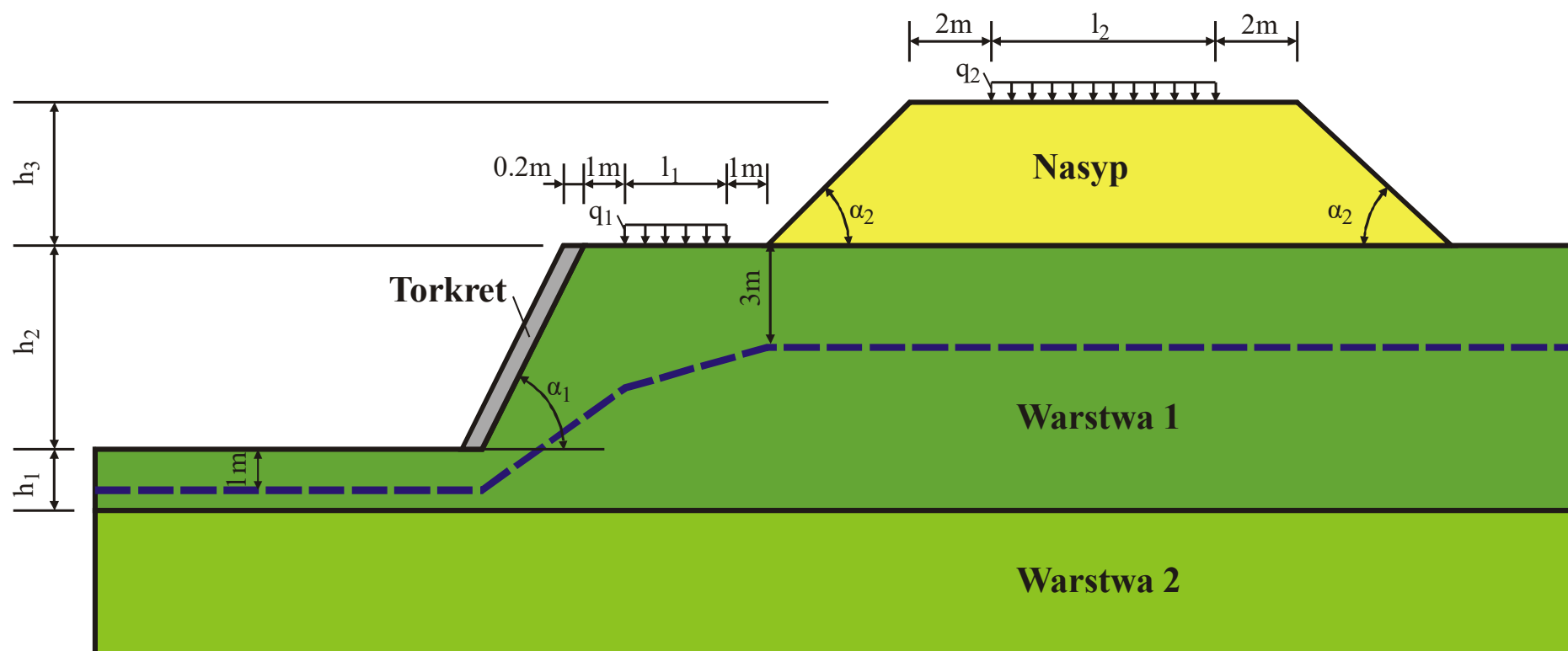


Projekt z przedmiotu

MECHANIKA GRUNTÓW

Budownictwo
II rok

Na projekt powinno składać się opracowanie zawierające wyniki analizy stateczności modelu przedstawionego na rys. 1. Analiza stateczności powinna dotyczyć skarpy górnej, skarpy dolnej oraz całego zbocza w wariancie bez zbrojenia oraz w wariancie uwzględniającym zbrojenie (łącznie 6 wyników). Nasyp (skarpe górną) należy zbroić geosiatkami bądź geotkaninami, natomiast skarpe dolną gwoździami bądź kotwami. Wymagane minimalne wartości wskaźników stateczności wynoszą 1.5. Obliczenia należy wykonać metodą Morgenstern-Price lub Bishop. Sposób określania powierzchni poślizgu: do wyboru Entry & Exit lub Grid & Radius. W opracowaniu należy opisać zastosowane zbrojenie. Należy również sporządzić rysunek techniczny przedstawiający geometrię modelu wraz z wymiarami oraz opisem zastosowanego zbrojenia. Do wyników należy załączyć pliki źródłowe.



