

# MU Guide

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## Volume of Earth in Embankments

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Tables in this publication provide a method for determining the volume of earth contained in embankments of various sizes and shapes. Values given are cubic yards of material per foot of length.

Table 1 gives values for embankments with a combination of side slopes totaling 5:1. Combinations include 3:1, 2:1; 2-1/2:1, 2-1/2:1; and 4:1, 1:1.

Table 2 gives values for embankments with a combination of side slopes totaling 6:1. Combinations include 4:1, 1:1; 5:1, 3:1; 6:1, 2:1; and 4-1/2:1, 3-1/2:1.

using table table include 3:1, 1:1, 2:1; and 5:1, 1:1.

Table 3 gives values for embankments with a combination of side slopes totaling 7:1. Combinations using this table include 3:1, 4:1; 2:1, 3:1-1/2:1, 3-1/2:1; and 6:1, 1:1.

Table 4 gives values for embankments with a combination of side slopes totaling 8:1. Combinations using this table include 4:1, 1:1; 5:1, 3:1; 6:1, 2:1; and 4-1/2:1, 3-1/2:1.

Table 1. Volume per foot of length for embankments with slopes totaling 5:1.

HEIGHT FT.	TOP WIDTH (FEET)					HEIGHT FT.	TOP WIDTH (FEET)					HEIGHT FT.	TOP WIDTH (FEET)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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0.2	0.05	0.06	0.08	0.09	0.11	0.12	0.14	0.15	0.15	0.15	24.17	25.28	26.39	27.50	28.61	29.72	30.83	31.94	33.05	34.16	35.27	36.38	37.49	38.60	39.71	40.82	41.93	43.04	44.15	45.26	46.37	47.48	48.59	49.70	50.81	51.92	53.03	54.14	55.25	56.36	57.47	58.58	59.69	60.80	61.91	63.02	64.13	65.24	66.35	67.46	68.57	69.68	70.79	71.90	73.01	74.12	75.23	76.34	77.45	78.56	79.67	80.78	81.89	83.00	84.11	85.22	86.33	87.44	88.55	89.66	90.77	91.88	92.99	94.10	95.21	96.32	97.43	98.54	99.65	100.76	101.87	102.98	104.09	105.20	106.31	107.42	108.53	109.64	110.75	111.86	112.97	114.08	115.19	116.30	117.41	118.52	119.63	120.74	121.85	122.96	124.07	125.18	126.29	127.40	128.51	129.62	130.73	131.84	132.95	134.06	135.17	136.28	137.39	138.50	139.61	140.72	141.83	142.94	144.05	145.16	146.27	147.38	148.49	149.60	150.71	151.82	152.93	154.04	155.15	156.26	157.37	158.48	159.59	160.70	161.81	162.92	164.03	165.14	166.25	167.36	168.47	169.58	170.69	171.80	172.91	174.02	175.13	176.24	177.35	178.46	179.57	180.68	181.79	182.90	184.01	185.12	186.23	187.34	188.45	189.56	190.67	191.78	192.89	194.00	195.11	196.22	197.33	198.44	199.55	200.66	201.77	202.88	203.99	205.10	206.21	207.32	208.43	209.54	210.65	211.76	212.87	213.98	215.09	216.20	217.31	218.42	219.53	220.64	221.75	222.86	223.97	225.08	226.19	227.30	228.41	229.52	230.63	231.74	232.85	233.96	235.07	236.18	237.29	238.40	239.51	240.62	241.73	242.84	243.95	245.06	246.17	247.28	248.39	249.50	250.61	251.72	252.83	253.94	255.05	256.16	257.27	258.38	259.49	260.60	261.71	262.82	263.93	265.04	266.15	267.26	268.37	269.48	270.59	271.70	272.81	273.92	275.03	276.14	277.25	278.36	279.47	280.58	281.69	282.80	283.91	285.02	286.13	287.24	288.35	289.46	290.57	291.68	292.79	293.90	295.01	296.12	297.23	298.34	299.45	300.56	301.67	302.78	303.89	305.00	306.11	307.22	308.33	309.44	310.55	311.66	312.77	313.88	314.99	316.10	317.21	318.32	319.43	320.54	321.65	322.76	323.87	324.98	326.09	327.20	328.31	329.42	330.53	331.64	332.75	333.86	334.97	336.08	337.19	338.30	339.41	340.52	341.63	342.74	343.85	344.96	346.07	347.18	348.29	349.40	350.51	351.62	352.73	353.84	354.95	356.06	357.17	358.28	359.39	360.50	361.61	362.72	363.83	364.94	366.05	367.16	368.27	369.38	370.49	371.60	372.71	373.82	374.93	376.04	377.15	378.26	379.37	380.48	381.59	382.70	383.81	384.92	386.03	387.14	388.25	389.36	390.47	391.58	392.69	393.80	394.91	396.02	397.13	398.24	399.35	400.46	401.57	402.68	403.79	404.90	406.01	407.12	408.23	409.34	410.45	411.56	412.67	413.78	414.89	416.00	417.11	418.22	419.33	420.44	421.55	422.66	423.77	424.88	425.99	427.10	428.21	429.32	430.43	431.54	432.65	433.76	434.87	435.98	437.09	438.20	439.31	440.42	441.53	442.64	443.75	444.86	445.97	447.08	448.19	449.30	450.41	451.52	452.63	453.74	454.85	455.96	457.07	458.18	459.29	460.40	461.51	462.62	463.73	464.84	465.95	467.06	468.17	469.28	470.39	471.50	472.61	473.72	474.83	475.94	477.05	478.16	479.27	480.38	481.49	482.60	483.71	484.82	485.93	487.04	488.15	489.26	490.37	491.48	492.59	493.70	494.81	495.92	497.03	498.14	499.25	500.36	501.47	502.58	503.69	504.80	505.91	507.02	508.13	509.24	510.35	511.46	512.57	513.68	514.79	515.90	517.01	518.12	519.23	520.34	521.45	522.56	523.67	524.78	525.89	527.00	528.11	529.22	530.33	531.44	532.55	533.66	534.77	535.88	536.99	538.10	539.21	540.32	541.43	542.54	