

## Uređivanje predložka u programu Laboratorij

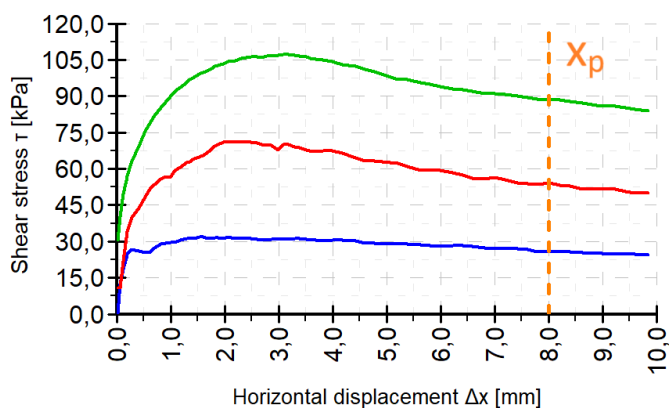
Program: Laboratorij  
 Datoteka: Demo\_manual\_52.gsg

Ovaj priručnik opisuje napredni rad s formulama i grafovima u predlošcima koristeći primjer uređivanja Shear Box ispitivanja. **Osnovni rad s formulama je objašnjen u Inženjerskom priručniku br. 51. Ovaj priručnik zahtjeva znanje pokriveno u priručniku br. 51.**

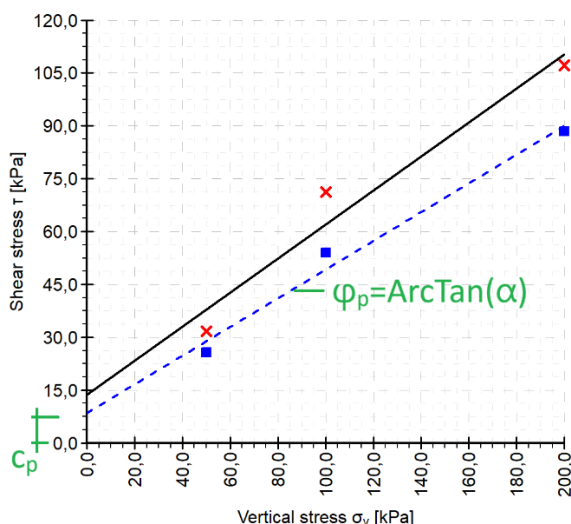
Naš zadatak je odrediti vrijednosti kuta unutarnjeg trenja  $\varphi_p$  i kohezije  $c_p$  u bilo kojoj točki tijekom ispitivanja (za pomak određen od strane nas na točki ispitivanja  $x_p$ ).

U našem slučaju uzet ćemo da je  $x_p = 8 \text{ mm}$ .

Postupak proračuna je isti kao za standardnu vršnu čvrstoću. Iz grafa naprezanja individualnih ispitivanja čitamo vrijednosti naprezanja u točki  $x_p$ .



Zatim namještamo ravnu liniju kroz preuzete točke u kalkuliramo vrijednosti  $\varphi_p$  i  $c_p$ .



*Napomena: Obično tražimo vrijednost parametara posmika u dijelu ispitivanja izvan vršne vrijednosti u pokušaju pronalaska preostalih parametara posmične čvrstoće. Kako bilo, kako shear box ispitivanje nije vjerodostojno za određivanje stvarnih preostalih parametara, predstavljamo izvedene parametre posmika za odabranu deformaciju.*

Izlazni izvještaj za shear box ispitivanje seta predložaka "Laboratory - EN-Standard" ima sljedeći izgled:

		Shear Box Test		
Project: Apartment building "Moonlighting" - Survey for building permit				
Test ID: Shear box test		Project ID: 2022/3548		
Supplier: GEO5 Laboratory Ltd.		Customer: Survey ABC Ltd.		
Date of measurement: 27.03.2023		Performed by: John Young		
Sample				
Field test: BH5		Sample type: undisturbed		
Sample index: VA1/1254		Geotechnical type: GT2		
Depth from: 7,00 m		Description:		
Depth to: 7,80 m		Clay with low plasticity, stiff, gray-blue color		
Specimen				
Specimen ID: VA1/1254-12		Consolidation time: 24,0 hour		
Depth: 7,35 m		Shear rate: 0,001 mm/min		
	Before test	Specimen Nr. 1	Specimen Nr. 2	Specimen Nr. 3
Dimensions (width/height) [mm]	-	60,00 / 21,00	60,00 / 21,00	60,00 / 21,00
Moisture content [%]	22,45	24,40	24,30	22,10
Consolidation (before test) [mm]	-	0,210	0,550	1,170
Vertical stress [kPa]	-	50	100	200
Max. shear stress [kPa]	-	31,7	71,3	107,2
Wet unit weight [kg/m <sup>3</sup> ]	1802,0	1848,0	1921,0	1967,0
Dry unit mass [kg/m <sup>3</sup> ]	1472,2	1485,5	1545,4	1610,9
Displacement at failure [mm]	-	1,530	2,061	3,080
Measured values and results				
<b>Test results:</b>		<b>Angle of internal friction <math>\phi_{ef}</math> [°]</b>		<b>Cohesion <math>c_{ef}</math> [kPa]</b>
Peak values:		25,8		13,8
Notes				
Specimens were flooded with water during the test. Moisture content indicated for the test specimens is after the end of the test (moisture content determined according to EN ISO 17892-01).				
Specimen supplied by the customer, test results refer to the sample as received. Test equipment: hydraulic shear device. Test performed in accordance with EN ISO 17892-10.				
Verified by: Peter Filmer		Date of issue: 28.03.2023		Stamp and signature

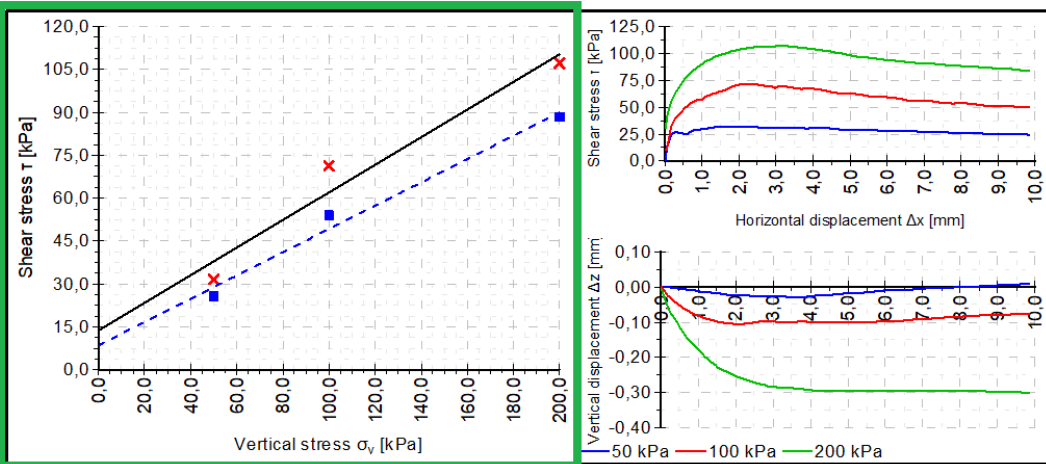
Zahtjevana forma protokola je:

	<b>Shear Box Test</b>	
	Project: Apartment building "Moonlighting" - Survey for building permit	
Test ID: Shear box test		Project ID: 2022/3548
Supplier: GEO5 Laboratory Ltd.		Customer: Survey ABC Ltd.
Date of measurement: 27.03.2023		Performed by: John Young

<b>Sample</b>	
Field test: BH5	Sample type: undisturbed
Sample index: VA1/1254	Geotechnical type: GT2
Depth from: 7,00 m	Description:
Depth to: 7,80 m	Clay with low plasticity, stiff, gray-blue color

<b>Specimen</b>				
Specimen ID: VA1/1254-12				
Consolidation time: 24,0 hour				
Depth: 7,35 m				
Shear rate: 0,001 mm/min				
	<b>Before test</b>	<b>Specimen Nr. 1</b>	<b>Specimen Nr. 2</b>	<b>Specimen Nr. 3</b>
Dimensions (width/height) [mm]	-	60,00 / 21,00	60,00 / 21,00	60,00 / 21,00
Moisture content [%]	22,45	24,40	24,30	22,10
Consolidation (before test) [mm]	-	0,210	0,550	1,170
Vertical stress [kPa]	-	50	100	200
Max. shear stress [kPa]	-	31,7	71,3	107,2
Wet unit weight [kg/m <sup>3</sup> ]	1802,0	1848,0	1921,0	1967,0
Dry unit mass [kg/m <sup>3</sup> ]	1472,2	1485,5	1545,4	1610,9
Displacement at failure [mm]	-	1,530	2,061	3,080

**Measured values and results**



<b>Test results:</b>	<b>Peak values:</b>	<b>Angle of internal friction <math>\phi_{ef}</math> [°]</b>	<b>Cohesion <math>c_{ef}</math> [kPa]</b>
		25,8	13,8
<b>Post peak values at displacement 8,0 mm:</b>		22,1	8,5

<b>Notes</b>	
Specimens were flooded with water during the test. Moisture content indicated for the test specimens is after the end of the test (moisture content determined according to EN ISO 17892-01).	
Specimen supplied by the customer, test results refer to the sample as received. Test equipment: hydraulic shear device. Test performed in accordance with EN ISO 17892-10.	
Verified by: Peter Filmer	Date of issue: 28.03.2023
Stamp and signature	

## Rješenje:

Uredite predložak u demo datoteci - Demo01.gla, koju možete pronaći u Fine online primjerima. Novokreirani set predložaka preimenujte u EM 52 i spremite ga u Upravitelj predložaka za buduće korištenje. Predstavljamo termin “Post peak parameters” za zahtjevane parametre unutar rješenja ovog priručnika.

