HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

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COMPUTER AIDED DESIGN OF A RESIDENTIAL SOLAR HEATING SYSTEM

By

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INTRODUCTION

Constructive use of solar energy dates back to the earliest periods in history. The greek physicist Archimedes was the first to use solar energy on a large scale , to set fire to the attacking Roman fleet at Syracuses in 212 B.C using a combination of small mirrors to focus the sun rays.

Today ,solar energy designs have drammatically improved and they still are in order to improve their quality and performance.

This project will be dealing with the design of a solar system that will be used for space heating purposes.In order to reach this objective successfully ,an examination will be attempted of the currently used designs ,and the most suitable will be chosen . It is interesting to know that nowadays computer softwares are being developed that enable the selection of the optimum solar design which will give maximum performance with minimum cost . Such a software will be used in this project with the aim of choosing a solar design which will best fit the heating requirements of the building.

The F-CHART is a computer program which will be used extensively throughout this project.This software allows the solar designer to compute the heating contribution fraction that solar energy supplies as to satisfy the thermal load requirements of the building under consideration .An aux. heating is employed as to make up the difference between the percentage of thermal energy supplied by solar and the total

energy required by the building. From the f-chart's results, several conclusions can be derived concerning the system to be employed in conjuction with its performance throughout the analysis period.

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