

Study Of Flow Pattern and Vortices in a backward-stepped flow with 2 inlets

MR. SHOUVIK GHORUI
B.E, JADAVPUR UNIVERSITY

Abstract

The aim of this study is to examine the flow pattern and behaviour of vortices in a backward-stepped flow with two inlets. Open source CFD package, OpenFOAM is used and pimpleFoam solver is used for my case study. Here for case study, a channel type geometry is observed and secondary inlet is added. The vortices generation will be studied by changing different parameters like position of secondary inlet, Reynolds number of flow. Second inlet may break the vortex near the step.

Problem Statement

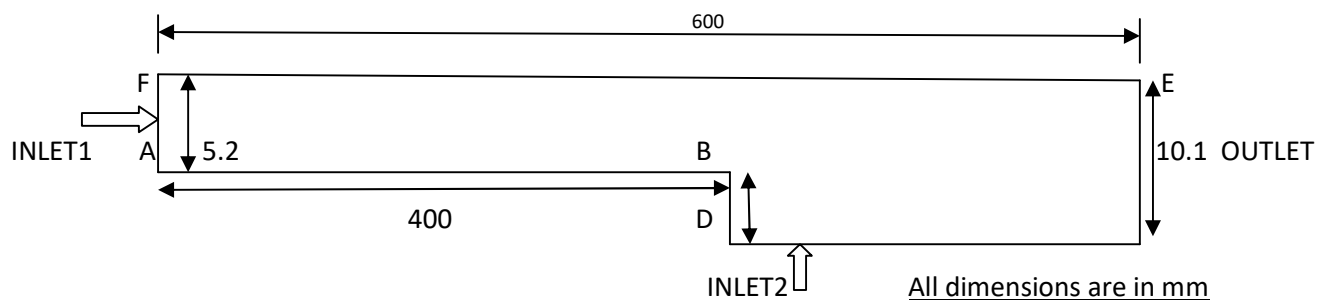


Fig:1 Laminar Flow in parallel plates having Backward-Facing Step with two inlets

A typical backward-step is shown in Figure 1. The LPLATE consists of walls AB, BC and CD. If INLET1 is used as the only inlet, then the vortices are formed near the walls BC and CD. Now we add another injection inlet INLET2 in the LPLATE CD (as shown) which injects the same fluid. The effect of the INLET2 on the flow field is studied by varying its position along the LPLATE

- ❖ Case1- INLET2 is at wall AB of LPLATE and extends from $X=0.396$ to 0.398 m
- ❖ Case2- INLET2 is at wall BC of LPLATE and extends from $Y=-0.0019$ to -0.0039 m
- ❖ Case3- INLET2 is at wall CD of LPLATE and extends from $X=0.427$ to 0.429 m

1. Initial Properties: 1) INLET1 velocity = 1 m/s 2) INLET2 velocity = 1.2 m/s

Reference :

https://www.researchgate.net/publication/232005183_Experimental_and_Theoretical_Investigation_of_Backward-Facing_Step_Flow