Analiza utilizand MEF

Topologie

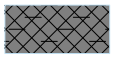
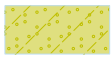
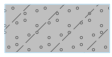
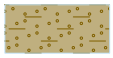
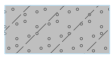
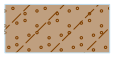
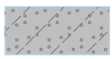
Proiect

Proiect : Pasaj denivelat pe DC 152 - Calea Urseni
Partea : Rampe pasaj
Data : 7/24/2025

Setari globale

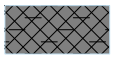
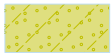
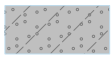
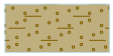
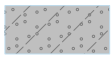
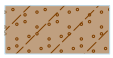
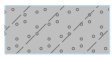
Geometrie proiect :	Stare de tensiuni plana
Tipul analizei :	Stress analysis
Tuneluri :	nu
Permite introduc. apei ca rezultat al analizei curgerii stationare :	nu
Permite analiza dinamica a seismului :	nu
Structuri din beton :	EN 1992-1-1 (EC2)
Calculul tensiunilor geologice (etapa 1) :	Tensiuni geologice
Param. generarii avansate a retelei :	nu
Param. avansati ai pamant. :	nu
Rezultate detaliate :	nu

Caracteristicile pământului - date de baza, subpresiune

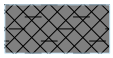
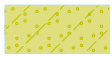
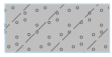
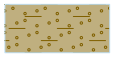
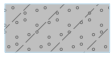
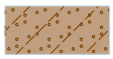
Nr.	Pattern	Soil name Material model	Tip pam.	γ [kN/m^3]	ν [-]	e_{in} [-]	γ_{sat} [kN/m^3]
1		1. umplutura nisip cu pietris, bolovanis Mohr-Coulomb	drained	18.50	0.27	1.000	20.00
2		2. Nisip prafos/ argilos, cafeniu galbui, mediu indesat, Mohr-Coulomb	drained	17.96	0.27	1.000	20.00
3		3. Nisip prafos cenusiu, mediu indesat, umed Mohr-Coulomb	drained	17.65	0.27	1.000	20.00
4		4. Nisip argilos cafeniu galbui, mediu indesat Mohr-Coulomb	drained	17.65	0.27	1.000	20.00
5		5. Nisip prafos cenusiu, mediu indesat, umed Mohr-Coulomb	drained	17.65	0.27	1.000	19.50
6		6. argila prafoasa slab nisipoasa cenusie, vartoasa Mohr-Coulomb	drained	19.32	0.27	1.000	21.00
7		7. nisip prafos cenusiu, mediu indesat Mohr-Coulomb	drained	17.68	0.27	1.000	20.00
8		8. argila prafoaa slab nisipoasa, cenusie, vartoasa Mohr-Coulomb	drained	19.32	0.27	1.000	21.00
9		9. nisip prafos cenusiu, mediu indesat/ indesat Mohr-Coulomb	drained	17.78	0.27	1.000	19.00

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Caracteristicile pământului - date conform modelului - partea 1/2

Nr.	Pattern	Soil name Material model	E [MPa]	E_{ur} [MPa]
1		1. umplutura nisip cu pietris, bolovanis Mohr-Coulomb	3.00	6.00
2		2. Nisip prafos/ argilos, cafeniu galbui, mediu indesat, Mohr-Coulomb	6.88	14.00
3		3. Nisip prafos cenusiu, mediu indesat, umed Mohr-Coulomb	13.10	26.00
4		4. Nisip argilos cafeniu galbui, mediu indesat Mohr-Coulomb	13.10	26.00
5		5. Nisip prafos cenusiu, mediu indesat, umed Mohr-Coulomb	13.10	26.00
6		6. argila prafoasa slab nisipoasa cenusie, vartoasa Mohr-Coulomb	14.80	28.00
7		7. nisip prafos cenusiu, mediu indesat Mohr-Coulomb	13.00	26.00
8		8. argila prafoaa slab nisipoasa, cenusie, vartoasa Mohr-Coulomb	14.84	28.00
9		9. nisip prafos cenusiu, mediu indesat/ indesat Mohr-Coulomb	13.00	26.00

Caracteristicile pământului - date conform modelului - partea 2/2

Nr.	Pattern	Soil name Material model	φ_{ef} [°]	c_{ef} [kPa]	ψ [°]
1		1. umplutura nisip cu pietris, bolovanis Mohr-Coulomb	25.00	0.00	0.00
2		2. Nisip prafos/ argilos, cafeniu galbui, mediu indesat, Mohr-Coulomb	19.20	11.00	0.00
3		3. Nisip prafos cenusiu, mediu indesat, umed Mohr-Coulomb	24.04	15.14	0.00
4		4. Nisip argilos cafeniu galbui, mediu indesat Mohr-Coulomb	24.04	15.14	0.00
5		5. Nisip prafos cenusiu, mediu indesat, umed Mohr-Coulomb	24.04	15.14	0.00
6		6. argila prafoasa slab nisipoasa cenusie, vartoasa Mohr-Coulomb	20.17	30.34	0.00
7		7. nisip prafos cenusiu, mediu indesat Mohr-Coulomb	27.18	0.00	0.00
8		8. argila prafoaa slab nisipoasa, cenusie, vartoasa Mohr-Coulomb	20.17	30.34	0.00
9		9. nisip prafos cenusiu, mediu indesat/ indesat Mohr-Coulomb	29.78	0.00	0.00

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Generarea retelei de discretizare

Parametrii generarii retelei

Lungimea elementului de margine : 2.00 [m]
Rafinarea retelei : da
Generarea elementelor multinod : da

Rezultatele generarii retelei

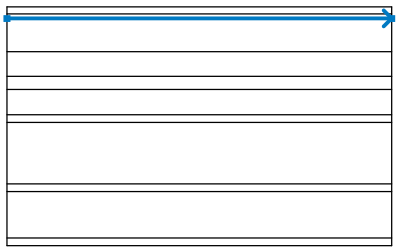
Reteaua de elemente finite a fost generata cu succes.
Numar de noduri 3791
Numarul de elemente 2572 (regiune 1000, grinda 393, interfata 1179)

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Introducere date (Etapa de constructie 1)

Apa

Tipul apei : NAS

Nr.	Localizarea NAS	Coordonatele punctelor NAS [m]					
		x	z	x	z	x	z
1099981523		0.00	-1.50	50.00	-1.50		

Setarea analizei

Tensiune

Metoda :	Newton - Raphson
Modificarea matricii de rigiditate :	dupa fiecare iteratie
Nr. max. de iteratii pt. un pas de calcul :	100
Pas de calcul initial :	0.1000
Eroare de deplasare :	0.0100
Eroare de forte dezechilibrate :	0.0100
Eroare de energie :	0.0100
Respectarea interfetelor de material :	nu

Plasticitate

Returneaza eroare de cartare :	0.00100
Numar max. de iteratii pentru un pas plast. :	20

Newton - Raphson

Factor de relaxare a pasului de calcul :	2.00
Nr. maxim de relaxari in pasul de calcul :	2
Numar min. de iteratii pentru un pas de calcul :	1

Linie de cautare

Metoda de solutionare :	iteratie nu
Linia limita de cautare - minimum :	0.100
Linia limita de cautare - maximum :	1.000

Rezultate (Etapa de constructie 1)

Analiza de tensiuni a fost finalizata cu succes.

Setari analiza : standard

Incarcare atinsa = 100.00 %

Extreme

Tensiune (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
tnes. totale $\sigma_{z,\,tot}$ [kPa]	50.00	0.00	-0.03	50.00	-31.00	608.00
Tens. efective $\sigma_{z,\,eff}$ [kPa]	50.00	0.00	-0.03	50.00	-31.00	313.00
tnes. totale $\sigma_{x,\,tot}$ [kPa]	50.00	0.00	-0.01	50.00	-31.00	410.77
Tens. efective $\sigma_{x,\,eff}$ [kPa]	50.00	0.00	-0.01	50.00	-31.00	115.77

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Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Efort tangential τ_{xz} [kPa]	14.50	-9.00	-0.65	35.50	-7.40	0.68

Tensiuni (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deviator. def. echivalent E_d [%]	13.00	0.00	0.00	50.00	-31.00	2.22
Deviator. deform. plastice echivalente $E_{d, pl}$ [%]	35.50	-1.50	0.00	32.29	-0.90	0.03

Grad de mobilizare (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	35.50	-1.50	50.35	15.09	0.00	100.00

Presiunea apei din pori (extreme)

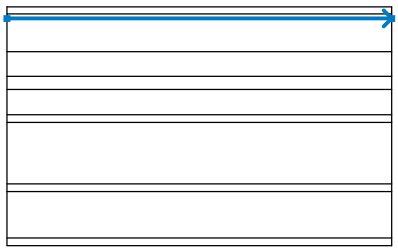
Variabil	Locaţie		Max
	x [m]	z [m]	
Pres. apei din pori totala u_{tot} [kPa]	2.00	-31.00	295.00

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Introducere date (Etapa de constructie 2 - sapatura generala)

Apa

Tipul apei : NAS

Nr.	Localizarea NAS	Coordonatele punctelor NAS [m]					
		x	z	x	z	x	z
1099981523		0.00	-1.50	50.00	-1.50		

Setarea analizei

Tensiune

Metoda :	Newton - Raphson
Modificarea matricii de rigiditate :	dupa fiecare iteratie
Nr. max. de iteratii pt. un pas de calcul :	100
Pas de calcul initial :	0.1000
Eroare de deplasare :	0.0100
Eroare de forte dezechilibrate :	0.0100
Eroare de energie :	0.0100
Respectarea interfetelor de material :	nu

Plasticitate

Returneaza eroare de cartare :	0.00100
Numar max. de iteratii pentru un pas plast. :	20

Newton - Raphson

Factor de relaxare a pasului de calcul :	2.00
Nr. maxim de relaxari in pasul de calcul :	2
Numar min. de iteratii pentru un pas de calcul :	1

Linie de cautare

Metoda de solutionare :	iteratie nu
Linia limita de cautare - minimum :	0.100
Linia limita de cautare - maximum :	1.000

Rezultate (Etapa de constructie 2 - sapatura generala)

Analiza de tensiuni a fost finalizata cu succes.

