

DESIGN OF CONTOUR BUND

Contour Bunding

Contour bunding is the construction of small bund across the slope of the land on a contour so that the long slope is cut into a series of small ones and each contour bund acts as a barrier to the flow of water, thus making the water to walk rather than run, at the same time impounding water against it for increasing soil moisture. Contour bunds divide the length of the slope, reduce the volume of runoff water, and thus preventing or minimizing the soil erosion.

Contour bunds are constructed in relatively low rainfall areas, having an annual rainfall or less than 600 mm, particularly in areas having light textured soils. For rolling and flatter lands having slopes from 2 to 6% contour bunding is practiced, in red soils.

Design of contour bunds

Vertical Interval between bunds (V.I)

$$V.I = \left(\frac{S}{a} + b \right) 0.3$$

where,

S – land slope (%); a and b are constants

a = 3 and b = 2 for medium and heavy rainfall zones

a = 2 and b = 2 for low rainfall zones

Horizontal Spacing in between bunds (H.I)

$$H.I = \frac{V.I}{S} \times 100$$

Length of bund per hectare (L.B)

$$L.B. \text{ per ha} = \frac{100S}{V.I} \text{ or } \frac{10,000}{H.I}$$

Depth of water impounding before the bund (h)

$$h = \sqrt{\frac{D * R}{500}}$$

where,

D – vertical interval (m)

R – maximum rainwater on area basis (mm)

Actual height of the bund = h + 20% of h as freeboard

DIMENSIONS OF THE CONTOUR BUND

| Type of soil | Bottom width (m) | Top width (m) | Height (m) | Side slope |
|------------------------------------|---------------------|------------------|---------------|------------|
| Gravel soils | 1.2 | 0.3 | 0.6 | 0.75: 1 |
| Red soils | 2.1 | 0.3 | 0.6 | 1.5: 1 |
| Shallow to medium black soil | 2.4 | 0.45 | 0.75 | 1.3: 1 |
| Deep soils | 3.3 | 0.60 | 0.675 | 2: 1 |

By knowing the cross section area of the bund, the volume of earthwork per hectare and the cost of earthwork per hectare can be determined.

Example:

On a 3 per cent land slope calculate the horizontal spacing of bunds in medium rainfall zone and the length of bunds per hectare.

Solution:

$$V.I. = \frac{30S}{3} + 60 = 90 \text{ cm} = 0.9 \text{ metres}$$

$$\text{Horizontal spacing} = 0.9 * \frac{100}{3} = 30 \text{ metres}$$

$$\text{Length of bund per hectare} = \frac{10000}{30} = 333 \text{ metres}$$