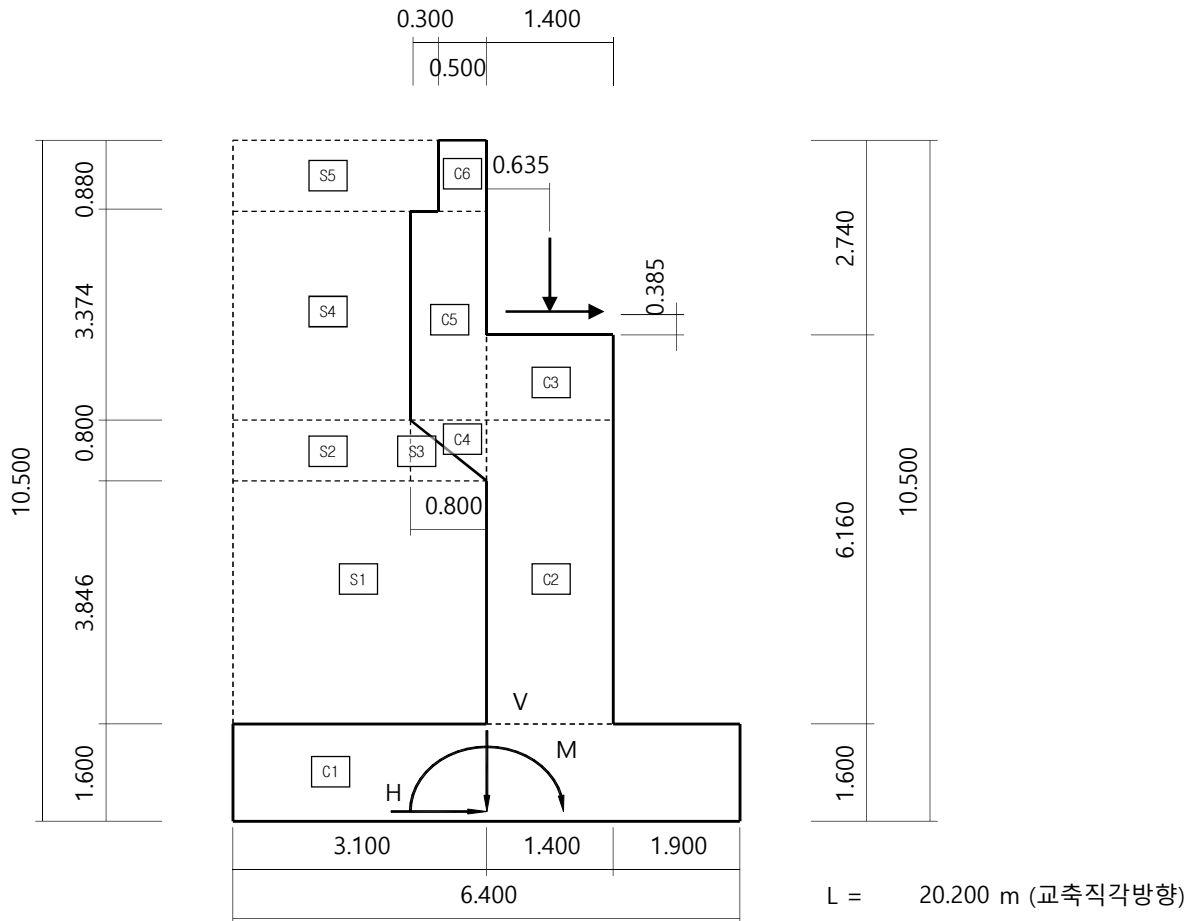


- 구체에 의한 작용력(Dc) 및 뒷채움에 의한 작용력(Ev)



(단위 폭당)

구분		A	γ	W	K_h	H	x	y	M_R	M
구체	C1	10.240	25.00	256.000	0.077	19.712	3.200	0.800	819.200	15.770
	C2	6.504	25.00	162.610	0.077	12.521	2.600	3.923	422.786	49.120
	C3	2.120	25.00	52.990	0.077	4.080	2.600	7.003	137.774	28.574
	C4	0.320	25.00	8.000	0.077	0.616	3.567	5.979	28.533	3.683
	C5	2.699	25.00	67.480	0.077	5.196	3.700	7.933	249.676	41.220
	C6	0.440	25.00	11.000	0.077	0.847	3.550	10.060	39.050	8.521
	소계	22.323		558.080		42.972			1697.019	146.887
뒷채움	S1	11.923	20.00	238.452	0.077	18.361	4.850	3.523	1156.492	64.685
	S2	1.840	20.00	36.800	0.077	2.834	5.250	5.846	193.200	16.565
	S3	0.320	20.00	6.400	0.077	0.493	3.833	5.713	24.533	2.815
	S4	7.760	20.00	155.204	0.077	11.951	5.250	7.933	814.821	94.805
	S5	2.288	20.00	45.760	0.077	3.524	5.100	10.060	233.376	35.447
	소계	24.131		482.616		37.161			2422.423	214.317
총 계				1040.696		80.133			4119.442	361.204