Podijelit ćemo rješenje ovog problema u nekoliko dijelova:

1. Definiranje vrste podataka “Displacement for post peak strength” i unos njene vrijednosti
2. Definiranje ostalih vrsta podataka potrebnih za proračun i plotanje grafa
3. Unos formula za automatski proračun
4. Uređivanje izlaznog izvještaja i prikaza koji uključuje nove podatke

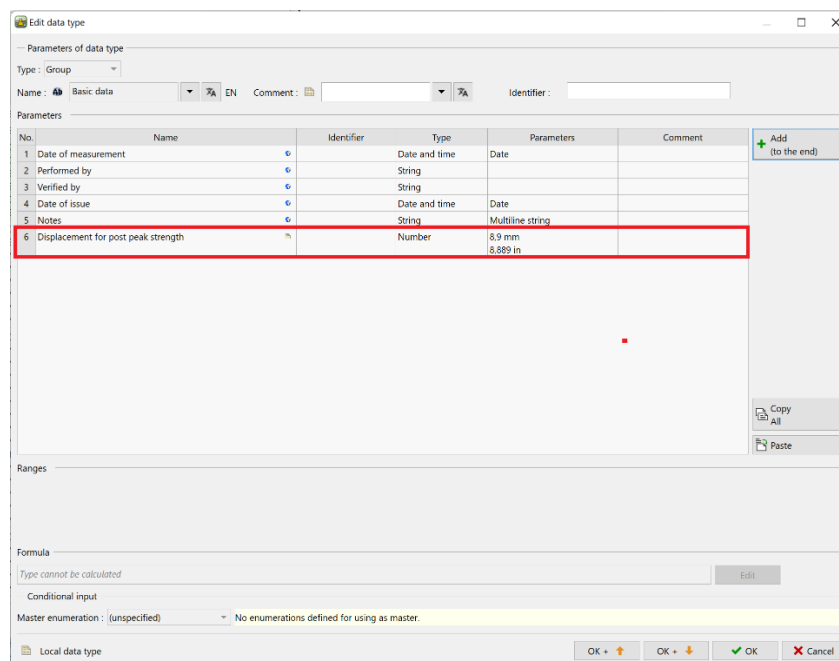
## Prvi dio

Najprije otvorite datoteku Demo01.gla, koja sadrži podatke koje ćemo koristiti za daljnji rad. U kartici Templates, provjerite jesmo li odabrali predložke koje želimo urediti – “Laboratory - EN-Standard”. Pritisnite tipku “Edit copy of current template set and add it into the Administrator” kako biste otvorili predložak u prozoru za uređivanje.

Dodijelite naziv kreiranom setu predložaka i spremite ga u upravitelj kao korisnički predložak.

Otvorite predložak za shear box ispitivanje i doajte novu lokalnu vrstu podataka u “Basic data” grupu, nazovite ju “**Displacement for post peak strength**” i dodijelite sljedeće parametre:

- Type: Number
- Unit type: length
- Name: Displacement for post peak strength
- Symbol: -
- Empty text: -
- Metric unit: mm, 1 decimal place
- Imperial unit: in, 3 decimal places



Parameters of data type

Type: Group

Name: Basic data EN Comment: Identifier:

No.	Name	Identifier	Type	Parameters	Comment	
1	Date of measurement		Date and time	Date		+ Add (to the end)
2	Performed by		String			
3	Verified by		String			
4	Date of issue		Date and time	Date		
5	Notes		String	Multiline string		
6	Displacement for post peak strength		Number	8.9 mm 8.889 in		

Ranges

Formula

Type cannot be calculated Edit

Conditional input

Master enumeration: (unspecified) No enumerations defined for using as master.

Local data type

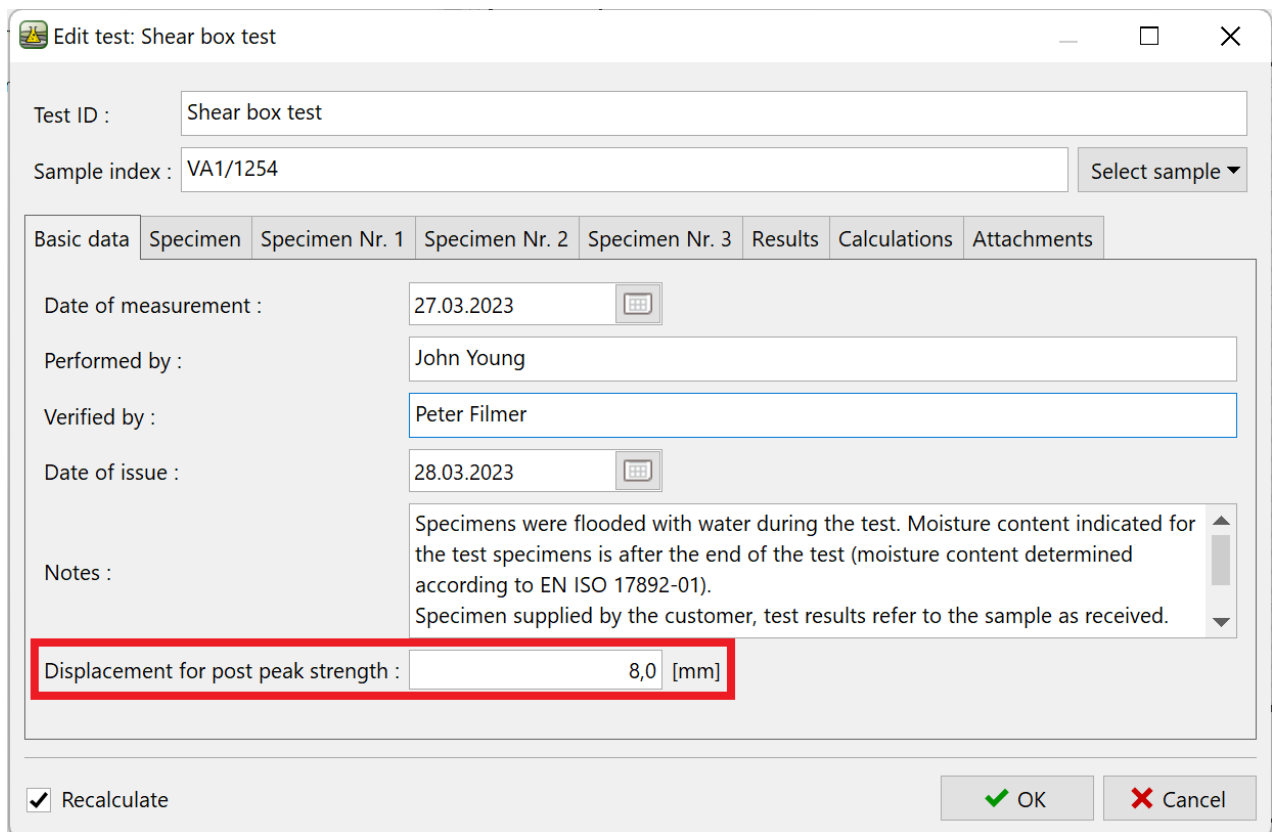
OK + ↑ OK + ↓ OK Cancel

*Napomena: Izrada lokalnih vrsta podataka i osnovni tijek rada s predlošcima je detaljno objašnjen u Inženjerskom priručniku 51.*

Spremite uređeni predložak i nastavite u karticu “shear box test” te otvorite već uneseno ispitvanje.

U prozoru vidimo novo polje za vrstu podataka koju smo kreirali, “Displacement for post peak strength”. Unijet ćemo 8 mm prema specifikacijama. Ovu vrijednost ćemo koristiti u daljnjem proračunu.

*Napomena: ako imamo već unesenu ovu vrijednost, vidjet ćemo prikaze specifičnih proračuna prilikom izrade formula.*



Edit test: Shear box test

Test ID : Shear box test

Sample index : VA1/1254 Select sample ▼

Basic data | Specimen | Specimen Nr. 1 | Specimen Nr. 2 | Specimen Nr. 3 | Results | Calculations | Attachments

Date of measurement : 27.03.2023

Performed by : John Young

Verified by : Peter Filmer

Date of issue : 28.03.2023

Notes :  
Specimens were flooded with water during the test. Moisture content indicated for the test specimens is after the end of the test (moisture content determined according to EN ISO 17892-01).  
Specimen supplied by the customer, test results refer to the sample as received.

Displacement for post peak strength : 8,0 [mm]

Recalculate OK Cancel

## Drugi dio

Sad se vratite u modifikacije predložaka i u grupu “Specimen Nr. 1” dodajte još jednu vrstu podataka “Post peak shear stress” sa sljedećim parametrima:

- Type: Number
- Unit type: pressure
- Name: Post peak shear stress
- Symbol:  $\tau_{pp}$
- Empty text: -
- Metric unit: kPa, 1 decimal place
- Imperial unit: psi, 3 decimal places

Ove podatke korisnik neće unositi, jer ćemo im dodijeliti formulu za automatski proračun.

Potrebna nam je ista vrsta podataka u grupama za uzorke 2 i 3. Kako bismo uštedjeli vrijeme, možemo kopirati već postojeću stavku i pritisnuti gumb “OK + down arrow” kako bismo se prebacili odmah na grupu “Specimen Nr. 2”, gdje možemo jednostavno stavku zalijepiti.

Parameters of data type

Type : Group

Name : Specimen Nr. 1 EN Comment : Identifier :

No.	Name	Identifier	Type	Parameters	Comment
4	Dry unit mass		Number	8,9 kg/m <sup>3</sup> 8,89 lb/ft <sup>3</sup>	
5	Moisture content		Number	8,89 % 8,89 %	
6	Vertical stress		Number	9 kPa 8,889 psi	
7	Consolidation (before test)		Number	8,889 mm 8,8889 in	
8	Displacement at failure		Number	8,889 mm 8,8889 in	
9	Shear - measurement		Table	General	
	Horizontal displacement		Number	Number of elements 4	
	Vertical displacement		Number		
	Shear stress		Number		
	Mobilized friction angle		Number		
10	Max. shear stress		Number	Symbol: $\tau_{max}$ 8,9 kPa 8,889 psi	
11	Post peak shear stress		Number	Symbol: $\tau_{pp}$ 8,9 kPa 8,889 psi	

Ranges

Formula

Type cannot be calculated

Conditional input

Master enumeration : (unspecified) No enumerations defined for using as master.

Local data type

OK + ↑ OK + ↓ OK Cancel

Nastaviti s lijepljenjem podataka u grupu “Specimen Nr. 3”.

Zatim nastavljamo s izradom vrsta podataka za proračun i izlazne izvještaje. U grupi "Results" već imamo dvije vrste podataka za rezultate i vršne vrijednosti. Sad možemo kopirati i ponovno zalijepiti ove dvije vrste podataka u istu grupu. Program će nas upozoriti da su iste vrste podataka već u grupi, ali ćemo ih ipak ponovno zalijepiti.

**Edit data type**

Parameters of data type

Type : Group

Name : Results EN Comment : Identifier :

Parameters

No.	Name	Identifier	Type	Parameters	Comment
1	Angle of internal friction		Number	Symbol: $\phi_{ef}$ 8,9 ° 8,9 °	
2	Cohesion		Number	Symbol: $c_{ef}$ 8,9 kPa 8,889 psi	

**Paste data types**

Name	Type	Paste	Replace	Note
Angle of internal friction	Number	<input checked="" type="checkbox"/>		Same as existing data type No. 1 "Angle of internal friction". Will be pasted as a new data type.
Cohesion	Number	<input checked="" type="checkbox"/>		Same as existing data type No. 2 "Cohesion". Will be pasted as a new data type.