Setari analiza : standard

Incarcare atinsa = 100.00 %

Extreme

Deplasari (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deplasari x [mm]	40.13	-0.43	-4.3	8.50	0.00	4.4
Deplasari z [mm]	25.73	-1.50	-25.4	2.00	-31.00	0.0

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Tensiune (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
tnes. totale $\sigma_{z, tot}$ [kPa]	8.50	0.00	-1.59	0.00	-31.00	596.52
Tens. efective $\sigma_{z, eff}$ [kPa]	8.50	0.00	-1.59	0.00	-31.00	301.52
tnes. totale $\sigma_{x, tot}$ [kPa]	31.32	-1.50	-4.45	0.00	-31.00	406.51
Tens. efective $\sigma_{x, eff}$ [kPa]	31.32	-1.50	-4.45	0.00	-31.00	111.51
Efort tangential τ_{xz} [kPa]	12.43	-7.40	-6.76	39.64	-7.40	6.67

Tensiuni (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deviator. def. echivalent E_d [%]	50.00	0.00	0.05	0.00	-31.00	2.18
Deviator. deform. plastice echivalente $E_{d, pl}$ [%]	0.00	-5.80	0.00	50.00	-17.08	0.10

Grad de mobilizare (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	14.50	-1.50	14.18	0.00	-21.59	99.99

Presiunea apei din pori (extreme)

Variabil	Locaţie		Max
	x [m]	z [m]	
Pres. apei din pori totala u_{tot} [kPa]	2.00	-31.00	295.00

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Introducere date (Etapa de constructie 3 - executie pereti mulati)

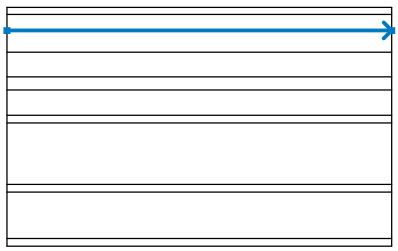
Grinzi

Nr.	Grindă		Locaţie	Reazem [m]		Include	Secţiune transversală	Material	Contacte	
	nou	modificat		Punct de start.	Punct final	greutate proprie			stanga	dreapta
1	Da		Linie libera No. 2	⊢	⊢	Da	1.00 (b) x 1.00 (h) m	C 30/37	(neintrodus)	(neintrodus)
2	Da		Linie libera No. 3	⊢	⊢	Da	1.00 (b) x 1.00 (h) m	C 30/37	(neintrodus)	(neintrodus)
3	Da		Linie libera No. 5	⊢	⊢	Da	1.00 (b) x 1.00 (h) m	C 30/37	(neintrodus)	(neintrodus)
4	Da		Linie libera No. 6	⊢	⊢	Da	1.00 (b) x 1.00 (h) m	C 30/37	(neintrodus)	(neintrodus)

Nr.	Secţiune transversală		Material	
	I_y [m⁴/m]	A [m²/m]	E [MPa]	G [MPa]
1	8.33E-02	1.00E+00	33000.00	13750.00
2	8.33E-02	1.00E+00	33000.00	13750.00
3	8.33E-02	1.00E+00	33000.00	13750.00
4	8.33E-02	1.00E+00	33000.00	13750.00

Apa

Tipul apei : NAS

Nr.	Localizarea NAS	Coordonatele punctelor NAS [m]					
		x	z	x	z	x	z
1099981523		0.00	-3.00	50.00	-3.00		

Setarea analizei

Tensiune

Metoda :	Newton - Raphson
Modificarea matricii de rigiditate :	dupa fiecare iteratie
Nr. max. de iteratii pt. un pas de calcul :	100
Pas de calcul initial :	0.1000
Eroare de deplasare :	0.0100
Eroare de forte dezechilibrate :	0.0100
Eroare de energie :	0.0100
Respectarea interfetelor de material :	nu

Plasticitate

Returneaza eroare de cartare :	0.00100
Numar max. de iteratii pentru un pas plast. :	20

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Newton - Raphson

Factor de relaxare a pasului de calcul :	2.00
Nr. maxim de relaxari in pasul de calcul :	10
Numar min. de iteratii pentru un pas de calcul :	1

Linie de cautare

Metoda de solutionare :	iteratie nu
Linia limita de cautare - minimum :	0.100
Linia limita de cautare - maximum :	1.000

Rezultate (Etapa de constructie 3 - executie pereti mulati)

Analiza de tensiuni a fost finalizata cu succes.
Setari analiza : definit de utilizator
Incarcare atinsa = 100.00 %

Extreme

Deplasari (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deplasari x [mm]	40.13	-0.43	-3.7	10.30	-0.45	4.0
Deplasari z [mm]	2.00	-31.00	0.0	0.00	-0.90	24.9

Tensiune (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
tnes. totale $\sigma_{z, tot}$ [kPa]	14.50	-1.50	-1.83	15.97	-31.00	621.11
Tens. efective $\sigma_{z, eff}$ [kPa]	14.50	-1.50	-1.83	15.97	-31.00	341.11
tnes. totale $\sigma_{x, tot}$ [kPa]	14.50	-1.50	-4.40	15.97	-31.00	406.13
Tens. efective $\sigma_{x, eff}$ [kPa]	14.50	-1.50	-4.40	15.97	-31.00	126.13
Efort tangential τ_{xz} [kPa]	16.31	-24.00	-22.95	34.10	-24.00	25.90

Tensiuni (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deviator. def. echivalent E_d [%]	50.00	0.00	0.04	14.21	-27.51	2.47
Deviator. deform. plastice echivalente $E_{d, pl}$ [%]	0.00	-5.80	0.00	35.50	-25.50	0.34

Grad de mobilizare (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	31.32	-1.50	11.31	45.86	-17.00	99.96

Presiunea apei din pori (extreme)

Variabil	Locaţie		Max
	x [m]	z [m]	
Pres. apei din pori totala u_{tot} [kPa]	2.00	-31.00	280.00

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Distributie pe grinzi (extreme)

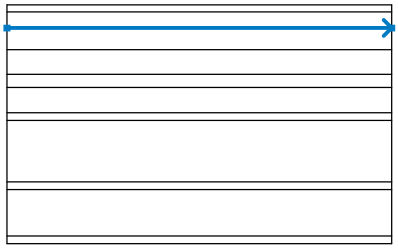
Nr.	Coordonate		D	N	M	Q
	x [m]	z [m]	[mm]	[kN/m]	[kNm/m]	[kN/m]
1	14.50	-1.50	**-2.0**	**-5.8**	0.0	**1.1**
	14.50	-4.00	0.4	-95.0	**-1.9**	0.1
	14.50	-10.10	**1.9**	**-228.6**	**0.5**	**-0.8**
2	14.50	-12.35	**2.0**	-255.8	3.0	-1.4
	14.50	-14.00	2.0	-269.3	5.5	**-1.5**
	14.50	-17.29	1.8	**-274.1**	8.8	-0.5
	14.50	-19.74	1.4	-262.9	**9.7**	-0.3
	14.50	-21.76	1.0	-231.5	7.8	**2.5**
	14.50	-25.50	**0.2**	**-120.0**	**0.0**	1.7
3	35.50	-1.50	**1.8**	**-6.9**	0.0	**-1.1**
	35.50	-4.00	-0.4	-94.6	**2.7**	-0.2
	35.50	-10.10	**-1.9**	**-226.8**	**-0.2**	**1.2**
4	35.50	-12.35	**-2.0**	-253.5	-3.8	2.1
	35.50	-14.00	-2.0	-266.7	-7.5	**2.2**
	35.50	-17.28	-1.7	**-271.0**	-13.8	1.6
	35.50	-19.73	-1.3	-259.0	**-16.7**	0.3
	35.50	-24.00	-0.4	-152.8	-6.7	**-4.4**
	35.50	-25.50	**0.0**	**-118.7**	**0.0**	-3.9

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Introducere date (Etapa de constructie 4 - excavatie -2.00 m)

Apa

Tipul apei : NAS

Nr.	Localizarea NAS	Coordonatele punctelor NAS [m]					
		x	z	x	z	x	z
1099981523		0.00	-3.00	50.00	-3.00		

Setarea analizei

Tensiune

Metoda :	Newton - Raphson
Modificarea matricii de rigiditate :	dupa fiecare iteratie
Nr. max. de iteratii pt. un pas de calcul :	100
Pas de calcul initial :	0.1000
Eroare de deplasare :	0.0100
Eroare de forte dezechilibrate :	0.0100
Eroare de energie :	0.0100
Respectarea interfetelor de material :	nu

Plasticitate

Returneaza eroare de cartare :	0.00100
Numar max. de iteratii pentru un pas plast. :	20

Newton - Raphson

Factor de relaxare a pasului de calcul :	2.00
Nr. maxim de relaxari in pasul de calcul :	10
Numar min. de iteratii pentru un pas de calcul :	1

Linie de cautare

Metoda de solutionare :	iteratie nu
Linia limita de cautare - minimum :	0.100
Linia limita de cautare - maximum :	1.000

Rezultate (Etapa de constructie 4 - excavatie -2.00 m)

Analiza de tensiuni a fost finalizata cu succes.

