

CHAPTER V

CONCLUSIONS

1. The flow pattern map consisting of the bubble and slug was generated from the two-phase flow apparatus built in this study. The transition of the bubble to slug occurred over a small range of values of superficial air velocities, which covered a point predicted by Nicklin's model, Eqn. (4). It was shown that the model could be used for primary predicting the bubble to slug flow transition.
2. These experiments showed that the rise velocity of single slugs was identical with the rise velocity predicted by Eqn. (6). These velocities were independent of slug length. An average value of c from experiment was 0.33. It was evident that the rise velocity of a single slug depended on hydrodynamics of the nose and was in no way affected by the wake.
3. The void fraction predicted by Eqn. (9) could be accepted within a given error. The model was satisfactory for various air and water flow rates.
4. It was evident that the rise velocities of continuous generated slugs from experiments were identical with those predicted by Eqn. (7). In addition, the rise velocity of continuous generated slugs was a function of linear with the superficial air velocity for a variety of water flow rates.
5. It was shown that the air velocity predicted by Eqn. (12) gave better agreement with the data at a low superficial air velocity required for incipient air-lift pump operation within the slug flow. However overall results were still acceptable within given error.
6. The velocity u_b which was determined by potential-flow theory was approximately 0.33.