Formula

Type cannot be calculated

Conditional input

Master enumeration : (unspecified) No enumerations defined for using as master.

Local data type

OK + ↑ OK + ↓ OK Cancel

Sad jednostavno otvorite nove dodijeljene stavke i uredite naziv i simbol, tj. dodavanjem “(pp)”, koje se odnosi na “post peak strength”.

Edit data type

Parameters of data type

Type: Group

Name: Results EN Comment: Identifier:

Parameters

No.	Name	Identifier	Type	Parameters	Comment
1	Angle of internal friction		Number	Symbol: $\phi_{ef}$ 8,9 ° 8,9 °	
2	Cohesion		Number	Symbol: $c_{ef}$ 8,9 kPa 8,889 psi	
3	Angle of internal friction (pp)		Number	Symbol: $\phi_{ef(pp)}$ 8,9 ° 8,9 °	
4	Cohesion (pp)		Number	Symbol: $c_{ef(pp)}$ 8,9 kPa 8,889 psi	

Copy All Paste

Ranges

Formula

Type cannot be calculated Edit

Conditional input

Master enumeration: (unspecified) No enumerations defined for using as master.

Local data type

OK + ↑ OK + ↓ **OK** Cancel



Na isti način, kopirajte tablice u grupu "Calculations" – i nazovite ih "Post peak strength".

Edit data type

Parameters of data type

Type : Group

Name : Calculations EN Comment : Identifier :

Parameters

No.	Name	Identifier	Type	Parameters	Comment
1	Peak strength - points (graph) Shear stress Vertical stress		Table Number Number	General Number of elements 2	
2	Peak strength - Tangent line Tangent line slope Tangent line shift Vertical stress Shear stress		Table Number Number Number Number	General Number of elements 4	
3	Post peak strength - points (graph) Shear stress Vertical stress		Table Number Number	General Number of elements 2	
4	Post peak strength - Tangent line Tangent line slope Tangent line shift Vertical stress Shear stress		Table Number Number Number Number	General Number of elements 4	

Copy All Paste

Ranges

Formula

Type cannot be calculated Edit

Conditional input

Master enumeration : (unspecified) No enumerations defined for using as master.

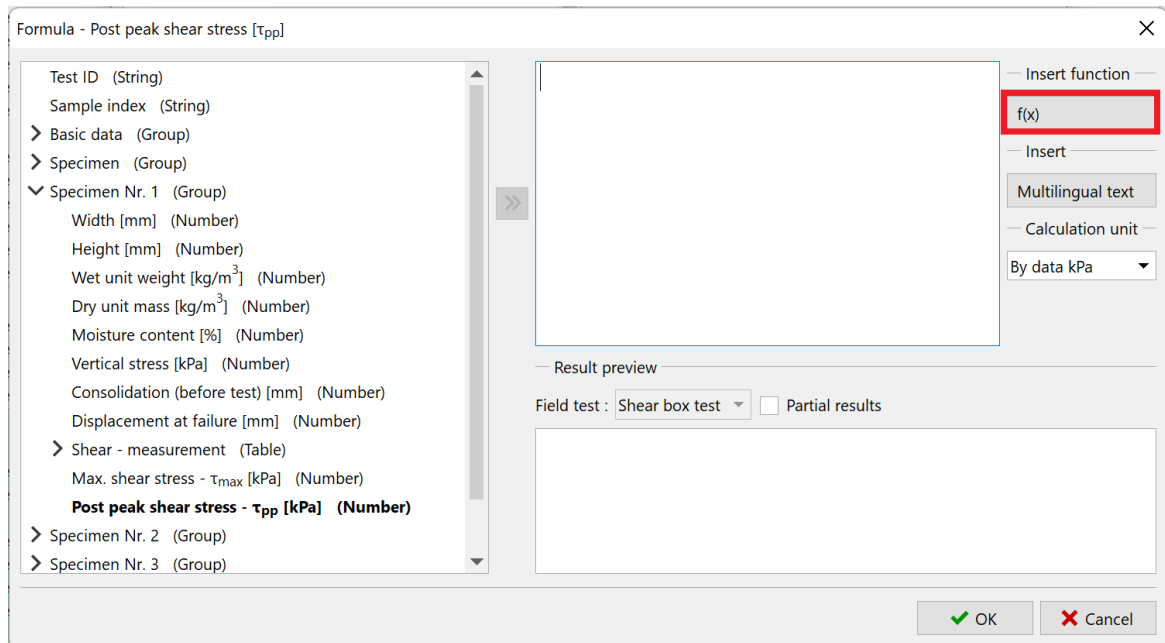
Local data type OK + OK Cancel

## Treći dio

Sad nastavljamo s unosom formula.

*Napomena: Osnovni tijek rada s formulama je objašnjen u inženjerskom priručniku 51.*

U stablu s lijeve strane pronađite novo kreirane podatke "Post peak shear stress" pod grupom "Specimen Nr. 1" otvorite prozor za dodavanje formule. Ovdje pritisnemo tipku za dodavanje funkcije.



Osnovna verzija predložka shear box ispitivanja koristi "Shear - Measurement" tablicu, u kojoj korisnik unosi horizontalni pomak, vertikalni pomak i posmično naprezanje. Za vršne vrijednosti, uzima se u obzir maksimalno uneseno posmično naprezanje. U opisu zadatka definirali smo da ćemo uzeti u obzir površinske parametre za određeni horizontalni pomak – u ovom zadatku uzimamo 8 mm. Koristeći mogućnost linearne interpolacije moramo proračunati dano posmično naprezanje za odabrani horizontalni pomak.

Funkciju možete pronaći u popisu pod "LINEARINTERPOLATION".

Funkcija proračuna vrijednost naprezanja (y) za određeni pomak (x) iz tablice "Shear - Measurement".

Varijable u funkciji su:

- x – Pomak nakon vršne čvrstoće
- x koordinata – "Horizontal displacement" u tablici Shear – measurement
- y koordinata – "Shear stress" u tablici Shear – measurement

Izraz funkcije:

Formula - Post peak shear stress [ $\tau_{pp}$ ]

- Height [mm] (Number)
- Wet unit weight [ $\text{kg/m}^3$ ] (Number)
- Dry unit mass [ $\text{kg/m}^3$ ] (Number)
- Moisture content [%] (Number)
- Vertical stress [kPa] (Number)
- Consolidation (before test) [mm] (Number)
- Displacement at failure [mm] (Number)
- Shear - measurement (Table)
  - Number of row
  - Horizontal displacement -  $\Delta x$  [mm] (Number)
  - Vertical displacement -  $\Delta z$  [mm] (Number)
  - Shear stress -  $\tau$  [kPa] (Number)
  - Mobilized friction angle -  $\varphi_{mob}$  [°] (Number)
  - Max. shear stress -  $\tau_{max}$  [kPa] (Number)
  - Post peak shear stress -  $\tau_{pp}$  [kPa] (Number)**
  - > Specimen Nr. 2 (Group)
  - > Specimen Nr. 3 (Group)
  - > Results (Group)

**LINEARINTERPOLATION(**  
{Displacement for post peak strength};{ $\Delta x$ }};{ $\tau$ }**)**

— Insert function —

f(x)

— Insert —

Multilingual text

— Calculation unit —

By data kPa

— Result preview —

Field test : Shear box test  Partial results

25,7

✓ OK
✗ Cancel

Unesite formule za vršno posmično naprezanje za uzorke 2 i 3 na isti način.

Ispravke unosa se mogu provjeriti u bilo kojem trenutku u prozoru za unos ispitivanja, gdje možemo vidjeti proračunate vrijednosti površinskog posmičnog naprezanja za odabrani pomak od 8 mm.

Edit test: Shear box test

Test ID : Shear box test

Sample index : VA1/1254 Select sample ▾

Basic data | Specimen | Specimen Nr. 1 | Specimen Nr. 2 | Specimen Nr. 3 | Results | Calculations | Attachments

Width : 60,00 [mm]

Height : 21,00 [mm]

Wet unit weight : 1921,0 [kg/m<sup>3</sup>]

Dry unit mass : 1545,4 [kg/m<sup>3</sup>]

Moisture content : 24,30 [%]

Vertical stress : 100 [kPa]

Consolidation (before test) : 0,550 [mm]

Displacement at failure : 2,061 [mm]

Shear - measurement :

No. ↗	Horizontal displacement Δx [mm]	Vertical displacement Δz [mm]	Shear stress τ [kPa]	Mobilized friction angle φ <sub>mob</sub> [°]
1	0,023	0,000	10,746	6,1
2	0,055	-0,005	10,746	6,1
3	0,118	-0,014	21,692	12,2
4	0,172	-0,020	31,542	17,5
5	0,196	-0,025	34,030	18,8
6	0,284	-0,032	39,934	21,8
7	0,408	-0,044	43,980	23,7
8	0,520	-0,053	48,259	25,8