Setari analiza : definit de utilizator

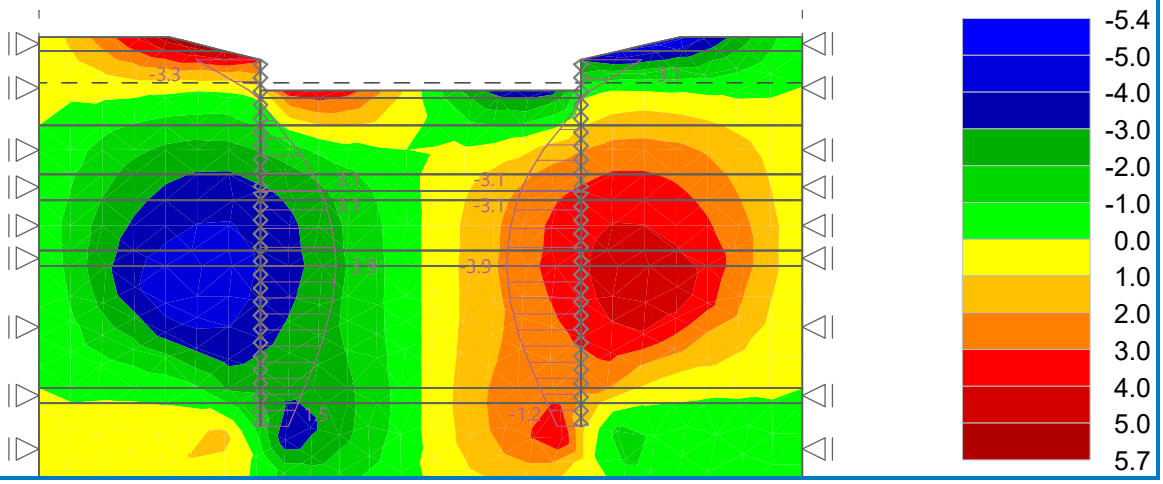
Incarcare atinsa = 100.00 %

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Nume : Analiza	Etapa : 4

Rezultate : general; variabile : Deplasare d $_x$; interval : <-5.4; 5.7> mm

D [mm]



Extreme

Deplasari (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deplasari x [mm]	40.13	-0.43	-5.4	10.30	-0.45	5.7
Deplasari z [mm]	25.17	-3.50	-17.9	0.00	-0.90	23.3

Tensiune (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
tnes. totale $\sigma_{z,\,tot}$ [kPa]	14.50	-1.50	-2.51	10.03	-31.00	604.37
Tens. efective $\sigma_{z,\,eff}$ [kPa]	21.88	-3.50	-2.77	10.03	-31.00	324.37
tnes. totale $\sigma_{x,\,tot}$ [kPa]	25.17	-3.50	-8.29	10.03	-31.00	399.95
Tens. efective $\sigma_{x,\,eff}$ [kPa]	25.17	-3.50	-13.29	10.03	-31.00	119.95
Efort tangential τ_{xz} [kPa]	16.07	-9.00	-21.93	33.96	-10.70	21.51

Tensiuni (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deviator. def. echivalent E_d [%]	50.00	0.00	0.07	13.49	-31.00	2.37
Deviator. deform. plastice echivalente $E_{d,\,pl}$ [%]	0.00	-5.80	0.00	35.50	-25.50	0.34

Grad de mobilizare (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	17.85	-3.50	15.62	50.00	-10.70	100.25

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Presiunea apei din pori (extreme)

Variabil	Locaţie		Max
	x [m]	z [m]	
Pres. apei din pori totala u_{tot} [kPa]	2.00	-31.00	280.00

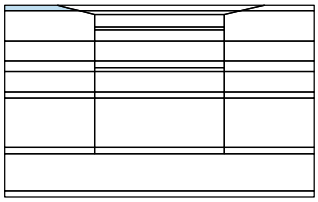
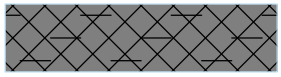
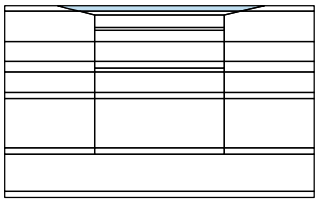
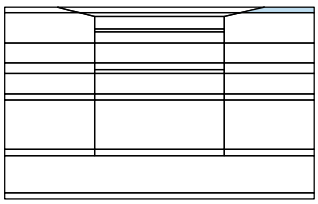
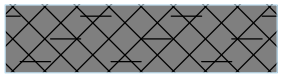
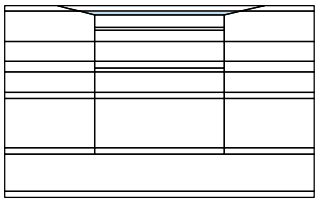
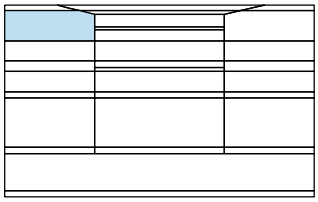
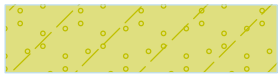
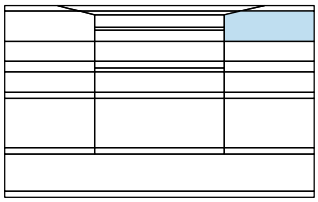
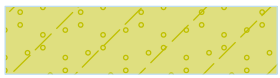
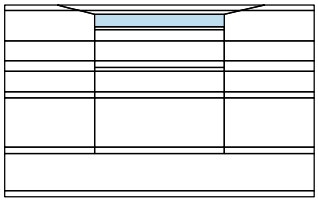
Distributie pe grinzi (extreme)

Nr.	Coordonate		D	N	M	Q
	x [m]	z [m]	[mm]	[kN/m]	[kNm/m]	[kN/m]
1	14.50	-1.50	**-3.3**	**-4.4**	**0.0**	-7.2
	14.50	-3.50	-0.6	-62.0	4.1	**1.3**
	14.50	-7.40	1.9	-100.4	60.1	**-18.4**
	14.50	-10.10	**3.1**	**-116.0**	**94.0**	-6.9
2	14.50	-10.10	3.1	-116.0	94.0	**-6.9**
	14.50	-12.35	3.7	-123.7	**100.9**	-0.1
	14.50	-14.00	3.9	**-128.3**	98.7	2.2
	14.50	-15.00	**3.9**	-124.9	96.0	3.9
	14.50	-21.76	2.7	-108.0	37.0	**14.0**
	14.50	-25.50	**1.5**	**-62.7**	**0.0**	5.2
3	35.50	-1.50	**3.1**	**-3.7**	**0.0**	6.7
	35.50	-3.50	0.5	-62.1	-3.4	**-1.5**
	35.50	-7.40	-2.0	-99.0	-60.2	**18.3**
	35.50	-10.10	**-3.1**	**-114.0**	**-94.3**	7.1
4	35.50	-10.10	-3.1	-114.0	-94.3	**7.1**
	35.50	-12.35	-3.7	-121.4	**-102.0**	0.6
	35.50	-14.00	-3.8	**-125.8**	-100.9	-1.5
	35.50	-15.00	**-3.9**	-122.4	-99.0	-2.9
	35.50	-21.71	-2.6	-104.2	-44.9	**-14.8**
	35.50	-25.50	**-1.2**	**-62.0**	**0.0**	-8.1

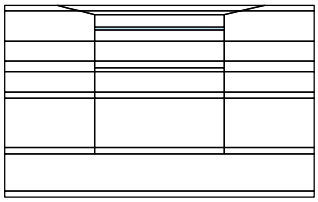
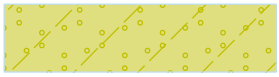
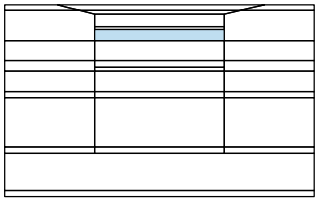
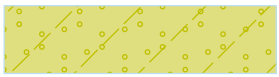
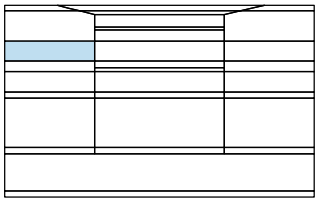
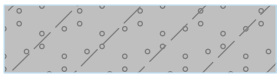
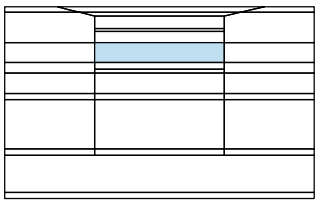
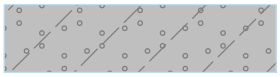
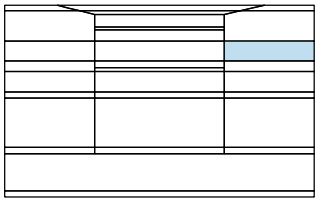
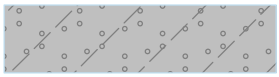
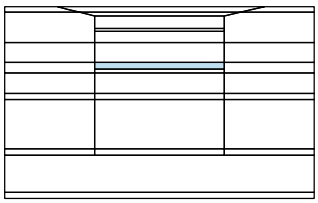
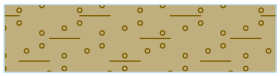
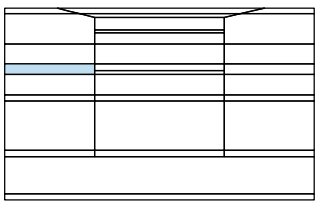
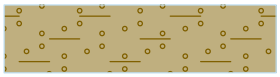
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Introducere date (Etapa de constructie 5 - sprijinire)

