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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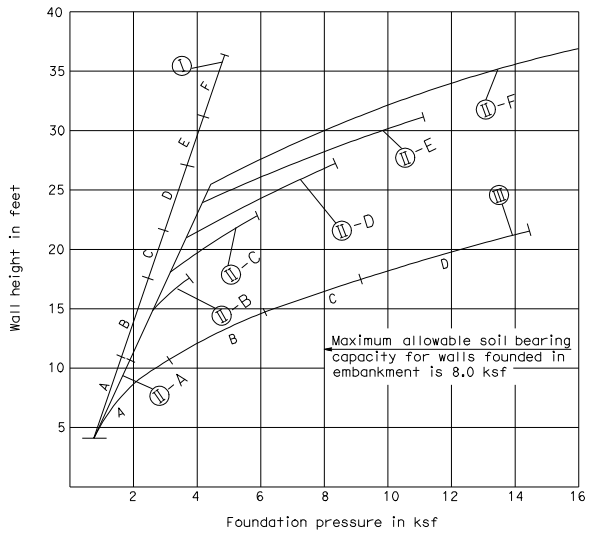
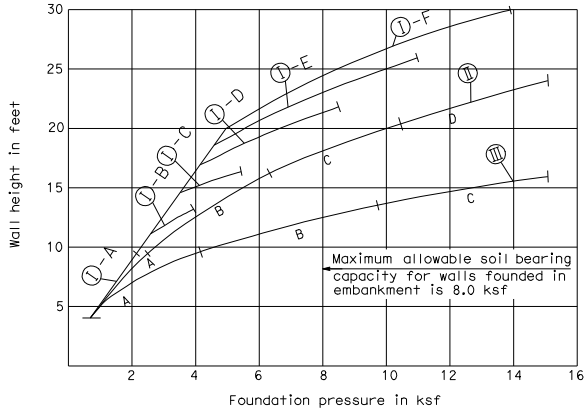


1:6 BATTERED WALL



VERTICAL WALL

DESIGN EXAMPLES

EXAMPLE No. 1

Given: Wall height 24′.
Design loading Case II.
115′ maximum from toe of wall to top of slope.
Base in embankment (5′ depth minimum).

Select: 1:6 Battered wall. Vertical wall not permitted. Type D wall selected. Maximum height on graph is 26′ at 8.0 ksf. Since the foundation pressure is 6.4 ksf at 24′, the wall must be founded on a 5′ thickness of "Structure Backfill" (See Design Note 1). A drainage system behind this wall will be required.

EXAMPLE No. 2

Given: Wall height 29′.
Design loading Case II. Foundation site investigation indicates lateral pressure from material above will be equivalent to 2:1 embankment slope. Base in excavation level at toe of wall. Foundation investigation determines the allowable soil bearing capacity at 3 TSF.

Select: Battered Type F wall maximum height at 8.0 ksf is 29′, therefore the replacement of 5′ of excavation with "Structure Backfill" to increase the allowable soil bearing capacity to 8.0 ksf is required (See Design Note 1). A drainage system for this wall should be investigated.

EXAMPLE No. 3

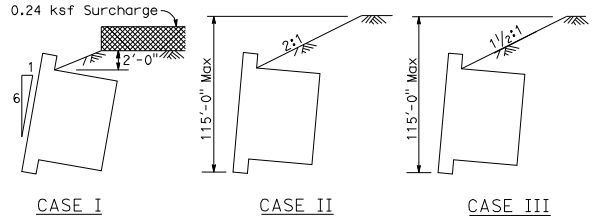
Given: Wall height 15′.
Design loading Case III with slope 18′ above top of wall to be retained. Based on original ground. Foundation investigation determines allowable soil bearing capacity at 4.0 ksf.

Select: Use a Type C Battered Wall. However foundation pressure exceeds 4.0 ksf, therefore the replacement of 5′ of excavation with "Structure Backfill" to increase the allowable soil bearing capacity to 8.0 ksf is required (See Design Note 1).

LEGEND FOR GRAPHS

A, B, C, D, E, F = Wall Type
I, II, III = Loading Case

- For description of loading case, see detail of design loading cases.
- Upper end of line indicates maximum wall height for a given wall type.



DETAIL OF DESIGN LOADING CASES

Note: Similar loading cases for vertical wall.

NOTE:

For construction details see Sheet C8A.

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 percent) 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 percent) shall be as set forth in Section 19-5.03 of the Standard Specifications.

3. Drainage:
   a. Internal: Section 19-3.06 of the Standard Specifications.
   b. External: If the combined height of wall and overfill (measured along face of wall and vertically from the toe of fill to top of fill) exceeds 25′ a system to drain water away from the back face of wall shall be provided. The type and extent of this system will depend on the type of backfill material expected to be used, the combined height of wall and backfill, and the location of the water table in the area.

4. Sloping Surcharge Limitations: The maximum height of fill behind any wall, or family of walls, shall not exceed 115′ (measured vertically from the toe of the bottom wall to the top of fill behind the uppermost wall). For a family of walls the slope of a line drawn from the top of the front face of the bottom wall to the top of the front face of any intermediate or top wall, shall in no case be steeper than 1½:1.

Material Specifications:
Steel sheets:
AASHTO M218
45,000 psi Ultimate
33,000 psi Yield
@ 20% Elongation
Bolts: ASTM A307 Grade A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

STEEL CRIB WALL DESIGN DATA

NO SCALE

C8C

2006 STANDARD PLAN C8C

7-18-05