543.65	544.76	545.87	546.98	548.09	549.20	550.31	551.42	552.53	553.64	554.75	555.86	556.97	558.08	559.19	560.30	561.41	562.52	563.63	564.74	565.85	566.96	568.07	569.18	570.29	571.40	572.51	573.62	574.73	575.84	576.95	578.06	579.17	580.28	581.39	582.50	583.61	584.72	585.83	586.94	588.05	589.16	590.27	591.38	592.49	593.60	594.71	595.82	596.93	598.04	599.15	600.26	601.37	602.48	603.59	604.70	605.81	606.92	608.03	609.14	610.25	611.36	612.47	613.58	614.69	615.80	616.91	618.02	619.13	620.24	621.35	622.46	623.57	624.68	625.79	626.90	628.01	629.12	630.23	631.34	632.45	633.56	634.67	635.78	636.89	638.00	639.11	640.22	641.33	642.44	643.55	644.66	645.77	646.88	647.99	649.10	650.21	651.32	652.43	653.54	654.65	655.76	656.87	657.98	659.09	660.20	661.31	662.42	663.53	664.64	665.75	666.86	667.97	669.08	670.19	671.30	672.41	673.52	674.63	675.74	676.85	677.96	679.07	680.18	681.29	682.40	683.51	684.62	685.73	686.84	687.95	689.06	690.17	691.28	692.39	693.50	694.61	695.72	696.83	697.94	699.05	700.16	701.27	702.38	703.49	704.60	705.71	706.82	707.93	709.04	710.15	711.26	712.37	713.48	714.59	715.70	716.81	717.92	719.03	720.14	721.25	722.36	723.47	724.58	725.69	726.80	727.91	729.02	730.13	731.24	732.35	733.46	734.57	735.68	736.79	737.90	739.01	740.12	741.23	742.34	743.45	744.56	745.67	746.78	747.89	749.00	750.11	751.22	752.33	753.44	754.55	755.66	756.77	757.88	758.99	760.10	761.21	762.32	763.43	764.54	765.65	766.76	767.87	768.98	770.09	771.20	772.31	773.42	774.53	775.64	776.75	777.86	778.97	780.08	781.19	782.30	783.41	784.52	785.63	786.74	787.85	788.96	790.07	791.18	792.29	793.40	794.51	795.62	796.73	797.84	798.95	800.06	801.17	802.28	803.39	804.50	805.61	806.72	807.83	808.94	810.05	811.16	812.27	813.38	814.49	815.60	816.71	817.82	818.93	820.04	821.15	822.26	823.37	824.48	825.59	826.70	827.81	828.92	830.03	831.14	832.25	833.36	834.47	835.58	836.69	837.80	838.91	840.02	841.13	842.24	843.35	844.46	845.57	846.68	847.79	848.90	850.01	851.12	852.23	853.34	854.45	855.56	856.67	857.78	858.89	860.00	861.11	862.22	863.33	864.44	865.55	866.66	867.77	868.88	870.00	871.11	872.22	873.33	874.44	875.55	876.66	877.77	878.88	880.00	881.11	882.22	883.33	884.44	885.55	886.66	887.77	888.88	890.00	891.11	892.22	893.33	894.44	895.55	896.66	897.77	898.88	900.00	901.11	902.22	903.33	904.44	905.55	906.66	907.77	908.88	910.00	911.11	912.22	913.33	914.44	915.55	916.66	917.77	918.88	920.00	921.11	922.22	923.33	924.44	925.55	926.66	927.77	928.88	930.00	931.11	932.22	933.33	934.44	935.55	936.66	937.77	938.88	940.00	941.11	942.22	943.33	944.44	945.55	946.66	947.77	948.88	950.00	951.11	952.22	953.33	954.44	955.55	956.66	957.77	958.88	960.00	961.11	962.22	963.33	964.44	965.55	966.66	967.77	968.88	970.00	971.11	972.22	973.33	974.44	975.55	976.66	977.77	978.88	980.00	981.11	982.22	983.33	984.44	985.55	986.66	987.77	988.88	990.00	991.11	992.22	993.33	994.44	995.55	996.66	997.77	998.88	1000.00	1001.11	1002.22	1003.33	1004.44	1005.55	1006.66	1007.77	1008.88	1010.00	1011.11	1012.22	1013.33	1014.44	1015.55	1016.66	1017.77	1018.88	1020.00	1021.11	1022.22	1023.33	1024.44	1025.55	1026.66	1027.77	1028.88	1030.00	1031.11	1032.22	1033.33	1034.44	1035.55	1036.66	1037.77	1038.88	1040.00	1041.11	1042.22	1043.33	1044.44	1045.55	1046.66	1047.77	1048.88	1050.00	1051.11	1052.22	1053.33	1054.44	1055.55	1056.66	1057.77	1058.88	1060.00	1061.11	1062.22	1063.33	1064.44	1065.55	1066.66	1067.77	1068.88	1070.00	1071.11	1072.22	1073.33	1074.44	1075.55	1076.66	1077.77	1078.88	1080.00	1081.11	1082.22	1083.33	1084.44	1085.55	1086.66	1087.77	1088.88	1090.00	1091.11	1092.22	1093.33	1094.44	1095.55	1096.66	1097.77	1098.88	1100.00	1101.11	1102.22	1103.33	1104.44	1105.55	1106.66	1107.77	1108.88	1110.00	1111.11	1112.22	1113.33	1114.44	1115.55	1116.66	1117.77	1118.88	1120.00	1121.11	1122.22	1123.33	1124.44	1125.55	1126.66	1127.77	1128.88	1130.00	1131.11	1132.22	1133.33	1134.44	1135.55	1136.66	1137.77	1138.88	1140.00	1141.11	1142.22

Eight different top widths, ranging from 6 to 20 feet, are provided in each table. Heights ranging from 0.1 feet to 45 feet are given in increments of 0.2 feet. If you need the values for a particular height lying between two of the given values, use the average of the two values. See Example 2.

**Example 1.** Determine the cubic yardage in a 150-foot long levee with a top width of 16 feet, a height of 14.2 feet and having 3:1, 2:1 side slopes.

Since the slopes total 5:1, use Table 1. At a height of 14.2 feet and a top width of 16 feet, Table 1 indicates a value of 27.09 cubic yards per foot of length. Multiply the value by 150 to get a total of 4063.5 cubic yards for the levee.

