

WATER INTAKE STRUCTURES

10.1 A transmission curve is constructed between rectangular and trapezoidal channels. Depth of the channel (d) is 1.8m, the freeboard is 0.4m, the width of the rectangular channel is 4m, the trapezoidal channel width is 3m, side slope is 1/1.5 and $7.5 \text{ m}^3/\text{s}$ discharge flows in this channel. The angle of the expanded part is 15° . Find the length of the transmission channel and calculate the head loss.

10.2 $2.5 \text{ m}^3/\text{s}$ total flowrate flows in a transmission line is with 0.0003 m/m bed slope. Side slopes of this trapezoidal channel are 1/2 and the base width of this channel is 1.4 m. Find the size of material (D) that is settled in this channel. (Specific weight of the material is 2.6 t/m^3 , $n=0.016$).

10.3 $8 \text{ m}^3/\text{s}$ total flowrate flows in a settling basin with 15m base width. The settling velocity of a material is 100 m/hour and the diameter of this material is $D=0.5\text{mm}$. Find the length of the settling basin to settle all materials down in the basin (*ignore turbulence in the flow*).

10.4 $6 \text{ m}^3/\text{s}$ total flowrate flows in three separated settling basins. The mean depth of the one settling basin is 2m, the width of the walls between basins is 0.35m. The settling velocity of material is 2 cm/s and the size of settled down material is $D=0.09\text{mm}$. Find the dimensions of this settling basin (*Consider flow is turbulent, take safety coefficient as 1.2*).