CHAPTER 28
SPECIAL FORMS OF CONSTRUCTION
SECTION 129 - RETAINING WALLS

2801. **General.** Retaining walls can be used if the construction of stable slopes is impracticable, of if it involves excessive earth movement, but skilled labor and suitable material must be available locally.

2802. **Revetment.** Some form of revetment may be adequate for temporary work:

a. For heights up to about five feet sandbags, gabions, or expendable oil or bitumen drums, filled with soil or rubble and fence posts of varying sizes.

b. **For Larger Scale Work.**

(i) Solid sandbag walls, properly battered and bonded, and well drained.
(ii) Sapling of logs, laid horizontally behind well driven and firmly anchored pickets or piles.
(iii) Concrete/reinforced concrete soil retaining walls.

Figure 28-1: Fence post

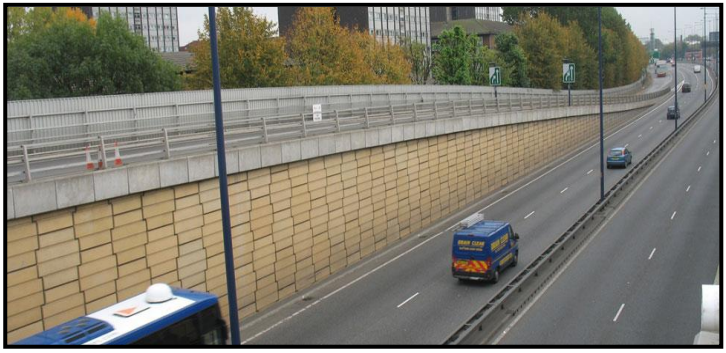

Figure 28-2: Concrete/Reinforced Concrete Retaining Wall

2803. **Pile and Planking Walls.** See RESPB No.3, Section 34.

Timber Cribbing

2804. Well-built ribbing (see Figure28.3) can be used for heights up to 30 ft. if the fill behind its well consolidated.

2805. **Materials.** Square timber is preferabletoround timber, not less than 6 in in diameter can be used.

Fill material must be clean, well graded, and free of mud or slurry. Hardcore or crushed stone is recommended. One 3-ton truckload of timber is needed for 8 cu yards of cribbing. Each cubic yard of cribbing requires about $\frac{1}{2}$ cu yard of stone for consolidation.

2806. **Construction.**

a. The foundation must be on solid ground and transverse slope 1 in 4. On longitudinal slopes the footing should be stepped, as each length must be level. Drainage channels,backfilled with rubble, should be cut at 30 ft intervals.

b. Ruling dimensions are shown in Figure28.3 and table 28.1. Both headers and stretchers should be spaced at 3 ft centers, but for walls less than 20 ft high spacing may be increased (maximum 6 ft).

c. The bottom course is always a header course, and the top one a stretcher course, well dogged to the headers below it. Headers must be laid vertically above each other and 10 percent should be of long timber

to bond with the fill behind the crib, stretchers must not be butt jointed; the timbers should overlap at least 18 ins. Joints must be staggered.

d. The crib is built in lifts not exceeding 2 ft the packing being thoroughly consolidated at each lift. The fill behind the crib should be placed and compacted in similar lifts.

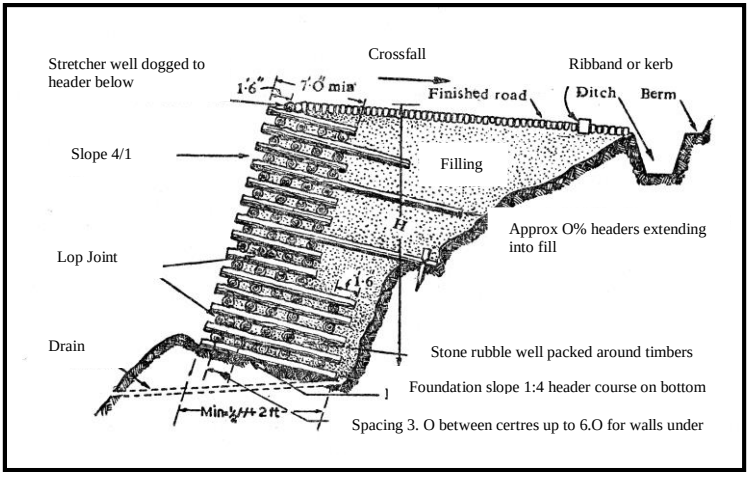

Figure 28-3: Timber Cribbing

Gravity Walls

2807. Design is dealt with in RESPB No 3 section 33. Typical; designs are shown in Figure28.4, and typical proportion in Table 28.1