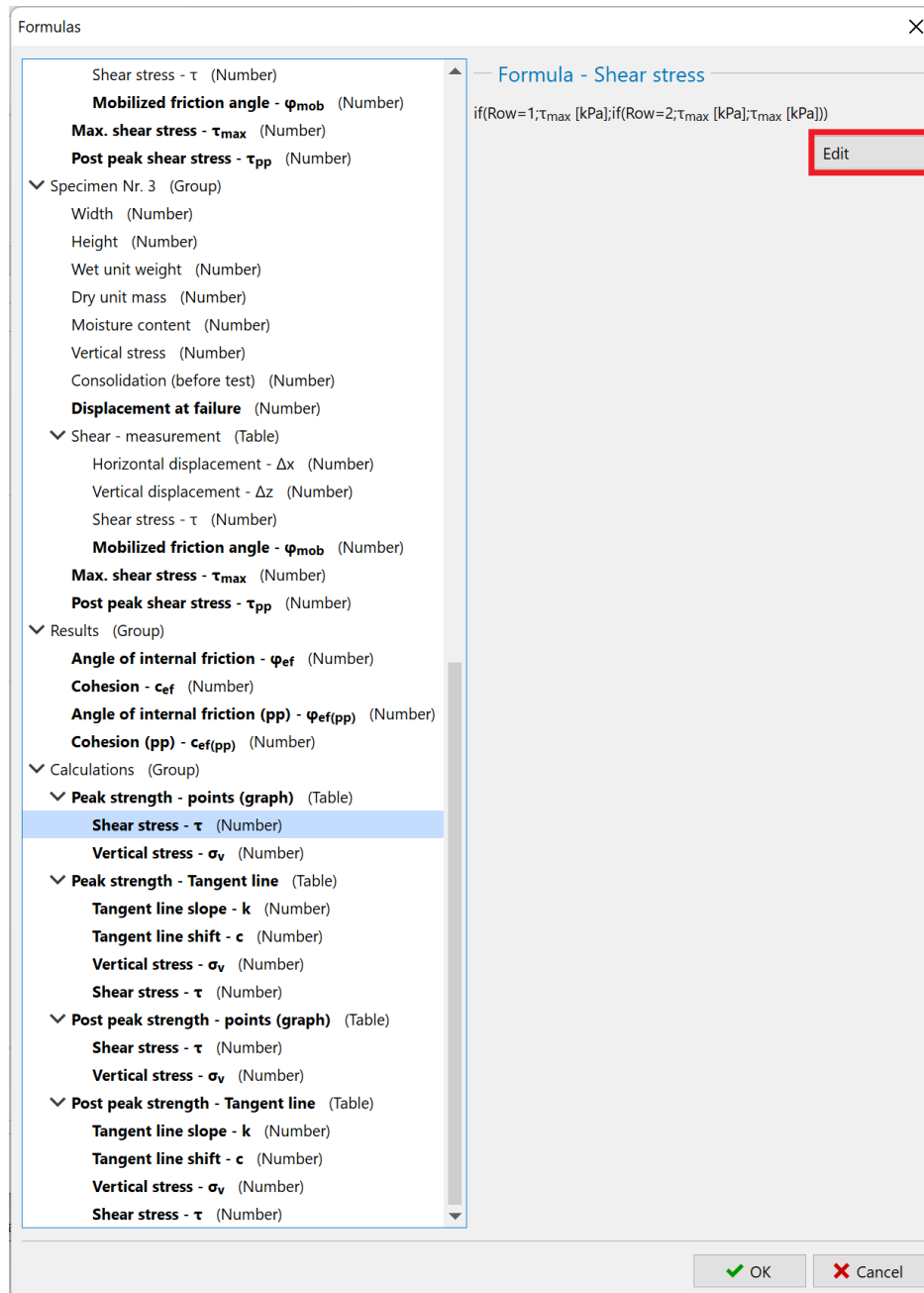
Max. shear stress : τ<sub>max</sub> = 71,3 [kPa]

Post peak shear stress : τ<sub>pp</sub> = 54,0 [kPa]

Recalculate OK Cancel

Zatim nastavljamo s unosom formula za ispis grafa. Pripremili smo dvije tablice u podacima. Prva tablica ispisuje točke grafa, a druga ispisuje liniju (trend line). Kao što možemo vidjeti u stablu prozora za uređivanje formula, podaci koje smo kopirali su se kopirali uključujući i formule.

Počinjemo s uređivanjem tablice za ispis točaka. Stupac "Vertical stress" je isti kao u tablici za vršne parametre, pa ga ne moramo modificirati. Zato ćemo modificirati formulu za stupac "Shear stress".



Ovdje vidim da se koristi IF formula kako bi se tablica ispunila na način da se prvi red tablice popunjava s podacima prvog uzorka, drugi red s podacima drugog uzorka i treći red s podacima trećeg uzorka.

U formuli jedino moramo zamijeniti reference na maksimalno posmično naprezanje (Max. shear stress) s referencama na vršno posmično naprezanje (Post peak shear stress), uvijek za odgovarajuće uzorke. Ovo jednostavno odrađujemo pritiskom lijeve tipke miša na uokvirenu stavku crvenom bojom (koja odgovara crvenoj stavci u formuli), držimo tipku, i mičemo miša prema drugoj stavci. Ovo će promijeniti poveznicu kako bi se uskladilo s novo odabranom vrstom podataka.

Formular - Shear stress  $[\tau]$

Wet unit weight  $[\text{kg}/\text{m}^3]$  (Number)  
 Dry unit mass  $[\text{kg}/\text{m}^3]$  (Number)  
 Moisture content [%] (Number)  
 Vertical stress  $[\text{kPa}]$  (Number)  
 Consolidation (before test)  $[\text{mm}]$  (Number)  
 Displacement at failure  $[\text{mm}]$  (Number)  
 > Shear - measurement (Table)  
 Max. shear stress -  $\tau_{\text{max}}$   $[\text{kPa}]$  (Number)  
 Post peak shear stress -  $\tau_{\text{pp}}$   $[\text{kPa}]$  (Number)  
 ✓ Specimen Nr. 2 (Group)  
 Width  $[\text{mm}]$  (Number)  
 Height  $[\text{mm}]$  (Number)  
 Wet unit weight  $[\text{kg}/\text{m}^3]$  (Number)  
 Dry unit mass  $[\text{kg}/\text{m}^3]$  (Number)  
 Moisture content [%] (Number)  
 Vertical stress  $[\text{kPa}]$  (Number)  
 Consolidation (before test)  $[\text{mm}]$  (Number)  
 Displacement at failure  $[\text{mm}]$  (Number)  
 > Shear - measurement (Table)  
 Max. shear stress -  $\tau_{\text{max}}$   $[\text{kPa}]$  (Number)  
 Post peak shear stress -  $\tau_{\text{pp}}$   $[\text{kPa}]$  (Number)  
 ✓ Specimen Nr. 3 (Group)  
 Width  $[\text{mm}]$  (Number)

if({Row}=1;{τ<sub>pp</sub>[kPa]};if({Row}=2;{τ<sub>max</sub>[kPa]};{τ<sub>max</sub>[kPa]}))

Insert function  
 f(x)  
 Insert  
 Multilingual text  
 Calculation unit  
 kPa

Result preview

Field test : Shear box test  Partial results

1 : 25,700  
 2 : 71,300  
 3 : 107,200

OK Cancel

Druga opcija je klik desnom tipkom miša unutar formule i odabrati opciju "Change" za odabir nove vrste podataka iz stabla.

Formula - Shear stress [τ]

IF( Test ; Then ; Else )  
Specifies a logical test to perform

if((Row)=1;{τ<sub>pp</sub>[kPa]};if((Row)=2;{τ<sub>max</sub>[kPa]};{τ<sub>max</sub>[kPa]}))

Change  
Remove

Result preview

Field test : Shear box test  Partial results

1 : 25,700  
2 : 71,300  
3 : 107,200

OK Cancel

Krajnja formula ima sljedeću formu:

Formula - Shear stress [τ]

if((Row)=1;{τ<sub>pp</sub>[kPa]};if((Row)=2;{τ<sub>pp</sub>[kPa]};{τ<sub>pp</sub>[kPa]}))

Result preview

Field test : Shear box test  Partial results

1 : 25,700  
2 : 54,000  
3 : 88,400

OK Cancel

Formula bi se trebala automatski prilagoditi prilikom kopiranja. Kako bilo, možemo ju otvoriti i provjeriti da poveznice podataka odgovaraju vršnoj čvrstoći (post peak strength).

Formula - Post peak strength - Tangent line ✕

- Test ID (String)
- Sample index (String)
- > Basic data (Group)
- > Specimen (Group)
- > Specimen Nr. 1 (Group)
- > Specimen Nr. 2 (Group)
- > Specimen Nr. 3 (Group)
- > Results (Group)
- ▼ Calculations (Group)
  - > Peak strength - points (graph) (Table)
  - > Peak strength - Tangent line (Table)
  - ▼ Post peak strength - points (graph) (Table)
    - Number of row
    - Shear stress -  $\tau$  [kPa] (Number)
    - Vertical stress -  $\sigma_v$  [kPa] (Number)
  - ▼ Post peak strength - Tangent line (Table)
    - Number of row
    - Tangent line slope - k [-] (Number)

**LINEARTRENDANDPOINTS**(({ $\sigma_v$  [kPa]};{ $\tau$  [kPa]}))

Result preview

Field test : Shear box test  Partial results

2; 0,407428571428571; 8,500000000000004; 0; 8,500000000000004; NAN; NAN; 200; 89,9857142857143

✓ OK
✕ Cancel



Zadnje formule koje moramo modificirati se nalaze u grupi "Results". U njima ćemo ponovno zamijeniti reference sa tablice "peak strength" u tablicu "post peak strength".

The screenshot shows the 'Formulas' dialog box with the following structure:

- Shear stress -  $\tau$  (Number)
  - Mobilized friction angle -  $\varphi_{mob}$**  (Number)
  - Max. shear stress -  $\tau_{max}$**  (Number)
  - Post peak shear stress -  $\tau_{pp}$**  (Number)
- Specimen Nr. 3 (Group)
  - Width (Number)
  - Height (Number)
  - Wet unit weight (Number)
  - Dry unit mass (Number)
  - Moisture content (Number)
  - Vertical stress (Number)
  - Consolidation (before test) (Number)
  - Displacement at failure** (Number)
- Shear - measurement (Table)
  - Horizontal displacement -  $\Delta x$  (Number)
  - Vertical displacement -  $\Delta z$  (Number)
  - Shear stress -  $\tau$  (Number)
  - Mobilized friction angle -  $\varphi_{mob}$**  (Number)
  - Max. shear stress -  $\tau_{max}$**  (Number)
  - Post peak shear stress -  $\tau_{pp}$**  (Number)
- Results (Group)
  - Angle of internal friction -  $\varphi_{ef}$**  (Number)
  - Cohesion -  $c_{ef}$**  (Number)
  - Angle of internal friction (pp) -  $\varphi_{ef(pp)}$**  (Number)
  - Cohesion (pp) -  $c_{ef(pp)}$**  (Number)
- Calculations (Group)
  - Peak strength - points (graph) (Table)
    - Shear stress -  $\tau$  (Number)
    - Vertical stress -  $\sigma_v$  (Number)
  - Peak strength - Tangent line (Table)
    - Tangent line slope -  $k$  (Number)
    - Tangent line shift -  $c$  (Number)
    - Vertical stress -  $\sigma_v$  (Number)
    - Shear stress -  $\tau$  (Number)
  - Post peak strength - points (graph) (Table)
    - Shear stress -  $\tau$  (Number)
    - Vertical stress -  $\sigma_v$  (Number)
  - Post peak strength - Tangent line (Table)
    - Tangent line slope -  $k$  (Number)
    - Tangent line shift -  $c$  (Number)
    - Vertical stress -  $\sigma_v$  (Number)
    - Shear stress -  $\tau$  (Number)

The 'Formula - Angle of internal friction (pp)' field contains the formula:  $ATAN(k/l)$ . An 'Edit' button is located to the right of the formula field.

At the bottom right of the dialog box, there are two buttons: 'OK' (with a green checkmark) and 'Cancel' (with a red X).

Ovim završavamo rad s formulama. Nakon povratka na prozro za unos ispitivanja, možemo provjeriti jesu li proračunate vrijednosti točne.