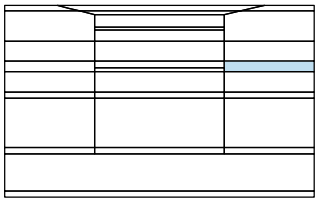
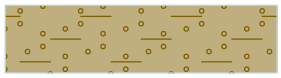
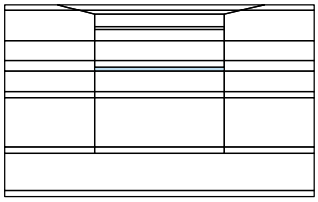
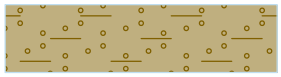
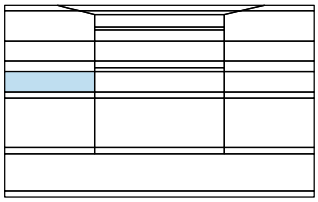
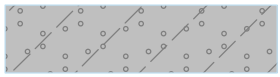
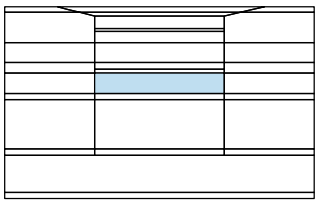
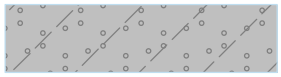
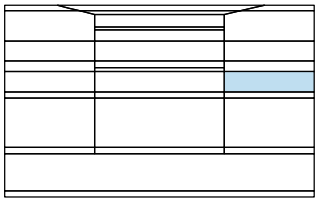
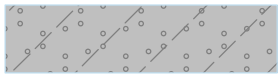
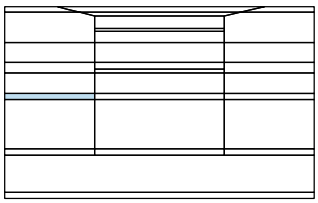
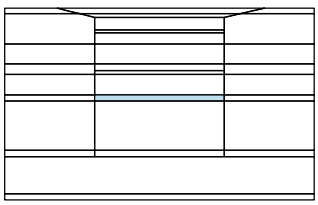
Atribuire si activare

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2		Inactiv	
3		Activ	1. umplutura nisip cu pietris, bolovanis 
4		Inactiv	
5		Activ	2. Nisip prafos/ argilos, cafeniu galbui, mediu indesat, 
6		Activ	2. Nisip prafos/ argilos, cafeniu galbui, mediu indesat, 
7		Inactiv	

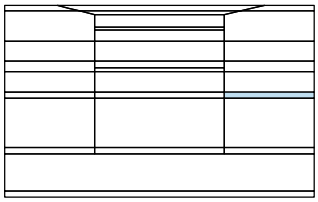
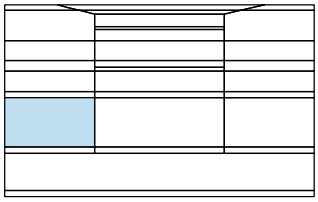
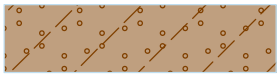
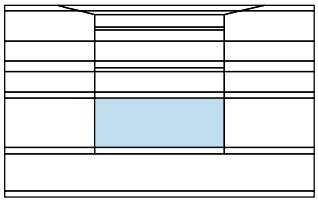
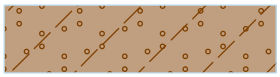
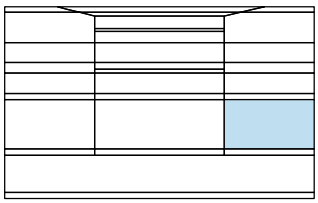
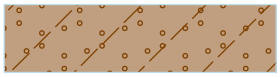
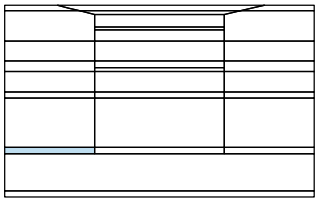
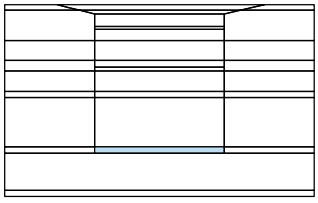
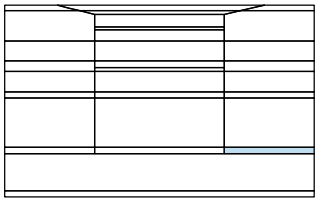
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Nr.	Regiune	Activ / inactiv	Pam. atribuit
8		Activ	2. Nisip prafos/ argilos, cafeniu galbui, mediu indesat, 
9		Activ	2. Nisip prafos/ argilos, cafeniu galbui, mediu indesat, 
10		Activ	3. Nisip prafos cenusiu, mediu indesat, umed 
11		Activ	3. Nisip prafos cenusiu, mediu indesat, umed 
12		Activ	3. Nisip prafos cenusiu, mediu indesat, umed 
13		Activ	4. Nisip argilos cafeniu galbui, mediu indesat 
14		Activ	4. Nisip argilos cafeniu galbui, mediu indesat 

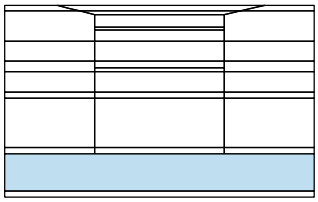
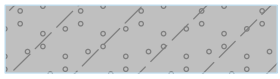
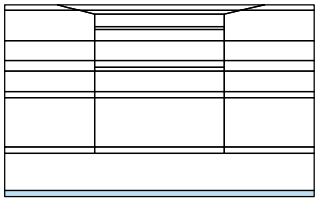
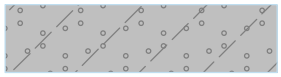
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Nr.	Regiune	Activ / inactiv	Pam. atribuit
15		Activ	4. Nisip argilos cafeniu galbui, mediu indesat 
16		Activ	4. Nisip argilos cafeniu galbui, mediu indesat 
17		Activ	5. Nisip prafos cenusiu, mediu indesat, umed 
18		Activ	5. Nisip prafos cenusiu, mediu indesat, umed 
19		Activ	5. Nisip prafos cenusiu, mediu indesat, umed 
20		Activ	6. argila prafoasa slab nisipoasa cenusie, vartoasa 
21		Activ	6. argila prafoasa slab nisipoasa cenusie, vartoasa 

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Nr.	Regiune	Activ / inactiv	Pam. atribuit
22		Activ	6. argila prafoasa slab nisipoasa cenusie, vartoasa 
23		Activ	7. nisip prafos cenusiu, mediu indesat 
24		Activ	7. nisip prafos cenusiu, mediu indesat 
25		Activ	7. nisip prafos cenusiu, mediu indesat 
26		Activ	8. argila prafoaa slab nisipoasa, cenusie, vartoasa 
27		Activ	8. argila prafoaa slab nisipoasa, cenusie, vartoasa 
28		Activ	8. argila prafoaa slab nisipoasa, cenusie, vartoasa 

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Nr.	Regiune	Activ / inactiv	Pam. atribuit
29		Activ	9. nisip prafos cenusiu, mediu indesat/ indesat 
30		Activ	9. nisip prafos cenusiu, mediu indesat/ indesat 

Grinzi

Nr.	Grindă		Locaţie	Reazem [m]		Include	Secţiune transversală	Material	Contacte	
	nou	modificat		Punct de start.	Punct final	greutate proprie			stanga	dreapta
1	Nu	Nu	Linie libera No. 2	⊢	⊢	Da	fara modificare	fara modificare	(neintrodus)	(neintrodus)
2	Nu	Nu	Linie libera No. 3	⊢	⊢	Da	fara modificare	fara modificare	(neintrodus)	(neintrodus)
3	Nu	Nu	Linie libera No. 5	⊢	⊢	Da	fara modificare	fara modificare	(neintrodus)	(neintrodus)
4	Nu	Nu	Linie libera No. 6	⊢	⊢	Da	fara modificare	fara modificare	(neintrodus)	(neintrodus)

Nr.	Secţiune transversală		Material	
	I_y [m^4/m]	A [m^2/m]	E [MPa]	G [MPa]
1	8.33E-02	1.00E+00	33000.00	13750.00
2	8.33E-02	1.00E+00	33000.00	13750.00
3	8.33E-02	1.00E+00	33000.00	13750.00
4	8.33E-02	1.00E+00	33000.00	13750.00

Reazeme liniare

Nr.	Reazem liniar		Locaţie	Reazem	
	nou	modificat		Directia X	Directia Z
A1	Da		Linia de retea No. 29	fixat	liber
A2	Da		Linia de retea No. 27	fixat	liber
A3	Da		Linia de retea No. 24	fixat	liber
A4	Da		Linia de retea No. 21	fixat	liber
A5	Da		Linia de retea No. 18	fixat	liber
A6	Da		Linia de retea No. 15	fixat	liber
A7	Da		Linia de retea No. 12	fixat	liber
A1 pana la A21 - reazmul liniar generat automat pe marginea modelului					