**Example 2.** Determine the cubic yards in a 100-foot long dam with a top width of 8 feet, a height of 12.1 feet and 4:1, 3:1 side slopes.

Slopes total 7:1, so use Table 3. The value for a 12-foot high, 8-foot wide slope is 22.22; for a height of 12.2 feet, 22.91. The average of these two is 22.56. Multiply this value by 100 to get a total cubic yardage of 2,256.

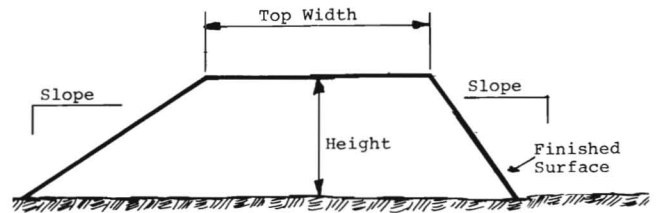


Figure 1. Cross section used to determine the table values.

## Method used in formulating tables

Figure 1 presents the cross section of the typical embankment used to determine table values. The equation is

$$\text{Table value} = \frac{(\text{total slope})(\text{height})^2 + (2)(\text{top width})(\text{height})}{54}$$

where the total slope represents the combination of the two side slope values (i.e. the total slope for a 3:1, 2:1 embankment = 5). The heights and widths are given in feet.

Table 2. Volume (cubic yards) per foot of length for embankments with slopes totaling 6:1.

