

Updated: 1/2024

Use of Formulas in Templates

Program:	Stratigraphy – Logs
File:	Demo_manual_51.gsg

The Stratigraphy and Laboratory programs allow you to use formulas for automatic recalculations of selected test data. The goal of this engineering manual is to show how to easily work with formulas and how to use them to modify the output protocol.

In our case, we will add a graph for the friction ratio R_f to the output report of the CPT test, which we will first calculate using already existing data. We calculate the friction ratio from the relationship:

$$R_f = \left(\frac{f_s}{q_c}\right) * 100 \,[\%]$$

, where q_c is cone resistance and f_s is local friction.

Assignment

Modify the "EN-Standard" CPT template so that:

- The CPT table contained a "Friction ratio" column
- Create a formula for the new column to be calculated automatically from the entered data
- Display the friction ratio in the output log.

Modify the template with the demo file - DEMO - Templates EN.gsg, which you can find in Fine online examples. Name the newly created template set EM 51 and save it in the Template Manager for future use.

GE05

The CPT output protocol of the "EN-Standard" template set has the following form:

GEO5 Laboratoř s.r.o. Sokolovská 232, Praha 8, 18000		Cone penetration te	st (CPT)	CPT1						
Project: Apartment building "Moonlighting" - Geological survey										
Project ID:	AA_0014 - 2019	Annex no.: 17.C	Type of test: TE2							
Location:	Stará 14/78, Hradec Králov	Type of cone: Ac=1000 mm ²								
Measured:	Joe Fieldman	Coordinate System: S-JTSK / Krovak / Balt after adjustment	Application class: 2							
Evaluated:	Bill New	Coordinate X: 1039700,63	Acc. to standard: EN ISO 22476	5-1						
Date of test:	10.08.2016	Coordinate Y: 745200,84	Vertical offset of the origin:	0,00 m						
Scale:	1:66,7	Coordinate Z: 222,00 m	Overall depth:	10,00 m						
Equipment:	PenSta A22	Filter location: U2	GWT: 5,00 m							

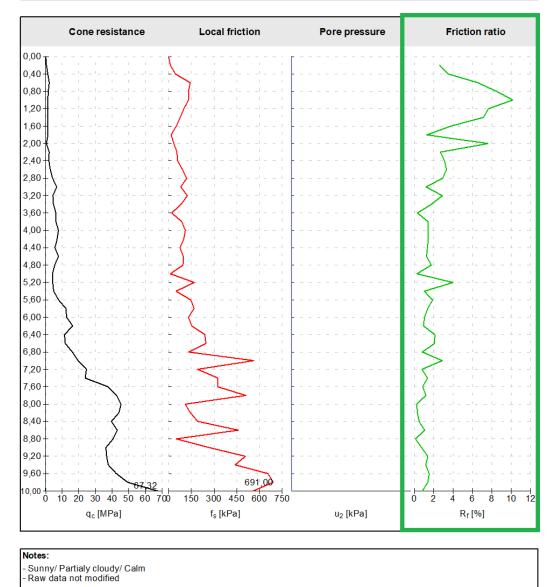
Cone resistance	Local friction	Pore pressure
0,00		
0,40		
0,80		•
1,20		
1,60 +		
2,00		
2,40		
2,80 +		
3,20		
3,60 +		
4,00		
4,40		
4,80 - /		
5,20		
5,60		
6,00		
6,40		•
6,80		
7,20		
7,60		
8,00		
8,40		
8,80		
9,20		
9,60		
10,00 <u> </u>	100 200 300 400 500 600 700	
q _c [MPa]	100 200 300 400 500 600 700 f _s [kPa]	u ₂ [kPa]
Notes:		
- Sunny/ Partialy cloudy/ Calm - Raw data not modified		

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The required form of the protocol is this:

GEO5 Laborato Sokolovská 232 18000	111 10505	Cone penetration te	CPT1								
Project:	Project: Apartment building "Moonlighting" - Geological survey										
Project ID:	AA_0014 - 2019	Annex no.: 17.C	Type of test: TE2								
Location:	Stará 14/78, Hradec Králov	é	Type of cone: Ac=1000 mm ²								
Measured:	Joe Fieldman	Coordinate System: S-JTSK / Krovak / Balt after adjustment	Application class: 2								
Evaluated:	Bill New	Coordinate X: 1039700,63	Acc. to standard: EN ISO 2247	6-1							
Date of test:	10.08.2016	Coordinate Y: 745200,84	Vertical offset of the origin:	0,00 m							
Scale:	1:66,7	Coordinate Z: 222,00 m	Overall depth:	10,00 m							
Equipment:	PenSta A22	Filter location: U2	GWT: 5,00 m								

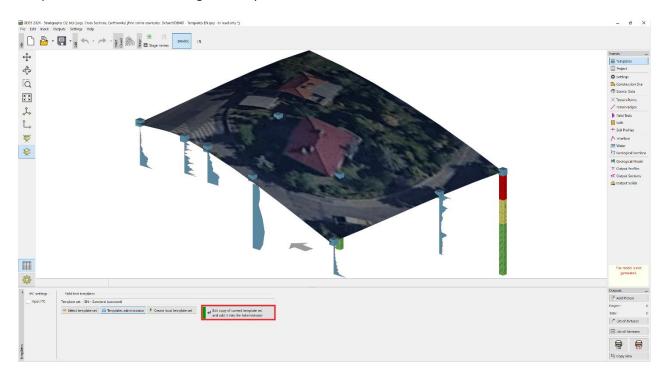


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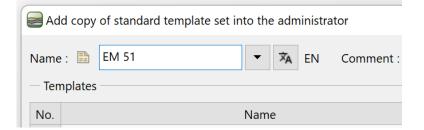


Solution:

First, open the file DEMO - Templates EN.gsg, which contains the data from which we will proceed. In the Templates frame, check whether we have selected the set of templates that we want to edit - "EN-Standard" (If another set of templates is selected, choose it from the list of templates using the "Select template set" button). Press the button "Edit copy of current template set and add it into the administrator" to open the window for editing the template set.



We will name the created set of templates EM 51. After editing, the template with this name will be saved into the administrator as a user template set.





In the table, select the template for CPT and press "Edit".

ne : 🛅 EM 51 🔹 🛪 EN	Comment : 🗈 👻 🥆		
emplates			
. Name	Capability	Comment	. Add
Borehole	model creation, borehole, well		+ Add (to the end)
Well	model creation, borehole, well		Incort
СРТ	model creation, CPTu		: Insert (before 3)
DPT	model creation, DPT		
SPT	model creation, SPT, borehole, well		Edit (number 3)
DMT	model creation, DMT		
PMT	model creation, PMT, borehole		· Remove (number 3)
			Move down (number 3)
			Edit formula (number 3)
			Copy (number 3)
			Paste

In the window "Edit template" continue with editing the item "Table CPT".