Rys. 1. Geometria modelu.

Warstwa 2			Torkret		
γ_{sat} [kN/m ³]	ϕ [°]	c [kPa]	γ [kN/m ³]	ϕ [°]	c [kPa]
22	20	35	25	35	600

Nr tematu	h ₁ [m]	h ₂ [m]	h ₃ [m]	l ₁ [m]	l ₂ [m]	α_1 [°]	α_2 [°]	q ₁ [kPa]	q ₂ [kPa]	Nasyp			Warstwa 1			
										γ_d [kN/m ³]	φ [°]	c [kPa]	γ_d [kN/m ³]	φ [°]	c [kPa]	n [%]
416188	1.7	6.8	6.6	6.6	28.0	90	60	20	14	20	29	8	19.6	16	17	26
417804	1.6	6.0	7.4	6.6	24.0	80	60	23	16	20	33	8	18.3	16	15	31
419374	2.4	6.8	7.8	7.4	24.0	90	50	23	14	20	31	6	19.0	18	17	28
419810	2.0	7.6	7.0	5.8	20.0	85	50	26	13	20	27	6	20.2	15	19	24
420533	1.7	8.2	6.4	7.0	23.0	85	45	20	12	20	22	5	21.2	17	21	20
420643	1.7	5.0	6.0	6.2	23.0	90	55	20	18	20	24	7	18.0	15	13	32
420739	2.5	6.2	6.0	6.2	29.0	90	55	23	16	20	24	7	19.3	15	16	27
421036	2.5	8.0	6.6	6.6	26.0	90	60	29	12	20	29	8	20.9	16	20	21
421041	1.9	5.4	8.0	5.4	21.0	80	45	29	17	20	30	5	17.4	14	14	34
421411	1.5	7.4	6.0	6.2	21.0	90	55	29	13	20	24	7	20.6	15	19	22
421428	2.1	7.2	7.4	6.6	28.0	80	60	20	14	20	33	8	19.6	16	18	26
421441	2.3	6.2	7.2	5.4	21.0	90	45	29	16	20	26	5	18.7	14	16	30
421442	2.4	6.4	7.0	5.8	22.0	85	50	32	15	20	27	6	19.0	15	16	28
421447	1.8	7.4	6.0	7.8	27.0	90	55	32	13	20	24	7	20.6	19	19	22
422137	1.5	5.0	7.2	5.4	27.0	90	45	32	18	20	26	5	17.4	14	13	34
422614	1.9	6.8	7.8	7.4	24.0	90	50	23	14	20	31	6	19.0	18	17	28
422654	1.5	7.6	7.0	7.4	24.0	85	50	23	13	20	27	6	20.2	18	19	24
423646	1.7	8.0	7.8	7.4	26.0	90	50	29	12	20	31	6	20.2	18	20	24
423764	2.5	6.4	5.8	6.6	24.0	85	60	23	15	20	25	8	19.6	16	16	26
423817	2.3	6.2	7.2	5.4	27.0	90	45	32	16	20	26	5	18.7	14	16	30
424453	2.1	7.4	7.2	7.0	23.0	90	45	20	13	20	26	5	19.9	17	19	25
424727	2.0	8.2	7.6	7.8	27.0	85	55	32	12	20	32	7	20.6	19	21	22
424782	2.0	8.4	6.2	7.4	22.0	80	50	32	11	20	23	6	21.5	18	21	19
424794	2.1	7.2	6.2	5.8	24.0	80	50	23	14	20	23	6	20.2	15	18	24
424823	1.7	5.8	7.6	7.8	23.0	85	55	20	16	20	32	7	18.0	19	15	32
424843	1.5	6.2	6.0	6.2	23.0	90	55	20	16	20	24	7	19.3	15	16	27
424860	2.1	6.0	7.4	6.6	20.0	80	60	26	16	20	33	8	18.3	16	15	31
424924	1.9	8.0	6.6	6.6	24.0	90	60	23	12	20	29	8	20.9	16	20	21
424931	1.5	5.8	7.6	6.2	21.0	85	55	29	16	20	32	7	18.0	15	15	32
424976	1.6	7.6	5.8	5.0	26.0	85	60	29	13	20	25	8	20.9	13	19	21