HEIGHT FT.	TOP WIDTH (FEET)								HEIGHT FT.	TOP WIDTH (FEET)								HEIGHT FT.	TOP WIDTH (FEET)							
	6	8	10	12	14	16	18	20		6	8	10	12	14	16	18	20		6	8	10	12	14	16	18	20
0.2	0.05	0.06	0.07	0.09	0.11	0.12	0.14	0.15	15.0	288.33	298.44	308.56	318.67	328.78	338.89	349.00	359.11	369.22	379.33	389.44	399.55	409.66	419.77	429.88	439.99	450.10
0.4	0.11	0.14	0.17	0.20	0.23	0.25	0.28	0.31	15.2	292.05	302.16	312.27	322.38	332.49	342.60	352.71	362.82	372.93	383.04	393.15	403.26	413.37	423.48	433.59	443.70	453.81
0.6	0.17	0.22	0.26	0.31	0.35	0.40	0.44	0.48	15.4	295.77	305.88	315.99	326.10	336.21	346.32	356.43	366.54	376.65	386.76	396.87	406.98	417.09	427.20	437.31	447.42	457.53
0.8	0.25	0.31	0.37	0.43	0.49	0.55	0.60	0.66	15.6	300.00	310.11	320.22	330.33	340.44	350.55	360.66	370.77	380.88	390.99	401.10	411.21	421.32	431.43	441.54	451.65	461.76
1.0	0.33	0.41	0.48	0.56	0.63	0.70	0.78	0.85	15.8	304.22	314.33	324.44	334.55	344.66	354.77	364.88	374.99	385.10	395.21	405.32	415.43	425.54	435.65	445.76	455.87	465.98
1.2	0.43	0.52	0.60	0.69	0.78	0.87	0.96	1.05	16.0	308.44	318.55	328.66	338.77	348.88	358.99	369.10	379.21	389.32	399.43	409.54	419.65	429.76	439.87	449.98	460.09	470.20
1.4	0.53	0.63	0.72	0.82	0.92	1.01	1.11	1.21	16.2	312.67	322.78	332.89	343.00	353.11	363.22	373.33	383.44	393.55	403.66	413.77	423.88	433.99	444.10	454.21	464.32	474.43
1.6	0.64	0.76	0.88	1.00	1.11	1.23	1.35	1.47	16.4	316.89	327.00	337.11	347.22	357.33	367.44	377.55	387.66	397.77	407.88	417.99	428.10	438.21	448.32	458.43	468.54	478.65
1.8	0.76	0.89	1.02	1.16	1.29	1.43	1.56	1.69	16.6	321.11	331.22	341.33	351.44	361.55	371.66	381.77	391.88	401.99	412.10	422.21	432.32	442.43	452.54	462.65	472.76	482.87
2.0	0.89	1.04	1.19	1.33	1.48	1.63	1.78	1.93	17.0	325.33	335.44	345.55	355.66	365.77	375.88	385.99	396.10	406.21	416.32	426.43	436.54	446.65	456.76	466.87	476.98	487.09
2.2	1.03	1.19	1.35	1.52	1.68	1.84	2.00	2.17	17.2	329.56	339.67	349.78	359.89	369.99	380.10	390.21	400.32	410.43	420.54	430.65	440.76	450.87	460.98	471.09	481.20	491.31
2.4	1.17	1.35	1.53	1.71	1.88	2.06	2.24	2.42	17.4	333.78	343.89	354.00	364.11	374.22	384.33	394.44	404.55	414.66	424.77	434.88	444.99	455.10	465.21	475.32	485.43	495.54
2.6	1.33	1.52	1.71	1.91	2.10	2.29	2.48	2.68	17.6	338.00	348.11	358.22	368.33	378.44	388.55	398.66	408.77	418.88	428.99	439.10	449.21	459.32	469.43	479.54	489.65	499.76
2.8	1.49	1.70	1.91	2.12	2.32	2.53	2.74	2.95	17.8	342.22	352.33	362.44	372.55	382.66	392.77	402.88	412.99	423.10	433.21	443.32	453.43	463.54	473.65	483.76	493.87	503.98
3.0	1.67	1.89	2.11	2.33	2.56	2.78	3.00	3.22	18.0	346.44	356.55	366.66	376.77	386.88	396.99	407.10	417.21	427.32	437.43	447.54	457.65	467.76	477.87	487.98	498.09	508.20
3.2	1.85	2.09	2.32	2.56	2.80	3.03	3.27	3.51	18.2	350.67	360.78	370.89	381.00	391.11	401.22	411.33	421.44	431.55	441.66	451.77	461.88	471.99	482.10	492.21	502.32	512.43
3.4	2.04	2.29	2.54	2.80	3.05	3.30	3.55	3.80	18.4	354.89	365.00	375.11	385.22	395.33	405.44	415.55	425.66	435.77	445.88	455.99	466.10	476.21	486.32	496.43	506.54	516.65
3.6	2.24	2.51	2.77	3.04	3.31	3.57	3.84	4.11	18.6	359.11	369.22	379.33	389.44	399.55	409.66	419.77	429.88	439.99	450.10	460.21	470.32	480.43	490.54	500.65	510.76	520.87
3.8	2.45	2.73	3.01	3.29	3.57	3.86	4.14	4.42	18.8	363.33	373.44	383.55	393.66	403.77	413.88	423.99	434.10	444.21	454.32	464.43	474.54	484.65	494.76	504.87	514.98	525.09
4.0	2.67	2.96	3.26	3.56	3.85	4.15	4.44	4.74	19.0	367.56	377.67	387.78	397.89	407.99	418.10	428.21	438.32	448.43	458.54	468.65	478.76	488.87	498.98	509.09	519.20	529.31