Edit ten	splate												— I ×
Name : 4	CPT	▼ 🖏 EN Comment :	b	▼ X _A									
					Input data						List of output prot	ocols	
No.		Name	Identifier	Type	Parameters	Conditional input	Comment	Add according to sample	No.	N	ame	Protocol type	+ Add
1	Test name		0	String			General / Fixed	 according to sample 	1 Field :	est - one page		Field tests	
2	Overall depth		6	Number	Symbol: dtot		Read only - automatically determined	. Add	2 Field t	est - two pages		Field tests	
					8,89 m		from data of field test / General / Fixed	to the end)	3 Field :	est - 1:50		Field tests	
					8,89 ft				4 Field t	est - 1:100		Field tests	
3	Coordinate X		6	Number	8,89 m		General / Fixed	E (before 7)	5 Soil pr	ofile - one page		Soil Profiles	
					8,89 ft				6 Soil pr	ofile - two page	5	Soil Profiles	
4	Coordinate Y		•	Number	8,89 m 8,89 ft		General / Fored	Edit	7 Soil p	ofile - 1:50		Soil Profiles	Copy All
5	Coordinate Z			Number	8,89 m		General / Fixed	(number 7)	8 Soll p	ofile - 1:100		Soil Profiles	All All
	Coordinate 2			Number	8,89 ft		General 7 Foted	Remove					Paste
6	Vertical offset of the origin		0	Number	Symbol: d _b		General / Fixed	Remove (number 7)					
					8.89 m					List	of mapping for expor	t and import	
					8,89 ft			Move upwards	No.	Name	Commen	t	+ Add -
7								(number 7)	1 FINE	GS4 Ed. 4.0.4			
								:=_ Move downwards	2 FINE	EN Standard			
	Cone resistance Local friction			Number Number				(number 7)					
	Pore pressure			Number									
	Data - Test			Group	Number of elements 6								
Ŭ	GWT			Number	Number of Planates o								
	Type of test		a	String									- Copy
	Type of cone		6	String				- Conv					Copy All
	Application class Filter location			String				Copy toumber 7					
	Eduipment			String String									
	Data - Protocol			Group	Number of elements 7			Paste	Default colu	mns for Geolog	ical Sections (number	of columns 4) :	Input columns
,	Annex no.		6	String	commence or elements ?								
	Location		0	String				👻 📰 Edit formulas	Graphical re	presentation (r	number of items 3) :	田 Input grap	hical representations
Global libra	sries : Fine	Capability :	nodel creation, CPTu							OK	(+ † OK+ 4	✓ OK	× Cancel



We can see that the table is part of the global library. By default, it is not possible to edit it. Therefore, it is necessary to press the button "Allow editing", so we can add a new item into the table.

📾 Edit data type					_ D X
- Parameters of data type					
Type : Table Table type : With d	epth	•			
Name : 🕥 Table CPT 🔹	🛪 EN Comment : 🕥 CP	T / Fixed	▼ 🛪 EN Identifier : 🔇		•
Parameters : 🕥 global 🔹 🚽					
No. Name 🌗 Allow	editing Identifier	Туре	Column Parame	ters Comment	
1 <u>Depth</u>	0	Number	 Symbol: d 8,89 m 8,89 ft 	General / Fixed	
2 Cone resistance	0	Number	✓ Symbol: q _c 8,89 MPa 8,9 psf	CPT / Fixed	
3 Local friction	ø	Number	✓ Symbol: f _s 8,89 kPa 8,9 psf	CPT / Fixed	
4 Pore pressure	0	Number	 Symbol: u2 8,89 kPa 8,9 psf 	only for CPT / Fixed	
					Copy All
Ranges : 🕥 global 🔻					
Minimum number of rows : 0					
Formula					
Conditional lines					Edit
Conditional input Master enumeration : (unspecified)	 No enumerations defined 	for using as master.			
S Global data type				OK + 🕇 OK + 🦊	✓ OK X Cancel
 Good data type 					

Note: Each data has a symbol next to the name, which corresponds with the data type.

- 1. **globe** •- indicates that the data type was selected from the "Global Library". The global library contains predefined data types that the user can insert into his template. The global library is selected in the bottom left corner of the dialog window.
- 2. **Paper sheet** indicates that the data type was created and named by the user
- 3. **globe/paper sheet** - indicates that the data type was selected from the global library and subsequently modified by the user



Data type changed to "changed global" for table parameters. Now we can continue by adding a new item.

E	dit data type							— 🗆 X
— Pa	rameters of data type							
Туре	: Table Table type : \	With depth	~					
Nam	e : 🕤 Table CPT	▼ 🛪 EN Co	omment : 🕤 CPT / F	ixed	▼ 🛪 EI	N Identifier : 📀	•	
Para	meters : 😭 changed global 💌							
No.	Name		Identifier	Туре	Column	Parameters	Comment	+ Add
1	<u>Depth</u>	0		Number	~	Symbol: d 8,89 m 8,89 ft	General / Fixed	(to the end)
2	Cone resistance	0		Number	✓	Symbol: q _c 8,89 MPa 8,9 psf	CPT / Fixed	
3	Local friction	ø		Number		Symbol: f _s 8,89 kPa 8,9 psf	CPT / Fixed	
4	Pore pressure	0		Number		Symbol: u ₂ 8,89 kPa 8,9 psf	only for CPT / Fixed	
								Copy All
								Paste
	ges : 🕥 global 🔹 🚽 —							
Form	nula							
								Edit
	onditional input							
Mas	ter enumeration : (unspecified)	No ent	umerations defined for	using as master.				
	Changed Global data type						OK + 🕇 OK + 🕹 🗸	OK X Cancel

Use the "Add" button to add a new table column. In our case, we are specifying an item that is not in the global library. So, we select "new local data type". Confirm with the "Next" button.





We select the type of the data type (number) and the type of unit (ratio). **These two types must be correctly defined the first time they are entered. Later modification of these types is not possible. In case of a mistake, it is necessary to delete the created data type and enter it again.** Enter other data: name, symbol and choose metric and imperial units for the data type - in our case percents. These data can be changed at any time in the future. Confirm with the "Add" button. The dialog box will not close automatically so that we can optionally enter additional data types. It is therefore necessary to close it with the button with a cross or the "Cancel" button.

New table column	
— Parameters of data type ———	
Type : Number 🔻 Unit ty	vpe : ratio
Name : 📑 Friction ratio	💌 🛪 EN Comment : 📑
Parameters	
Symbol : R _f	
Empty text :	
Metric : 🧏 🔻	decimal places : 1 🗧 🛛 Exponential format 1,1 %
English : % 🔻	decimal places : 1 🗧 🛛 Exponential format 1,1 %

In the CPT table, we can now see the new data type. Now confirm the edits of the table and the CPT template using the "OK" buttons.

