BTech 4th Semester Civil

Course:- Fluid Mechanics Lab> CIV-402 P

Experiment :- To find friction factor for pipes of different materials.

Introduction :-

The major factor contributing to the energy loss in any pipe flow is through the boundary shear. In cases of steady flow through the pipe, a constant pressure gradient is to be maintained to overcome the frictional losses due to the boundary shear. Estimation of frictional losses is important from engineering point of view as the design of pipe mains carrying water from any reservoir to the township over a long distance mainly depends upon the friction factors. Booster pumps at places are to be provided to add additional energy needed to maintain the required quantity of flow. In steady, uniform turbulent incompressible flow in conduits of constant cross section, the wall shear stress varies about proportional to the square of the average velocity

Procedure:

1. Gradually open the inlet valve of the set-up to let water into the pipes and connecting tubes. Disconnect the pressure tapping from the manometer, allow the water to flow freely thorough the flexible tubes connected to the pressure tapping to remove air bubbles if any. After ensuring that there are no air bubbles, connect the flexible tubes back to the manometer

2. Record the size of the pipes, the distances of the pressure tapping which are to be used as lengths-of pipes and temperature of water flowing.

3. Allow the discharge to come to steady state and note the difference in pressure between the tappings.

4. For the same discharge, close the outlet valve of the collecting tank. Allow the water level in the collecting tank to rise by a certain amount. Note the time taken for this rise in water level and the area of the collecting tank. The discharge is equal to the volume of water collected divided by the time taken.

5. Repeat the procedure for different values of different discharges and different pipes. Maintain different tabular forms for different pipes.

Observation Table

Length of the pipe, or the distance between the pressure tappings, L=

Diameter of the pipe, D=

Temperature of water =

S.No.	Volume of water collected in the tank	Time taken (mm)	Discharge Q	Velocity of flow, V=Q/A	(V2/2g)	Differential manometer reading	Friction factor, f	Reynolds number
1								
2								
3								
4								
5								
6								

Plot the friction factor f verses the Reynolds number of flow

NOTE:- See the youtube Video link:-

https://www.youtube.com/watch?v=c7JRAz1KacI&feature=youtu.be