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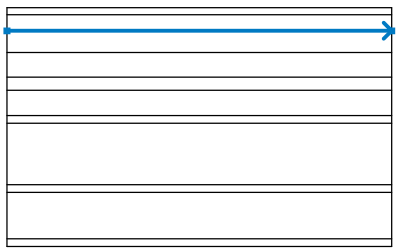
Nr.	Reazem liniar		Locaţie	Reazem	
	nou	modificat		Directia X	Directia Z
A8	Da		Linia de retea No. 9	fixat	liber
A9	Da		Linia de retea No. 6	fixat	liber
A10	Da		Linia de retea No. 3	fixat	liber
A11	Da		Linia de retea No. 31	fixat	liber
A12	Da		Linia de retea No. 26	fixat	liber
A13	Da		Linia de retea No. 23	fixat	liber
A14	Da		Linia de retea No. 20	fixat	liber
A15	Da		Linia de retea No. 17	fixat	liber
A16	Da		Linia de retea No. 14	fixat	liber
A17	Da		Linia de retea No. 11	fixat	liber
A18	Da		Linia de retea No. 8	fixat	liber
A19	Da		Linia de retea No. 5	fixat	liber
A20	Da		Linia de retea No. 1	fixat	liber
A21	Da		Linia de retea No. 30	fixat	fixat
A1 pana la A21 - reazmul liniar generat automat pe marginea modelului					

Sprijiniri

Nr.	Bancheta	Punct 1		Punct 2		Distanta dintre sprijiniri	Aria	Modul de elasticitate
	nou	x [m]	z [m]	x [m]	z [m]	b [m]	A [mm²]	E [MPa]
1	Da	14.50	-3.50	35.50	-3.50	2.00	23870.0	210000.00

Apa

Tipul apei : NAS

Nr.	Localizarea NAS	Coordonatele punctelor NAS [m]					
		x	z	x	z	x	z
1099981523		0.00	-3.00	50.00	-3.00		

Setarea analizei

Tensiune

Metoda :	Newton - Raphson
Modificarea matricii de rigiditate :	dupa fiecare iteratie
Nr. max. de iteratii pt. un pas de calcul :	100
Pas de calcul initial :	0.1000
Eroare de deplasare :	0.0100
Eroare de forte dezechilibrate :	0.0100
Eroare de energie :	0.0100
Respectarea interfetelor de material :	nu

Plasticitate

Returneaza eroare de cartare :	0.00100

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Numar max. de iteratii pentru un pas plast. :	20
Newton - Raphson	
Factor de relaxare a pasului de calcul :	2.00
Nr. maxim de relaxari in pasul de calcul :	10
Numar min. de iteratii pentru un pas de calcul :	1
Linie de cautare	
Metoda de solutionare :	iteratie nu
Linia limita de cautare - minimum :	0.100
Linia limita de cautare - maximum :	1.000

Rezultate (Etapa de constructie 5 - sprijinire)

Analiza de tensiuni a fost finalizata cu succes.
Setari analiza : definit de utilizator
Incarcare atinsa = 100.00 %

Extreme

Deplasari (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deplasari x [mm]	40.13	-0.43	-5.4	10.30	-0.45	5.7
Deplasari z [mm]	25.17	-3.50	-17.9	0.00	-0.90	23.3

Tensiune (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
tnes. totale $\sigma_{z,\,tot}$ [kPa]	14.50	-1.50	-2.51	10.03	-31.00	604.37
Tens. efective $\sigma_{z,\,eff}$ [kPa]	21.88	-3.50	-2.77	10.03	-31.00	324.37
tnes. totale $\sigma_{x,\,tot}$ [kPa]	25.17	-3.50	-8.29	10.03	-31.00	399.95
Tens. efective $\sigma_{x,\,eff}$ [kPa]	25.17	-3.50	-13.29	10.03	-31.00	119.95
Efort tangential τ_{xz} [kPa]	16.07	-9.00	-21.93	33.96	-10.70	21.51

Tensiuni (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deviator. def. echivalent E_d [%]	50.00	0.00	0.07	13.49	-31.00	2.37
Deviator. deform. plastice echivalente $E_{d,\,pl}$ [%]	0.00	-5.80	0.00	35.50	-25.50	0.34

Grad de mobilizare (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	17.85	-3.50	15.62	50.00	-10.70	100.25

Presiunea apei din pori (extreme)

Variabil	Locaţie		Max
	x [m]	z [m]	
Pres. apei din pori totala u_{tot} [kPa]	2.00	-31.00	280.00

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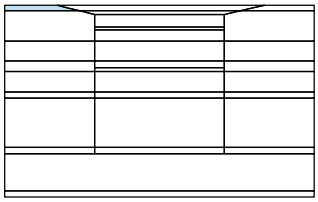
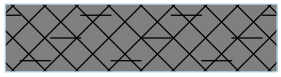
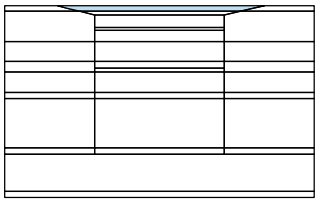
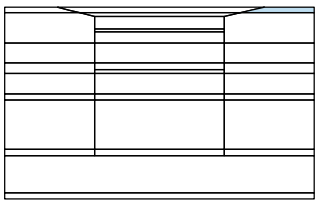
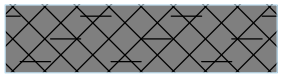
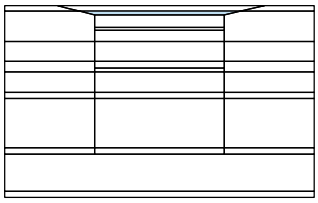
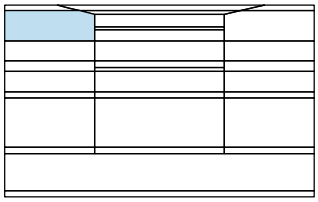
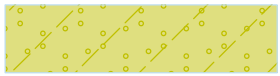
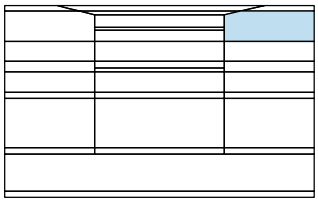
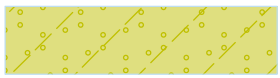
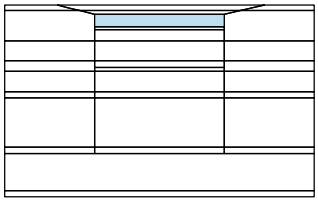
Distributie pe grinzi (extreme)

Nr.	Coordonate		D	N	M	Q
	x [m]	z [m]	[mm]	[kN/m]	[kNm/m]	[kN/m]
1	14.50	-1.50	**-3.3**	**-4.4**	**0.0**	-7.2
	14.50	-3.50	-0.6	-62.0	4.1	**1.3**
	14.50	-7.40	1.9	-100.4	60.1	**-18.4**
	14.50	-10.10	**3.1**	**-116.0**	**94.0**	-6.9
2	14.50	-10.10	3.1	-116.0	94.0	**-6.9**
	14.50	-12.35	3.7	-123.7	**100.9**	-0.1
	14.50	-14.00	3.9	**-128.3**	98.7	2.2
	14.50	-15.00	**3.9**	-124.9	96.0	3.9
	14.50	-21.76	2.7	-108.0	37.0	**14.0**
	14.50	-25.50	**1.5**	**-62.7**	**0.0**	5.2
3	35.50	-1.50	**3.1**	**-3.7**	**0.0**	6.7
	35.50	-3.50	0.5	-62.1	-3.4	**-1.5**
	35.50	-7.40	-2.0	-99.0	-60.2	**18.3**
	35.50	-10.10	**-3.1**	**-114.0**	**-94.3**	7.1
4	35.50	-10.10	-3.1	-114.0	-94.3	**7.1**
	35.50	-12.35	-3.7	-121.4	**-102.0**	0.6
	35.50	-14.00	-3.8	**-125.8**	-100.9	-1.5
	35.50	-15.00	**-3.9**	-122.4	-99.0	-2.9
	35.50	-21.71	-2.6	-104.2	-44.9	**-14.8**
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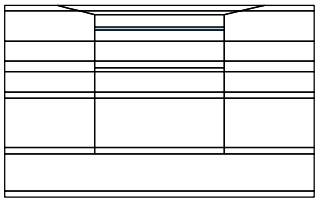
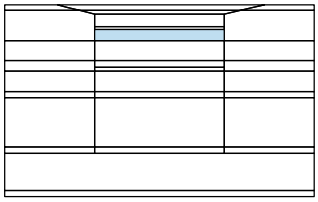
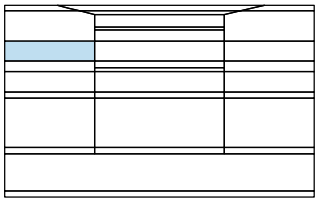
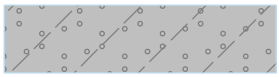
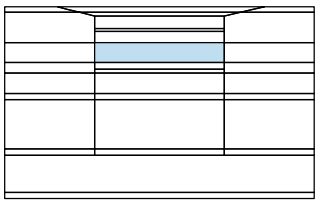
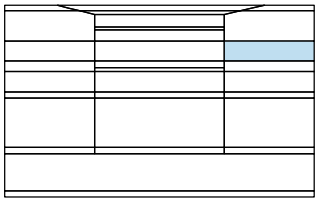
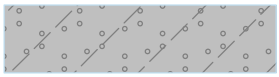
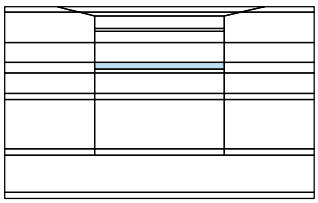
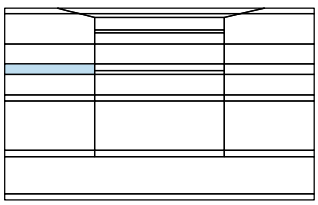
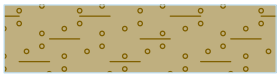
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Introducere date (Etapa de constructie 6 - excavatie pana la cota radier)