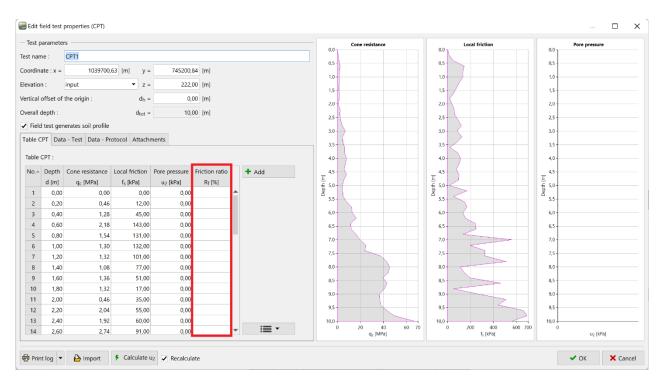
🗃 Edit data type						— 🗆 X
Parameters of data type						
Type : Table v Table type : With depth	v					
	Comment : 🕤 CPT / Fixed	•	≭a en	N Identifier : 🕤		•
Parameters : 🏠 changed global						
No. Name	Identifier		Column		Comment	+ Add
1 Depth	N	lumber	~	Symbol: d 8,89 m 8,89 ft	General / Fixed	(to the end)
2 Cone resistance	N	lumber	✓	Symbol: q _c 8,89 MPa 8,9 psf	CPT / Fixed	
3 Local friction	N	lumber	✓	Symbol: f _s 8,89 kPa 8,9 psf	CPT / Fixed	
4 Pore pressure	N	lumber	-	Symbol: u ₂ 8,89 kPa 8,9 psf	only for CPT / Fixed	
5 Friction ratio	N	lumber	-	Symbol: R _f 8,9 % 8,9 %		
						Copy All
Ranges : 🕥 global 🔹						
Minimum number of rows : 0						
Formula						Edit
- Conditional input						Lun
	numerations defined for usir	ng as master.				
Changed Global data type					OK + 🕇 OK + 🦊	✓ OK X Cancel



With the "Add + Close" button, confirm the modification of the template set and save the modified set under the name "EM 51" in the administrator.

Add copy of standard template set into the administr			- 0
	Comment : 🖺 👻 🔻		
Templates			
o. Name	Capability	Comment	+ Add
Borehole	model creation, borehole, well		(to the end)
Well	model creation, borehole, well		: Insert (before 3)
CPT CPT	model creation, CPTu		(before 3)
DPT	model creation, DPT		- Edit
SPT	model creation, SPT, borehole, well		Chit (number 3)
DMT	model creation, DMT		
PMT	model creation, PMT, borehole		· Remove (number 3)
			∰ Move down (number 3)
			Edit formula (number 3)
			Copy (number 3)
			Paste
Project data template 🛛 👔 Common data template	Field test templates outside set : Borehole 💌 🕂 Add		

In the frame "Field Tests" frame, open the "CPT1" test. In the table, you can see the newly created column that does not yet contain any data. It is now possible to enter the data into the column in the standard way. However, we want to use a formula to define the automatic recalculation of this column.

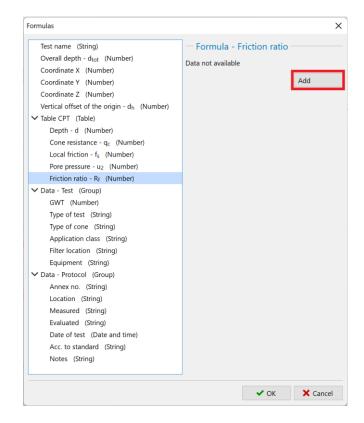


GE05

Edit ten	plate									- Π
ame : 🗛	CPT * 7A EN	Comment : 🛅	• 7 _A							
				Input data					List of output protocols	
No.	Name	Identif	ier Type	Parameters	Conditional input	Comment	Add according to sample	No.	Name Protocol typ	+ Add
1	Test name	6	String			General / Fixed	 according to sample 	1 Field test - one page	pe Field tests	
2	Overall depth	۰	Number	Symbol: dtot		Read only - automatically determined from data of field test / General / Fixed	+ Add	2 Field test - two pag		
				8,89 m 8,89 ft		from data of held test/ General / Hxed	(to the end)	3 Field test - 1:50	Field tests	
3	Coordinate X		a transferra	8,89 m		General / Fixed		4 Field test - 1:100	Field tests	
3	Coordinate x		Number	8,89 ft		General / Pixed		5 Soil profile - one p		
4	Coordinate Y		Number	8 89 m		General / Fixed		6 Soil profile - two p		
			110110-01	8,89 ft		Contract Process		7 Soil profile - 1:50	Soil Profiles	Copy All
5	Coordinate Z		Number	8,89 m		General / Fixed		8 Soil profile - 1:100	Soil Profiles	
				8,89 ft						Paste
6	Vertical offset of the origin	6	Number	Symbol: dh		General / Fixed		List of mapping for export and import		
				8,89 m 8,89 ft				No. Name	Comment	+ Add
7	Table CPT		Table	With depth		CPT / Fixed		1 FINE AGS4 Ed. 4.0.		- A00
· ·	Depth		Number	Number of elements 5		CFT / FARE		2 FINE - EN Standard		
	Cone resistance	6	Number					a mist har standard	·	
	Local friction	•	Number							
	Pore pressure Friction ratio	P	Number							
8	Data - Test		Group	Number of elements &						
	GWT	•	Number							CODY
	Type of test	6	String				- Com			Copy All
	Type of cone Application class	•	String				Copy All			
	Application class Filter location		String				10. 10.			
	Equipment		String				🖹 Paste	Default columns for Geo	logical Sections (number of columns 4) :	I Input celu
9	Data - Protocol	p.	Group	Number of elements 7			👻 📰 Edit formulas	Graphical representation	foundation of James 20 and 1998 James and	phical representat
	Annex no	6	String				Em cuit rormulas	oraphical representation	 (number or mems 3) : III input gra 	priscai representai

So, let's go back to editing the template for CPT and press the "Edit formulas" button.

Here we will select the created data type "Friction ratio" in the list, to which we will add the formula, and press the "Add" button.





By double-clicking in the data list, we can add data references to the formula.

Test name (String)	{f _s }	— I	nsert function
Overall depth - d _{tot} [m] (Number)	('S)	f()	
Coordinate X [m] (Number)			
Coordinate Y [m] (Number)		-1	nsert
Coordinate Z [m] (Number)		M	lultilingual text
Vertical offset of the origin - dh [m] (Number)	»		Calculation uni
✓ Table CPT (Table)			
Number of row		Ву	data %
Row number			
Depth - d [m] (Number)			
Cone resistance - gc [MPa] (Number)	Result preview		
Local friction - f _s [kPa] (Number)			
Pore pressure - u ₂ [kPa] (Number)	Field test : CPT1 Partial results		
Friction ratio - R _f [%] (Number)	1: 0,0		
Data - Test (Group)	2 : 12,0		
Data - Protocol (Group)	3: 45,0		
	4: 143,0		
	5 : 131,0 6 : 132,0		
	7: 101,0		
	8: 77,0		
	9: 51,0		
	10 : 17,0		
	11 : 35,0		
	12 : 55,0		
		🗸 ОК	× Cance

Input formula:
$$\frac{f_s}{q_c}$$

Formula - Friction ratio [R _f]		
Test name (String) Overall depth - d _{tot} [m] (Number) Coordinate X [m] (Number) Coordinate Y [m] (Number) Coordinate Z [m] (Number) Vertical offset of the origin - d _h [m] (Number) ✓ Table CPT (Table) <i>Number of row</i> <i>Row number</i> Depth - d [m] (Number)	>>	{f _s }/{q _c }
Cone resistance - q _c [MPa] (Number)		- Result preview
Local friction - f_s [kPa] (Number)		
Pore pressure - u ₂ [kPa] (Number)		Field test : CPT1
Friction ratio - R _f [%] (Number)		1: NAN : Divis

Note: Common mathematical operations as well as more complex functions can be used in the calculation. Entering functions is very similar to MS Excel.



