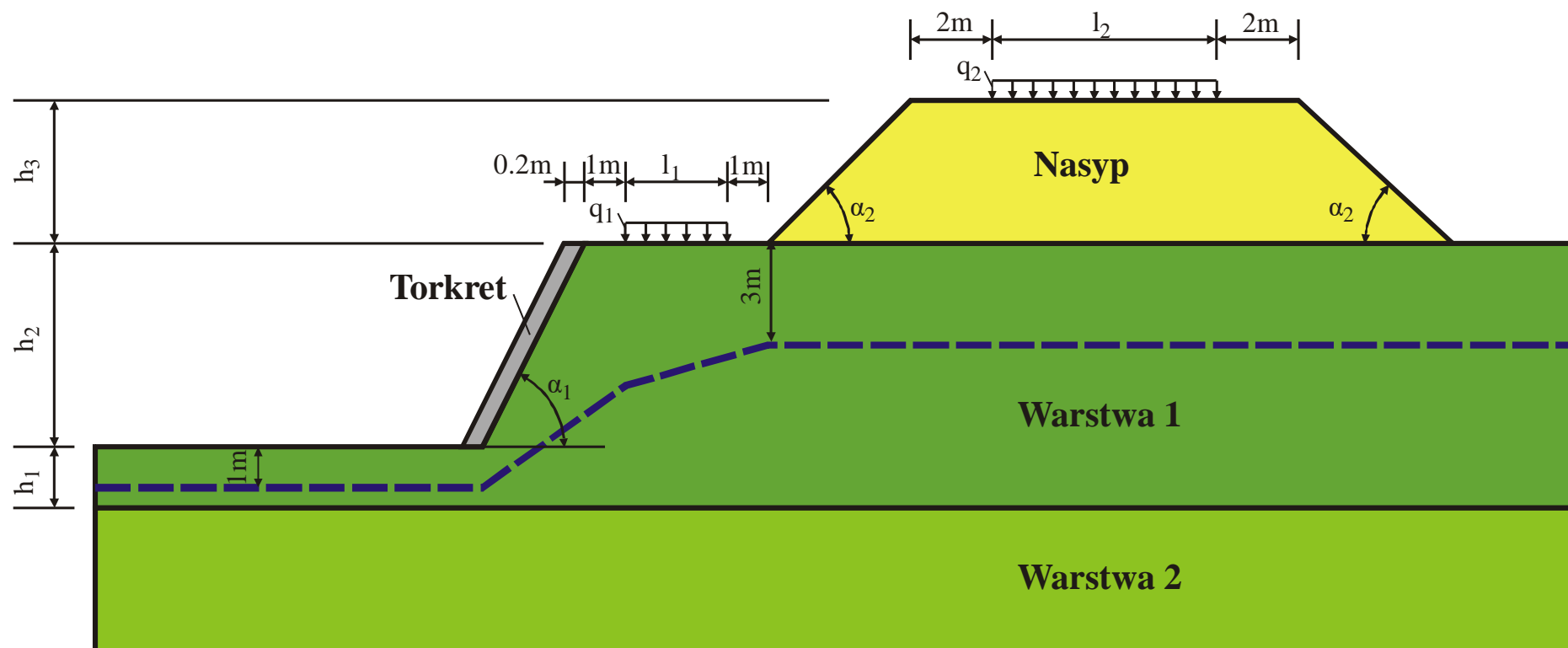


Projekt z przedmiotu

# 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 wariantcie bez zbrojenia oraz w wariantcie 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		
$\gamma_{\text{sat}}$ [kN/m <sup>3</sup> ]	$\varphi$ [°]	c [kPa]	$\gamma$ [kN/m <sup>3</sup> ]	$\varphi$ [°]	c [kPa]
22	20	35	25	35	600

Nr tematu	h <sub>1</sub> [m]	h <sub>2</sub> [m]	h <sub>3</sub> [m]	l <sub>1</sub> [m]	l <sub>2</sub> [m]	α <sub>1</sub> [°]	α <sub>2</sub> [°]	q <sub>1</sub> [kPa]	q <sub>2</sub> [kPa]	Nasyp			Warstwa 1			
										γ <sub>d</sub> [kN/m <sup>3</sup> ]	φ [°]	c [kPa]	γ <sub>d</sub> [kN/m <sup>3</sup> ]	φ [°]	c [kPa]	n [%]
407126	1.7	6.4	7.0	7.4	20.0	85	50	26	15	20	27	6	19.0	18	16	28
409849	2.5	8.0	7.8	5.8	28.0	90	50	20	12	20	31	6	20.2	15	20	24
410072	2.3	6.8	6.6	5.0	28.0	90	60	20	14	20	29	8	19.6	13	17	26
411305	1.6	6.8	6.6	6.6	28.0	90	60	20	14	20	29	8	19.6	16	17	26
411805	2.4	7.0	7.6	7.8	27.0	85	55	32	14	20	32	7	19.3	19	18	27
411977	2.0	5.4	8.0	5.4	27.0	80	45	32	17	20	30	5	17.4	14	14	34
412072	2.0	5.2	5.8	5.0	20.0	85	60	26	18	20	25	8	18.3	13	13	31
412677	1.6	8.0	7.8	7.4	20.0	90	50	26	12	20	31	6	20.2	18	20	24
413149	2.4	8.0	6.6	6.6	28.0	90	60	20	12	20	29	8	20.9	16	20	21
413350	1.5	7.0	6.4	5.4	23.0	85	45	20	14	20	22	5	19.9	14	18	25
413485	1.5	8.4	6.2	5.8	20.0	80	50	26	11	20	23	6	21.5	15	21	19
413776	2.5	5.4	6.8	7.8	21.0	80	55	29	17	20	28	7	18.0	19	14	32
414300	1.9	5.6	6.6	6.6	22.0	90	60	32	17	20	29	8	18.3	16	14	31
414326	1.5	6.4	5.8	6.6	22.0	85	60	32	15	20	25	8	19.6	16	16	26
414448	1.5	8.0	6.6	5.0	26.0	90	60	29	12	20	29	8	20.9	13	20	21
414474	1.7	8.4	6.2	5.8	28.0	80	50	20	11	20	23	6	21.5	15	21	19
414500	2.1	6.4	5.8	6.6	24.0	85	60	23	15	20	25	8	19.6	16	16	26
414512	1.5	6.0	7.4	6.6	20.0	80	60	26	16	20	33	8	18.3	16	15	31
414541	2.2	6.2	7.2	7.0	23.0	90	45	20	16	20	26	5	18.7	17	16	30
414713	2.1	6.8	7.8	5.8	24.0	90	50	23	14	20	31	6	19.0	15	17	28
