FINAL YEAR PROJECT REPORT

ADVANCED DIPLOMA IN MECHANICAL ENGINEERING

SCHOOL OF ENGINEERING

MARA INSTITUTE OF TECHNOLOGY

SHAH ALAM

LANDSCAPING FOR HEAT REJECTION DESIGN OF NATURAL CONVECTION COOLING DEVICE

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PREFACE

A study of natural convection flow and heat and mass transfer mechanism between a flowing hot water and the moist air is the subject of this project. The main purpose is to provide an analysis for this area, in recognition of the tremendous interest that presently exists in it and of its importance in a wide range of problems and areas.

The utilisation of ambient air in the heat transfer mechanism should be maximised because the properties of the air are suitable in the process. The cost of handling the air in this analysis is zero, therefore this analysis can provide the world of engineering a cheap alternative of cooling device.

Principally, this project covers heat transmission, psychrometrics, mass transfer, and landscape design. The field of heat transfer is so wide and diversified that an orderly presentation of scientific facts is essential for the analysis.

Finally, these principles can be the basic guidelines in the preparation of the cooling device design. Chapter 2 builds up the necessary formulation in the analysis and chapter 5 will show an example of application..

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Chapter 1

1.0 Introduction

Over the past decade, a considerable interest has grown in buoyancy induced flows, which are abound in nature and in technology. These flows, termed natural or free convection, arise simply because of a density variation, caused by heat or mass transfer processes, in a body force field, such as gravitational. This increased interest in natural convection is the reflection of our growing concern with energy and the environment. Several processes, in nature and in technological applications, are dominated by natural convective mechanisms and, in several others, it exist to aid or oppose other mechanism that give rise to thermal and material transport.

A study of considerable importance in areas concerned with the physical processes involved in energy generation and utilisation is that of heat transfer. With the growing sophistication in technology and with the increasing concerned with energy and the environment, the study of heat transfer has, over the past several years, been related to a very wide variety of problems each with its own demands of precision and elaboration in the understanding of the · particular processes of interest. Areas of study range from

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