In the list, we see that while local friction has a unit of [kPa], cone resistance has a unit of [MPa]. To set the correct unit for the calculation, click on the q_c data type in the formula. This opens a dialog box in which we set the unit as [kPa]. The program then converts the unit before performing the calculation.

Test name (String)	{f _s }/{q	9		Insert function	
Overall depth - d _{tot} [m] (Number) Coordinate X [m] (Number)		📄 Data value			
Coordinate Y [m] (Number)		Data type :	Table value	- Preview	
Coordinate Z [m] (Number) Vertical offset of the origin - d _h [m] (Number)	»	Unit :	kPa	← Field test :	CPT1 -
Table CPT (Table) Number of row Row number Depth - d [m] (Number) Cone resistance - q. [MPa] (Number) Local friction - f. [kPa] (Number) Pore pressure - u.g. [kPa] (Number) Friction ratio - Rf [%] (Number) Data - Test (Group) Data - Protocol (Group)	- Resul Field te: 1: N 2: 24 3: 35 4: 65 5: 91		Current row	 ★ 0 460 1280 2180 1540 1300 1320 1080 1360 1320 460 2040 	
	5: 85 6: 10 7: 76 8: 7 9: 3 10: 12 11: 76 12: 2) 1,3 2,9 5,1	-	✔ ОК	X Cancel

When defining the data type, we specified that the unit of the friction ratio is percentage [%]. However, the result of the specified formula is dimensionless. So, we need to choose the unit of the calculation result as dimensionless [-]. The program then performs the multiplication to percentages automatically. When entering more complex formulas, this function eliminates unit conversion errors.

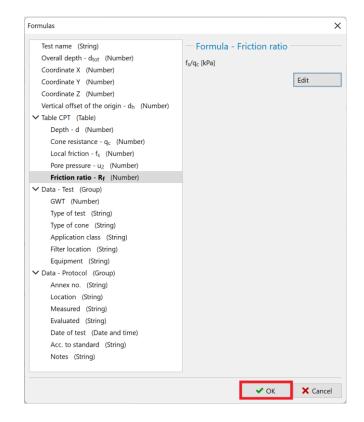
Formula - Friction ratio [Rf]		×
Test name (String) Overall depth - d _{tot} [m] (Number) Coordinate X [m] (Number) Coordinate Y [m] (Number) Coordinate Z [m] (Number) Vertical offset of the origin - d _h [m] (Number) ✓ Table CPT (Table) <i>Number of row</i> <i>Row number</i> Depth - d [m] (Number)	(f _s)/(q _c [kPa])	 Insert function — f(x) Insert Multilingual text Calculation unit = By data % ▼ By data % %
Cone resistance - qc [MPa] (Number) Local friction - fs [kPa] (Number) Pore pressure - u2 [kPa] (Number) Friction ratio - Rf [%] (Number) > Data - Test (Group) > Data - Protocol (Group)	Result preview Field test : CPT1 Partial results 1: NAN : Division by zero 2: 0.0 2: 0.0 3: 0.0 4: 0.1 5: 0.1 5: 0.1 6: 0.1 7: 0.1 8: 0.1 9: 0.0 10: 10: 11: 0.1 12: 0.0	⁷⁶ 9cm ppm ppb
	✓ OI	K X Cancel



In the lower part of the window, we can always see a preview of the calculation result. Confirm the entered formula with the "OK" button.

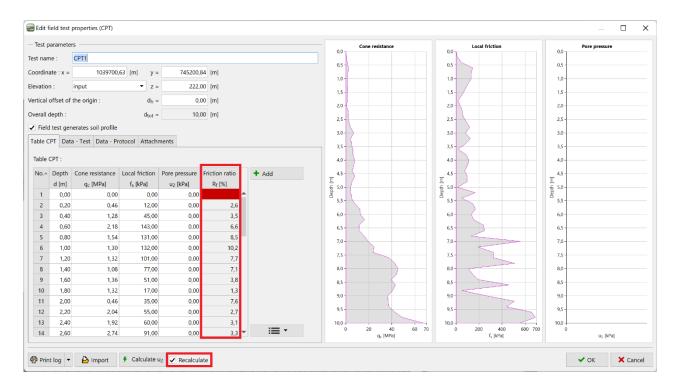
Formula - Friction ratio [Rf]			×
Test name (String) Overall depth - d _{tot} [m] (Number) Coordinate X [m] (Number) Coordinate Y [m] (Number) Coordinate Z [m] (Number) Vertical offset of the origin - d _h [m] (Number) ✓ Table CPT (Table) <i>Number of row</i> <i>Row number</i> Depth - d [m] (Number)	*	{f _s }/{q _c [kPa]}	 Insert function f(x) Insert Multilingual text Calculation unit -
Cone resistance - q _c [MPa] (Number) Local friction - f _s [kPa] (Number) Pore pressure - u ₂ [kPa] (Number) Friction ratio - Rf [%] (Number) > Data - Test (Group) > Data - Protocol (Group)		Result preview Field test : CPT1 ▼ Partial results 1: NAN : Division by zero 2: 2,6 3: 3,5 4: 6,6 5: 8,5 6: 10,2 7: 7,7 8: 7,1 9: 3,8 10: 1,3 11: 7,6 12: 2,7	
			✓ OK X Cancel

Data, which are calculated using formulas are displayed in bold in the list.



If we now return to the field test input frame, we can see the automatically calculated column. Automatic recalculation can be turned on or off at the bottom of the window.





In the next phase, we will define the graphical representation of the calculated column - we add a fourth graph to the field test input window.



We will return to editing the template and press the button "Input graphical representations".

Edit temp	late									Π
me : 📣	CPT * 🛪 EN C	omment : 🗈	▼ 7 _A							
				Input data				List of output p	rotocols	
No.	Name	Ident	fier Type	Parameters	Conditional input	Comment	Add according to sample	No. Name	Protocol type	+ Add
1	Test name	6	String			General / Fixed	 according to sample 	1 Field test - one page	Field tests	
2	Overall depth	•	Number	Symbol: dtot		Read only - automatically determined	- Add	Field test - two pages	Field tests	
				8,89 m		from data of field test / General / Fixed	+ Add (to the end)	3 Field test - 1:50	Field tests	
				8,89 N				4 Field test - 1:100	Field tests	
3	Coordinate X	•	Number	8,89 m		General / Fixed		5 Soil profile - one page	Soil Profiles	
				8,89 ft				6 Soil profile - two pages	Soil Profiles	
4	Coordinate Y	•	Number	6,89 m 5,89 ft		General / Fixed		7 Soil profile - 1.50	Soil Profiles	Copy
5	Coordinate Z		Number	6,69 m		General / Fixed		8 Soil profile - 1:100	Soil Profiles	"Lad All
2	Coordinate 2		Number	8,69 ft		General / Poted				Paste
6	Vertical offset of the origin	6	Number	Symbol: du		General / Fixed				
				8,89 m				List of mapping for ex	port and import	
				8,89 ft				No. Name Comm	nent	+ Add
7	Table CPT	e	Table	With depth		CPT / Fixed		1 FINE AGS4 Ed. 4.0.4		
	Depth	•	Number	Number of elements 5				2 FINE - EN Standard		
	Cone resistance Local friction		Number							
	Pore pressure		Number							
	Friction ratio	R	Number							
8	Data - Test	12	Group	Number of elements 6						
	GWT	۰	Number							Copy
	Type of test Type of cone		String				Copy All			Al
	Application class		String				All All			
	Filter location	•	String				Paste			
	Equipment	6	String				C Paste	Default columns for Geological Sections (num	er of columns 4):	🖽 Input celu
9	Data - Protocol	P	Group	Number of elements 7			👻 💷 Edit formulas	Graphical representation (number of items 3) :	III Input area	phical representa
	Annex no	6	String				· · · · · · · · · · · · · · · · · · ·	statistic apresentation (nonicer of news sy).	ma subar diss	incon representa

