

Chapter 4 Seawalls

4-1. General

A seawall is a massive structure that is designed primarily to resist wave action along high value coastal property. Seawalls may be either gravity- or pile-supported structures. Common construction materials are either concrete or stone. Seawalls can have a variety of face shapes (Figure 4-1).

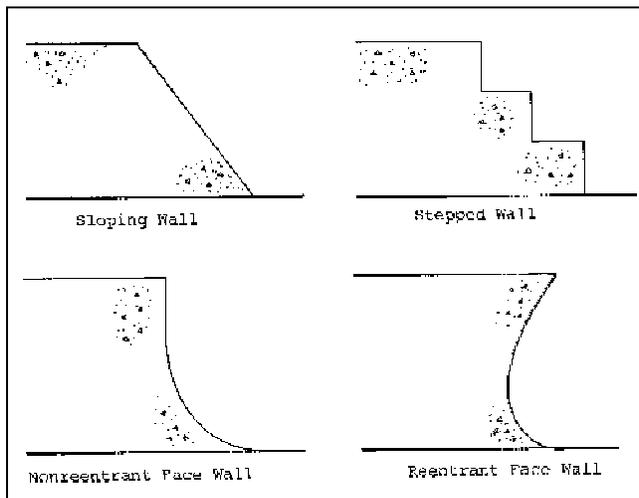


Figure 4-1. Typical concrete seawall sections

4-2. Concrete Seawalls

These structures are often pile-supported with sheetpile cutoff walls at the toe to prevent undermining. Additional rock toe protection may also be used. The seaward face may be stepped, vertical, or recurved. Typical examples are described in Appendix C and shown in Figure 4-2.

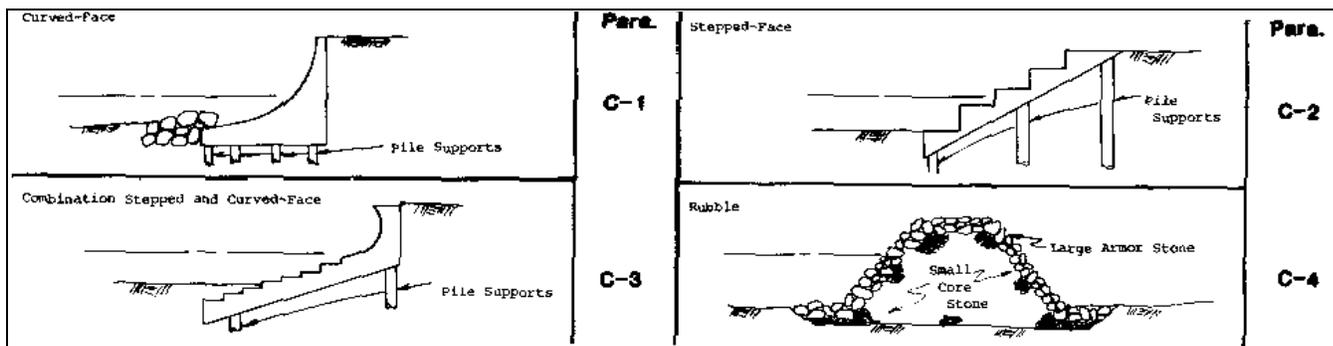


Figure 4.2. Summary of seawall alternatives

4-3. Rubble-Mound Seawalls

These are designed like breakwaters using a rock size that will be stable against the design wave. Stability is determined using the method described in paragraphs 2-15 to 2-18. An example is described in Appendix C and shown in Figure 4-2.

4-4. Design Procedure Checklist

The most critical design elements are a secure foundation to minimize settlement and toe protection to prevent undermining. Both of these are potential causes of failure of such walls. The usual steps needed to develop an adequate seawall design follow.

- a. Determine the water level range for the site (paragraph 2-5).
- b. Determine the wave heights (paragraphs 2-6 to 2-11).
- c. Select suitable seawall configurations (Appendix C).
- d. Design pile foundations using EM 1110-2-2906.
- e. Select a suitable armor unit type and size (rubble seawalls and toe protection) (paragraphs 2-15 to 2-18).
- f. Determine the potential runup to set the crest elevation (paragraphs 2-12 to 2-13).
- g. Determine the amount of overtopping expected for low structures (paragraph 2-14).
- h. Design underdrainage features if they are required.

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i. Provide for local surface runoff and overtopping and runoff, and make any required provisions for other drainage facilities such as culverts and ditches.

j. Consider end conditions to avoid failure due to flanking (paragraph 2-21).

k. Design the toe protection (paragraph 2-19).

l. Design the filter and underlayers (paragraph 2-20).

m. Provide for firm compaction of all fill and back-fill materials. This requirement should be included on the plans and in the specifications, and due allowance for compaction must be made in the cost estimate.

n. Develop cost estimate for each alternative.