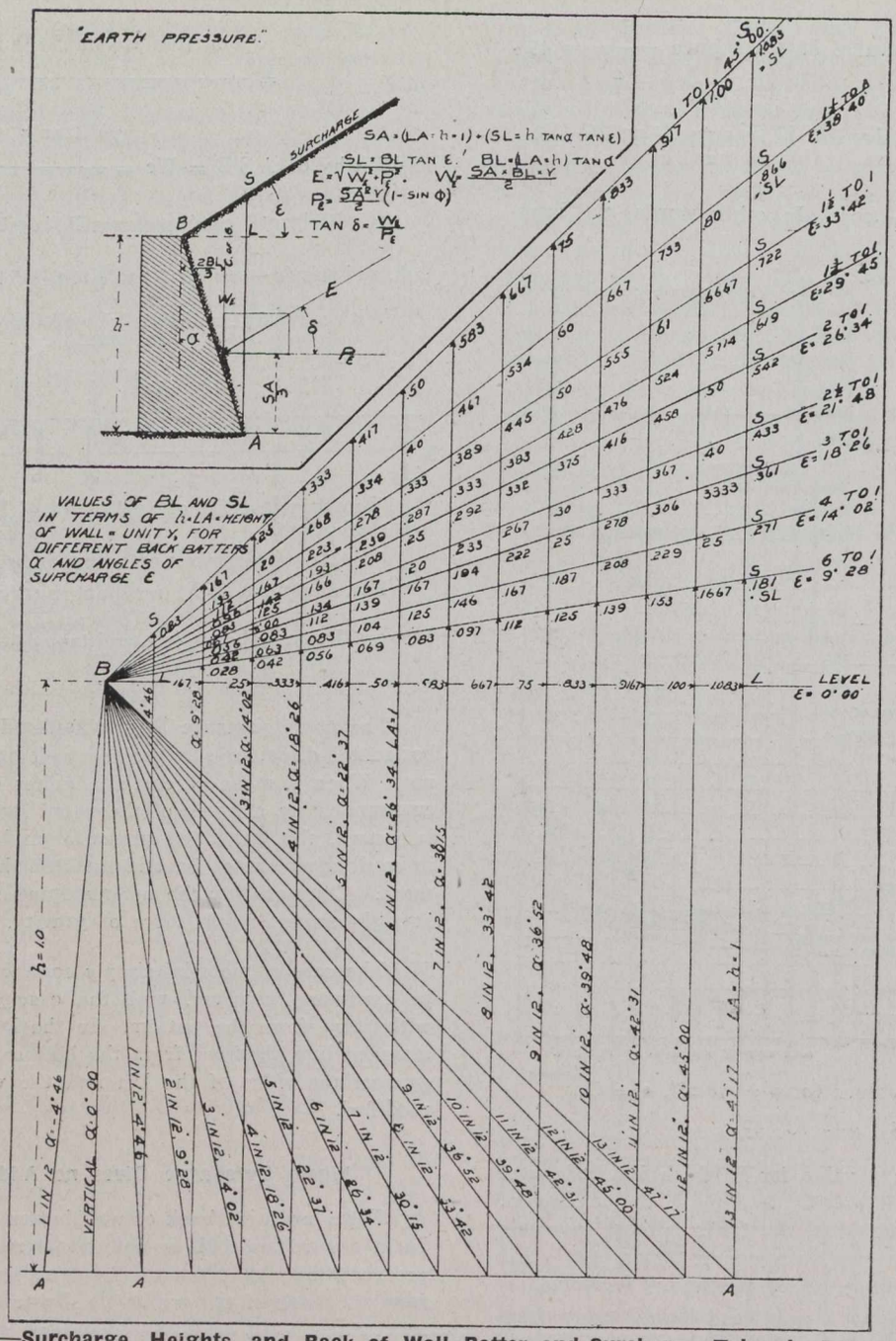
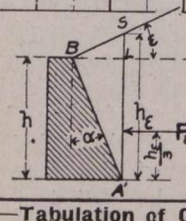


Fig. 7.—Surcharge Heights and Back of Wall Batter and Surcharge Triangle Dimensions.

HEIGHTS h_ε AND AREAS A_u OF EARTH WEDGE BACK OF WALL FOR DIFFERENT DEGREES OF SURCHARGE ε AND BACK OF WALL BATTERS α. BASED ON HEIGHT OF WALL h EQUAL UNITY.