4.2	2.89	3.20	3.52	3.83	4.14	4.45	4.76	5.07	19.2	371.78	381.89	392.00	402.11	412.22	422.33	432.44	442.55	452.66	462.77	472.88	482.99	493.10	503.21	513.32	523.43	533.54
4.4	3.13	3.45	3.78	4.11	4.43	4.76	5.08	5.41	19.4	376.00	386.11	396.22	406.33	416.44	426.55	436.66	446.77	456.88	466.99	477.10	487.21	497.32	507.43	517.54	527.65	537.76
4.6	3.37	3.71	4.05	4.40	4.74	5.08	5.42	5.76	19.6	380.22	390.33	400.44	410.55	420.66	430.77	440.88	450.99	461.10	471.21	481.32	491.43	501.54	511.65	521.76	531.87	541.98
4.8	3.63	3.98	4.34	4.69	5.05	5.40	5.76	6.11	19.8	384.44	394.55	404.66	414.77	424.88	434.99	445.10	455.21	465.32	475.43	485.54	495.65	505.76	515.87	525.98	536.09	546.20
5.0	3.89	4.26	4.63	5.00	5.37	5.74	6.11	6.48	20.0	388.67	398.78	408.89	418.99	429.10	439.21	449.32	459.43	469.54	479.65	489.76	499.87	509.98	520.09	530.20	540.31	550.42
5.2	4.16	4.54	4.92	5.30	5.67	6.04	6.41	6.78	20.2	392.89	403.00	413.11	423.22	433.33	443.44	453.55	463.66	473.77	483.88	493.99	504.10	514.21	524.32	534.43	544.54	554.65
5.4	4.44	4.84	5.24	5.64	6.04	6.44	6.84	7.24	20.4	397.11	407.22	417.33	427.44	437.55	447.66	457.77	467.88	477.99	488.10	498.21	508.32	518.43	528.54	538.65	548.76	558.87
5.6	4.73	5.14	5.56	5.97	6.39	6.80	7.22	7.63	20.6	401.33	411.44	421.55	431.66	441.77	451.88	461.99	472.10	482.21	492.32	502.43	512.54	522.65	532.76	542.87	552.98	563.09
5.8	5.03	5.46	5.89	6.32	6.75	7.17	7.60	8.03	20.8	405.56	415.67	425.78	435.89	445.99	456.10	466.21	476.32	486.43	496.54	506.65	516.76	526.87	536.98	547.09	557.20	567.31
6.0	5.33	5.78	6.22	6.67	7.11	7.56	8.00	8.44	21.0	409.78	419.89	429.99	440.10	450.21	460.32	470.43	480.54	490.65	500.76	510.87	520.98	531.09	541.20	551.31	561.42	571.53
6.2	5.65	6.11	6.57	7.03	7.49	7.95	8.40	8.86	21.2	414.00	424.11	434.22	444.33	454.44	464.55	474.66	484.77	494.88	504.99	515.10	525.21	535.32	545.43	555.54	565.65	575.76
6.4	5.97	6.45	6.92	7.39	7.86	8.32	8.79	9.26	21.4	418.22	428.33	438.44	448.55	458.66	468.77	478.88	488.99	499.10	509.21	519.32	529.43	539.54	549.65	559.76	569.87	579.98
6.6	6.31	6.80	7.28	7.77	8.26	8.75	9.24	9.73	21.6	422.44	432.55	442.66	452.77	462.88	472.99	483.10	493.21	503.32	513.43	523.54	533.65	543.76	553.87	563.98	574.09	584.20
6.8	6.65	7.15	7.66	8.16	8.66	9.17	9.67	10.17	21.8	426.67	436.78	446.89	456.99	467.10	477.21	487.32	497.43	507.54	517.65	527.76	537.87	547.98	558.09	568.20	578.31	588.42
7.0	7.00	7.52	8.04	8.56	9.07	9.59	10.11	10.63	22.0	430.89	441.00	451.11	461.22	471.33	481.44	491.55	501.66	511.77	521.88	531.99	542.10	552.21	562.32	572.43	582.54	592.65
7.2	7.36	7.89	8.43	8.96	9.49	10.03	10.56	11.09	22.2	435.11	445.22	455.33	465.44	475.55	485.66	495.77	505.88	515.99	526.10	536.21	546.32	556.43	566.54	576.65	586.76	596.87
7.4	7.73	8.28	8.83	9.37	9.92	10.47	11.02	11.57	22.4	439.33	449.44	459.55	469.66	479.77	489.88	499.99	510.10	520.21	530.32	540.43	550.54	560.65	570.76	580.87	590.98	601.09
7.6	8.11	8.67	9.23	9.80	10.36	10.92	11.48	12.05	22.6	443.56	453.67	463.78	473.89	483.99	494.10	504.21	514.32	524.43	534.54	544.65	554.76	564.87	574.98	585.09	595.20	605.31
7.8	8.49	9.07	9.65	10.23	10.80	11.38	11.96	12.54	22.8	447.78	457.89	467.99	478.10	488.21	498.32	508.43	518.54	528.65	538.76	548.87	558.98	569.09	579.20	589.31	599.42	609.53
8.0	8.89	9.48	10.07	10.67	11.26	11.85	12.44	13.04	23																	

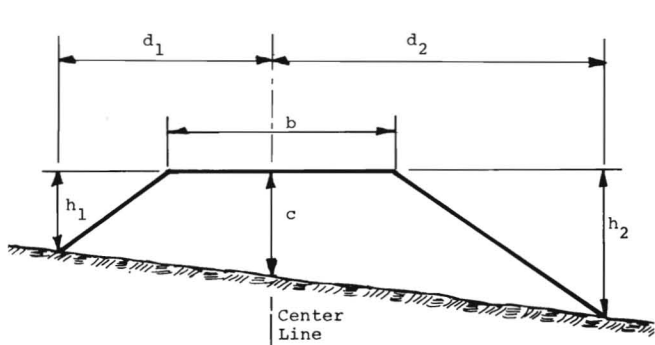


Figure 2. Cross section of an embankment that has been constructed on a sloping base.

