TALLER No. 1C
Flujo uniforme

4.1. A 5-m wide rectangular channel is carrying a flow of 5 m^3/s. If the Manning$n = 0.013$ and the bottom slope, $S_o = 0.001$, determine the normal depth.

4.7. Prove that the most efficient cross sections for a given flow area are as follows:

1. Triangular section : vertex angle = 90^o
2. Trapezoidal section : half hexagon

4.14. An 8-ft diameter concrete-lined sewer is laid at a bottom slope of 1 ft/mile. Find the flow depth for a flow of 30 ft^3/sec.

4.16. The flow depth in a long trapezoidal channel (bottom width = 8 m, side slopes 1:1) for a flow of 28 m^3/s is 3 m. The channel bottom slope is 0.0001. Determine the flow depth if the rate of discharge is doubled.

4.18. A boulder-lined drainage channel overflowed its banks during a spring runoff for flows exceeding 20 cfs. The channel is 15 ft wide, is rectangular in shape, and drops 10 ft/mile. If you are the design engineer, what will be your options to prevent flooding for this flow.

4.21. The flow depth for a discharge of 15 m^3/s in a long canal having a trapezoidal cross section (bottom width = 10 m; side slopes = 1V : 2H) is 2 m. If the discharge is increased to 20 m^3/s, what will be the flow depth?

6-1. Determine the normal discharges in channels having the following sections for $y = 6$ ft, $n = 0.015$, and $S = 0.0020$:

a. A rectangular section 20 ft wide
b. A triangular section with a bottom angle equal to 60°
c. A trapezoidal section with a bottom width of 20 ft and side slopes of 1 on 2
d. A circular section 15 ft in diameter

6-15. A rectangular testing channel is 2 ft wide and laid on a slope of 0.1035%. When the channel bed and walls were made smooth by neat cement, the measured normal depth of flow was 1.36 ft for a discharge of 8.9 cfs. The same channel was then roughened by cemented sand grains, and thus the measured normal depth became 1.31 ft for a discharge of 5.2 cfs.

a. Determine the discharge for a normal depth of 1.31 ft if the bed were roughened and the walls were kept smooth.

b. Determine the discharge for a normal depth of 1.31 ft if the walls were roughened and the bed were smooth.

6-18. Compute the discharge in an overflowed highway gutter (Fig. 6-10) having a depth of flow of 3 in. and a longitudinal slope of 0.03. The gutter is made of concrete with $n = 0.017$ and has a triangular section with a vertical curb side, a sloped side of $z = 12$, and a top width of $T = 2$ ft. The overflowed soil-aggregate pavement has a cross slope of $z_1 = 24$ and $n_1 = 0.020$.

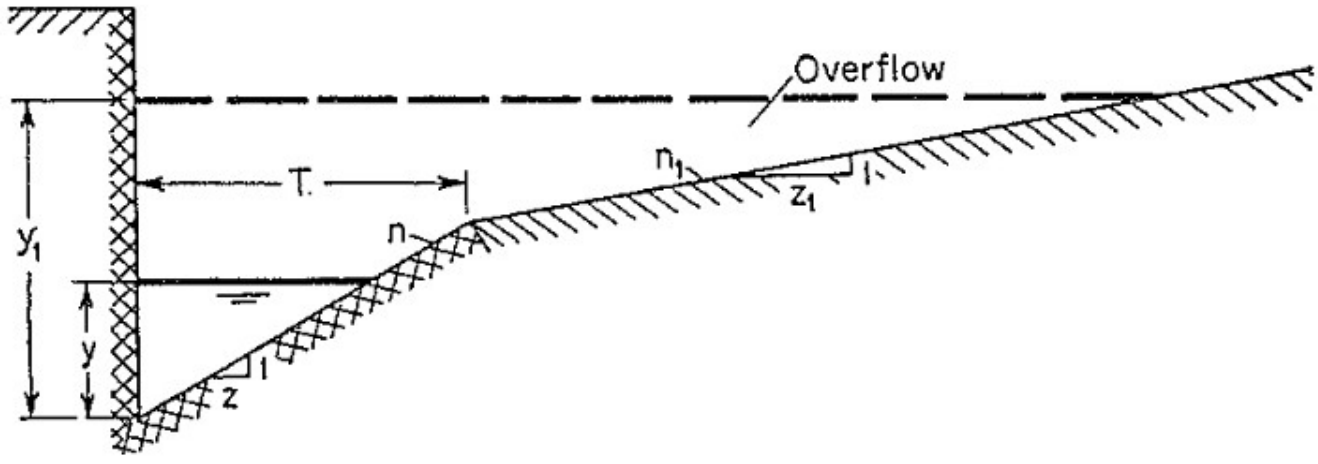

FIG. 6-10. A highway gutter section.