Nr tematu	h ₁ [m]	h ₂ [m]	h ₃ [m]	l ₁ [m]	l ₂ [m]	α_1 [°]	α_2 [°]	q ₁ [kPa]	q ₂ [kPa]	Nasyp			Warstwa 1			
										γ_d [kN/m ³]	φ [°]	c [kPa]	γ_d [kN/m ³]	φ [°]	c [kPa]	n [%]
424988	1.7	6.4	5.8	6.6	28.0	85	60	20	15	20	25	8	19.6	16	16	26
424996	2.5	8.0	6.6	6.6	26.0	90	60	29	12	20	29	8	20.9	16	20	21
425069	2.1	8.2	6.4	7.0	29.0	85	45	23	12	20	22	5	21.2	17	21	20
425073	2.5	5.4	8.0	5.4	23.0	80	45	20	17	20	30	5	17.4	14	14	34
425087	1.7	8.2	7.6	7.8	27.0	85	55	32	12	20	32	7	20.6	19	21	22
425123	2.0	8.2	7.6	6.2	23.0	85	55	20	12	20	32	7	20.6	15	21	22
425124	2.1	8.4	7.4	6.6	24.0	80	60	23	11	20	33	8	20.9	16	21	21
425127	2.4	5.4	6.8	7.8	27.0	80	55	32	17	20	28	7	18.0	19	14	32
425291	2.3	5.8	7.6	6.2	21.0	85	55	29	16	20	32	7	18.0	15	15	32
425294	1.5	6.4	7.0	7.4	24.0	85	50	23	15	20	27	6	19.0	18	16	28
425301	2.2	7.8	8.0	7.0	21.0	80	45	29	12	20	30	5	19.9	17	20	25
425369	2.4	7.0	6.4	5.4	29.0	85	45	23	14	20	22	5	19.9	14	18	25
425433	2.2	5.4	8.0	5.4	23.0	80	45	20	17	20	30	5	17.4	14	14	34
425477	2.2	7.0	6.4	7.0	27.0	85	45	32	14	20	22	5	19.9	17	18	25
425519	2.0	8.2	7.6	7.8	29.0	85	55	23	12	20	32	7	20.6	19	21	22
425582	1.7	6.4	7.0	7.4	22.0	85	50	32	15	20	27	6	19.0	18	16	28
425638	1.8	6.8	7.8	7.4	28.0	90	50	20	14	20	31	6	19.0	18	17	28
425688	2.4	6.0	7.4	5.0	28.0	80	60	20	16	20	33	8	18.3	13	15	31
425705	1.9	5.8	6.4	5.4	25.0	85	45	26	16	20	22	5	18.7	14	15	30
425726	1.8	6.4	7.0	7.4	26.0	85	50	29	15	20	27	6	19.0	18	16	28
425768	1.6	7.6	5.8	5.0	28.0	85	60	20	13	20	25	8	20.9	13	19	21
425804	1.9	7.6	5.8	6.6	24.0	85	60	23	13	20	25	8	20.9	16	19	21
425882	2.0	5.2	7.0	5.8	22.0	85	50	32	18	20	27	6	17.7	15	13	33
425938	2.1	5.6	7.8	5.8	28.0	90	50	20	17	20	31	6	17.7	15	14	33
425941	2.4	6.2	7.2	7.0	21.0	90	45	29	16	20	26	5	18.7	17	16	30
425981	2.0	7.0	6.4	7.0	21.0	85	45	29	14	20	22	5	19.9	17	18	25
426007	2.4	5.0	6.0	7.8	27.0	90	55	32	18	20	24	7	18.0	19	13	32
426076	1.6	8.0	6.6	6.6	26.0	90	60	29	12	20	29	8	20.9	16	20	21
426135	2.0	5.4	6.8	7.8	25.0	80	55	26	17	20	28	7	18.0	19	14	32
426195	2.5	6.6	6.8	6.2	25.0	80	55	26	15	20	28	7	19.3	15	17	27