## Calculating for sloped base

The tabulated values are accurate only when the embankment is constructed on a level base. Figure 2 presents the cross section of an embankment constructed on a cross slope. Volumes in cubic yards per foot of length can be calculated for this situation by using the following equation where all distances are in feet:

$$\text{Volume per foot of length} = \frac{C(d_1 + d_2)}{54} + \frac{b(h_1 + h_2)}{108}$$

Table 3. Volume (cubic yards) per foot of length for embankments with slopes totaling 7:1.

EIGHT FT.	TOP WIDTH (FEET)										HEIGHT FT.	TOP WIDTH (FEET)										HEIGHT FT.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
	6	8	10	12	14	16	18	20	22	24		6	8	10	12	14	16	18	20	22	24																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
3.2	0.05	0.36	1.14	2.39	4.11	6.12	8.40	11.15	15.3	32.50	33.61	34.72	35.83	36.94	38.06	39.17	40.28	41.39	42.50	43.61	44.72	45.83	46.94	48.06	49.17	50.28	51.39	52.50	53.61	54.72	55.83	56.94	58.06	59.17	60.28	61.39	62.50	63.61	64.72	65.83	66.94	68.06	69.17	70.28	71.39	72.50	73.61	74.72	75.83	76.94	78.06	79.17	80.28	81.39	82.50	83.61	84.72	85.83	86.94	88.06	89.17	90.28	91.39	92.50	93.61	94.72	95.83	96.94	98.06	99.17	100.28	101.39	102.50	103.61	104.72	105.83	106.94	108.06	109.17	110.28	111.39	112.50	113.61	114.72	115.83	116.94	118.06	119.17	120.28	121.39	122.50	123.61	124.72	125.83	126.94	128.06	129.17	130.28	131.39	132.50	133.61	134.72	135.83	136.94	138.06	139.17	140.28	141.39	142.50	143.61	144.72	145.83	146.94	148.06	149.17	150.28	151.39	152.50	153.61	154.72	155.83	156.94	158.06	159.17	160.28	161.39	162.50	163.61	164.72	165.83	166.94	168.06	169.17	170.28	171.39	172.50	173.61	174.72	175.83	176.94	178.06	179.17	180.28	181.39	182.50	183.61	184.72	185.83	186.94	188.06	189.17	190.28	191.39	192.50	193.61	194.72	195.83	196.94	198.06	199.17	200.28	201.39	202.50	203.61	204.72	205.83	206.94	208.06	209.17	210.28	211.39	212.50	213.61	214.72	215.83	216.94	218.06	219.17	220.28	221.39	222.50	223.61	224.72	225.83	226.94	228.06	229.17	230.28	231.39	232.50	233.61	234.72	235.83	236.94	238.06	239.17	240.28	241.39	242.50	243.61	244.72	245.83	246.94	248.06	249.17	250.28	251.39	252.50	253.61	254.72	255.83	256.94	258.06	259.17	260.28	261.39	262.50	263.61	264.72	265.83	266.94	268.06	269.17	270.28	271.39	272.50	273.61	274.72	275.83	276.94	278.06	279.17	280.28	281.39	282.50	283.61	284.72	285.83	286.94	288.06	289.17	290.28	291.39	292.50	293.61	294.72	295.83	296.94	298.06	299.17	300.28	301.39	302.50	303.61	304.72	305.83	306.94	308.06	309.17	310.28	311.39	312.50	313.61	314.72	315.83	316.94	318.06	319.17	320.28	321.39	322.50	323.61	324.72	325.83	326.94	328.06	329.17	330.28	331.39	332.50	333.61	334.72	335.83	336.94	338.06	339.17	340.28	341.39	342.50	343.61	344.72	345.83	346.94	348.06	349.17	350.28	351.39	352.50	353.61	354.72	355.83	356.94	358.06	359.17	360.28	361.39	362.50	363.61	364.72	365.83	366.94	368.06	369.17	370.28	371.39	372.50	373.61	374.72	375.83	376.94	378.06	379.17	380.28	381.39	382.50	383.61	384.72	385.83	386.94	388.06	389.17	390.28	391.39	392.50	393.61	394.72	395.83	396.94	398.06	399.17	400.28	401.39	402.50	403.61	404.72	405.83	406.94	408.06	409.17	410.28	411.39	412.50	413.61	414.72	415.83	416.94	418.06	419.17	420.28	421.39	422.50	423.61	424.72	425.83	426.94	428.06	429.17	430.28	431.39	432.50	433.61	434.72	435.83	436.94	438.06	439.17	440.28	441.39	442.50	443.61	444.72	445.83	446.94	448.06	449.17	450.28	451.39	452.50	453.61	454.72	455.83	456.94	458.06	459.17	460.28	461.39	462.50	463.61	464.72	465.83	466.94	468.06	469.17	470.28	471.39	472.50	473.61	474.72	475.83	476.94	478.06	479.17	480.28	481.39	482.50	483.61	484.72	485.83	486.94	488.06	489.17	490.28	491.39	492.50	493.61	494.72	495.83	496.94	498.06	499.17	500.28	501.39	502.50	503.61	504.72	505.83	506.94	508.06	509.17	510.28	511.39	512.50	513.61	514.72	515.83	516.94	518.06	519.17	520.28	521.39	522.50	523.61	524.72	525.83	526.94	528.06	529.17	530.28	531.39	532.50	533.61	534.72	535.83	536.94	538.06	539.17	540.28	541.39	542.50	543.61	544.72	545.83	546.94	548.06	549.17	550.28	551.39	552.50	553.61	554.72	555.83	556.94	558.06	559.17	560.28	561.39	562.50	563.61	564.72	565.83	566.94	568.06	569.17	570.28	571.39	572.50	573.61	574.72	575.83	576.94	578.06	579.17	580.28	581.39	582.50	583.61	584.72	585.83	586.94	588.06	589.17	590.28	591.39	592.50	593.61	594.72	595.83	596.94	598.06	599.17	600.28	601.39	602.50	603.61	604.72	605.83	606.94	608.06	609.17	610.28	611.39	612.50	613.61	614.72	615.83	616.94	618.06	619.17	620.28	621.39	622.50	623.61	624.72	625.83	626.94	628.06	629.17	630.28	631.39	632.50	633.61	634.72	635.83	636.94	638.06	639.17	640.28	641.39	642.50	643.61	644.72	645.83	646.94	648.06	649.17	650.28	651.39	652.50	653.61	654.72	655.83	656.94	658.06	659.17	660.28	661.39	662.50	663.61	664.72	665.83	666.94	668.06	669.17	670.28	671.39	672.50	673.61	674.72	675.83	676.94	678.06	679.17	680.28	681.39	682.50	683.61	684.72	685.83	686.94	688.06	689.17	690.28	691.39	692.50	693.61	694.72	695.83	696.94	698.06	699.17	700.28	701.39	702.50	703.61	704.72	705.83	706.94	708.06	709.17	710.28	711.39	712.50	713.61	714.72	715.83	716.94	718.06	719.17	720.28	721.39	722.50	723.61	724.72	725.83	726.94	728.06	729.17	730.28	731.39	732.50	733.61	734.72	735.83	736.94	738.06	739.17	740.28	741.39	742.50	743.61	744.72	745.83	746.94	748.06	749.17	750.28	751.39	752.50	753.61	754.72	755.83	756.94	758.06	759.17	760.28	761.39	762.50	763.61	764.72	765.83	766.94	768.06	769.17	770.28	771.39	772.50	773.61	774.72	775.83	776.94	778.06	779.17	780.28	781.39	782.50	783.61	784.72	785.83	786.94	788.06	789.17	790.28	791.39	792.50	793.61	794.72	795.83	796.94	798.06	799.17	800.28	801.39	802.50	803.61	804.72	805.83	806.94	808.06	809.17	810.28	811.39	812.50	813.61	814.72	815.83	816.94	818.06	819.17	820.28	821.39	822.50	823.61	824.72	825.83	826.94	828.06	829.17	830.28	831.39	832.50	833.61	834.72	835.83	836.94	838.06	839.17	840.28	841.39	842.50	843.61	844.72	845.83	846.94	848.06	849.17	850.28	851.39	852.50	853.61	854.72	855.83	856.94	858.06	859.17	860.28	861.39	862.50	863.61	864.72	865.83	866.94	868.06	869.17	870.28	871.39	872.50	873.61	874.72	875.83	876.94	878.06	879.17	880.28	881.39	882.50	883.61	884.72	885.83	886.94	888.06	889.17	890.28	891.39	892.50	893.61	894.72	895.83	896.94	898.06	899.17	900.28	901.39	902.50	903.61	904.72	905.83	906.94	908.06	909.17	910.28	911.39	912.50	913.61	914.72	915.83	916.94	918.06	919.17	920.28	921.39	922.50	923.61	924.72	925.83	926.94	928.06	929.17	930.28	931.39	932.50	933.61	934.72	935.83	936.94	938.06	939.17	940.28	941.39	942.50	943.61	944.72	945.83	946.94	948.06	949.17	950.28	951.39	952.50	953.61	954.72	955.83	956.94	958.06	959.17	960.28	961.39	962.50	963.61	964.72	965.83	966.94	968.06	969.17	970.28	971.39	972.50	973.61	974.72	975.83	976.94	978.06	979.17	980.28	981.39	982.50	983.61	984.72	985.83	986.94	988.06	989.17	990.28	991.39	992.50	993.61	994.72	995.83	996.94	998.06	999.17	1000.28	1001.39	1002.50	1003.61	1004.72	1005.83	1006.94	1008.06	1009.17	1010.28	1011.39	1012.50	1013.61	1014.72	1015.83	1016.94	1018.06	1019.17	1020.28	1021.39	1022.50	1023.61	1024.72	1025.83	1026.94	1028.06	1029.17	1030.28	1031.39	1032.50	1033.61	1034.72	1035.83	1036.94	1038.06	1039.17	1040.28	1041.39	1042.50	1043.61	1044.72	1045.83	1046.94	1048.06	1049.17	1050.28	1051.39	1052.50	1053.61	1054.72	1055.83	1056.94	1058.06	1059.17	1060.28	1061.39	1062.50	1063.61	1064.72	1065.83	1066.94	1068.06	1069.17	1070.28	1071.39	1072.50	1073.61	1074.72	1075.83	1076.94	1078.06	1079.17	1080.28	1081.39	1082.50	1083.61	1084.72	1085.83	1086.94	1088.06	1089.17	1090.28	1091.39	1092.50	1093.61	1094.72	1095.83	1096.94	1098.06	1099.17	1100.28	1101.39	1102.50	1103.61	1104.72	1105.83	1106.94	1108.06	1109.17	1110.28	1111.39	1112.50	1113.61	1114.72	1115.83	1116.94	1118.06	1119.17	1120.28	1121.39	1122.50	1123.61	1124.72	1125.83	1126.94	1128.06	1129.17	1130.28	1131.39	1132.50	1133.61	1134.72	1135.83	1136.94	1138.06	1139.17	1140.28	1141.39	1142.50	1143.61	1144.72	1145.83	1146.94	1148.06	1149.17	1150.28	1151.39	1152.50	1153.61	1154.72	1155.83	1156.94	1158.06	1159.17	1160.28	1161.39	1162.50	1163.61	1164.72	1165.83	1166.94	1168.06	1169.17	1170.28	1171.39	1172.50	1173.61	1174.72	1175.83	1176.94	1178.06	1179.17	1180.28	1181.39	1182.50	1183.61	1184.72	1185.83	1186.94	