414746	1.6	6.6	6.8	6.2	21.0	80	55	29	15	20	28	7	19.3	15	17	27
414765	2.1	6.2	6.0	6.2	27.0	90	55	32	16	20	24	7	19.3	15	16	27
414832	1.6	6.0	7.4	6.6	24.0	80	60	23	16	20	33	8	18.3	16	15	31
414855	2.1	7.0	6.4	5.4	29.0	85	45	23	14	20	22	5	19.9	14	18	25
414867	2.5	6.6	6.8	7.8	29.0	80	55	23	15	20	28	7	19.3	19	17	27
414870	2.3	8.4	7.4	5.0	28.0	80	60	20	11	20	33	8	20.9	13	21	21
414884	1.6	5.6	6.6	6.6	22.0	90	60	32	17	20	29	8	18.3	16	14	31
414892	2.3	8.0	6.6	5.0	26.0	90	60	29	12	20	29	8	20.9	13	20	21
414904	1.6	8.2	6.4	7.0	23.0	85	45	20	12	20	22	5	21.2	17	21	20
414911	2.3	6.8	7.8	5.8	22.0	90	50	32	14	20	31	6	19.0	15	17	28

Nr tematu	h <sub>1</sub> [m]	h <sub>2</sub> [m]	h <sub>3</sub> [m]	l <sub>1</sub> [m]	l <sub>2</sub> [m]	α <sub>1</sub> [°]	α <sub>2</sub> [°]	q <sub>1</sub> [kPa]	q <sub>2</sub> [kPa]	Nasyp			Warstwa 1			
										γ <sub>d</sub> [kN/m <sup>3</sup> ]	φ [°]	c [kPa]	γ <sub>d</sub> [kN/m <sup>3</sup> ]	φ [°]	c [kPa]	n [%]
414929	1.7	7.8	6.8	7.8	27.0	80	55	32	12	20	28	7	20.6	19	20	22
414946	1.9	8.2	6.4	5.4	29.0	85	45	23	12	20	22	5	21.2	14	21	20
415007	2.0	8.4	6.2	5.8	20.0	80	50	26	11	20	23	6	21.5	15	21	19
415186	1.7	7.2	7.4	5.0	20.0	80	60	26	14	20	33	8	19.6	13	18	26
415195	1.8	6.0	7.4	6.6	22.0	80	60	32	16	20	33	8	18.3	16	15	31
415199	2.5	6.8	6.6	6.6	22.0	90	60	32	14	20	29	8	19.6	16	17	26
415201	2.0	6.6	8.0	7.0	29.0	80	45	23	15	20	30	5	18.7	17	17	30
415243	1.8	5.6	6.6	6.6	20.0	90	60	26	17	20	29	8	18.3	16	14	31
415267	1.7	7.6	7.0	7.4	20.0	85	50	26	13	20	27	6	20.2	18	19	24
415330	1.8	6.4	7.0	5.8	22.0	85	50	32	15	20	27	6	19.0	15	16	28
415345	2.3	7.4	6.0	7.8	27.0	90	55	32	13	20	24	7	20.6	19	19	22
415356	2.3	6.8	6.6	5.0	20.0	90	60	26	14	20	29	8	19.6	13	17	26
415367	2.2	6.8	7.8	7.4	24.0	90	50	23	14	20	31	6	19.0	18	17	28
415387	1.9	7.4	6.0	7.8	23.0	90	55	20	13	20	24	7	20.6	19	19	22
415480	1.8	5.2	7.0	5.8	26.0	85	50	29	18	20	27	6	17.7	15	13	33
415482	2.2	5.6	7.8	7.4	28.0	90	50	20	17	20	31	6	17.7	18	14	33