TABLE 28.1 – RETAINING WALLS – TYPICAL PROPORTIONS

(See Figure28.4)

Ser No	Material	Thickness		Width of foundation	Remarks
		Base	Top		
(a)	(b)	(c)	(d)	(e)	(f)
1.	Mass concrete	0.35 H	0.175 H	0.52 H	Lay course at right angle to batter ditto
2.	Dressed stone	0.35 H	0.175 H	0.52 H	
3.	First class rubble in mortar	0.35 H	0.175 H	0.52 H	
4.	Good common rubble	0.4 H	0.2 H	0.6 H	
5.	Brick in mortar	0.4 H	0.2 H	0.6 H	Decrease width every fifth course

6.	Dry stone masonry	0.5 H	0.25 H	0.75 H	Bed each course in earth or stone dust
7.	Timber crib	0.5 H + 2ft	7 ft (min)	0.5H + 2ft	Fill voids of crib with stone and rubble

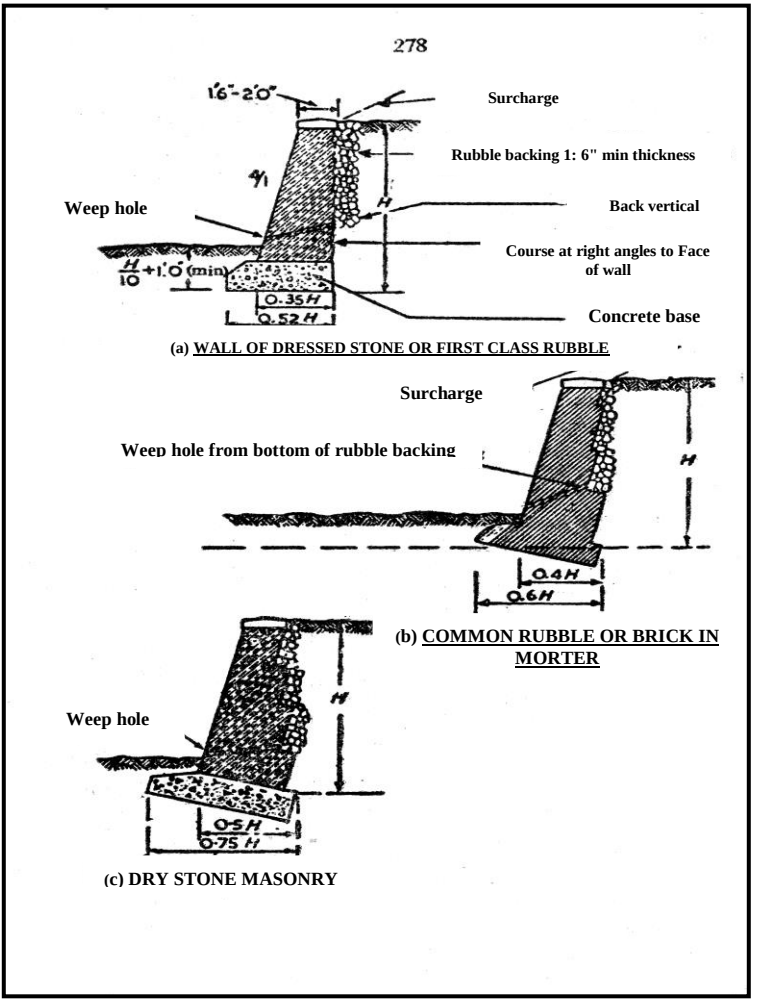

Figure 28-4: Typical Gravity Retaining Wall

2808. **Construction.** A solid foundation and correct batter are vital. Each course must be built at right angles to the better of the face wall, and be properly bonded and bedded with through stones at intervals. In wall is over 10 ft in height, provide a 12-in strengthening course, set in cement or time mortar, at 6 ft vertical intervals.

2809. **Drainage.** Provide weep holes, 2 to 3 ins in diameter, about every 6 to 10 ft , both vertically and horizontally, the lowest row being about 1 ft above ground level. The previous backfill immediately behind the wall and above the bottom weep holes (see Figure 64) should be about 18 ins thick. Broken stone, rubber, clinker, or similar coarse material should be used.

2810. **Surcharged walls.** A wall is surcharged when the ground behind it slopes upwards from the top of the wall. The increased dimensions required to resist the additional pressure are determined by substituting for H, in table 96, the effective height, ie the total height of earth at a distance H/2 from the base of the wall.