**Table 4. Volume (cubic yards) per foot of length for embankments with slopes totaling 8:1.**

HEIGHT FT.	TOP WIDTH (FEET)								HEIGHT FT.	TOP WIDTH (FEET)								HEIGHT FT.	TOP WIDTH (FEET)							
	6	8	10	12	14	16	18	20		6	8	10	12	14	16	18	20		6	8	10	12	14	16	18	20
0.2	0.05	0.07	0.08	0.09	0.11	0.12	0.14	0.15	15.0	36.67	37.78	38.89	40.00	41.11	42.22	43.33	44.44	30.0	140.00	142.22	144.44	146.66	148.89	151.11	153.33	155.55
0.4	0.11	0.14	0.17	0.20	0.23	0.26	0.29	0.32	15.2	37.61	38.73	39.86	40.98	42.11	43.24	44.36	45.49	30.2	141.83	144.76	147.69	150.62	153.55	156.48	159.41	162.34
0.6	0.19	0.23	0.28	0.32	0.36	0.41	0.45	0.50	15.4	38.56	39.70	40.84	41.98	43.12	44.26	45.40	46.54	30.4	143.67	146.62	149.57	152.52	155.47	158.42	161.37	164.32
0.8	0.27	0.33	0.39	0.45	0.51	0.57	0.63	0.69	15.6	39.52	40.68	41.83	42.99	44.14	45.30	46.45	47.61	30.6	145.52	148.50	151.47	154.45	157.42	160.39	163.36	166.33
1.0	0.37	0.44	0.52	0.59	0.67	0.74	0.81	0.89	15.8	40.49	41.67	42.84	44.01	45.18	46.35	47.52	48.69	30.8	147.38	149.66	151.94	154.22	156.50	158.78	161.06	163.34
1.2	0.48	0.57	0.66	0.75	0.84	0.92	1.01	1.10	16.0	41.48	42.67	43.85	45.04	46.22	47.41	48.59	49.78	31.0	149.26	151.55	153.85	156.15	158.44	160.74	163.03	165.33
1.4	0.60	0.71	0.81	0.91	1.02	1.12	1.22	1.33	16.2	42.48	43.68	44.88	46.08	47.28	48.48	49.68	50.88	31.2	151.14	153.46	155.77	158.08	160.39	162.70	165.01	167.32
1.6	0.73	0.85	0.97	1.09	1.21	1.33	1.45	1.56	16.4	43.49	44.71	45.92	47.13	48.35	49.56	50.78	51.99	31.4	153.04	155.37	157.70	160.02	162.35	164.67	167.00	169.32
1.8	0.88	1.01	1.15	1.28	1.41	1.55	1.68	1.81	16.6	44.51	45.74	46.97	48.20	49.43	50.66	51.89	53.12	31.6	154.95	157.30	159.64	161.98	164.32	166.66	169.00	171.34
2.0	1.04	1.19	1.33	1.48	1.63	1.78	1.93	2.07	16.8	45.55	46.79	48.04	49.28	50.52	51.77	53.01	54.26	31.8	156.88	159.23	161.59	163.94	166.29	168.64	171.00	173.35
2.2	1.21	1.37	1.53	1.69	1.86	2.02	2.18	2.35	17.0	46.59	47.85	49.11	50.37	51.63	52.89	54.15	55.41	32.0	158.81	161.18	163.55	165.92	168.29	170.66	173.03	175.40
2.4	1.39	1.56	1.74	1.92	2.10	2.28	2.45	2.63	17.2	47.65	48.92	50.20	51.47	52.75	54.02	55.29	56.57	32.2	160.76	163.14	165.53	167.91	170.30	172.68	175.07	177.45
2.6	1.58	1.77	1.96	2.16	2.35	2.54	2.73	2.93	17.4	48.72	50.01	51.30	52.59	53.88	55.16	56.45	57.74	32.4	162.72	165.12	167.52	169.92	172.32	174.72	177.12	179.52
2.8	1.78	1.99	2.20	2.41	2.61	2.82	3.03	3.24	17.6	49.80	51.10	52.41	53.71	55.02	56.32	57.62	58.93	32.6	164.69	167.10	169.51	171.93	174.34	176.75	179.16	181.57
3.0	2.00	2.22	2.44	2.67	2.89	3.11	3.33	3.56	17.8	50.89	52.21	53.53	54.85	56.17	57.49	58.81	60.12	32.8	166.67	169.10	171.53	173.96	176.39	178.82	181.25	183.68
3.2	2.23	2.47	2.70	2.94	3.18	3.41	3.65	3.89	18.0	52.00	53.33	54.67	56.00	57.33	58.67	60.00	61.33	33.0	168.66	171.11	173.55	176.00	178.44	180.89	183.33	185.77
3.4	2.47	2.72	2.97	3.22	3.48	3.73	3.98	4.23	18.2	53.12	54.46	55.81	57.16	58.51	59.86	61.21	62.55	33.2	170.67	173.13	175.59	178.05	180.51	182.97	185.43	187.88
3.6	2.72	2.99	3.25	3.52	3.79	4.05	4.32	4.59	18.4	54.25	55.61	56.97	58.33	59.70	61.06	62.42	63.79	33.4	172.69	175.16	177.64	180.11	182.58	185.05	187.53	190.01
3.8	2.98	3.27	3.55	3.83	4.11	4.39	4.67	4.95	18.6	55.39	56.76	58.14	59.52	60.90	62.28	63.65	65.03	33.6	174.72	177.21	179.69	182.18	184.67	187.16	189.65	192.14
4.0	3.25	3.56	3.85	4.15	4.44	4.74	5.04	5.33	18.8	56.54	57.93	59.32	60.72	62.11	63.50	64.89	66.29	33.8	176.76	179.26	181.77	184.27	186.77	189.28	191.78	194.28
4.2	3.55	3.86	4.17	4.48	4.79	5.10	5.41	5.72	19.0	57.70	59.11	60.52	61.93	63.33	64.74	66.15	67.56	34.0	178.81	181.33	183.85	186.37	188.89	191.41	193.92	196.44
4.4	3.85	4.17	4.50	4.82	5.15	5.48	5.80	6.13	19.2	58.88	60.30	61.72	63.15	64.57	65.99	67.41	68.84	34.2	180.88	183.41	185.93	188.45	190.97	193.49	196.01	198.53