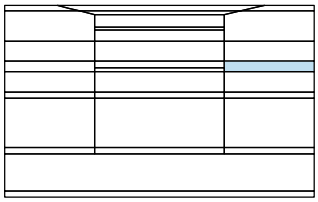
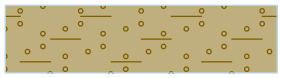
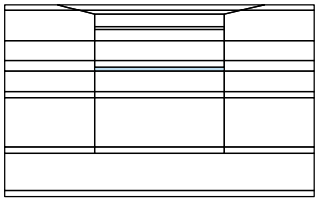
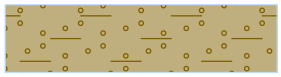
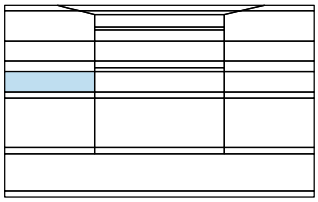
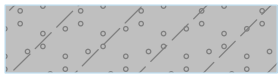
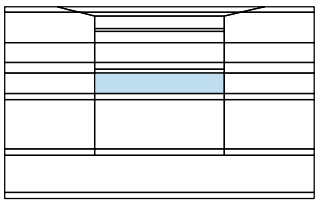
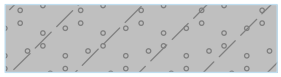
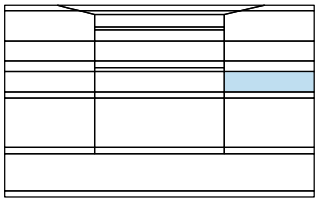
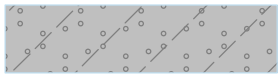
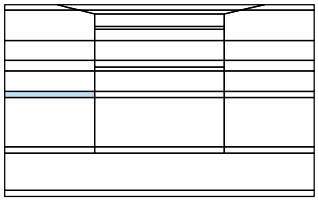
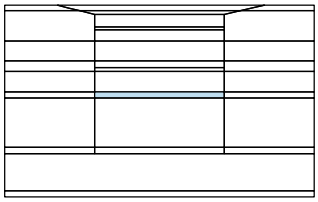
Atribuire si activare

Nr.	Regiune	Activ / inactiv	Pam. atribuit
1		Activ	1. umplutura nisip cu pietris, bolovanis 
2		Inactiv	
3		Activ	1. umplutura nisip cu pietris, bolovanis 
4		Inactiv	
5		Activ	2. Nisip prafos/ argilos, cafeniu galbui, mediu indesat, 
6		Activ	2. Nisip prafos/ argilos, cafeniu galbui, mediu indesat, 
7		Inactiv	

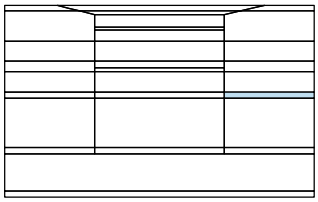
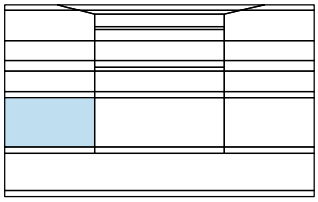
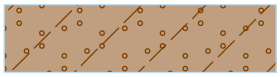
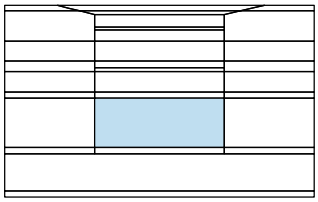
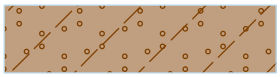
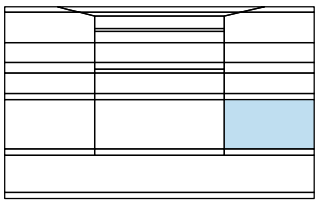
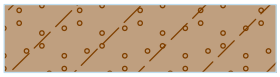
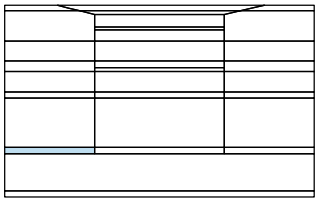
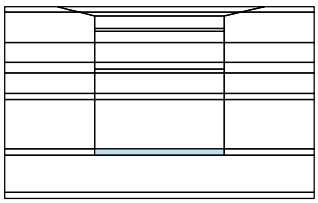
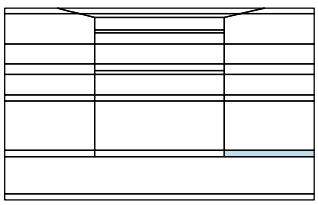
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Nr.	Regiune	Activ / inactiv	Pam. atribuit
8		Inactiv	
9		Inactiv	
10		Activ	3. Nisip prafos cenusiu, mediu indesat, umed 
11		Inactiv	
12		Activ	3. Nisip prafos cenusiu, mediu indesat, umed 
13		Inactiv	
14		Activ	4. Nisip argilos cafeniu galbui, mediu indesat 

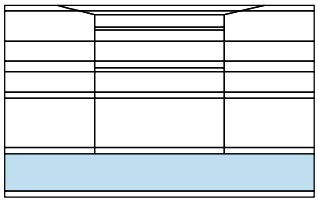
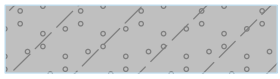
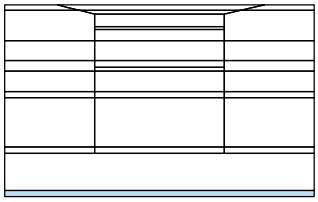
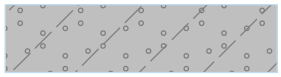
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Nr.	Regiune	Activ / inactiv	Pam. atribuit
15		Activ	4. Nisip argilos cafeniu galbui, mediu indesat 
16		Activ	4. Nisip argilos cafeniu galbui, mediu indesat 
17		Activ	5. Nisip prafos cenusiu, mediu indesat, umed 
18		Activ	5. Nisip prafos cenusiu, mediu indesat, umed 
19		Activ	5. Nisip prafos cenusiu, mediu indesat, umed 
20		Activ	6. argila prafoasa slab nisipoasa cenusie, vartoasa 
21		Activ	6. argila prafoasa slab nisipoasa cenusie, vartoasa 

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Nr.	Regiune	Activ / inactiv	Pam. atribuit
22		Activ	6. argila prafoasa slab nisipoasa cenusie, vartoasa 
23		Activ	7. nisip prafos cenusiu, mediu indesat 
24		Activ	7. nisip prafos cenusiu, mediu indesat 
25		Activ	7. nisip prafos cenusiu, mediu indesat 
26		Activ	8. argila prafoaa slab nisipoasa, cenusie, vartoasa 
27		Activ	8. argila prafoaa slab nisipoasa, cenusie, vartoasa 
28		Activ	8. argila prafoaa slab nisipoasa, cenusie, vartoasa 

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Nr.	Regiune	Activ / inactiv	Pam. atribuit
29		Activ	9. nisip prafos cenusiu, mediu indesat/ indesat 
30		Activ	9. nisip prafos cenusiu, mediu indesat/ indesat 

Grinzi

Nr.	Grindă		Locaţie	Reazem [m]		Include	Secţiune transversală	Material	Contacte	
	nou	modificat		Punct de start.	Punct final	greutate proprie			stanga	dreapta
1	Nu	Nu	Linie libera No. 2	⊢	⊢	Da	fara modificare	fara modificare	(neintrodus)	(neintrodus)
2	Nu	Nu	Linie libera No. 3	⊢	⊢	Da	fara modificare	fara modificare	(neintrodus)	(neintrodus)
3	Nu	Nu	Linie libera No. 5	⊢	⊢	Da	fara modificare	fara modificare	(neintrodus)	(neintrodus)
4	Nu	Nu	Linie libera No. 6	⊢	⊢	Da	fara modificare	fara modificare	(neintrodus)	(neintrodus)

Nr.	Secţiune transversală		Material	
	I_y [m^4/m]	A [m^2/m]	E [MPa]	G [MPa]
1	8.33E-02	1.00E+00	33000.00	13750.00
2	8.33E-02	1.00E+00	33000.00	13750.00
3	8.33E-02	1.00E+00	33000.00	13750.00
4	8.33E-02	1.00E+00	33000.00	13750.00

Reazeme liniare

Nr.	Reazem liniar		Locaţie	Reazem	
	nou	modificat		Directia X	Directia Z
A1	Da		Linia de retea No. 29	fixat	liber
A2	Da		Linia de retea No. 27	fixat	liber
A3	Da		Linia de retea No. 24	fixat	liber
A4	Da		Linia de retea No. 21	fixat	liber
A5	Da		Linia de retea No. 18	fixat	liber
A6	Da		Linia de retea No. 15	fixat	liber
A7	Da		Linia de retea No. 12	fixat	liber
A1 pana la A21 - reazmul liniar generat automat pe marginea modelului					

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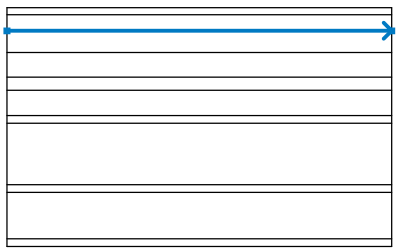
Nr.	Reazem liniar		Locaţie	Reazem	
	nou	modificat		Directia X	Directia Z
A8	Da		Linia de retea No. 9	fixat	liber
A9	Da		Linia de retea No. 6	fixat	liber
A10	Da		Linia de retea No. 3	fixat	liber
A11	Da		Linia de retea No. 31	fixat	liber
A12	Da		Linia de retea No. 26	fixat	liber
A13	Da		Linia de retea No. 23	fixat	liber
A14	Da		Linia de retea No. 20	fixat	liber
A15	Da		Linia de retea No. 17	fixat	liber
A16	Da		Linia de retea No. 14	fixat	liber
A17	Da		Linia de retea No. 11	fixat	liber
A18	Da		Linia de retea No. 8	fixat	liber
A19	Da		Linia de retea No. 5	fixat	liber
A20	Da		Linia de retea No. 1	fixat	liber
A21	Da		Linia de retea No. 30	fixat	fixat
A1 pana la A21 - reazmul liniar generat automat pe marginea modelului					