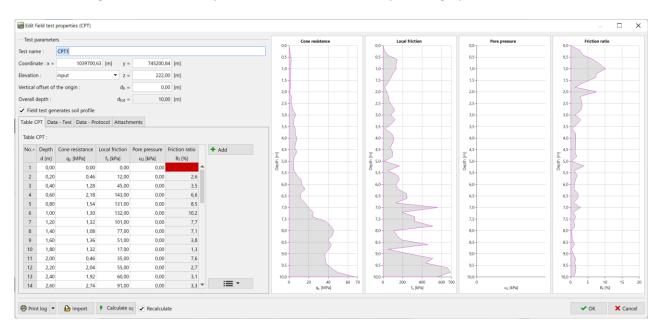
Here we add the newly defined column "Friction ratio" and confirm.

lo.	Type of graphical representations	Content	Default	+ Add
1	field test graph	Table CPT - Cone resistance	۲	(to the end)
2	field test graph	Table CPT - Local friction	0	
3	field test graph	Table CPT - Pore pressure	0	
	nical representations are sorted acco			

New graphical representation				×
Type of graphical representations :	field test graph	•		
Table :	Table CPT	•	Column : Fric	tion ratio 🔻
		Γ	🕇 Add	🗙 Cancel



After returning to the field test input window, we see the newly added graph for the calculated column.



The last change required is to add a new graph to the output log. Let's go back to editing the template, select the desired output protocol and press the "Edit" button.

📰 Edit te	mplate										_ I ×
Name :	CPT ·	A EN Comment:	8	▼ 7 _A							
					Input data					List of output protocols	
No.	Na	me	Identifier	Type	Parameters	Conditional input	Comment	Add according to sample	No. Namo	Protocol type	+ Add
1	Test name		•	String			General / Fixed	 according to sample 	1 Field test - one page	Field tests	
2	Overall depth		•	Number	Symbol: d _{tat} 8,89 m 8,89 ft		Read only - automatically determined from data of field test / General / Fixed	+ Add (to the end)	2 Field test - two pages 3 Field test - 1:50 4 Field test - 1:100	Field tests Field tests Field tests	Image: Z Edit (number 1)
3	Coordinate X		6	Number	8,89 m 8,89 ft		General / Fixed		Fold test - 1:100 Soil profile - one page Soil profile - two pages	Soil Profiles	Remove (number 1)
4	Coordinate Y		0	Number	8,89 m 8,89 ft		General / Fixed		7 Soil profile - 1:50	Soil Profiles	Copy (number 1)
5	Coordinate Z		6	Number	8,89 m 8,89 ft		General / Fixed		8 Soil profile - 1:100	Soil Profiles	Paste
6	Vertical offset of the origin		•	Number	Symbol: dy, 8,89 m 8,89 ft		General / Fixed			napping for export and import	
7	Table CPT		0	Table	8,89 ft With depth		CPT / Fixed		No. Name	Comment	+ Add -
7	Depth Cone resistance Local friction Pore pressure Friction ratio			Number Number Number Number Number	Number of elements 5		CPT / Fixed		1 FINE AG54 Ed. 4.0.4 2 FINE - EN Standard		
8	Data - Test GWT Type of test		5 6	Group Number String	Number of elements 6			- Came			Copy All
	Type of cone Application class Filter location		0	String String String				Copy All			
9	Equipment Data - Protocol		0	String Group	Number of elements 7					Sections (number of columns 4) :	Input columns
	Annex nn		0	String	internet of elements of			🔻 🔚 Edit formulas	Graphical representation (num	ber of items 4) : 🔠 input grap	hical representations
Global lib	raries : Fine	Capability : r	model creation, CPTu						OK +	🕇 ОК + 💺 ✔ ОК	X Cancel



We will proceed to the "Columns" section, where we see the original graph.

Edit protocol												×
Sections	Parameters		Drawing		Paper format		Margins		Font			Preview
Current section : DI * + Add *			Thickness : 0,40 (mm		Paper size : A4			0 [mm] Default (Arial)	•		Field	test : 😽
	Protocol type : Field tests 🔹	Inner lines Height	Thickness : 0,20 (mm Row : 5,0 (mm		Layout : portrait	Left : 15.0 (r	nm) Right: 15,	0 [mm]			CPTI	 Print preview
		riegne	NOW . 3/0 (PPP	g ront. 3,5 pm	*							
Header Columns Footer												+ Add -
Type : brader											Column :	
Table repeating :											× Remove	Remove (Header)
on first page •								1	1		Row :	
Space above :		A : 1,0	B : 1,0	C : 1,0	D : 1,0	E : 1,0	F : 1,0	G : 1,0	H : 1,0	l : 1,0	+ Add	
0,0 [mm]	1:2.0	GEO5 Laborati		GE05 Laboratory		Cono	enetration te	et (CPT)		CPT1	× Remove	
Freme on the top Frame left	1:2,0	Sokolovská 23	2, Praha 8, 18000	Laboratory		Colle p	enetration te	st (CFT)		CFII		
Frame right	2 : 1,0	Project:	Apartment bu	ilding "Moonli	ighting" - Geol	ogical survey						
5,0 (mm)	3 : 1,0	Project ID:	AA_0014 - 20	19	Annex no.:	17.C		Type of test:	TE2			
Frame on the bottom	4 : 1,0	Location:	Stará 14/78, H	Iradec Králové				Type of cone:	Ac=1000 mm	2	GeoClipboard**	
	5 : 1.0	Measured:	Joe Fieldman		Coordinate System:	S-JTSK / Krovak / B	alt after adjustment	Application class:	2		⊡ Copy header	
	6:1.0	Evaluated:	Bill New		Coordinate X:	1039700.63		Acc. to standard:	EN ISO 2247	6-1		
	7:1.0	Date of test:	10.08.2016		Coordinate Y:				t of the origin:	0.00 m	Zoom :	
Conditions	8:1.0	Scale:	one page		Coordinate Z:			Overall depth	0	10.00 m	100%	
always						· · · · · · · · · · · · · · · · · · ·				10,00 111		
	9 : 1,0	Equipment:	PenSta A22		Filter location:	uz		GWT:	5,00 m			
Edit												
Peper size : 180.0mm × 267.0mm												
											CK i 🔶 🖌	OK X Cancel

By pressing the "Add" button, we will add a column with which we will continue to work.