SURFACE SLOPE OR SURCHARGE ANGLE ε	BACK OF WALL BATTERS AND ANGLE OF INCLINATION WITH THE VERTICAL α.																										SURFACE SLOPE OR RATIO OF BASE TO HEIGHT
	VERTICAL 0° 00		1" IN 12" 4° 46'		2" IN 12" (1 IN 6) 9° 28		3" IN 12" (1 IN 4) 14° 02'		4" IN 12" (1 IN 3) 18° 26'		5" IN 12" (1 IN 2.4) 22° 37'		6" IN 12" (1 IN 2) 26° 34'		7" IN 12" (1 IN 1.71) 30° 15'		8" IN 12" (1 IN 1.5) 33° 42'		9" IN 12" (1 IN 1.33) 36° 52'		10" IN 12" (1 IN 1.2) 39° 48'		11" IN 12" (1 IN 1.09) 42° 31'		12" IN 12" (1 IN 1) 45° 00'		13" IN 12" (1 IN 0.92) 47° 17'		14" IN 12" (1 IN 0.86) 49° 24'		15" IN 12" (1 IN 0.80) 51° 20'	
	CONSTANTS FOR HEIGHT h_ε AND AREA A_u WHEN HEIGHT OF WALL h IS EQUAL UNITY.																										
	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	h_ε	A_u	
45° 00'	1.00	.000	1.08	.045	1.17	.097	1.25	.156	1.33	.222	1.42	.295	1.50	.375	1.58	.462	1.67	.556	1.75	.656	1.83	.764	1.92	.878	2.00	1.000	2.08	1.100	2.17	1.263	2.25	1.405	1 TO 1
38° 40'	"	"	1.07	.044	1.13	.094	1.20	.150	1.27	.211	1.33	.278	1.40	.350	1.47	.428	1.53	.511	1.60	.600	1.67	.695	1.73	.794	1.80	.900	1.87	1.010	1.93	1.127	2.00	1.250	1½ TO 1
33° 42'	"	"	1.06	.044	1.11	.093	1.17	.146	1.22	.204	1.28	.266	1.33	.333	1.39	.405	1.45	.482	1.50	.563	1.56	.648	1.61	.739	1.67	.833	1.72	.934	1.78	1.036	1.83	1.145	1½ TO 1
29° 45'	"	"	1.05	.044	1.09	.091	1.14	.143	1.19	.199	1.24	.258	1.29	.321	1.33	.392	1.38	.460	1.43	.535	1.48	.615	1.52	.697	1.57	.786	1.62	.875	1.67	.972	1.71	1.071	1¾ TO 1
26° 34'	"	"	1.04	.043	1.08	.090	1.12	.141	1.17	.194	1.21	.252	1.25	.313	1.29	.377	1.33	.445	1.38	.515	1.42	.590	1.46	.668	1.50	.750	1.54	.834	1.58	.923	1.62	1.015	2 TO 1
21° 48'	"	"	1.03	.043	1.07	.089	1.10	.138	1.13	.189	1.17	.243	1.20	.300	1.23	.364	1.27	.422	1.30	.481	1.33	.556	1.37	.626	1.40	.700	1.43	.771	1.47	.855	1.50	.937	2½ TO 1
18° 26'	"	"	1.03	.043	1.06	.088	1.08	.135	1.11	.185	1.14	.237	1.17	.292	1.19	.349	1.22	.407	1.25	.469	1.28	.533	1.31	.598	1.33	.667	1.36	.736	1.39	.809	1.42	.885	3 TO 1
14° 02'	"	"	1.02	.043	1.04	.087	1.06	.133	1.08	.181	1.10	.230	1.13	.281	1.15	.334	1.17	.389	1.19	.445	1.21	.504	1.23	.563	1.25	.625	1.27	.687	1.29	.753	1.31	.820	4 TO 1
9° 28'	"	"	1.01	.042	1.03	.086	1.04	.130	1.06	.176	.72	.223	1.08	.271	1.10	.320	1.11	.371	1.12	.423	1.14	.465	1.15	.529	1.17	.583	1.18	.638	1.19	.696	1.21	.755	6 TO 1
4° 46'	"	"	1.00	.042	1.01	.084	1.02		1.03		1.03		1.04		1.05		1.05		1.06		1.07		1.08		1.08		1.09		1.10	.640	1.11	.690	12 TO 1
LEVEL	"	"	1.00	.042	1.00	.083	1.00	.125	1.00	.167	1.00	.208	1.00	.250	1.00	.292	1.00	.333	1.00	.375	1.00	.417	1.00	.458	1.00	.500	1.00	.542	1.00	.583	1.00	.625	0 0



A_u EQUAL AREA OF TRIANGLE ABS = SA × BL ÷ 2 = h_ε × BL ÷ 2.
h_ε EQUAL HEIGHT, FROM THE BOTTOM OF THE BACK BATTER OF WALL TO THE POINT WHERE ITS VETICAL PROJECTION INTERSECTS THE SURFACE OF THE EARTH FILL OR BACKING.
h_ε = SA = SL + (LA = h) = h TAN α TAN ε + h = h (1 + TAN α TAN ε). FOR h = UNITY, h_ε = 1 + TAN α TAN ε.
A_u = h_ε × BL ÷ 2 = h (1 + TAN α TAN ε) (BL = h TAN α) ÷ 2 = h^2 (TAN α + TAN^2 α TAN ε) ÷ 2. FOR h = UNITY, A_u = (TAN α + TAN^2 α TAN ε) ÷ 2.
TO OBTAIN THE HEIGHT h_ε FOR ANY HEIGHT OF WALL h MULTIPLEY h_ε OF THE TABLE FOR THE GIVEN VALUES OF α AND ε BY h. FOR EXAMPE FOR h = 20', α = 22°37' AND ε 33°42'. FROM THE TABLE h_ε IS GIVEN AS 1.28. h_ε = (h_ε = CONSTANT) h = 1.28 × 20 = 25.6 FT.
TO OBTAIN THE AREA A FOR ANY HEIGHT OF WALL MULTIPLY A_u OF THE TABLE FOR THE GIVEN CONDITIONS BY THE SQUARE OF THE HEIGHT h. A = $h^2 A_u$. FOR VALUES OF α AND ε AS ABOVE A_u .266. WENCE FOR h = 20 FT, A = 20^2 × .266 = 400 × .266 = 106.4

Fig. 7a.—Tabulation of Computed Values of h_ε Correspondin g to Heigat SA of Fig. 7. .Also Area Au Corresponding to Triangle BAS of Fig. 7.

(Continued Next Week.)