CE 412 A: Water Supply & Wastewater Disposal Systems

Tutorial 1 – 2019-20 II

TUTORIAL 2

Problem: Design an inverted siphon of three pipes to cross a 70m wide canal. The invert levels at the inlet and outlet ends of the sewer are 123.21m and 122.74m respectively. The main sewer pipe of 1m diameter flows 0.7 full at maximum flow at a slope of 1 in 1000. The velocity of flow in the main pipe at minimum flow is 0.6m/sec. The peak sewage flow was considered to be 3 times the average flow. A self-cleansing velocity of 0.9m/sec should be maintained in the siphon pipes. Ignore minor head losses. Assume Manning's co-efficient value 0.013 and it doesn't change with depth. Use the following table for calculating flow values.

d/D	v/V	q/Q
1.0	1.000	1.000
0.9	1.124	1.066
0.8	1.140	0.968
0.7	1.120	0.838
0.6	1.072	0.671
0.5	1.000	0.500
0.4	0.902	0.337
0.3	0.776	0.196
0.2	0.615	0.088
0.1	0.401	0.021