protocol											
Sections	Parameters		Drawing			oer format	Margins		Font		Preview
rent section : 11 * + Add *	Neme : 40 Field test - one page Protocol type : Field tests •	In	ner lines Thickness : 0	40 (mm) Color: 20 (mm) Color: 20 (mm) Color: 20 (mm) Color: 20 (mm) Font: 20 (mm) Font	Paper size Ayout : J,5 [mm]	portrait	15.0 (mm) Bottom 15.0 (mm) Right:	: 15,0 (mm)	Default (Arial)	Field te CPT1	Print pre
ider Columns Footer									-		+ Add -
ze : Jumos 👻				A:02	8:1.0	C:10		D:1.0	1	Column :	
e:			1:20	_	one resistance	Local friction	Pore	pressure		+ Add	TRANSPORT
page 🔻				0,00						× Remove	
inda (0,80		3				Row : + Add	
er repeating :				1,60		/				+ Add	
ch page 🔻				2,00		1					
above :				2,80		£- } -}-;;;;				GeoClipboard**	
0,0 (mm)				3,20-		2				급 Copy columns	
rame on the top				4,60		$\mathbf{)}$				Paste columns	
ame left ame right				4,80		2					
below :				5,20		>				Zoom :	
5,0 (mm)				8,00		2				100%	
rame on the bottom Whole page frame				8,40		2					
anditions				7,20	2	<					
ys.				7,60	\mathbf{i}						
				8,40 8,80	5						
Edit				8,20	(~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
size :				9,80	67.32		9100				
0mm × 267,0mm				0 10 20	30 43 50 60 70 qc[MPw]	ό 100 200 300 400 600 Γ _ε (κΡκ)		(4Pe)			
						41-4	~		J		
										CK i 🕹 🖌 🖌	к 🗙 с

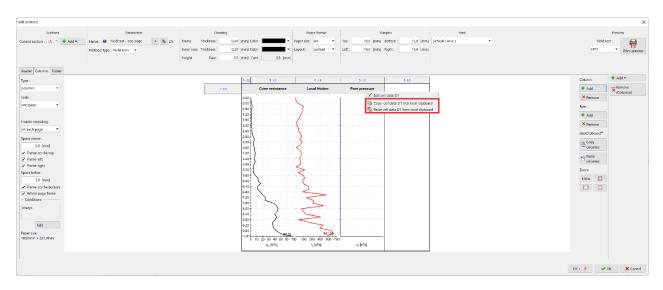
Insert one column behind the existing column D.

Insert	column			×
Insert	column :	Behind	D	•
Numb	er :			1
	🗸 OK		X Cancel	



Columns contain a header and a body.

Let's start by editing the header. To save time with formatting, we can copy the cell titled "Pore pressure" and paste it into the cell in the header of the newly added column. The options for copying and pasting are displayed by pressing the right mouse button on the desired cell.



With the left mouse button in the header of column E, we open the cell editing. We click on the name "Pore pressure" and change it to "Friction ratio" by selecting from the list.

modification E1		×		Dave	
nber of columns : 🛛 🖌 Right margin 🛛 Background color : 🗨		Por	e pressure	Pore	pressu
nber of row : 1 Bottom margin		· · · · · ·			
n 1					
		+ Add item			
m type : Text		(to the end)			
$ \mathbf{B} I \ \underline{\cup} \twoheadrightarrow \underline{A} \checkmark \underline{A} \checkmark \mathbf{X}_2 \ \mathbf{X}_2 \ \underline{\Xi} \equiv \underline{\Xi} \equiv \underline{\Xi} \equiv \underline{\Xi} $	Insert field -	- Incert item			
Pore pressure		E Insert item			
		Test data - name			×
		Name	Symbol	Unit	
		Test name			
		Overall depth	d _{tot}	m	
		Coordinate X		m	
		Coordinate Y		m	
		Coordinate Z		m	
		Vertical offset of the origin	dh	m	
		Table CPT			
		Table CPT → Depth	d	m	
		Table CPT → Cone resistance	qc	MPa	
		Table CPT → Local friction	fs	kPa	
		Table CPT → Pore pressure	u2	kPa	
		Table CPT \rightarrow Friction ratio	Rf	%	
		Data - Test			
		Data - Test → GWT		m	



Now we have the column header correct, but we can see that there is a separator line between the original column and the new column. To remove it, open the modification of the cell titled "Pore pressure" and turn off the right margin.

t protocol										
Sections	Parameters			Drawing	Paper format	Margins		Font		Preview
rrent section : 10 * + Add *	Name : 40 Field test - one page Protocol type : Field tests	* 74 EN	Frame Thickness Inner lines Thickness Height Row	: 0,20 [mm] Color : .	Layout : portrait 💌	Top: 15.0 [mm] Botton Left: 15.0 [mm] Right:		Default (Arial) 👻	Field CPT1	est : Print prev
adar Columns Footer										
xe :				A:02 B:10	C:10	U:10	6:10		Column :	+ Add →
utors 🔻				Cone resistance	Local friction	Pore pressure	Friction ratio		+ Add × Remove	Remove (Columns)
le: rpige 🔻				0.40	5				Row :	
				0.80					+ Add	
ader repeating :				1.60-					× Remove	
each page 🔹				2.40	5				GeoClipboard**	
0,0 (mm)				3.20 +	>				Copy columns	
Frame on the top				4.00+						
Frame left Frame right				4.80 - /	2				Columns	
ace below :				8.20 6.60	\leq				Zoom : 100% # 1	
5,0 (mm) Frame on the bottom				6.00+	5					
Whole page frame Conditions				6.80+ 7.20+						
larays				7.60						
				8.40						
Edit				9,20	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
per size : 0,0mm × 267,0mm				10,00 0 10 20 30 40 50 60	2 691 CA 730 150 300 450 500 750					
				q. (VPa)	f, (kPa)	u; (kPa)				
									CK+ ♣ ✓	ок <mark>Х</mark> Саг
				D : 1,0			E : 1,0			
				Pore pressu	re	Frie	ction ra	atio		
			Cell r	nodification D	1					

Number of row :

Number of columns :

Proceed in the same way for the body with the pore pressure graph.

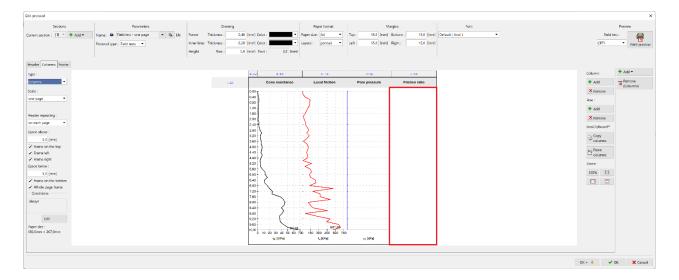
The last necessary modification is the actual addition of the chart to the new column. By clicking in the empty space of the column, we open its modification.

1

1

Right margin

Bottom margin





Here, select the column type as "Chart in depth" and press the "Add serie" button.

