

INTRODUCTION

In recent years, considerable efforts have been directed towards studying momentum and heat transfer to two-phase and three-phase systems, because of the diverse applications in the fields of chemical and power industries. Further impetus for the study of such systems has been given by the advent of nuclear energy as a source of power. Heat transfer to fluids in a condition involving more than one fluid phase is probably of greater industrial significance than any other heat transfer process (29). The most familiar of these are encountered in the operation of evaporators, chemical reactors, heat exchangers and other types of processing equipments. These problems about two phase and three phase systems have been studied up till now as detached units for the point application to a specific process.

It is recognised that the transport taking place in a system, whether it is momentum, heat or mass transfer, should be understood through building up of the total picture of the phenomena from elemental components which contribute to the system. Hence it was thought advisable to break up the problem into simpler liquid-solid and gas-liquid systems and then to integrate the findings of these studies towards a three phase system.

The investigations carried out by the earlier workers on momentum and heat transfer studies relevant to the present work, may be classified under the following main heads :

- (A) Momentum transfer to solid-liquid systems
- (B) Heat transfer to solid-liquid systems
- (C) Momentum transfer to gas-liquid and gas-solid-liquid systems
- (D) Heat transfer to gas-liquid and gas-solid-liquid systems.