Experiment to investigate the validation of bernoulli's equation

Bernoulli's Principle

OBJECTIVE

Experiment is done to investigate the validation of the Bernoulli's equation and also to measure pressure distribution along venture tube.

INTRODUCTION

This experiment is carried out to investigate the validity of Bernoulli's theorem when applied to the steady flow of water in tapered duct and to measure the flow rates and both static and total pressure heads in a rigid convergent/divergent tube of known geometry for a range of steady flow rates.

The Bernoulli's theorem (Bernoulli's theorem, 2011) relates the pressure, velocity, and elevation in a moving fluid (liquid or gas), the compressibility and viscosity of which are negligible and the flow of which is steady, or laminar. In order to demonstrate the Bernoulli's theorem Bernoulli's Apparatus Test Equipment issued in this experiment.

THEORY

- Velocity of fluid is less fluid

- The fluid is incompressible and non- viscous

There is no heat energy transferred across the boundaries of the pipe to the fluid as either a heat gain or loss. There are no pumps in the section of pipe For an ideal fluid flow the energy density is the same at all locations along the pipe. This is the same as saying that the energy of a unit mass of the fluid does not change as it flow through the pipe system.

APPARATUS EXPERIMENTAL PROCEDURE

- A inspection was done to ensure that the unit was in proper operating condition, so that the experiment will not consist of errors.

- A hose had to be connected to the nearest power supply.

- The discharged pipe was then opened.

The cap nut of the probe compression gland was set to such condition, that the slight resistance could be felt on moving the probe, and the water flow created a sound which also helps to determine the flow pressure (by hearing it). The inlet and outlet valve was then opened. Then the pump was switched on and the main cock was released slowly opened. The vent valve on water pressure gauze was opened and outlet cock was closed with great care until pressure gauze was flushed. , By simultaneously setting the inlet and outlet cock, the water level pressure gauze was regulated, so that neither upper or the lower range limit was overshot or undershot. Pressure at all point were measured and recorded. The overall pressure probe was moved to corresponding measurement level and the overall pressure was noted down. The volumetric pressure flow was determined, by using stopwatch to established time required to raise the water level in the volumetric tank from 3to 7 liters.

GRAPH DISCUSSION it is known that water is a fluid and all fluids have the properties to take shape of the container or wherever they are stored or flow through.

Since the fluid cosses through a given path for duration of time there have to be a pressure lose due to the path design or distance or width. Bernoulli's principle states that if the rate of flow of the fluid is high the pressure will be

low and if the slower rate of flow the fluid exerts more quickly (with pressure).

CONCLUSION

From the experiment it is found that the difference between the experimental and the calculated value are to high, this could happen due to such factors the reading was not taken accurately or either not taken to the very decimal point or perhaps parallel eye reading. , Bubbles those were trapped on the top of the tube and could not have been released or seen. The recording the data time might not be accurate. The internal resistance of the water , those were not taken into account during the calculation. The pressure at each manometer tube might not be stable before reading was taken due to in accurate air flow or pressure flow. All the factors mentioned above could play a great role in effecting the results. There are many ways to improve reading one way can be repeating the experiment multiple times and get the average.

Considering all factors and the comparison between data collected via multiple values the experiment is successful, and it proves Bernoulli's principle of fluid motion pressure.

REFERENCES

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