Edit test: Shear box test
\_ □ ×

Test ID :

Sample index :  Select sample ▾

Basic data
Specimen
Specimen Nr. 1
Specimen Nr. 2
Specimen Nr. 3
Results
Calculations
Attachments

Angle of internal friction :       $\varphi_{ef}$  =  [°]

Cohesion :                               $c_{ef}$  =  [kPa]

Angle of internal friction (pp) :  $\varphi_{ef(pp)}$  =  [°]

Cohesion (pp) :                       $c_{ef(pp)}$  =  [kPa]

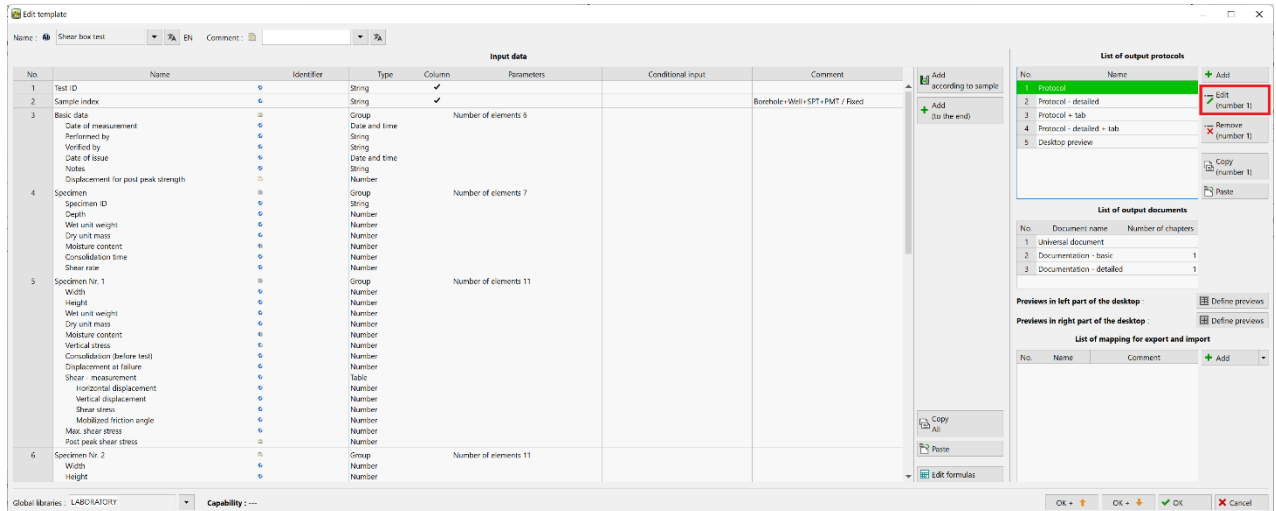
Recalculate

## Čtvrti dio

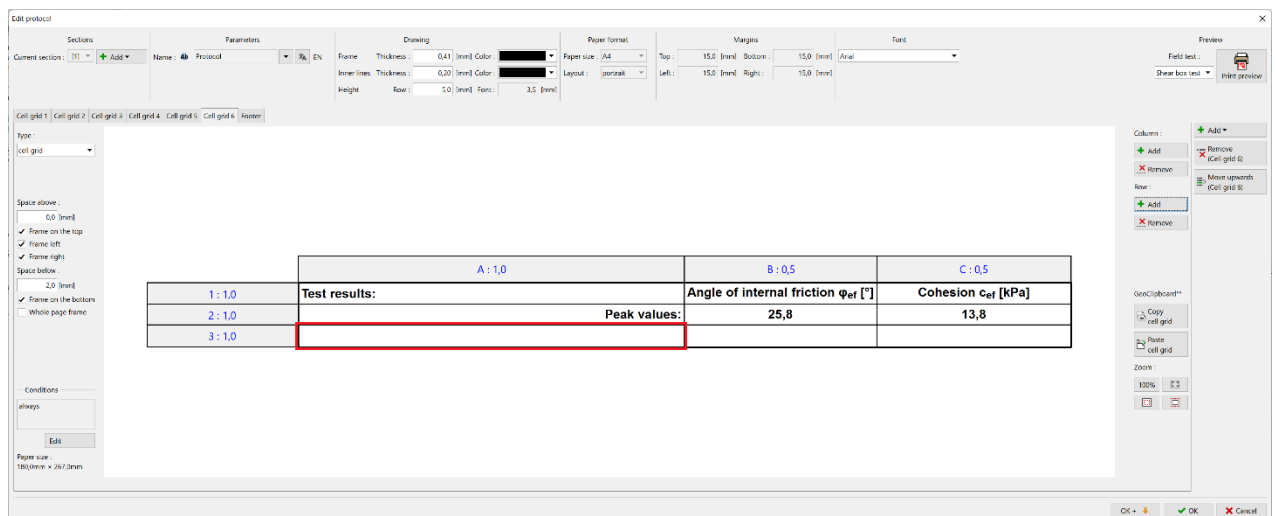
U sljedećem dijelu ćemo modificirati graf i protokol kako bismo uključili novo izrađene podatke.

*Napomena: Osnovno uređivanje izvještaja je opisan u Inženjerskom priručniku 51.*

Počet ćemo s promjenom protokola:



U kartici "Cell grid 6", gdje su prikazane rezultirajuće vrijednosti, dodat ćemo redak.



U novo izrađenoj ćeliji, upišite tekst "Post peak values at displacement", izmijenite način formatiranja i dodajte poveznicu na vrstu podataka za pomak koju smo odabrali. Sam broj se može dodati putem opcije "Test data - data", mjerna jedinica se može dodati putem opcije "Test data - name". Ovo će osigurati da ukoliko promijenimo mjernu jedinicu podataka na npr. cm, mijenja se isto tako i izlazni izvještaj.

Cell modification A3

Number of columns : 1  Right margin Background color : No color

Number of row : 1  Bottom margin

Item 1

Item type : Text

Post peak values at displacement [Displacement for post peak strength] mm

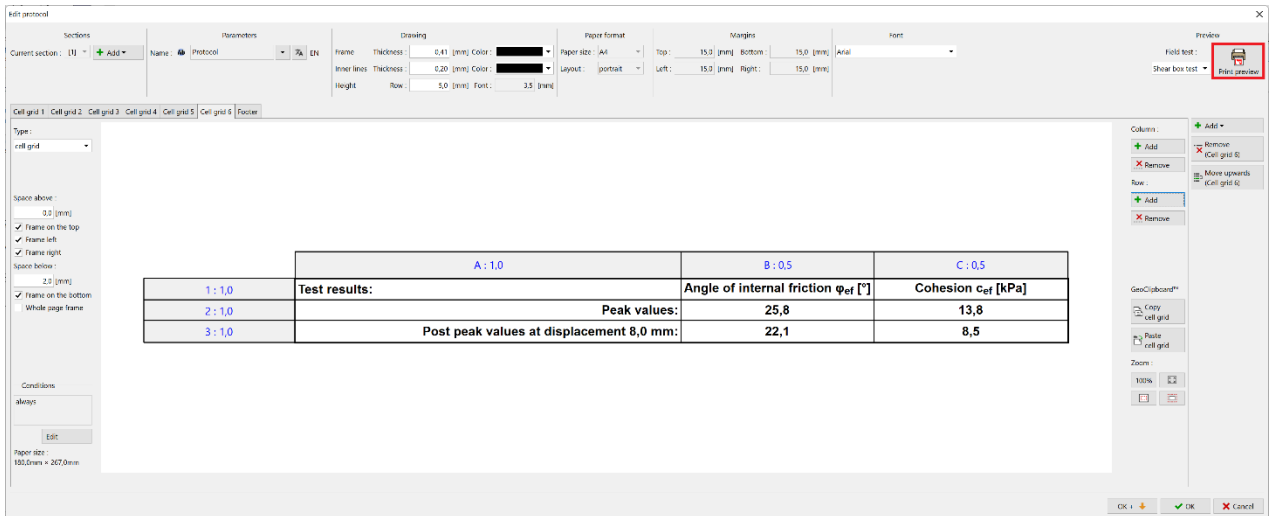
Test data - name

Name	Symbol	Unit
Test ID		
Sample index		
Basic data		
Basic data -> Date of measurement		
Basic data -> Performed by		
Basic data -> Verified by		
Basic data -> Date of issue		
Basic data -> Notes		
Basic data -> Displacement for post peak strength		mm
Specimen		
Specimen -> Specimen ID		
Specimen -> Depth		m
Specimen -> Wet unit weight		kg/m <sup>3</sup>
Specimen -> Dry unit mass		kg/m <sup>3</sup>
Specimen -> Moisture content		%
Specimen -> Consolidation time		hour
Specimen -> Shear rate		mm/min
Specimen Nr. 1		
Specimen Nr. 1 -> Width		mm
Specimen Nr. 1 -> Height		mm

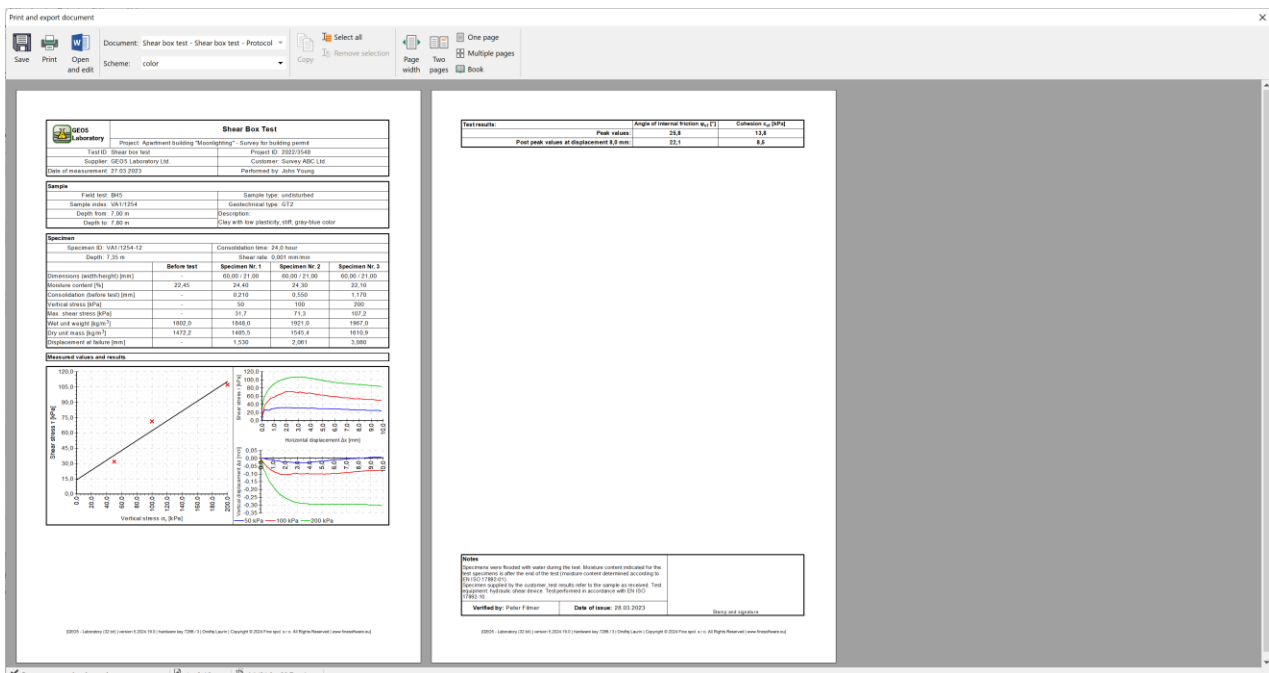
OK Cancel

*Napomena: u slučaju da želimo koristiti protokol na više jezika, moguće je unijeti "Multilingual text" putem opcije "Insert field", gdje tekst može biti preveden na druge jezike.*

