DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

May 1, 2006
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Overcomer Y. Hor No. C45803 Exp. 12-31-06 CIVIL STATE OF CALIFORNIA

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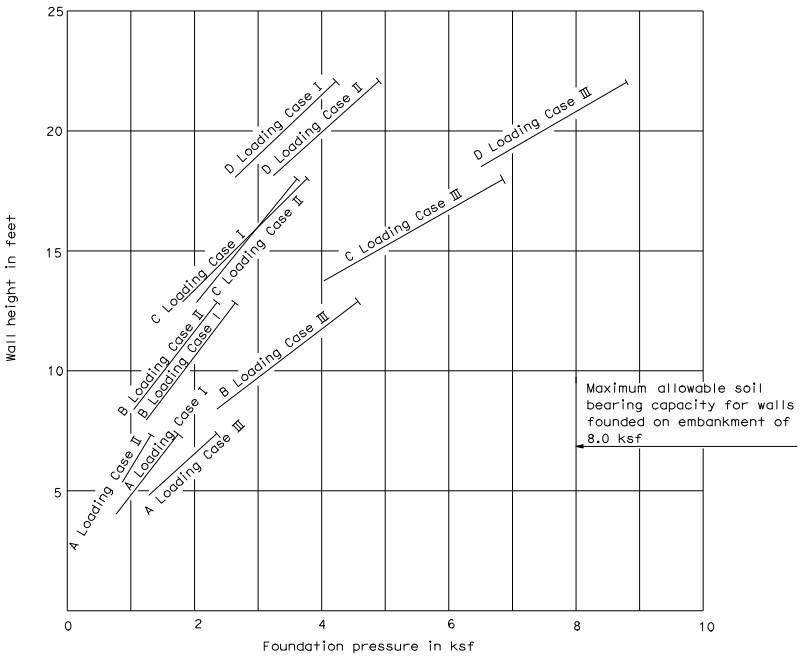


1:6 BATTERED WALL

LEGEND FOR GRAPH

- A, B, C, D = Wall type.
- Solid lines indicate normal range of wall use. Upper end of line indicates maximum wall height for a given wall type and loading.
- For description of loading case see DETAIL OF DESIGN LOADING CASES.

DESIGN NOTES:

1. WALL BASE IN EMBANKMENT: A minimum depth of 5′ of embankment at 95% relative soil compaction is required below the base of all walls in order to constitute an embankment condition. When the foundation pressure is between 5.0 ksf and 8.0 ksf embankment below the wall shall consist of "Structure backfill" material as set forth in Section 19-3.06 of the Standard Specifications. The limits of relative compaction (95%) shall be as set forth in Section 19-5.03 of the Standard Specifications.

2. WALL BASE IN ORIGINAL GROUND: Allowable soil pressure at toe of wall shall be determined by foundation site investigation. Walls that are to retain cut slopes shall be designed for lateral and toe pressures determined from site investigation data. Overall stability of slope with wall in place must be analyzed. If original ground slopes away from toe of wall, reduction in allowable bearing capacity due to slope must be considered. Walls shall not be founded in original ground having an allowable bearing capacity of less than 3.0 ksf. Consideration should be given to removal and replacement of unsuitable material with "Structure backfill" material as set forth in Section 19-3.06 of the Standard Specifications. The limits of relative compaction (95%) shall be as set forth in Section 19-5.03 of the Standard Specifications.

3. Soil Parameters;
   Backfill - $\phi = 34°$, $\gamma = 120$ LB/CF
   Foundation - $\phi = 34°$
   Lateral earth pressure determined by Rankine Theory.

DESIGN EXAMPLES

EXAMPLE No. 1

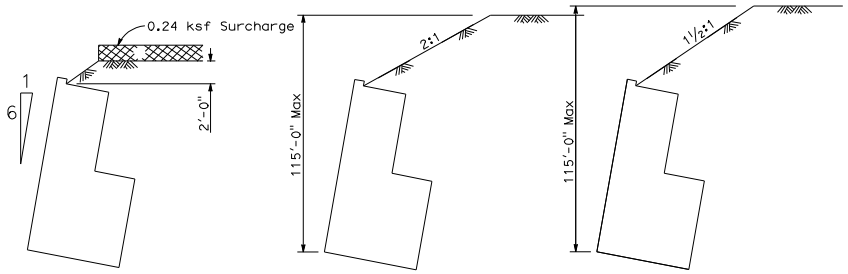
Given: Wall height 14′
Design Loading Case II.
Base in embankment (5′ depth minimum See Note 1)
Select: 1:6 batter "C" wall gives 2.5 ksf foundation pressure.
Vertical Wall not permitted.
See chart for required numbers and sizes of timber members.

EXAMPLE No. 2

Given: Wall height 19′-4"
Design Loading Case III. Base is in original ground.
Foundation site investigation determines the allowable soil bearing capacity at 6.0 ksf.
Select: 1:6 batter "D" wall gives 7.5 ksf foundation pressure.
Vertical wall not permitted. Since foundation pressure is greater than allowable bearing capacity of native material, replace original material with "Structure backfill" to increase base bearing capacity. (See Note 2)

EXAMPLE No. 3

Given: Wall height 22′
Design Loading Case II. Base is in embankment.
(See Note 1)
Select: 1:6 batter "D" wall gives 5.2 ksf foundation pressure.
Vertical wall not permitted. Foundation pressure is less than 5.0 ksf. Base material below wall shall be compacted to a relative compaction of 95%. (See Note 1).



CASE I CASE II CASE III

DETAIL OF DESIGN LOADING CASES

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

TIMBER CRIB WALL TYPES A, B, C AND D DESIGN DATA

NO SCALE

C9B

7-26-05