11.7.3 안정검토

- CASE1 : 1.0Dc+1.0Dw+1.0EH+1.0EV+1.0EQ

1) 단면력 산정

$$\begin{aligned}
 H &= 1.0 \times 42.972 + 1.0 \times 345.965 + 1.0 \times 37.161 + 1.0 \times 13.029 &= & 439.127 \text{ kN} \\
 V &= 1.0 \times (214.584 + 558.080) + 1.0 \times 46.000 + 1.0 \times 482.616 &= & 1301.280 \text{ kN} \\
 M_r &= 1.0 \times (214.584 \times 2.665 + 1,697.019) + 1.0 \times (46.000 \times 2.665) & & \\
 &\quad + 1.0 \times 2,422.423 &= & 4813.899 \text{ kN.m} \\
 M &= 1.0 \times 146.887 + 1.0 \times 1,816.316 + 1.0 \times 214.317 & & \\
 &\quad + 1.0 \times 13.029 \times 8.145 &= & 2283.643 \text{ kN.m}
 \end{aligned}$$

2) 전도에 대한 안정

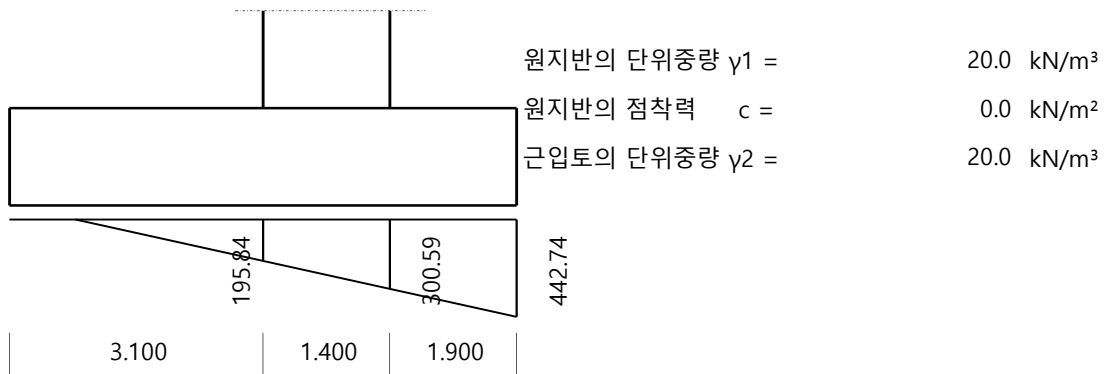
$$\begin{aligned}
 e &= B/2 - (M_r - M)/V = 6.400 / 2 - (4,813.899 - 2,283.643) / 1,301.280 \\
 &= 1.256 \text{ m} < (4B/10) = 4 \times 6.400 / 10 = 2.560 \text{ m} \quad \therefore \text{O.K}
 \end{aligned}$$

3) 활동에 대한 안정 (최대 수평력에 대해 검토)

$$\begin{aligned}
 H_r &= Q_R = \phi Q_n = \phi_\tau Q_\tau + \phi_{ep} Q_{ep} & Q_\tau &= V \tan \delta & \tan \delta &= \tan \phi_f \\
 \text{원지반의 내부마찰각 } \phi &= \sqrt{(15 \times N) + 15} = \sqrt{(15 \times 50) + 15} &= & 42.4^\circ \\
 H_r &= 1.0 \times V \times \tan(\phi/3) = 1.0 \times 1,301.280 \times 0.537 &= & 699.420 \text{ kN} \\
 SF &= H_r / H = 699.420 / 439.127 &= & 1.6 > 1.0 \quad \therefore \text{O.K}
 \end{aligned}$$

4) 지반반력 q

$$\begin{aligned}
 q_1 &= V/A(1+6e/B) = 1301.280 / 6.400 \times (1+6 \times 1.256 / 6.400) &= & 442.74 \text{ kN/m}^2 \\
 q_2 &= V/A(1-6e/B) = 1301.280 / 6.400 \times (1-6 \times 1.256 / 6.400) &= & -36.09 \text{ kN/m}^2 \\
 q_{\max} &= 442.74 \text{ kN/m}^2 < q_a = 2792.4 \text{ kN/m}^2 \quad \therefore \text{O.K}
 \end{aligned}$$



- 지반의 허용지지력 (기존 자료의 부족으로 아래 식을 적용)

$$\begin{aligned}
 \text{상재하중 } q &= \gamma_2 \times D_f = 20.000 \times 1.600 &= & 32.000 \text{ kN/m}^2 \\
 \text{유효재하폭 } B' &= B - 2e = 6.400 - 2 \times 1.256 &= & 3.888 \text{ m} \\
 \text{유효재하면적 } A' &= L \times B' = 20.200 \times 3.888 &= & 78.538 \text{ m}^2 \\
 \alpha &= 1.0 + 0.3 B/L = 1.0 + 0.3 \times 6.400 / 20.200 &= & 1.095 \\
 \beta &= 0.5 - 0.1 B/L = 0.5 - 0.1 \times 6.400 / 20.200 &= & 0.468 \\
 N_c &= 97.91, N_q = 90.36, N_r = 150.74 \\
 q_a &= S.F (\alpha c N_c + q N_q + \beta r_1 B' N_r) \\
 &= 1/3 \times (1.095 \times 0.0 \times 97.91 + 32.0 \times 90.36 + 0.468 \times 20.0 \times 3.888 \times 150.74) \\
 &= 2792.4 \text{ kN/m}^2
 \end{aligned}$$