Nr tematu	h ₁ [m]	h ₂ [m]	h ₃ [m]	l ₁ [m]	l ₂ [m]	α_1 [°]	α_2 [°]	q ₁ [kPa]	q ₂ [kPa]	Nasyp			Warstwa 1			
										γ_d [kN/m ³]	φ [°]	c [kPa]	γ_d [kN/m ³]	φ [°]	c [kPa]	n [%]
426197	1.6	7.0	6.4	7.0	27.0	85	45	32	14	20	22	5	19.9	17	18	25
426199	1.8	7.4	6.0	7.8	29.0	90	55	23	13	20	24	7	20.6	19	19	22
426205	2.4	5.0	7.2	7.0	25.0	90	45	26	18	20	26	5	17.4	17	13	34
426211	1.9	6.2	6.0	6.2	21.0	90	55	29	16	20	24	7	19.3	15	16	27
426229	1.5	6.2	7.2	7.0	29.0	90	45	23	16	20	26	5	18.7	17	16	30
426240	1.5	8.4	7.4	5.0	20.0	80	60	26	11	20	33	8	20.9	13	21	21
426273	1.5	7.8	8.0	5.4	23.0	80	45	20	12	20	30	5	19.9	14	20	25
426279	2.1	5.4	6.8	7.8	29.0	80	55	23	17	20	28	7	18.0	19	14	32
426284	1.5	6.4	5.8	6.6	24.0	85	60	23	15	20	25	8	19.6	16	16	26
426344	2.0	7.6	5.8	5.0	24.0	85	60	23	13	20	25	8	20.9	13	19	21
426364	1.8	8.0	6.6	6.6	24.0	90	60	23	12	20	29	8	20.9	16	20	21
426371	2.5	5.8	7.6	6.2	21.0	85	55	29	16	20	32	7	18.0	15	15	32
426424	2.3	5.6	6.6	5.0	24.0	90	60	23	17	20	29	8	18.3	13	14	31
426478	2.2	5.6	7.8	7.4	28.0	90	50	20	17	20	31	6	17.7	18	14	33
426495	1.7	5.4	6.8	7.8	25.0	80	55	26	17	20	28	7	18.0	19	14	32
426501	2.3	6.6	8.0	7.0	21.0	80	45	29	15	20	30	5	18.7	17	17	30
426505	1.6	7.4	7.2	5.4	25.0	90	45	26	13	20	26	5	19.9	14	19	25
426512	2.3	5.2	5.8	5.0	22.0	85	60	32	18	20	25	8	18.3	13	13	31
426563	1.9	8.2	7.6	6.2	23.0	85	55	20	12	20	32	7	20.6	15	21	22
426579	2.4	7.8	6.8	6.2	29.0	80	55	23	12	20	28	7	20.6	15	20	22
426587	2.1	5.8	7.6	6.2	27.0	85	55	32	16	20	32	7	18.0	15	15	32
426661	1.8	6.2	7.2	7.0	21.0	90	45	29	16	20	26	5	18.7	17	16	30
426664	2.1	6.8	6.6	5.0	24.0	90	60	23	14	20	29	8	19.6	13	17	26
426670	1.6	8.0	7.8	7.4	20.0	90	50	26	12	20	31	6	20.2	18	20	24
426679	2.5	6.2	6.0	7.8	29.0	90	55	23	16	20	24	7	19.3	19	16	27
426696	2.0	6.0	7.4	5.0	26.0	80	60	29	16	20	33	8	18.3	13	15	31
426697	2.1	6.2	7.2	5.4	27.0	90	45	32	16	20	26	5	18.7	14	16	30
426740	2.0	7.6	5.8	6.6	20.0	85	60	26	13	20	25	8	20.9	16	19	21
426757	1.5	7.4	7.2	7.0	27.0	90	45	32	13	20	26	5	19.9	17	19	25
426831	2.3	7.8	6.8	7.8	21.0	80	55	29	12	20	28	7	20.6	19	20	22

