HEAD AND MINOR LOSSES IN PIPES

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Objective

HEAD AND MINOR LOSSES IN PIPES

The experimental study of a flow in forced pipe will be based on the measurement of pressure difference produced by a flowrate, determined by a flow meter. In this way, the dependence ratio between the friction factor *f* of the Darcy-Weisbach equation and the Reynolds number in pipes can be obtained on the one hand, and on the other, the experimental values of the minor loss coefficients.

A) Equipment:

- Armfield Fluid Friction Measurements unit. A unit for the detailed study of fluid friction head losses, which occur when an incompressible fluid flows through pipes, fittings and flow metering devices.
- Armfield Hydraulics Bench

B) Procedure:

1. From the maximum flowrate, this will be reduced later. For each flowrate and each element will take 3 measures every 10 seconds. The value of the variable to be used in the calculations will be the average of these three values.
2. Measure head losses on pipe 2.
3. Measure head losses on pipe 4.
4. Measure head losses on pipe 5.
5. Measure pressure drop on ball valve.
6. Measure head loss at the T-joint.

C) Report:

1. Calculate the velocity in each pipe and singularity, using the value of the flowrate measured in the flow meter placed in the outlet pipe of the panel.
2. Calculate the Reynolds number, considering.
3. Calculate the friction factor f by the Moody diagram, considering that pipes are hydraulically smooth, for pipes 2 and 4. In case of pipe 5, calculate k / D to be able to use the diagram.
4. Calculate the value of the friction factor by clearing it from the Darcy-Weisbach equation, considering the pressure loss measured by the pressure sensors. Compare the result with that obtained in section 3 for all the pipes and explain the results.
5. Calculate the head losses of the two smooth pipes by the Blasius equation and by the Hazen-Williams equation (C = 150) by comparing these values with the measured ones. Analyze the results.
6. Calculate the K factors corresponding to the singularities (T-junction, ball valve), using the equation of minor losses.