4.6	4.16	4.50	4.84	5.18	5.52	5.86	6.20	6.54	19.4	60.07	61.50	62.94	64.38	65.82	67.25	68.69	70.13	34.4	182.95	185.50	188.05	190.60	193.15	195.69	198.24	200.79
4.8	4.48	4.84	5.19	5.55	5.90	6.26	6.61	6.97	19.6	61.27	62.72	64.17	65.62	67.08	68.53	69.98	71.43	34.6	185.04	187.61	190.17	192.73	195.29	197.86	200.42	202.98
5.0	4.81	5.19	5.56	5.93	6.30	6.67	7.04	7.41	19.8	62.48	63.95	65.41	66.88	68.35	69.81	71.28	72.75	34.8	187.14	189.72	192.30	194.87	197.45	200.03	202.61	205.19
5.2	5.15	5.52	5.89	6.26	6.63	7.00	7.37	7.74	20.0	63.70	65.18	66.67	68.15	69.63	71.11	72.59	74.07	35.0	189.26	191.85	194.44	197.03	199.63	202.22	204.81	207.40
5.4	5.52	5.92	6.32	6.72	7.12	7.52	7.92	8.32	20.2	64.94	66.44	67.93	69.43	70.92	72.42	73.92	75.41	35.2	191.38	193.99	196.60	199.21	201.81	204.42	207.02	209.63
5.6	5.89	6.31	6.72	7.13	7.55	7.96	8.38	8.79	20.4	66.19	67.70	69.21	70.72	72.23	73.74	75.25	76.76	35.4	193.56	196.18	198.80	201.42	204.04	206.66	209.28	211.90
5.8	6.27	6.70	7.13	7.56	7.99	8.42	8.85	9.28	20.6	67.45	68.97	70.50	72.02	73.55	75.07	76.60	78.13	35.6	195.76	198.39	201.03	203.67	206.31	208.95	211.59	214.23
6.0	6.67	7.11	7.56	8.00	8.44	8.89	9.33	9.78	20.8	68.72	70.26	71.80	73.34	74.88	76.42	77.96	79.50	35.8	197.92	200.58	203.24	205.90	208.56	211.22	213.88	216.54
6.2	7.07	7.53	7.99	8.45	8.91	9.37	9.83	10.29	21.0	70.00	71.55	73.11	74.67	76.22	77.78	79.33	80.89	36.0	200.00	202.66	205.33	208.00	210.66	213.33	216.00	218.66
6.4	7.49	7.96	8.44	8.91	9.39	9.85	10.33	10.81	21.2	71.29	72.86	74.43	76.01	77.58	79.15	80.72	82.29	36.2	202.18	204.85	207.54	210.22	212.91	215.60	218.29	220.98
6.6	7.92	8.41	8.90	9.39	9.88	10.36	10.85	11.34	21.4	72.60	74.19	75.77	77.36	78.94	80.53	82.11	83.70	36.4	204.38	207.07	209.77	212.47	215.17	217.87	220.57	223.27
6.8	8.36	8.87	9.37	9.87	10.38	10.88	11.38	11.89	21.6	73.92	75.52	77.12	78.72	80.32	81.92	83.52	85.12	36.6	206.58	209.29	212.01	214.72	217.43	220.14	222.85	225.56
7.0	8.81	9.33	9.85	10.37	10.89	11.41	11.93	12.44	21.8	75.25	76.88	78.48	80.09	81.71	83.32	84.94	86.55	36.8	208.80	211.53	214.25	216.98	219.71	222.44	225.17	227.90
7.2	9.28	9.81	10.35	10.89	11.41	11.95	12.48	13.01	22.0	76.59	78.22	79.85	81.48	83.11	84.74	86.37	88.00	37.0	211.03	213.77	216.51	219.24	222.00	224.74	227.48	230.22
7.4	9.76	10.31	10.85	11.40	11.96	12.50	13.05	13.59	22.2	77.95	79.59	81.23	82.88	84.52	86.17	87.81	89.46	37.2	213.29	216.03	218.79	221.54	224.29	227.05	229.81	232.56
7.6	10.25	10.81	11.37	11.93	12.50	13.06	13.62	14.19	22.4	79.31	80.97	82.63	84.29	85.95	87.61	89.27	90.93	37.4	215.53	218.28	221.03	223.78	226.53	229.29	232.05	234.82
7.8	10.75	11.32	11.90	12.48	13.06	13.64	14.21	14.79	22.6	80.69	82.36	84.04	85.71	87.39	89.06	90.73	92.41	37.6	217.80	220.56	223.33	226.10	228.87	231.64	234.41	237.18
8.0	11.26	11.85	12.44	13.04	13.63	14.22	14.81	15.41	22.8	82.08	83.77	85.46	87.15	88.84	90.52	92.21	93.90	37.8	220.08	222.87	225.67	228.46	231.26	234.05	236.85	239.65
8.2	11.78	12.39	13.00	13.61	14.21	14.82	15.43	16.04	23.0	83.48	85.18	86.89	88.59	90.29	92.00	93.70	95.41	38.0	222.37	225.18	228.00	230.81	233.62	236.44	239.25	242.07
8.4	12.32	12.94	13.56	14.19	14.81	15.43	16.05	16.68	23.2	84.89	86.61	88.33	90.05	91.77	93.49	95.20	96.92	38.2	224.67	227.50	230.33	233.16	236.00	238.82	241.65	244.48
8.6	12.87	13.51	14.14	14.78	15.42	16.05	16.69	17.33	23.4	86.32	88.05	89.78	91.52	93.25	94.99	96.72	98.45	38.4	226.98	229.83	232.67	235.52	238.36	241.21	244.05	246.90
8.8	13.43	14.08	14.73	15.38	16.04	16.69	17.34	17.99	23.6	87.76	89.50	91.25	93.00	94.75	96.50	98.24	99.99	38.6	229.31	232.17	235.03	237.89	240.75	243.61	246.47	249.32
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