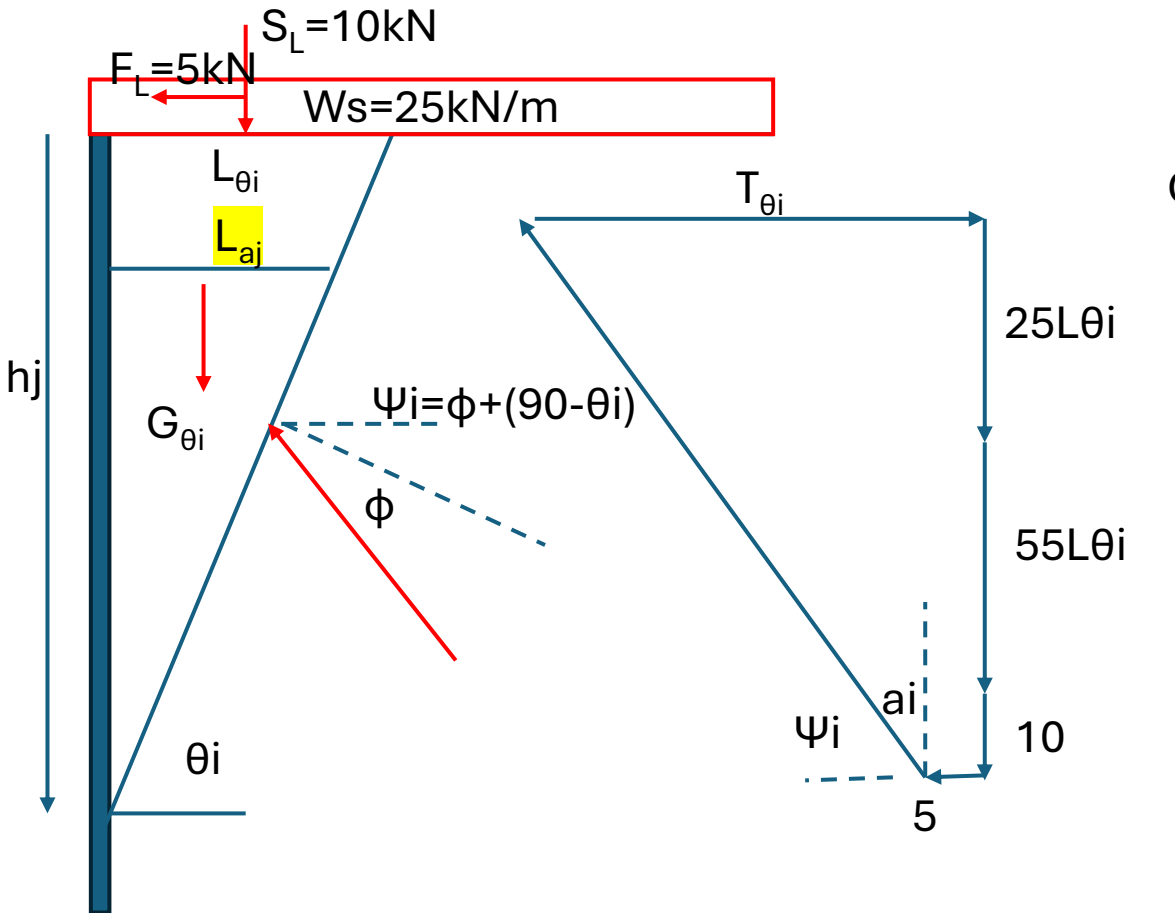




$$L_{\theta i} = 5.5 (\tan \theta i)^{-1}$$

$$W_{s,j} = W_s * L_{\theta i}$$

$$G_{\theta i} = 1/2 (H - S_{vj}) * L_{\theta i} * \gamma = 1/2 * 5.5 \text{m} * 20 \text{kN/m}^3 = 55 L_{\theta i}$$

$$\text{Or } T_{\theta i} = FL + (W_{s,\theta i} + G_{\theta i} + SL) \tan a_i = (\theta i - \phi) = 5 + \tan(\theta i - 32) * [10 + 80 L_{\theta i}]$$

$$\theta i = 70, 61.5, 54, 48$$

$$T_{\max} = 145.8 \text{ kN}$$

Tensile force along reinforcement at level j

$$T_j = T_{pj} + T_{sj} + T_{fj}$$

$T_{pj} \rightarrow$ Meyerhof

$$T_{sj} = k_a * S_L * S_{vj} / D_j \text{ where } D_j = h_j + b = h_j + 1 \rightarrow h_j < 2d - b = 2 * 1.5 - 1 = 2$$

$$D_j = (h_j + 1) / 2 \quad h_j > 2d - b = 2 \text{m}$$

$$T_{fj} = 2FL * Q * (1 - h_j * Q) * S_{vj} = 2 * 5 * 0.277 * (1 - h_j * 0.277) * 0.5 = 1.385 * (1 - 0.277 * h_j)$$

$$\text{Where } Q = \tan(45 - \phi/2) / (d + b/2) = 0.277$$

Length of reinforcement in passive zone:

$$L_{ej} = L - L_{aj} = 6 - (5.5 - h_j) / \tan(61.5)$$

$$L_{aj} = L_{\theta i} * (H - S_{vj} - h_j) / (H - S_{vj}) = 5.5 / \tan 61.5 * (5.5 - h_j) / 5.5 = 5.5 - h_j / \tan 61.5$$

j	h _j (m)	ΣM/σ _{vj} =ξ	ε _j =L/2-ξ (m)	σ _{vj} (kPa)	D _j	T _{pj} (kN)	T _{sj}	T _{fj}	T _j (kN) < TD=40 kN
1	0.5	647.5/220	0.06	37	1.5	5.7	1.02	1.19	7.9
11	5.5	2673/(660+ 150+10)	0.26	820/(6- 2*0.26) =149.6	3.25	23.1	0.47	-0.7 ignore	23.57

j	h _j	σ _{vj}	L _{aj} =(5.5-h _j)/tan61.5	L _{ej} =L-L _{aj}	P _j *L _{ej} *σ _{vj} *0.5*tanφ
1	0.5	37	2.71	3.29	38.8
11	5.5	149.6	0	6	285.9 ignore

SUM >> 145.8kN