Sprijiniri

Nr.	Bancheta	Punct 1		Punct 2		Distanta dintre sprijiniri	Aria	Modul de elasticitate
	nou	x [m]	z [m]	x [m]	z [m]	b [m]	A [mm²]	E [MPa]
1	Nu	14.50	-3.50	35.50	-3.50	2.00	23870.0	210000.00

Apa

Tipul apei : NAS

Nr.	Localizarea NAS	Coordonatele punctelor NAS [m]					
		x	z	x	z	x	z
1099981523		0.00	-3.00	50.00	-3.00		

Setarea analizei

Tensiune

Metoda :	Newton - Raphson
Modificarea matricii de rigiditate :	dupa fiecare iteratie
Nr. max. de iteratii pt. un pas de calcul :	100
Pas de calcul initial :	0.1000
Eroare de deplasare :	0.0100
Eroare de forte dezechilibrate :	0.0100
Eroare de energie :	0.0100
Respectarea interfetelor de material :	nu

Plasticitate

Returneaza eroare de cartare :	0.00100

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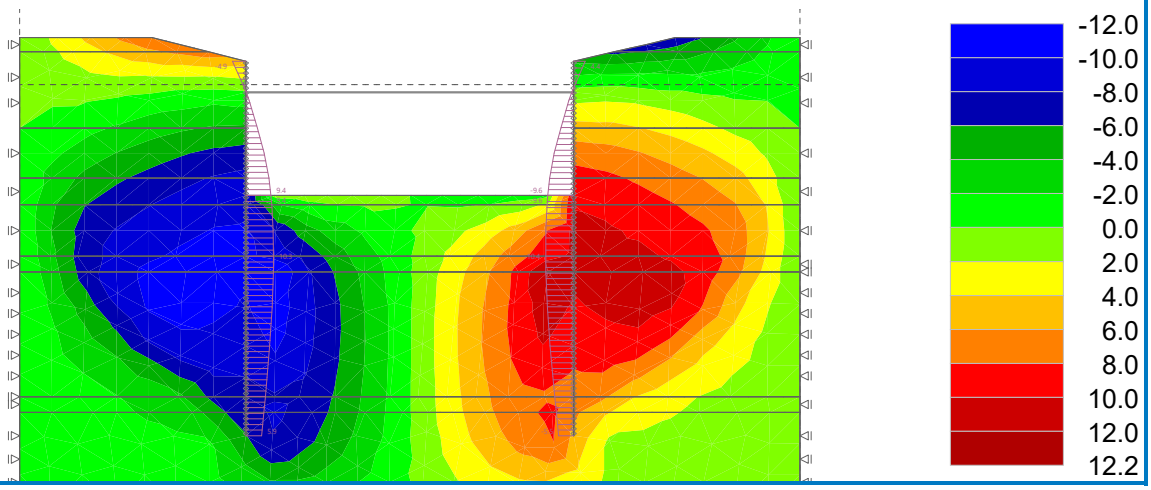
Numar max. de iteratii pentru un pas plast. :	20
Newton - Raphson	
Factor de relaxare a pasului de calcul :	2.00
Nr. maxim de relaxari in pasul de calcul :	10
Numar min. de iteratii pentru un pas de calcul :	1
Linie de cautare	
Metoda de solutionare :	iteratie nu
Linia limita de cautare - minimum :	0.100
Linia limita de cautare - maximum :	1.000

Rezultate (Etapa de constructie 6 - excavatie pana la cota radier)

Analiza de tensiuni a fost finalizata cu succes.
Setari analiza : definit de utilizator
Incarcare atinsa = 100.00 %

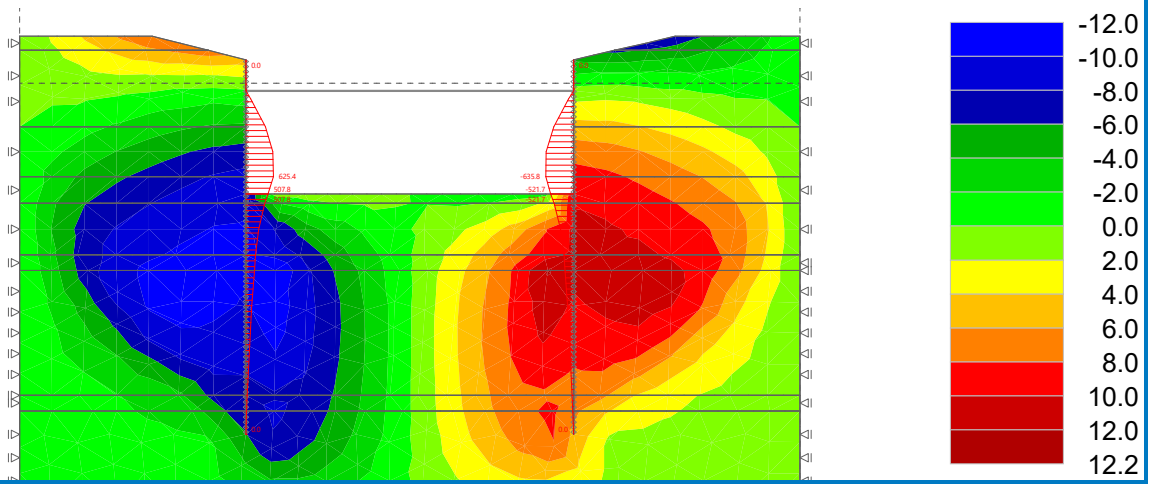
Nume : Analiza	Etapa : 6

Rezultate : general; variabile : Deplasare d_x; interval : <-12.0; 12.2> mm
D [mm]



Nume : Analiza	Etapa : 6

Rezultate : general; variabile : Deplasare d_x; interval : <-12.0; 12.2> mm
M [kNm/m]



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Extreme

Deplasari (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deplasari x [mm]	16.38	-15.00	-12.0	33.85	-15.00	12.2
Deplasari z [mm]	25.10	-10.10	-54.5	50.00	-0.90	28.1

Tensiune (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
tnes. totale $\sigma_{z,\,tot}$ [kPa]	14.50	-1.50	-2.13	0.00	-31.00	591.18
Tens. efective $\sigma_{z,\,eff}$ [kPa]	21.34	-10.10	-2.33	0.00	-31.00	311.18
tnes. totale $\sigma_{x,\,tot}$ [kPa]	35.50	-1.50	-4.07	0.00	-31.00	395.09
Tens. efective $\sigma_{x,\,eff}$ [kPa]	25.10	-10.10	-10.14	0.00	-31.00	115.09
Efort tangential τ_{xz} [kPa]	16.35	-14.00	-42.21	33.59	-14.00	40.06

Tensiuni (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deviator. def. echivalent E_d [%]	40.13	-0.43	0.10	35.50	-10.10	2.44
Deviator. deform. plastice echivalente $E_{d,\,pl}$ [%]	2.07	-5.80	0.00	35.50	-10.10	1.79

Grad de mobilizare (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	22.20	-10.70	9.40	8.50	0.00	102.07

Presiunea apei din pori (extreme)

Variabil	Locaţie		Max
	x [m]	z [m]	
Pres. apei din pori totala u_{tot} [kPa]	2.00	-31.00	280.00

Distributie pe grinzi (extreme)

Nr.	Coordonate		D	N	M	Q
	x [m]	z [m]	[mm]	[kN/m]	[kNm/m]	[kN/m]
1	14.50	-1.50	**-4.9**	**-4.1**	**0.0**	-5.9
	14.50	-4.00	1.3	-83.6	111.1	**-212.5**
	14.50	-9.00	8.6	-228.8	**625.4**	56.0
	14.50	-10.10	**9.4**	**-240.0**	507.8	**142.8**
2	14.50	-10.10	9.4	**-240.0**	**507.8**	**142.8**
	14.50	-14.00	**10.3**	-192.3	217.1	26.4
	14.50	-25.50	**5.9**	**-50.4**	**0.0**	**7.5**

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Nr.	Coordonate		D	N	M	Q
	x [m]	z [m]	[mm]	[kN/m]	[kNm/m]	[kN/m]
3	35.50	-1.50	**4.4**	**-3.5**	**0.0**	5.7
	35.50	-4.00	-1.7	-82.8	-112.0	**213.5**
	35.50	-9.00	-8.9	-226.0	**-635.8**	-53.0
	35.50	-10.10	**-9.6**	**-242.5**	-521.7	**-143.7**
4	35.50	-10.10	-9.6	**-242.5**	**-521.7**	**-143.7**
	35.50	-14.00	**-10.4**	-202.9	-219.3	-28.3
	35.50	-25.50	**-5.5**	**-57.1**	**0.0**	**-9.9**

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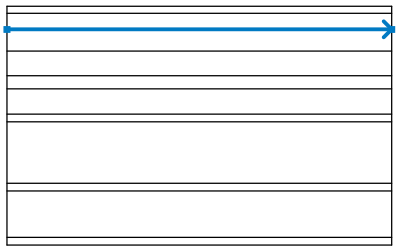
Introducere date (Etapa de constructie 7 - executie radier)