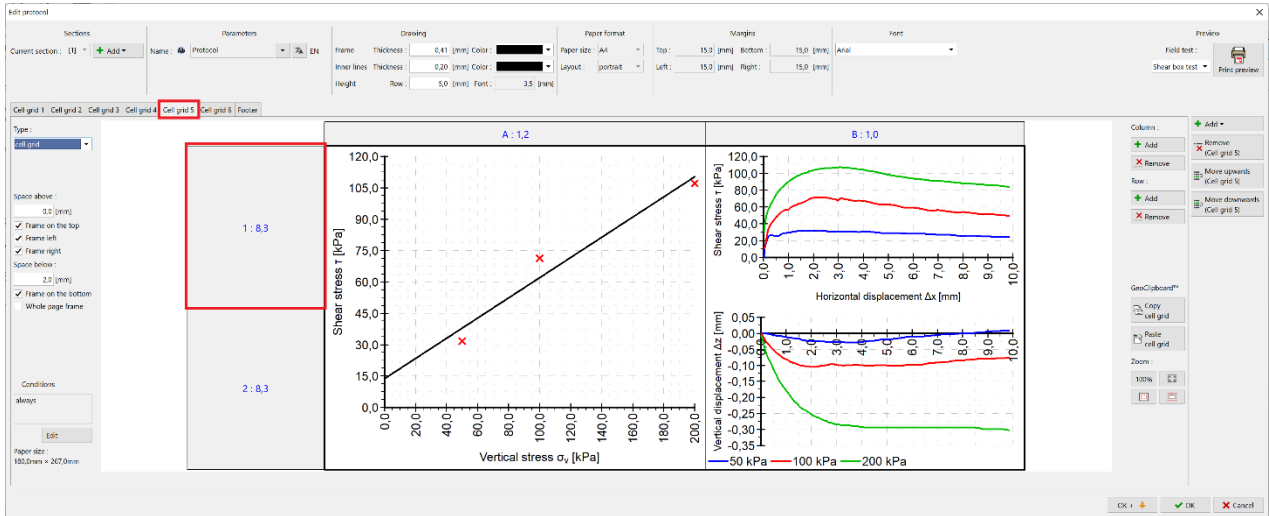
Zatim unosimo odgovarajuće podatke u preostale ćelije. Odaberite "Test data - data" putem opcije "Insert field".



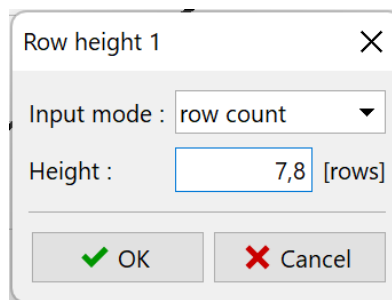
Koristeći tipku "Print Preview", možete vidjeti modificirani izvještaj u prikazu za print. Ovdje možemo vidjeti da pošto smo dodali liniju, više ne stane sve na jednu stranicu.



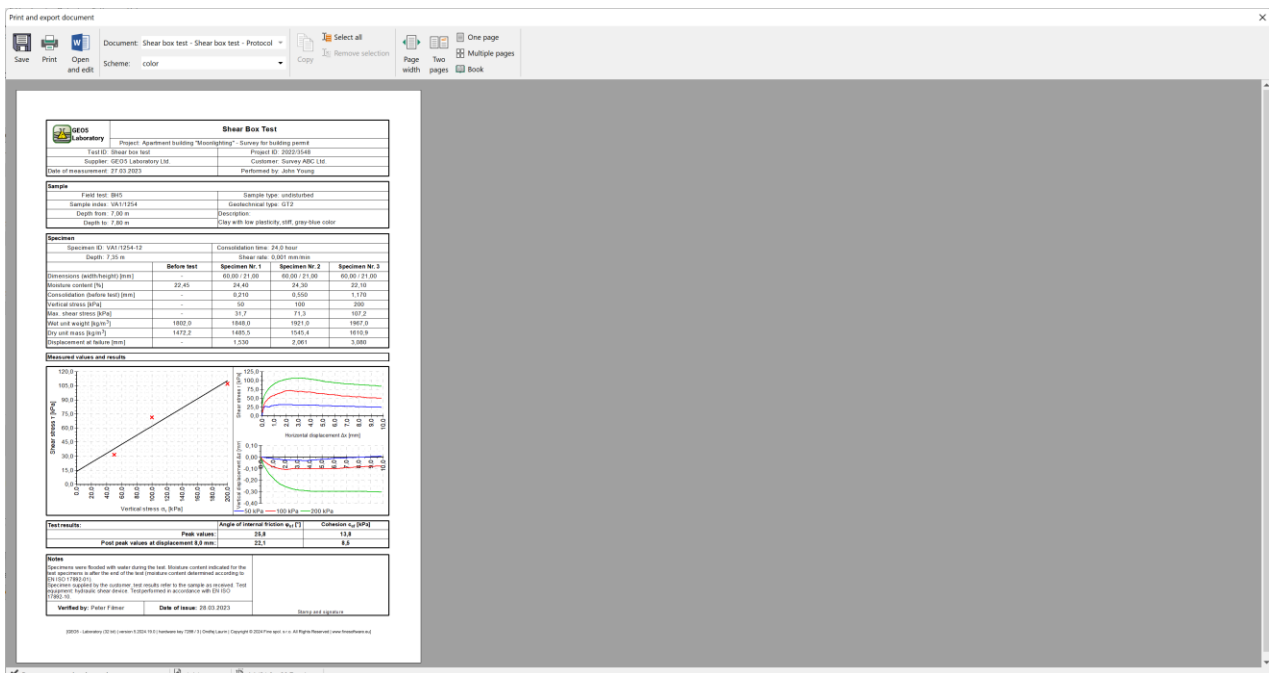
Kako bismo to riješili, moženo npr. smanjiti veličinu grafa u kartici "Grid cell 5" - svaki redak za 0.5.



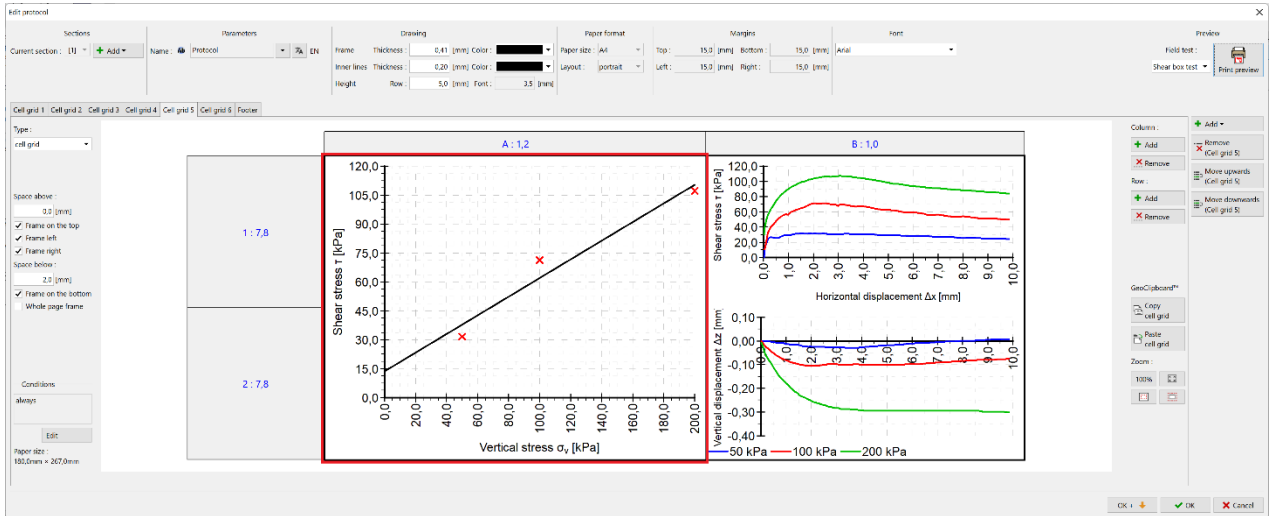
Smanjite veličinu sa 0.5 - na 7.8 za oba retka.



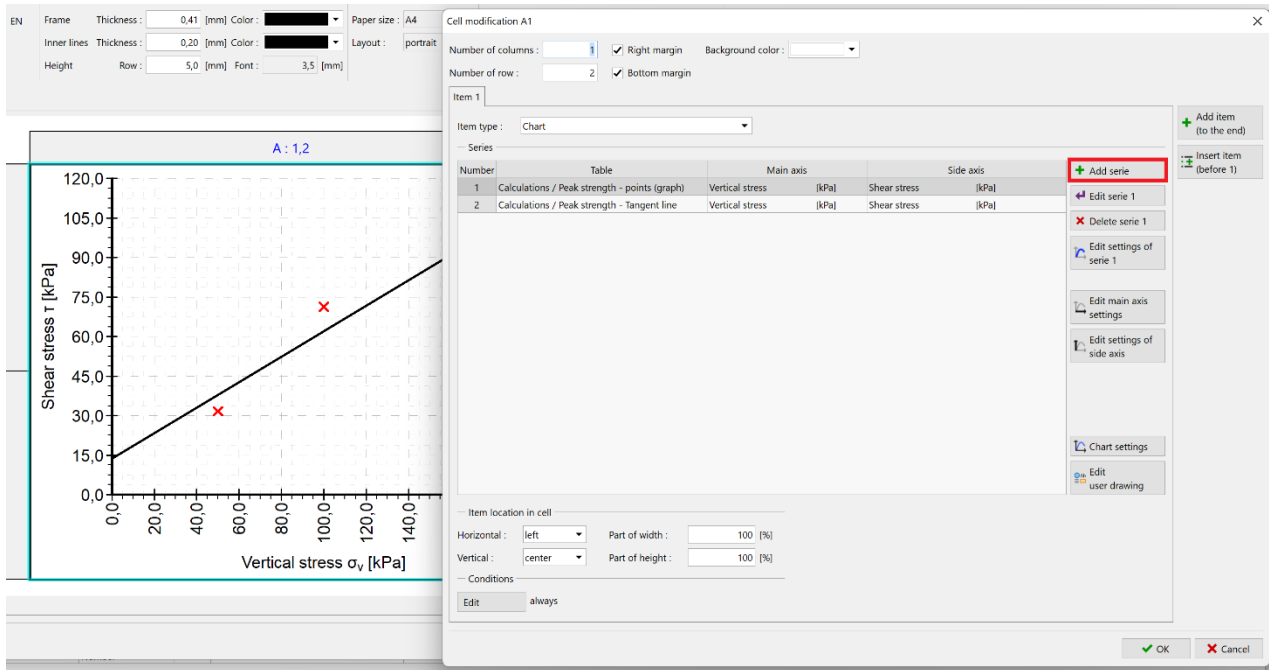
Sad možemo vidjeti da protokol ponovno stane na jednu stranicu.