415506	1.7	6.2	7.2	7.0	27.0	90	45	32	16	20	26	5	18.7	17	16	30
415535	1.8	6.4	7.0	7.4	28.0	85	50	20	15	20	27	6	19.0	18	16	28
415550	2.4	7.8	6.8	6.2	29.0	80	55	23	12	20	28	7	20.6	15	20	22
415573	1.9	7.0	6.4	7.0	29.0	85	45	23	14	20	22	5	19.9	17	18	25
415620	1.8	5.4	6.8	7.8	29.0	80	55	23	17	20	28	7	18.0	19	14	32
415645	2.2	7.8	6.8	7.8	27.0	80	55	32	12	20	28	7	20.6	19	20	22
415687	2.0	8.4	6.2	5.8	22.0	80	50	32	11	20	23	6	21.5	15	21	19
415688	2.5	5.2	5.8	5.0	20.0	85	60	26	18	20	25	8	18.3	13	13	31
415697	2.2	7.8	8.0	7.0	25.0	80	45	26	12	20	30	5	19.9	17	20	25
415712	1.8	5.0	7.2	7.0	25.0	90	45	26	18	20	26	5	17.4	17	13	34
415715	1.6	7.6	5.8	6.6	26.0	85	60	29	13	20	25	8	20.9	16	19	21
415733	1.7	6.4	5.8	5.0	28.0	85	60	20	15	20	25	8	19.6	13	16	26
415736	2.1	7.2	7.4	6.6	22.0	80	60	32	14	20	33	8	19.6	16	18	26
415797	1.6	5.0	7.2	5.4	23.0	90	45	20	18	20	26	5	17.4	14	13	34

Nr tematu	h <sub>1</sub> [m]	h <sub>2</sub> [m]	h <sub>3</sub> [m]	l <sub>1</sub> [m]	l <sub>2</sub> [m]	α <sub>1</sub> [°]	α <sub>2</sub> [°]	q <sub>1</sub> [kPa]	q <sub>2</sub> [kPa]	Nasyp			Warstwa 1			
										γ <sub>d</sub> [kN/m <sup>3</sup> ]	φ [°]	c [kPa]	γ <sub>d</sub> [kN/m <sup>3</sup> ]	φ [°]	c [kPa]	n [%]
415843	2.1	5.4	6.8	7.8	21.0	80	55	29	17	20	28	7	18.0	19	14	32
415900	2.0	6.0	7.4	6.6	22.0	80	60	32	16	20	33	8	18.3	16	15	31
415936	1.7	8.4	6.2	5.8	22.0	80	50	32	11	20	23	6	21.5	15	21	19
415961	2.5	6.2	7.2	5.4	23.0	90	45	20	16	20	26	5	18.7	14	16	30
416103	2.0	6.2	7.2	5.4	25.0	90	45	26	16	20	26	5	18.7	14	16	30
416116	1.6	6.2	6.0	6.2	23.0	90	55	20	16	20	24	7	19.3	15	16	27
416126	2.0	7.0	7.6	7.8	27.0	85	55	32	14	20	32	7	19.3	19	18	27
416169	2.3	7.0	7.6	6.2	23.0	85	55	20	14	20	32	7	19.3	15	18	27
416199	2.5	5.4	8.0	5.4	29.0	80	45	23	17	20	30	5	17.4	14	14	34
416200	2.5	6.2	6.0	7.8	21.0	90	55	29	16	20	24	7	19.3	19	16	27
416257	1.6	5.2	5.8	6.6	24.0	85	60	23	18	20	25	8	18.3	16	13	31
416290	1.9	5.2	5.8	5.0	20.0	85	60	26	18	20	25	8	18.3	13	13	31
