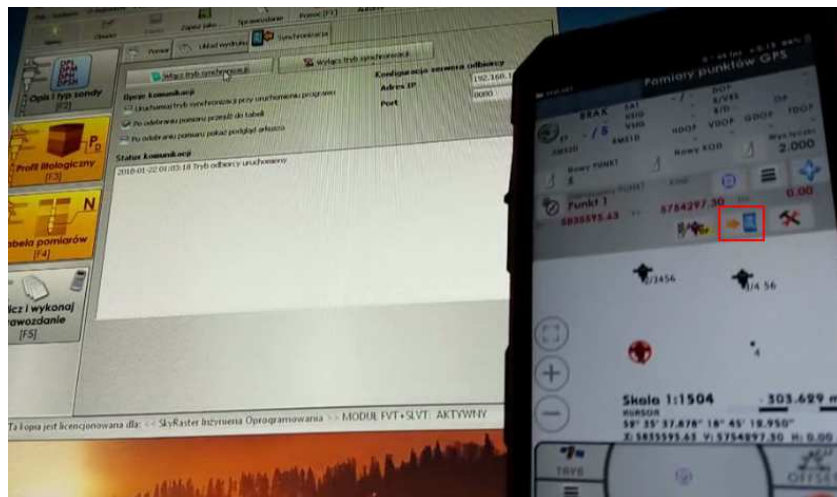
If the server is created successfully, the IP address and information about entering **the recipient mode** will be displayed.

- ✎ If for some reason a specific port, e.g. 8080 is blocked in the local network, you can use another one (or agree the appropriate port number with the network administrator).*
- ✎ If you often use synchronization, you can select **“Start synchronization mode when starting the program”** - then there will be no need to click the **“Enable synchronization mode”** physically as it will run automatically.*

The indicated IP address must be entered in the PowerGPS application:



Data transfer from the program follows after clicking the transfer icon. After a while, the data should be on the computer, and if the option to start the preview after receiving the measurement is selected – it should automatically appear on the computer.

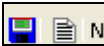


A video showing an exemplary communication session can be found at:

<https://www.youtube.com/watch?v=5prls2cN2DQ>

5. USEFUL INFORMATION

Most of options are available from the top menu.

At the bottom of the window one can find status bar, with two icons that show save status / modification status of the current sheet. After save, you can see two icons (disk & sheet – without asterisk)  In case of any modification, disk icon disappear, and sheet icon will be shown with asterisk , what show that changes hasn't been stored in file.

Authors button show title screen panel.

We are open to comments, opinions or suggestions regarding this software, because they allow us to create better and better software tailored to the needs of users. In case of applications, please send them via e-mail or via convenient forms on the website www.skyraster.com.

We wish you comfortable and fruitful work

SKYRASTER , GEOLAB