Zadnji zadatak je dodavanje novih podataka u graf. Kliknite na graf i otvorite prozor za uređivanje.



Pritisnite tipku "Add serie".



Odaberite tablicu "Post peak strength - points", glavna os "Vertical stress" i sekundarna os "Shear stress".

Cell modification A1

Number of columns :   Right margin Background color :

Number of row :   Bottom margin

Item 1

Item type :

Series

Number	Table	Main axis	Side axis
1	Calculations / Peak strength - points (graph)	Vertical stress [kPa]	Shear stress [kPa]
2	Calculations / Peak strength - Tangent line	Vertical stress [kPa]	Shear stress [kPa]

Add serie

Data source

Table :

Main axis :

Side axis :

Chart settings

Side axis :

Item location in cell

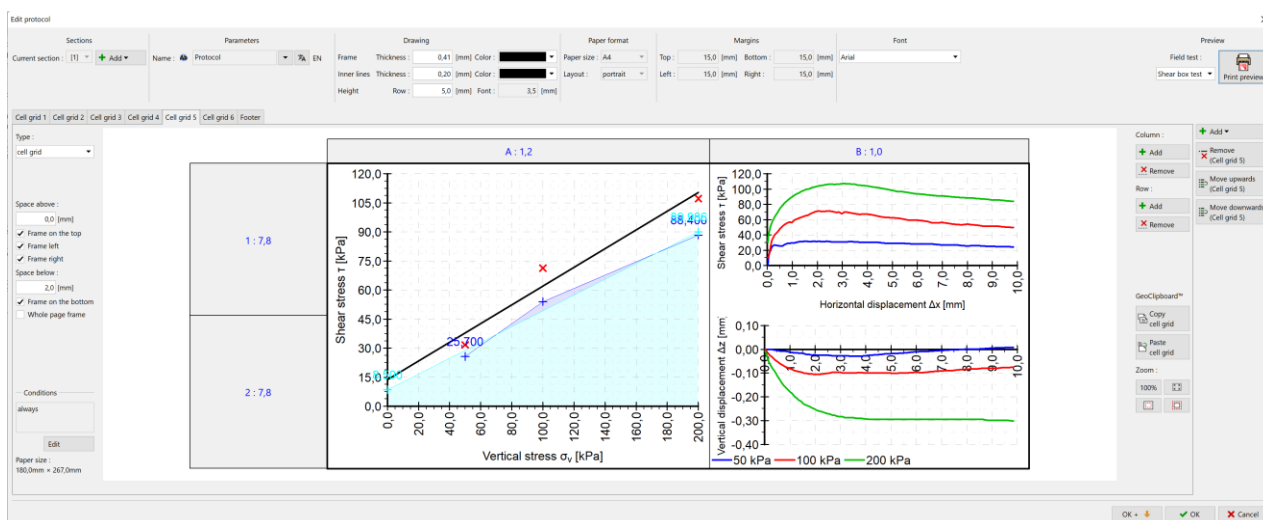
Horizontal :  Part of width :  [%]

Vertical :  Part of height :  [%]

Conditions

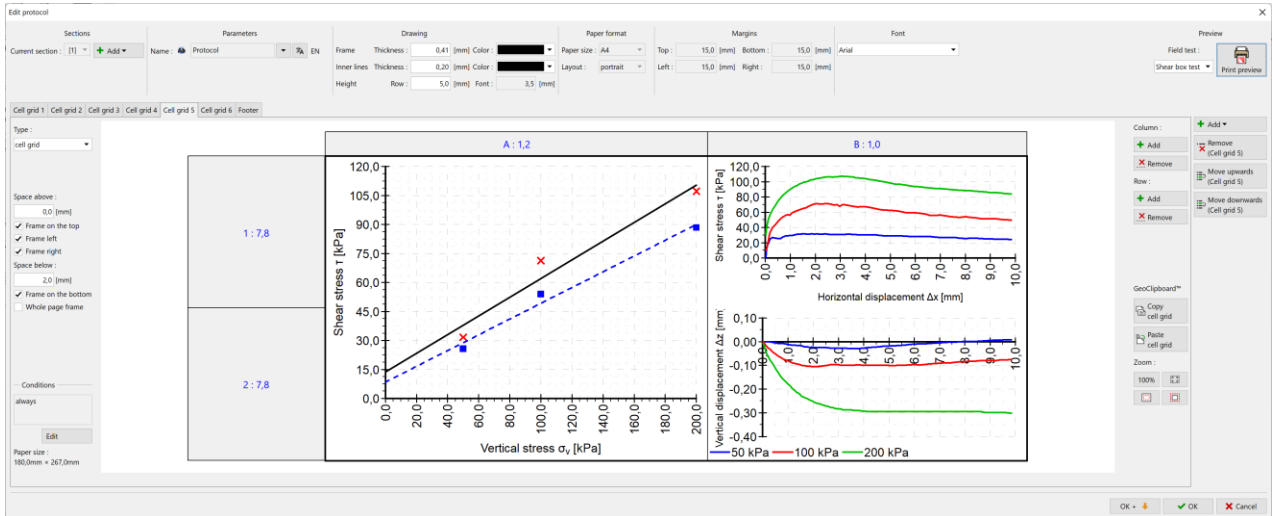
always

Dodajte liniju za "post peak strength" na isti način. Vidimo dvije nove serije u grafu:





Nakon toga modificiramo vizualizaciju dvaju novih serija kako bi zadovoljila naše zahtjeve:



*Napomena: Uređivanje grafičke vizualizacije grafa je objašnjeno u Inženjerskom priručniku 51.*

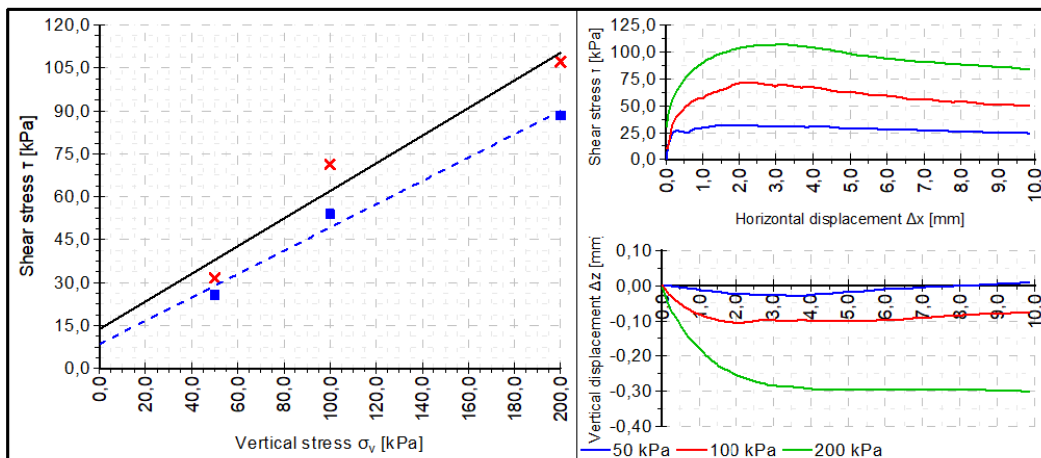
Modificirani protokol odgovora specifikacijama.

	<b>Shear Box Test</b>	
	Project: Apartment building "Moonlighting" - Survey for building permit	
Test ID: Shear box test		Project ID: 2022/3548
Supplier: GEO5 Laboratory Ltd.		Customer: Survey ABC Ltd.
Date of measurement: 27.03.2023		Performed by: John Young

<b>Sample</b>	
Field test: BH5	Sample type: undisturbed
Sample index: VA1/1254	Geotechnical type: GT2
Depth from: 7,00 m	Description:
Depth to: 7,80 m	Clay with low plasticity, stiff, gray-blue color

<b>Specimen</b>																																														
Specimen ID: VA1/1254-12	Consolidation time: 24,0 hour																																													
Depth: 7,35 m	Shear rate: 0,001 mm/min																																													
	<table border="1"> <thead> <tr> <th></th> <th>Before test</th> <th>Specimen Nr. 1</th> <th>Specimen Nr. 2</th> <th>Specimen Nr. 3</th> </tr> </thead> <tbody> <tr> <td>Dimensions (width/height) [mm]</td> <td>-</td> <td>60,00 / 21,00</td> <td>60,00 / 21,00</td> <td>60,00 / 21,00</td> </tr> <tr> <td>Moisture content [%]</td> <td>22,45</td> <td>24,40</td> <td>24,30</td> <td>22,10</td> </tr> <tr> <td>Consolidation (before test) [mm]</td> <td>-</td> <td>0,210</td> <td>0,550</td> <td>1,170</td> </tr> <tr> <td>Vertical stress [kPa]</td> <td>-</td> <td>50</td> <td>100</td> <td>200</td> </tr> <tr> <td>Max. shear stress [kPa]</td> <td>-</td> <td>31,7</td> <td>71,3</td> <td>107,2</td> </tr> <tr> <td>Wet unit weight [kg/m<sup>3</sup>]</td> <td>1802,0</td> <td>1848,0</td> <td>1921,0</td> <td>1967,0</td> </tr> <tr> <td>Dry unit mass [kg/m<sup>3</sup>]</td> <td>1472,2</td> <td>1485,5</td> <td>1545,4</td> <td>1610,9</td> </tr> <tr> <td>Displacement at failure [mm]</td> <td>-</td> <td>1,530</td> <td>2,061</td> <td>3,080</td> </tr> </tbody> </table>		Before test	Specimen Nr. 1	Specimen Nr. 2	Specimen Nr. 3	Dimensions (width/height) [mm]	-	60,00 / 21,00	60,00 / 21,00	60,00 / 21,00	Moisture content [%]	22,45	24,40	24,30	22,10	Consolidation (before test) [mm]	-	0,210	0,550	1,170	Vertical stress [kPa]	-	50	100	200	Max. shear stress [kPa]	-	31,7	71,3	107,2	Wet unit weight [kg/m <sup>3</sup> ]	1802,0	1848,0	1921,0	1967,0	Dry unit mass [kg/m <sup>3</sup> ]	1472,2	1485,5	1545,4	1610,9	Displacement at failure [mm]	-	1,530	2,061	3,080
	Before test	Specimen Nr. 1	Specimen Nr. 2	Specimen Nr. 3																																										
Dimensions (width/height) [mm]	-	60,00 / 21,00	60,00 / 21,00	60,00 / 21,00																																										
Moisture content [%]	22,45	24,40	24,30	22,10																																										
Consolidation (before test) [mm]	-	0,210	0,550	1,170																																										
Vertical stress [kPa]	-	50	100	200																																										
Max. shear stress [kPa]	-	31,7	71,3	107,2																																										
Wet unit weight [kg/m <sup>3</sup> ]	1802,0	1848,0	1921,0	1967,0																																										
Dry unit mass [kg/m <sup>3</sup> ]	1472,2	1485,5	1545,4	1610,9																																										
Displacement at failure [mm]	-	1,530	2,061	3,080																																										

