INTISARI

Penelitian ini dilakukan pengamatan karateristik aliran dua fase air udara *stratified* dengan metode *parallel-wire*. Tujuan utama dari penelitian ini adalah mengetahui karakteristik aliran *stratified* pada pipa horisontal dari data ketebalan *film* cairan dan mengetahui pengaruh perubahan kecepatan superfisial udara dan air terhadap perubahan ketebalan *film* cairan.

Pada penelitian ini dilakukan pengamatan perubahan beda potensial sensor *parallel-wire* yang disebabkan aliran air udara yang melewati sensor dan pengambilan gambar visual aliran. Grafik beda potensial didapatkan dari DAQ *module*. Setelah itu, Grafik beda potensial dikonversi menjadi grafik ketebalan *film* dengan *software* Labview 2017 dan Microsoft Excel. Sensor *parallel-wire* terbuat dari kawat tembaga berdiameter 0,51 mm. sensor dipasang di pipa akrilik berdiameter 26 mm dan panjang pipa sebesar 10 m. Pengambilan gambar visual menggunakan *high speed camera* Phantom Miro M310 juga dilakukan untuk mengetahui kesesuaian antara grafik ketebalan *film* aliran dan visualisasi alirannya.

Beberapa sub rezim aliran, seperti *stratified smooth*, 2D *wave*, 3D *wave*, *roll wave*, *pseudo-slug*¸ *entrained droplet*, dan *annular* berhasil diamati dan terklasifikasi berdasarkan karakteristik tebal cairan dan visualnya dari 84 variasi kecepatan superfisial air (J_L) dan kecepatan superfisial udara (J_G). Namun tebal cairan pada bagian batas atas pipa pada pola aliran annular tidak dapat diidentifikasi. *Hydraulic jump* dan pelepasan *droplet* dapat diidentifikasi dari grafik ketebalan cairan. Dari hasil penelitian ini dapat diketahui bahwa ketebalan cairan akan memiliki kecenderungan untuk meningkat seiring dengan meningkatnya kecepatan superfisial udara (J_L) pada kecepatan superfisial udara (J_G) yang sama dan ketebalan cairan akan memiliki kecenderungan menurun seiring dengan meningkatnya kecepatan superfisial udara (J_G) pada kecepatan superfisial air (J_L) yang sama.

Kata Kunci : aliran dua fasa air-udara, *stratified*, ketebalan *film*, *parallel-wire*.

ABSTRACT

This experiment has been conducted to observe the characteristics of the stratified gas-liquid two-phase flow in a horizontal pipe by using the parallel-wire method. The main purpose of this research is to investigate the characteristics of the stratified two-phase flow in horizontal pipe from the data of the liquid film thickness and also to know the effects of superficial liquid-gas velocity change in liquid film thickness change.

Observation of parallel-wire sensor voltage change due to gas-liquid flow that pass the sensor and flow visual records were performed. Voltage charts from DAQ module has been obtained. Then the voltage charts are converted to film thickness charts by using Labview 2017 and Microsoft Excel. Parallel-wire sensor is made by copper wire with diameter 0,51 mm. The sensor is installed in acrylic pipe with diameter 26 mm and length 10 m. Flow visual records using high speed camera Phantom Miro M310 were performed to know the suitability between flow film thickness charts and their flow visualization.

The group of stratified sub-flow regime, such as stratified smooth, 2D wave, 3D wave, roll wave, pseudo-slug, entrained droplet, and annular were sucessfully observed and classified based on the visualization characteristics and liquid film thickness charts from 84 variations of the test condition of superficial water velocity (J_L) and superficial air velocity (J_G). But, liquid film thickness on upper limit of the pipe in annular flow could not be identified. Hydraulic jump and droplet release could be identified from liquid film thickness chart. From the result of this study, it could be seen that liquid film thickness have a tendency to increase with the increase of superficial water velocity (J_L), when the value of superficial air velocity (J_L) is kept constantly and liquid film thickness have a tendency to decreased with the increase of superficial air velocity (J_G), when the value of superficial water velocity (J_L) is kept constantly.

Keywords : gas-liquid two-phase flow, stratified, film thickness, parallel-wire