416323	2.1	5.6	7.8	5.8	22.0	90	50	32	17	20	31	6	17.7	15	14	33
416412	2.4	6.2	7.2	7.0	25.0	90	45	26	16	20	26	5	18.7	17	16	30
416439	2.3	5.4	8.0	7.0	27.0	80	45	32	17	20	30	5	17.4	17	14	34
416464	2.1	6.6	6.8	7.8	29.0	80	55	23	15	20	28	7	19.3	19	17	27
416564	2.2	6.8	6.6	5.0	20.0	90	60	26	14	20	29	8	19.6	13	17	26
416599	1.6	6.4	5.8	5.0	26.0	85	60	29	15	20	25	8	19.6	13	16	26
416636	2.2	7.6	7.0	7.4	22.0	85	50	32	13	20	27	6	20.2	18	19	24
416657	1.5	7.0	6.4	7.0	27.0	85	45	32	14	20	22	5	19.9	17	18	25
416686	2.1	7.6	5.8	6.6	26.0	85	60	29	13	20	25	8	20.9	16	19	21
416986	2.3	8.0	7.8	7.4	28.0	90	50	20	12	20	31	6	20.2	18	20	24
416995	1.7	5.4	6.8	6.2	23.0	80	55	20	17	20	28	7	18.0	15	14	32
417011	2.3	6.6	8.0	5.4	29.0	80	45	23	15	20	30	5	18.7	14	17	30
417098	2.0	8.2	6.4	5.4	27.0	85	45	32	12	20	22	5	21.2	14	21	20
417206	2.0	6.8	6.6	6.6	28.0	90	60	20	14	20	29	8	19.6	16	17	26
417214	2.1	7.0	6.4	7.0	29.0	85	45	23	14	20	22	5	19.9	17	18	25
417235	1.5	6.6	8.0	7.0	25.0	80	45	26	15	20	30	5	18.7	17	17	30
417250	2.3	6.8	6.6	5.0	24.0	90	60	23	14	20	29	8	19.6	13	17	26
417278	2.1	7.2	7.4	6.6	24.0	80	60	23	14	20	33	8	19.6	16	18	26

Nr tematu	h <sub>1</sub> [m]	h <sub>2</sub> [m]	h <sub>3</sub> [m]	l <sub>1</sub> [m]	l <sub>2</sub> [m]	α <sub>1</sub> [°]	α <sub>2</sub> [°]	q <sub>1</sub> [kPa]	q <sub>2</sub> [kPa]	Nasyp			Warstwa 1			
										γ <sub>d</sub> [kN/m <sup>3</sup> ]	φ [°]	c [kPa]	γ <sub>d</sub> [kN/m <sup>3</sup> ]	φ [°]	c [kPa]	n [%]
417307	1.5	8.2	6.4	5.4	29.0	85	45	23	12	20	22	5	21.2	14	21	20
417313	1.8	7.8	8.0	7.0	23.0	80	45	20	12	20	30	5	19.9	17	20	25
417324	2.0	7.6	5.8	5.0	28.0	85	60	20	13	20	25	8	20.9	13	19	21
417364	2.2	5.4	6.8	7.8	27.0	80	55	32	17	20	28	7	18.0	19	14	32
417620	2.4	5.8	6.4	5.4	29.0	85	45	23	16	20	22	5	18.7	14	15	30
417703	1.6	5.2	7.0	7.4	28.0	85	50	20	18	20	27	6	17.7	18	13	33
417732	2.0	8.2	6.4	7.0	23.0	85	45	20	12	20	22	5	21.2	17	21	20
417759	1.8	7.2	7.4	6.6	24.0	80	60	23	14	20	33	8	19.6	16	18	26
