EXPERIMENTAL AND NUMERICAL STUDY OF FLOW IN RECTANGULAR ELBOW90º WITH GUIDE VANE

Student Name : **DANIES SETYO HUSODO**
NRP : **2109100089**
Major : **Mechanical of Engineering FTI-ITS**
Lecture : **Prof. Ir. Sutardi, M.Eng. Ph.D**

Abstract

In this time, the installation of pipes has high efficiency to support the progress ofthe production process. One example of piping connection (fitting) is a 90° elbow. The use of elbows in the piping system design, will lead to a loss of pressure in the flow. This is due to the change in direction of fluid through the channel. Value of the pressure drop (pressure drop) in the flow through the elbow is affected by the magnitude of the radius of curvature and turn angle of the elbow, which led to the separation and secondary flow (secondary flow) at the elbow.

The test model used in this study is rectangular 90º elbow with a radius ratio (rm/D_h) 1,875. Model 2 with extended 70 mm. Model 1 without extended, and $Re_{Dh} \approx 2,1 \times 10^4$. The measured variable are stagnation pressure and static pressure. Stagnation pressure was measured using pitot tube, while static pressure was measured using the Inclined manometer connected to wall pressure tap. Research conducted experimentally and numerically using the software Fluent 6.3.26, and Gambit 2.30.

The results obtained in experiments with model 2 is 67.41%. It can increase pressure drop than model 1. For numeric is that model 2 numeric is 50.71%. It can reduce pressure drop than model 1. Model 1 have 2 vortexs then model 2 have 4 vortex. The results numeric can inform pressure contour, and velocity.

Keywords : Guide vane, headloss, model 1, model 2, pressure drop, rectangular elbow 90º, secondary flow

iv

(Halaman ini sengaja dikosongkan)