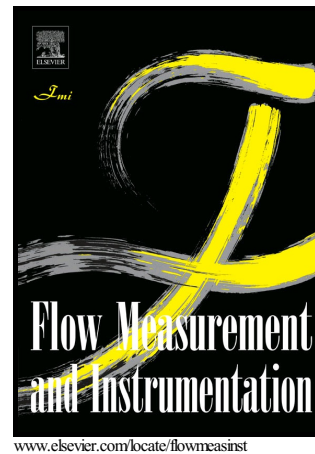


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THE DEVELOPMENT OF IMAGE PROCESSING TECHNIQUE TO STUDY THE
INTERFACIAL BEHAVIOR OF AIR-WATER SLUG TWO-PHASE FLOW IN
HORIZONTAL PIPES

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ABSTRACT

The aim of the present paper is to propose an image processing technique in order to study the interfacial behavior of air-water slug two-phase flow in horizontal pipes. Here, the experiments were performed in two sets of transparent acrylic pipes with inner pipe diameters of 16 mm and 50 mm. To observe the interfacial behavior of slug flow, the liquid and gas superficial velocities were set to 0.2 – 0.77 m/s and 0.7 – 2.83 m/s, respectively. Visualization studies by using high speed video camera combined with image processing techniques were since it offered numerous advantages. Moreover, a sequential procedure was implemented for processing of each image. This technique has succeeded to enhance the image contrast and remove the uneven background. Next, a number of steps applied to binary image were also performed in order to remove the dispersed bubble attached on bubble tail which becomes one of the biggest challenges for the visualization studies of slug flow. As a result, the developed image processing technique was able to minimize the errors in order to produce the accurate measurement. Moreover, the processed image have been utilized to gather the quantitative information. It reveals the comprehensive characteristics of slug flow in horizontal pipes. Finally, a good agreement between the present and previous works proves the reliability of the developed technique.

Keyword: Image processing technique, slug flow, visualization study, slug parameter

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