Column modification E				×
Number of columns :	1 Right margin Backgrou	nd color : No color 👻		
Item 1				
- Column content				+ Add item (to the end)
Column type : Chart in	depth		-	
Data source : Test			Ŧ	∃ Insert item (before 1)
Series				
Number Table	Main axis	Side axis	+ Add serie	
			Chart settings	
- Item location in column		Hide column if no data for show		
Horizontal : left Part Conditions	100 [%]	Repeat axes on every page		
Edit always				
			🗸 ок	🗙 Cancel

We select the corresponding data – "Friction ratio".

Add serie	×
— Data sou	rce
Table :	Table CPT 👻
Main axis :	Depth 👻
Side axis :	Friction ratio
— Chart set	tings
Side axis :	Axis 1 👻
+ Add	× Cancel



Now we can see the desired graph in the column. However, we still need to adjust its visual appearance to correspond with the other graphs.

	A : 0,2 B : 1,0	C : 1,0	D : 1,0	E : 1,0
1 : 2,0	Cone resistance	Local friction	Pore pressure	Friction ratio
	0,00	1		0,0
	0,40 +			
	0,80 +			1,0+ + +
	1,60 +			
	2,00 +			2,0+
	2,40 +			∇
	2,80+			3,0- <
	3,20+ (
	3,60+			4,0
	4,80+			5,0 5,0 5,0 5,0 5,0 5,0 5,0 5,0 5,0 5,0
	5,20+	S		5,0 5,0 5,0 5,0 5,0 5,0 5,0 5,0 5,0 5,0
	5,60 +			ے م
	6,00 +			6,0
	6,40+ - (
				7,0
	7,60 +	<u> </u>		
	8,00+	· · · · · · · · · · · · · · · · · · ·		8,0
	8,40+			
	8,80			9,0
	9,20 +			
	9,60 +	691.00		10.0
	q _c [MPa]	f _s [kPa]	u ₂ [kPa]	Friction ratio R _f [%]



Let's start by editing the main axis (vertical). This is common to all graphs - we will not display it for the edited graph.

tem 1 Column content Column type : Chi Data source : Tes	art in depth		•	+ Add item (to the end) $\vdots \pm \underset{(before 1)}{\text{Add item}}$	E:1,0 Friction ratio
Series Number Table 1 Table CPT 1 Table CP		Side axis Friction ratio [%]	 + Add serie ↓ Edit serie 1 × Delete serie 1 ▷ Edit settings of serie 1 ▷ Edit main axis settings □ Edit settings of side axis □ Chart settings ○ Chart settings ○ Edit user drawing 		0,0 1,0 2,0 3,0 4,0 4,0 5,0 6,0 7,0 8,0 9,0 10,0 2,4 6 8 10 1 Friction ratio Rr [%]

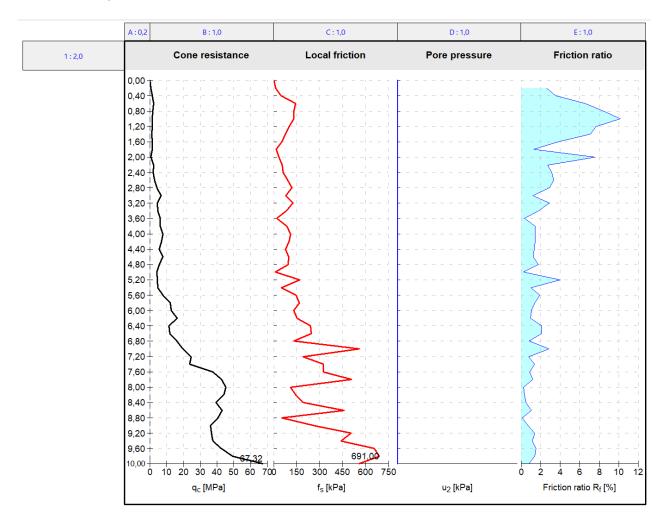


We will turn off the display of the line, the description of the axis, and in the "Division" tab, also the shape and description.

type : Chart in depth	 Insert item 	E : 1,0
ur Edit axis settings	×	Friction ratio
Line Division Axis settings	0.0	0,0
Axis type : linear	1,0	1,0++
Axis orientation : values rise left / down	2,0	2,0
Axis position : Axis outside the chart, left or bottom	3,0	
Unit type : length	4.0	3,0
Unit : m Decimal digits count : Min : 1 Max : 3	5,0	4,0-
Exponential format	6,0	5,0
Background color : No color	7,0	6,0
	8,0	
	9,0	7,0-
	10,0	8,0
		9,0
f Unify colors + Mirror	✓ OK X Cancel	10,0
al : left Part 100 [%] Repeat axes on every page		0 2 4 6 8 10 12 Friction ratio R _f [%]
tions		

Edit axis settings			×	Friction ratio
Line Division				
Draw main division of Division type :	f the axis Draw subdivision of	f the axis		
Draw shape				
Show description				
Down with				
✓ Draw grid Line :				$= \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$
Unify colors + Mirro		✓ OK	× Cancel	
🗲 Unify colors 🕂 Mirro		• OK	Cancel) 2 4 6 8 10 12
II: left Part	100 [%] Repeat axes on every page			Friction ratio R _f [%]





Now we will adjust the visualization of the series itself to match the other charts.



Press button "Edit settings of serie 1".

Column modification E				×	
Number of columns : 1	Right margin Back	kground color : No color 🔹			argins
Item 1					Bottom : 15,0 [mm]
Column content				+ Add item (to the end)	Right : 15,0 [mm]
Column type : Chart in depth			-		
Data source : Test				: Ξ Insert item (before 1)	
Series					E : 1,0
Number Table	Main axis	Side axis	+ Add serie		Friction ratio
1 Table CPT Depth	[m]	Friction ratio [%]	← Edit serie 1		
			× Delete serie 1		
			Edit settings of serie 1		
			Edit main axis		
			settings		
			Edit settings of side axis		-
					7.0000000000
			••••••		
			Chart settings		
			Edit user drawing		
Item location in column		Hide column if no data for show	assi diaming		R-+
Horizontal : left Part	100 [%]	Repeat axes on every page			
Conditions	1	_ nepear axes on every page			0 2 4 6 8 10 12
Edit always					Friction ratio Rf [%]
					-
			🗸 ОК	× Cancel	
			♥ UK		

Here, we will do the necessary modifications – turn off the color fill below the line.

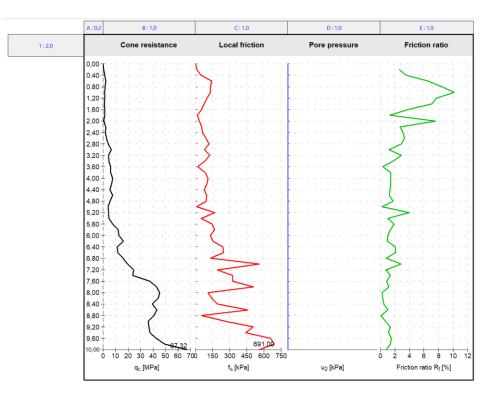
Column content Column type : Chart in depth	+ Add item (to the end)	
Edit serie settings	×	
Legend : Columns		E:10
Point Shapes		
Image: Winify colors Horizontal : left - Part 100 100 Conditions Edit always	✓ OK X Cancel	0 2 4 6 8 10 12 Friction ratio Rr [%]



Next, by pressing the button with three dots, we will edit the line itself. We will unify the thickness to 0.4 mm and select the green color, which is not yet used.