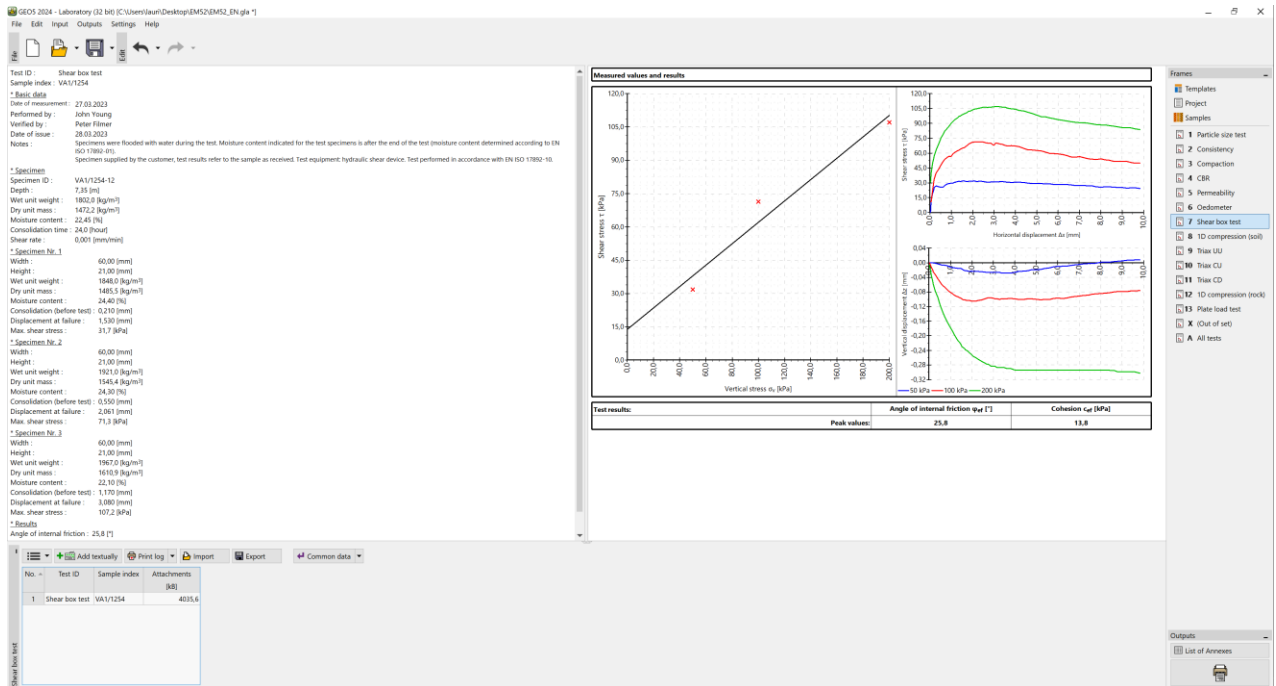
**Measured values and results**



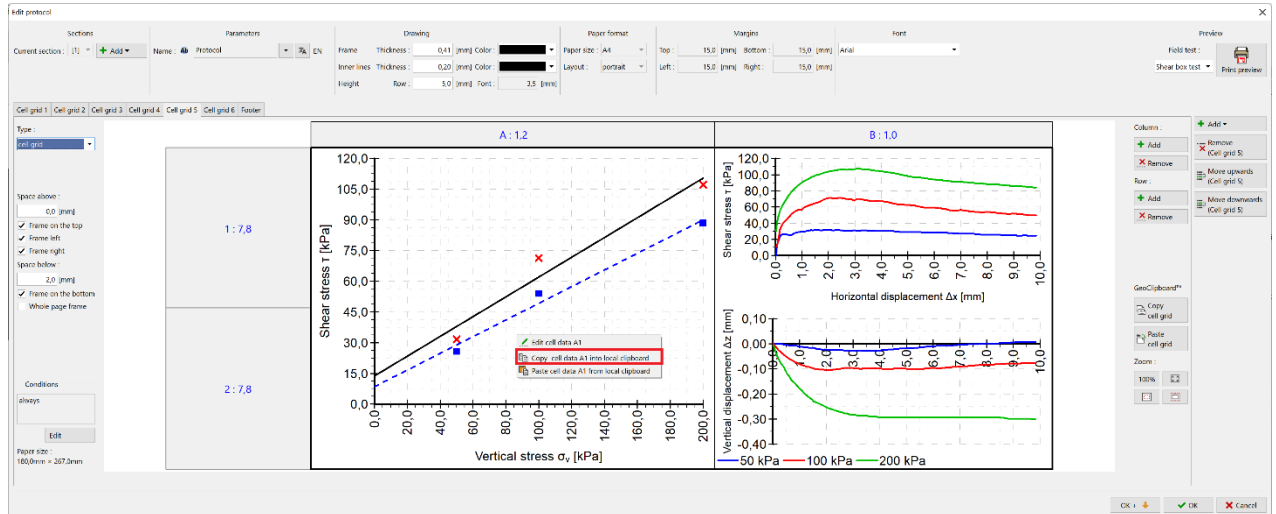
<b>Test results:</b>	<b>Angle of internal friction <math>\phi_{ef}</math> [°]</b>	<b>Cohesion <math>c_{ef}</math> [kPa]</b>
<b>Peak values:</b>	<b>25,8</b>	<b>13,8</b>
<b>Post peak values at displacement 8,0 mm:</b>	<b>22,1</b>	<b>8,5</b>

<b>Notes</b>	
Specimens were flooded with water during the test. Moisture content indicated for the test specimens is after the end of the test (moisture content determined according to EN ISO 17892-01). Specimen supplied by the customer, test results refer to the sample as received. Test equipment: hydraulic shear device. Test performed in accordance with EN ISO 17892-10.	
Verified by: Peter Filmer	Date of issue: 28.03.2023
Stamp and signature	

Kako bilo, ako odemo u glavni prozor programa, vidimo da se graf nije promijenio. Graf koji se ovdje prikazuje je iz izlaznog protokola koji se zove "Desktop Preview", pa to također moramo izmijeniti.



Jednostavno kopirajte i zaljepite graf i tablicu rezultata u prikaz.



GEOS 2024 - Laboratory (32 bit) [C:\Users\laun\Desktop\EM52\EM52\_EN.gja ']

File Edit Input Outputs Settings Help

Test ID: Shear box test  
 Sample index: VAI17254

**- Basic data**  
 Date of measurement: 27.03.2023  
 Performed by: John Young  
 Verified by: Peter Florer  
 Date of issue: 28.03.2023  
 Notes: Specimens were flooded with water during the test. Moisture content indicated for the test specimens is after the end of the test (moisture content determined according to EN 650 71800-01).  
 Specimens supplied by the customer, test results refer to the sample as received. Test performed in accordance with EN ISO 17892-10.

**- Specimens**  
 Specimen ID: VAI17254-12  
 Depth: 7.35 [m]  
 Wet unit weight: 1852.0 [kg/m<sup>3</sup>]  
 Dry unit mass: 1472.2 [kg/m<sup>3</sup>]  
 Moisture content: 22.45 [%]  
 Consolidation time: 24.0 [hour]  
 Shear rate: 0.000 [mm/min]

**- Specimen Nr. 1**  
 Width: 60.00 [mm]  
 Height: 21.00 [mm]  
 Wet unit weight: 1848.0 [kg/m<sup>3</sup>]  
 Dry unit mass: 1465.5 [kg/m<sup>3</sup>]  
 Moisture content: 24.40 [%]  
 Consolidation (before test): 0.210 [mm]  
 Displacement at failure: 1.530 [mm]  
 Max. shear stress: 31.7 [kPa]

**- Specimen Nr. 2**  
 Width: 60.00 [mm]  
 Height: 21.00 [mm]  
 Wet unit weight: 1921.0 [kg/m<sup>3</sup>]  
 Dry unit mass: 1545.4 [kg/m<sup>3</sup>]  
 Moisture content: 24.30 [%]  
 Consolidation (before test): 0.550 [mm]  
 Displacement at failure: 2.061 [mm]  
 Max. shear stress: 71.3 [kPa]

**- Specimen Nr. 3**  
 Width: 60.00 [mm]  
 Height: 21.00 [mm]  
 Wet unit weight: 1967.0 [kg/m<sup>3</sup>]  
 Dry unit mass: 1519.9 [kg/m<sup>3</sup>]  
 Moisture content: 22.50 [%]  
 Consolidation (before test): 1.170 [mm]  
 Displacement at failure: 3.080 [mm]  
 Max. shear stress: 107.2 [kPa]

**- Results**  
 Angle of internal friction: 25.8 [°]

**Measured values and results**

**Test results:**

	Peak values:	Angle of internal friction $\varphi$ [°]	Cohesion $c_d$ [kPa]
Post peak values at displacement 8.0 mm:		25.8	13.8
		22.1	8.5

Frames:  
 Templates  
 Project  
 Samples  
 1 Particle size test  
 2 Consistency  
 3 Compaction  
 4 CBR  
 5 Permeability  
 6 Oedometer  
 7 Shear box test  
 8 1D compression (soil)  
 9 Triax LIU  
 10 Triax CU  
 11 Triax CD  
 12 1D compression (rock)  
 13 Plate load test  
 X Out of set  
 A All tests

Outputs:  
 List of Annexes

Shear box test

1 No. -- Test ID Sample index Attachments (kB)  
 1 Shear box test VAI17254 4035.6

Ostali protokoli se mogu modificirati na isti način.