2.4.2 OTHER STRUCTURES

2.4.2.1 RETAINING WALLS – GENERAL and USING STANDARD COMPONENTS

GENERAL DESCRIPTION

Precast retaining walls are used to retain material, usually soil. They can be cantilever walls or walls spanning vertically between supports (such as the basement floor and ground floors in buildings) or walls spanning horizontally between columns, walls, abutments or similar.

They resist lateral actions due to soil, water, surcharge loads, other materials and the like. When they are resisting soil loads they should be designed to AS 4678 *Earth retaining structures*, with an appropriate geotechnical investigation. They may also have to prevent the ingress of water, which will require consideration of hydrostatic pressures, tanking, drainage, sealing of joints, etc.

Precast retaining walls can be built using standard components as described below, or purpose-designed (see 2.4.2.2).

STORAGE WALLS

Modular L- and T-shaped cantilever retaining wall units are used internally or externally, often to confine bulk materials, and to increase the amount that can be stored in a given area. Units are typically free-standing but they can be mechanically fixed to the foundation when necessary. Designs can accommodate materials of varying density from grains to metals.

Units are available generally in 610 and 1220 mm widths with a height range from 1.07 to 6.10 m. Detailed design information can be found on various manufactures' websites.

HOLLOWCORE WALLS

Hollowcore wall panels have been used as retaining walls in both building and civil projects, generally spanning horizontally. Their use has included retaining walls for buildings, abutment walls for bridges and walls for mining projects.

Panels come in 1200-mm widths and of varying lengths. Their thicknesses range from 150 to 400 mm in 50-mm increments. A common arrangement is for walls to span horizontally between galvanised steel sections.

CRIB WALLS

Crib walls are constructed by interlocking individual precast concrete boxes which are filled with crushed stone or other coarse materials to create a free-draining structure. The units are spaced so that the fill material contained within the crib acts in conjunction to support the retained earth.

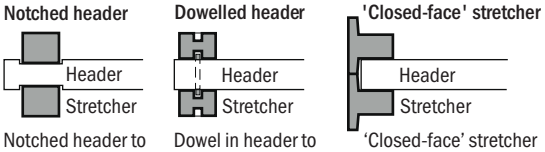
Crib walls use less concrete than a concrete gravity wall. They are commonly used with compacted embankments, cuttings and bridge approaches. They may be used as either permanent or temporary structures.

They are normally constructed with a 4:1 batter, but by increasing the section depth the batter may be lessened and/or the wall height increased. Crib elements are supplied in lengths from 500 to 2000 mm in modular systems to suit wall heights ranging from 1.5 to 10 m.

Crib walls are designed as gravity retaining walls using either the Rankine Theory (semi fluid analysis) or the Coulomb Theory (Soil Wedge Analysis) with the requisite safety factors for overturning and sliding. They are not suitable for retaining slopes which are likely to slip. High crib walls are sensitive to transverse differential settlement and the strength of cross members will limit the support of surcharged loads.

Detailed design information and other propriety systems can be found on manufacturers' websites.

TYPICAL CRIB-WALL HEADER VARIATIONS

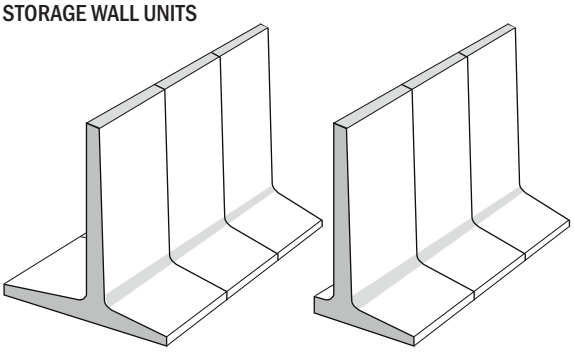


Notched header to locate and retain stretcher

Dowel in header to locate and retain stretcher

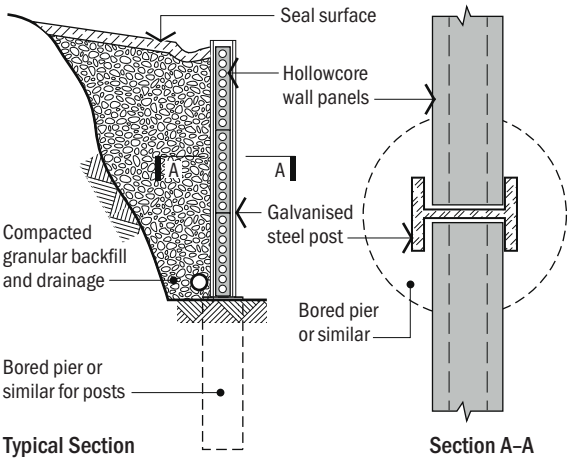
'Closed-face' stretcher to retain fill in marine applications

STORAGE WALL UNITS



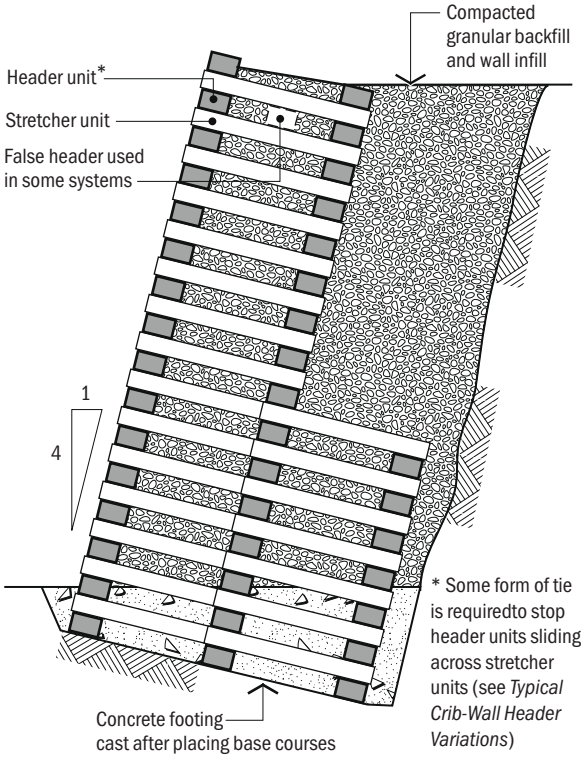
T-Units L-Units

HOLLOWCORE WALLS



Typical Section Section A–A

TYPICAL ARRANGEMENT OF CRIB WALLS



* Some form of tie is requiredto stop header units sliding across stretcher units (see *Typical Crib-Wall Header Variations*)