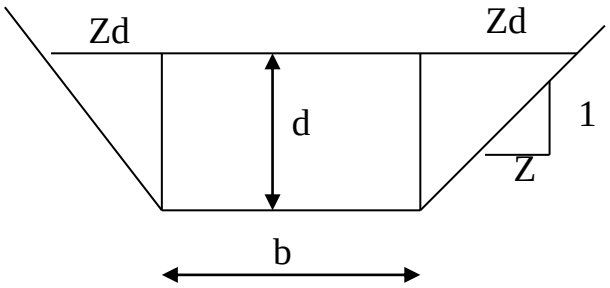
For a Trapezoidal Section

Area of cross section(A) = $b\,d + Z\,d^2$
Width , b = $A/d - Z\,d$ .....(1)
Perimeter = $b + 2\,d\,(1 + Z^2)^{1/2}$
From (1), Perimeter = $A/d - Z\,d + 2\,d(1 + Z^2)^{1/2}$



Water- level in Canals and Drains

It is shown in one single chart the longituinal section 0f the main canal and of the banch canals depending on :

1. **Longitudinal scale 1:100000.**
2. **Vertical scale 1:100 or 1:50.**
3. **Preparing Longitudinal sections of the ground surface for the main and the branch canals.**
4. **Fix the water –levels, the design is begun with the branch canals and the water level in the main canal are then obtained as a function of the water level in the branch canals.**
5. **The water level in branch canal must be 25 cm above the ground level.**

Cross- Section of an irrigation canal

A canal section may be :

- **In cutting.**
- **In filling.**
- **In partial cutting and filling.**
-

Side Slope (Z):

The ratio of the horizontal to vertical distance of the sides of the channel. The side slope of the canal depend on the type of the soil.

Berm

It is a narrow strip of land, left on either side of a canal at G.L. between upper edge of the cut and the inside toe the bank . The width of berm depends upon the size of the canal . Berm perfoms following functions:

- **The width of the canal can be easily increased if required .**
- **Slipping soils and boulders are held up at berms and do not allow them to be dropped into th canal .**
- **It acts as a storage space for materials if some repair or construction work is to be done in the canal.**
- **They strength the canal banks.**
- **They also provide easy path for inspection.**
- **They increase the width of bank, and thus seepage line not likely to be exposed**

THE WIDTH OF THE BERM CAN BE TAKEN AS:

1. **For canal in cutting ; Berm=D**
2. **For canal in filling ; Berm=3D**
3. **For canal partly in cutting and in filling ; Berm=2D**

D=depth of water in the canal (m).

Free board

The vertical distance between full ssupply level t0 the top of the canal . The distance should be sufficient to prevent waves or fluctuations in water surface from overtopping the sides.

$F=\sqrt{CD}$
F=free board(m)
C=constant varying from 0.46 to 0.76

Or
$F=0.2+0.15Q^{1/3}$
Q=discharge of canal (m3/sec)

Bed width

Bed width (b) is limited by the practical capability of the machinery used for constraction.
So min.(b)=0.4m

or $b=Q^{0.33}$
for b<1m rounded off to the nearest 0.1m
for b=1-3m rounded off to the nearest 0.25or0.2m
for b=3-6m rounded off to the nearest 0.5m
for b>6m rounded off to the nearest 1m

Maximum permissible velocity($V_{max.}$)

$V_{max} = C_1 y^{0.64}$
Where y=depth of flow
C_1=coefficient for max. permissible velocity which depend on the Material of the canal bed

Type of bed material	C_1 for $(V_{max.})$
Fine light sandy soil	0.55
Coarse light sandy soil	0.6
Sandy loamy silt	0.66
Coarse soil	0.71

Minimum permissible velocity($V_{min.}$)

$V_{min} = C_2 y^{0.64}$
C_2 = coefficient for min. permissible velocity which depend on the Suspended material

Type of suspended material	C_2
Light loam and very fine sand	0.4
fine sand	0.55
Moderate coarse sand	0.65
coarse sand	0.67
Very coarse sand	0.9