417765	2.1	6.4	7.0	5.8	28.0	85	50	20	15	20	27	6	19.0	15	16	28
417786	2.5	8.4	6.2	5.8	24.0	80	50	23	11	20	23	6	21.5	15	21	19
417801	1.5	7.2	6.2	7.4	26.0	80	50	29	14	20	23	6	20.2	18	18	24
417808	2.3	6.0	7.4	6.6	26.0	80	60	29	16	20	33	8	18.3	16	15	31
417882	2.4	5.0	6.0	7.8	23.0	90	55	20	18	20	24	7	18.0	19	13	32
417970	1.6	6.6	6.8	7.8	23.0	80	55	20	15	20	28	7	19.3	19	17	27
417988	2.0	8.4	7.4	5.0	24.0	80	60	23	11	20	33	8	20.9	13	21	21
418052	2.4	7.4	6.0	7.8	27.0	90	55	32	13	20	24	7	20.6	19	19	22
418146	2.1	8.0	6.6	5.0	26.0	90	60	29	12	20	29	8	20.9	13	20	21
418185	2.0	5.8	7.6	6.2	29.0	85	55	23	16	20	32	7	18.0	15	15	32
418188	1.8	6.2	6.0	7.8	29.0	90	55	23	16	20	24	7	19.3	19	16	27
418315	2.4	7.4	7.2	7.0	25.0	90	45	26	13	20	26	5	19.9	17	19	25
418355	2.3	5.2	5.8	5.0	28.0	85	60	20	18	20	25	8	18.3	13	13	31
418361	1.9	5.2	7.0	5.8	26.0	85	50	29	18	20	27	6	17.7	15	13	33
418470	1.8	5.2	5.8	5.0	20.0	85	60	26	18	20	25	8	18.3	13	13	31
418597	2.2	5.6	7.8	7.4	26.0	90	50	29	17	20	31	6	17.7	18	14	33
418688	2.5	8.4	7.4	6.6	20.0	80	60	26	11	20	33	8	20.9	16	21	21
1	1.5	5.4	6.8	6.2	21.0	80	55	29	17	20	28	7	18.0	15	14	32
2	1.9	8.4	6.2	5.8	26.0	80	50	29	11	20	23	6	21.5	15	21	19
3	2.5	8.2	7.6	6.2	23.0	85	55	20	12	20	32	7	20.6	15	21	22
4	1.5	5.0	7.2	5.4	21.0	90	45	29	18	20	26	5	17.4	14	13	34
5	1.6	5.2	7.0	5.8	22.0	85	50	32	18	20	27	6	17.7	15	13	33

Nr tematu	h <sub>1</sub> [m]	h <sub>2</sub> [m]	h <sub>3</sub> [m]	l <sub>1</sub> [m]	l <sub>2</sub> [m]	α <sub>1</sub> [°]	α <sub>2</sub> [°]	q <sub>1</sub> [kPa]	q <sub>2</sub> [kPa]	Nasyp			Warstwa 1			
										γ <sub>d</sub> [kN/m <sup>3</sup> ]	φ [°]	c [kPa]	γ <sub>d</sub> [kN/m <sup>3</sup> ]	φ [°]	c [kPa]	n [%]
6	1.7	5.4	6.8	6.2	23.0	80	55	20	17	20	28	7	18.0	15	14	32
7	1.8	5.6	6.6	6.6	24.0	90	60	23	17	20	29	8	18.3	16	14	31
8	1.9	5.8	6.4	7.0	25.0	85	45	26	16	20	22	5	18.7	17	15	30
9	2.0	6.0	6.2	7.4	26.0	80	50	29	16	20	23	6	19.0	18	15	28
10	2.1	6.2	6.0	7.8	27.0	90	55	32	16	20	24	7	19.3	19	16	27