Sprijiniri

Nr.	Bancheta	Punct 1		Punct 2		Distanta dintre sprijiniri	Aria	Modul de elasticitate
	nou	x [m]	z [m]	x [m]	z [m]	b [m]	A [mm^2]	E [MPa]
1	Nu	14.50	-3.50	35.50	-3.50	2.00	23870.0	210000.00

Apa

Tipul apei : NAS

Nr.	Localizarea NAS	Coordonatele punctelor NAS [m]					
		x	z	x	z	x	z
1099981523		0.00	-3.00	50.00	-3.00		

Setarea analizei

Tensiune

Metoda :	Newton - Raphson
Modificarea matricii de rigiditate :	dupa fiecare iteratie
Nr. max. de iteratii pt. un pas de calcul :	100
Pas de calcul initial :	0.1000
Eroare de deplasare :	0.0100
Eroare de forte dezechilibrate :	0.0100
Eroare de energie :	0.0100
Respectarea interfetelor de material :	nu

Plasticitate

Returneaza eroare de cartare :	0.00100
Numar max. de iteratii pentru un pas plast. :	20

Newton - Raphson

Factor de relaxare a pasului de calcul :	2.00
Nr. maxim de relaxari in pasul de calcul :	10
Numar min. de iteratii pentru un pas de calcul :	1

Linie de cautare

Metoda de solutionare :	iteratie nu
Linia limita de cautare - minimum :	0.100
Linia limita de cautare - maximum :	1.000

Rezultate (Etapa de constructie 7 - executie radier)

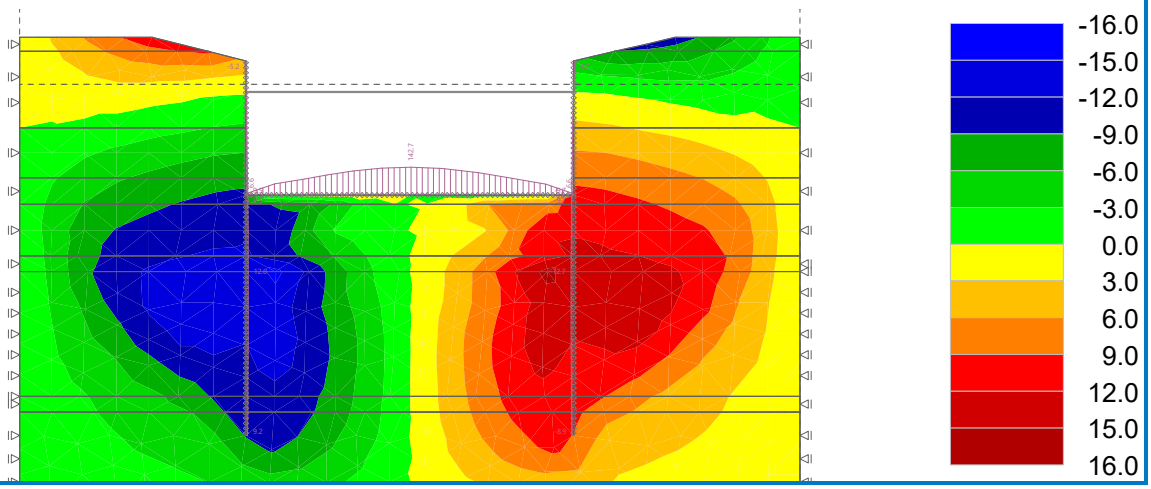
Analiza de tensiuni a fost finalizata cu succes.
Setari analiza : definit de utilizator
Incarcare atinsa = 99.92 %

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Nume : Analiza	Etapa : 7

Rezultate : general; variabile : Deplasare d_x; interval : <-16.0; 16.0> mm

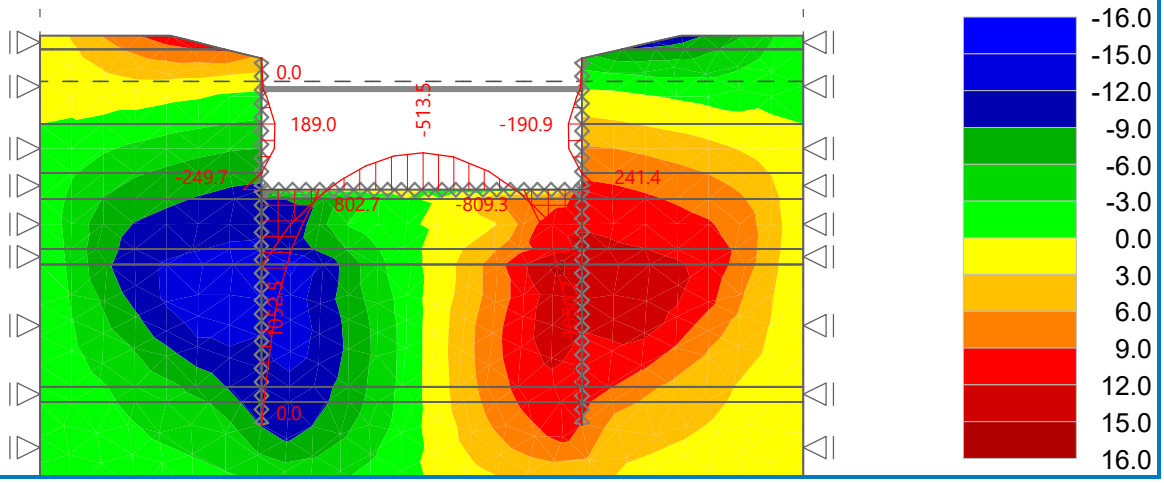
D [mm]



Nume : Analiza	Etapa : 7

Rezultate : general; variabile : Deplasare d_x; interval : <-16.0; 16.0> mm

M [kNm/m]



Extreme

Deplasari (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deplasari x [mm]	16.38	-15.00	-16.0	33.85	-15.00	16.0
Deplasari z [mm]	25.10	-10.10	-142.7	0.00	-0.90	25.1

Tensiune (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
tnes. totale $\sigma_{z, tot}$ [kPa]	14.50	-1.50	-6.31	0.00	-31.00	580.23
Tens. efective $\sigma_{z, eff}$ [kPa]	29.39	-10.10	-35.28	0.00	-31.00	300.23
tnes. totale $\sigma_{x, tot}$ [kPa]	35.50	-1.50	-15.55	0.00	-31.00	391.03
Tens. efective $\sigma_{x, eff}$ [kPa]	19.73	-10.10	-35.79	0.00	-31.00	111.03

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Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Efort tangential τ_{xz} [kPa]	16.35	-14.00	-39.15	33.59	-14.00	38.04

Tensiuni (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Deviator. def. echivalent E_d [%]	40.13	-0.43	0.10	25.10	-10.10	24.51
Deviator. deform. plastice echivalente $E_{d, pl}$ [%]	2.07	-5.80	0.00	25.10	-10.10	24.93

Grad de mobilizare (extreme)

Variabil	Locaţie		Min	Locaţie		Max
	x [m]	z [m]		x [m]	z [m]	
Mobilized shear strength [%]	40.32	-0.90	43.85	35.50	-1.50	110.29

Presiunea apei din pori (extreme)

Variabil	Locaţie		Max
	x [m]	z [m]	
Pres. apei din pori totala u_{tot} [kPa]	2.00	-31.00	280.00

Distributie pe grinzi (extreme)

Nr.	Coordonate		D	N	M	Q
	x [m]	z [m]	[mm]	[kN/m]	[kNm/m]	[kN/m]
1	14.50	-1.50	**-5.2**	**-6.4**	0.0	-11.5
	14.50	-4.00	0.7	-91.5	71.9	**-90.8**
	14.50	-5.80	3.5	-150.3	**189.0**	-33.0
	14.50	-10.10	**9.5**	**-296.5**	**-249.7**	**276.2**
2	14.50	-10.10	9.5	**94.7**	**802.7**	89.2
	14.50	-12.35	11.6	53.8	570.0	**108.1**
	14.50	-15.00	**12.6**	68.0	358.4	68.0
	14.50	-25.50	**9.2**	**32.7**	**0.0**	**20.3**
3	35.50	-1.50	**4.7**	**-5.9**	0.0	11.1
	35.50	-4.00	-1.0	-91.0	-72.2	**91.4**
	35.50	-5.80	-3.8	-150.0	**-190.9**	34.2
	35.50	-10.10	**-9.7**	**-293.2**	**241.4**	**-274.3**
4	35.50	-10.10	-9.7	**87.7**	**-809.3**	-93.0
	35.50	-12.35	-11.8	52.1	-578.5	**-106.6**
	35.50	-15.00	**-12.7**	63.3	-372.3	-68.5
	35.50	-25.50	**-8.9**	**24.7**	**0.0**	**-24.0**
5	14.50	-10.10	6.6	**-167.9**	**1052.5**	**-352.6**
	25.10	-10.10	**142.7**	-186.2	**-513.5**	2.3
	31.62	-10.10	84.6	**-186.6**	77.4	178.5
	35.50	-10.10	**6.6**	-169.9	1050.7	**355.2**

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Monitorizare

Nr.	Monitorizare			Punct / Punct 1		Punct 2		Rezultate	
	nou	Activ	Tip	x [m]	z [m]	x [m]	z [m]	Variabil	Valoare
1	Da	Nu	punct	14.42	-4.45				
2	Da	Nu	punct	35.55	-1.69				

Monitorizare - detaliat

Nr.	Incarcare atinsa [%]	Deplasare d_z [mm]	Deplasare d_x [mm]	tnes. totale $\sigma_{z, tot}$ [kPa]	tnes. totale $\sigma_{x, tot}$ [kPa]

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