Nr tematu	h ₁ [m]	h ₂ [m]	h ₃ [m]	l ₁ [m]	l ₂ [m]	α_1 [°]	α_2 [°]	q ₁ [kPa]	q ₂ [kPa]	Nasyp			Warstwa 1			
										γ_d [kN/m ³]	φ [°]	c [kPa]	γ_d [kN/m ³]	φ [°]	c [kPa]	n [%]
426872	2.0	5.2	5.8	5.0	22.0	85	60	32	18	20	25	8	18.3	13	13	31
426886	2.3	8.0	7.8	7.4	26.0	90	50	29	12	20	31	6	20.2	18	20	24
426903	1.8	7.8	6.8	7.8	23.0	80	55	20	12	20	28	7	20.6	19	20	22
426932	2.5	6.4	5.8	6.6	22.0	85	60	32	15	20	25	8	19.6	16	16	26
426958	1.8	8.0	7.8	7.4	28.0	90	50	20	12	20	31	6	20.2	18	20	24
427093	2.1	6.2	7.2	7.0	23.0	90	45	20	16	20	26	5	18.7	17	16	30
427145	1.8	5.8	6.4	5.4	25.0	85	45	26	16	20	22	5	18.7	14	15	30
427201	1.9	6.2	7.2	5.4	21.0	90	45	29	16	20	26	5	18.7	14	16	30
427292	2.2	6.4	5.8	6.6	22.0	85	60	32	15	20	25	8	19.6	16	16	26
427314	2.2	7.2	6.2	5.8	24.0	80	50	23	14	20	23	6	20.2	15	18	24
427350	2.5	7.2	6.2	7.4	20.0	80	50	26	14	20	23	6	20.2	18	18	24
427411	2.0	5.0	6.0	6.2	21.0	90	55	29	18	20	24	7	18.0	15	13	32
427489	2.1	6.2	7.2	5.4	29.0	90	45	23	16	20	26	5	18.7	14	16	30
427550	1.6	7.6	7.0	7.4	20.0	85	50	26	13	20	27	6	20.2	18	19	24
427562	1.7	6.4	7.0	5.8	22.0	85	50	32	15	20	27	6	19.0	15	16	28
427563	1.8	6.6	6.8	6.2	23.0	80	55	20	15	20	28	7	19.3	15	17	27
427649	1.6	5.8	6.4	5.4	29.0	85	45	23	16	20	22	5	18.7	14	15	30
427667	2.3	5.8	7.6	6.2	27.0	85	55	32	16	20	32	7	18.0	15	15	32
427844	2.4	5.2	5.8	6.6	24.0	85	60	23	18	20	25	8	18.3	16	13	31
427876	2.3	8.0	6.6	6.6	26.0	90	60	29	12	20	29	8	20.9	16	20	21
427890	1.5	7.2	6.2	5.8	20.0	80	50	26	14	20	23	6	20.2	15	18	24
427990	1.6	5.6	7.8	7.4	20.0	90	50	26	17	20	31	6	17.7	18	14	33
427992	1.8	6.0	7.4	5.0	22.0	80	60	32	16	20	33	8	18.3	13	15	31
427998	2.4	7.2	6.2	7.4	28.0	80	50	20	14	20	23	6	20.2	18	18	24
428040	2.2	8.4	7.4	5.0	20.0	80	60	26	11	20	33	8	20.9	13	21	21
428042	2.4	5.2	7.0	5.8	22.0	85	50	32	18	20	27	6	17.7	15	13	33
428049	2.0	6.6	8.0	5.4	29.0	80	45	23	15	20	30	5	18.7	14	17	30
428063	2.3	5.8	7.6	7.8	23.0	85	55	20	16	20	32	7	18.0	19	15	32
428076	2.5	8.4	7.4	6.6	26.0	80	60	29	11	20	33	8	20.9	16	21	21
428107	2.3	7.4	6.0	6.2	27.0	90	55	32	13	20	24	7	20.6	15	19	22