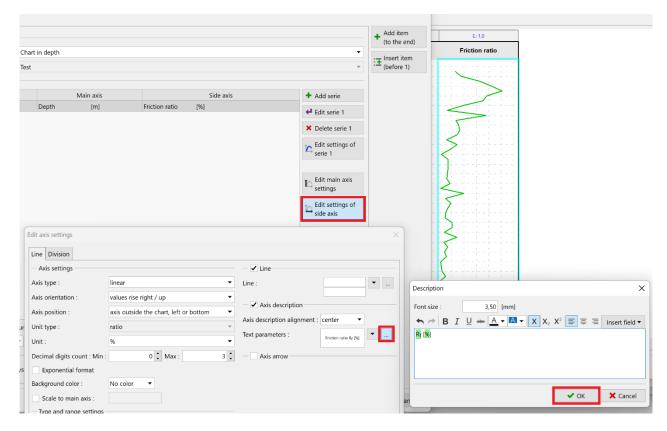
committype. chart in deput			Income Service
Edit serie settings			×
Legend :	▼		
Line		Λ	
Line type : line	•		
Line :			
Fill color below the line : No color	Line editor		×
Fill color below the line : No color	Line kind : Full 🔻 Thickness : 0,40 [mm] Color :		
Point description			
Unify colors		🗸 ОК	× Cancel

We will also adjust the description of the side axis to match the other graphs.

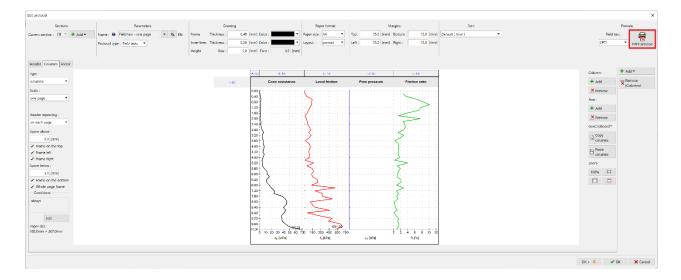


GE05

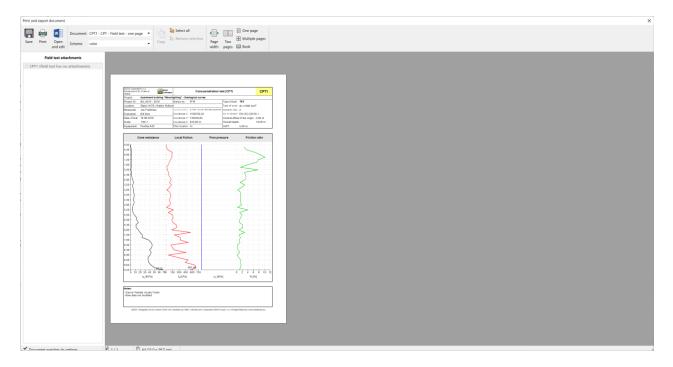
The procedure here is similar to other modifications – we open the side axis editor and modify the description of the axis so that it contains only the symbol.



By pressing the "Print preview" button, we can check whether our log corresponds to the required assignment.

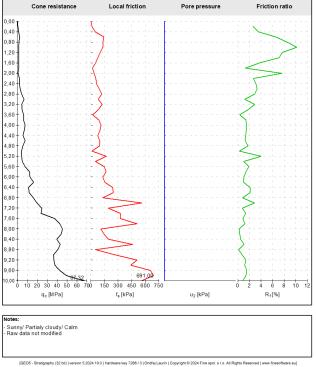


GE05



The created protocol corresponds to our assignment.

Sokolovská 23: 18000	2, Praha 8, GEOS Laboratory	Cone penetration te	st (CPT)	CPT
Project:	Apartment building "Moon!	ighting" - Geological survey		
Project ID:	AA_0014 - 2019	Annex no.: 17.C	Type of test: TE2	
Location:	Stará 14/78, Hradec Králov	ė	Type of cone: Ac=1000 mm	
Measured:	Joe Fieldman	Coordinate System: S-JTSK / Krovak / Balt after adjustment	Application class: 2	
Evaluated:	Bill New	Coordinate X: 1039700,63	Acc. to standard: EN ISO 22476	-1
Date of test:	10.08.2016	Coordinate Y: 745200,84	Vertical offset of the origin:	0,00 m
Scale:	1:66,7	Coordinate Z: 222,00 m	Overall depth:	10,00 m
Equipment:	PenSta A22	Filter location: U2	GWT: 5,00 m	





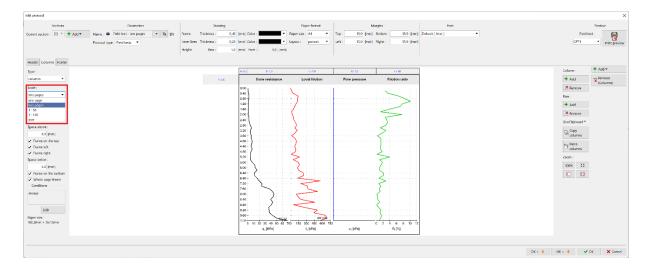
If we want to modify the graph in other protocols, it can be copied very quickly. In the edited log, click on the column tab and press "Copy columns".

sections unent section : [1] * + Add * Header Columna Footer yppa :	Name . 60 Feld test: one page Policial test: one page Policial test Policial t	A102 0.12	Leyout: portrait Left :	Margies 15.0 (mm) Dir 15.0 (mm) Sight: 15.0 (mm) Dir 15.0 (mm) Sight: 15.0 (mm) Dir 12 x.10 15.0 (mm) Dir Dir Dir	Pont Gualt (Anid)	Testis test : CPTI v p Column : + Add
ucknes:		840 440 720 840 840 840 840 840 840 840 84				+ Add X harrow Rom: Common Com

Now open the second log - in our case a two-page log and insert the columns.

fit protocol						
Sections	Parameters	Drawing	Paper format	Margins	Fort	Proview
ent section : [1] * + Add *	Name: A Field test - two pages • 7% EN Protocol type: Field tests •	Frame Thickness : 0,40 (mm) Co Inner lines Thickness : 0,20 (mm) Co			mm) Default (Arial)	Field test :
edar Columna Factor v: uma • le : pages • eder reporting :	Proceed gym Find tests -		a 1.0 Cone resistance Loc	rita sua per sur su per su per sur su per su per sur su per s		Colume + Add - + Add - X Innove Nervice + Add - X Innove + Columnic
each page * ceach page * ceach page * ceach page * coach		200 245- 258- 336- 400 446- 582- 588- 500 500				Kennov Gencülgsbarent* Columns Zorn : 20
Paane on the bostom Whole page frame Conditions orage Edit Defit		\$40 690 7.227 700 8.20 8.20 8.20 8.20 9.00 9.20 9.20 9.20 9.20 9.20 9.20 9	N W	igua -		
0mm × 267,3mm				lo da soo aba 700 jβrne] ⊮gβrne]		οκι † οκι ∔ γ∕οκ Χαπ

Now just adjust the appropriate scale - two pages.





In this way, we can easily modify other protocols as well.