Nr tematu	h ₁ [m]	h ₂ [m]	h ₃ [m]	l ₁ [m]	l ₂ [m]	α_1 [°]	α_2 [°]	q ₁ [kPa]	q ₂ [kPa]	Nasyp			Warstwa 1			
										γ_d [kN/m ³]	φ [°]	c [kPa]	γ_d [kN/m ³]	φ [°]	c [kPa]	n [%]
428109	2.5	7.8	8.0	7.0	29.0	80	45	23	12	20	30	5	19.9	17	20	25
428145	1.7	7.8	8.0	5.4	25.0	80	45	26	12	20	30	5	19.9	14	20	25
428196	2.4	7.2	7.4	6.6	26.0	80	60	29	14	20	33	8	19.6	16	18	26
428212	1.8	6.8	6.6	6.6	22.0	90	60	32	14	20	29	8	19.6	16	17	26
428225	2.0	5.8	6.4	5.4	25.0	85	45	26	16	20	22	5	18.7	14	15	30
428262	2.4	6.0	6.2	7.4	22.0	80	50	32	16	20	23	6	19.0	18	15	28
428344	1.8	8.0	6.6	5.0	24.0	90	60	23	12	20	29	8	20.9	13	20	21
428352	1.5	6.0	7.4	5.0	22.0	80	60	32	16	20	33	8	18.3	13	15	31
428356	1.9	6.8	6.6	6.6	26.0	90	60	29	14	20	29	8	19.6	16	17	26
428371	2.3	6.2	6.0	6.2	21.0	90	55	29	16	20	24	7	19.3	15	16	27
428384	2.5	5.2	5.8	5.0	24.0	85	60	23	18	20	25	8	18.3	13	13	31
428468	2.1	7.6	5.8	6.6	28.0	85	60	20	13	20	25	8	20.9	16	19	21
428501	2.1	7.0	6.4	7.0	21.0	85	45	29	14	20	22	5	19.9	17	18	25
428587	1.9	6.2	6.0	6.2	27.0	90	55	32	16	20	24	7	19.3	15	16	27
428625	2.4	6.6	8.0	5.4	25.0	80	45	26	15	20	30	5	18.7	14	17	30
428695	1.7	6.2	6.0	7.8	25.0	90	55	26	16	20	24	7	19.3	19	16	27
428709	2.0	5.4	8.0	7.0	29.0	80	45	23	17	20	30	5	17.4	17	14	34
428828	1.8	7.6	5.8	6.6	28.0	85	60	20	13	20	25	8	20.9	16	19	21
428896	2.0	6.8	6.6	5.0	26.0	90	60	29	14	20	29	8	19.6	13	17	26
428950	1.9	6.8	7.8	7.4	20.0	90	50	26	14	20	31	6	19.0	18	17	28
429023	1.5	7.0	7.6	7.8	23.0	85	55	20	14	20	32	7	19.3	19	18	27
429132	2.5	7.2	7.4	6.6	22.0	80	60	32	14	20	33	8	19.6	16	18	26
429147	1.8	6.6	6.8	6.2	27.0	80	55	32	15	20	28	7	19.3	15	17	27
429174	2.3	8.4	6.2	7.4	24.0	80	50	23	11	20	23	6	21.5	18	21	19
429296	2.4	7.6	5.8	5.0	26.0	85	60	29	13	20	25	8	20.9	13	19	21
429501	2.0	5.4	8.0	7.0	21.0	80	45	29	17	20	30	5	17.4	17	14	34
429681	2.4	5.4	8.0	5.4	21.0	80	45	29	17	20	30	5	17.4	14	14	34
1	1.5	5.0	7.2	5.4	21.0	90	45	29	18	20	26	5	17.4	14	13	34
2	1.6	5.2	7.0	5.8	22.0	85	50	32	18	20	27	6	17.7	15	13	33
3	1.7	5.4	6.8	6.2	23.0	80	55	20	17	20	28	7	18.0	15	14	32

Nr tematu	h ₁ [m]	h ₂ [m]	h ₃ [m]	l ₁ [m]	l ₂ [m]	α ₁ [°]	α ₂ [°]	q ₁ [kPa]	q ₂ [kPa]	Nasyp			Warstwa 1			
										γ _d [kN/m ³]	φ [°]	c [kPa]	γ _d [kN/m ³]	φ [°]	c [kPa]	n [%]
4	1.8	5.6	6.6	6.6	24.0	90	60	23	17	20	29	8	18.3	16	14	31
5	1.9	5.8	6.4	7.0	25.0	85	45	26	16	20	22	5	18.7	17	15	30