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DESIGN OF A FROST PROTECTION  
SYSTEM FOR PLANTATIONS

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***DESIGN OF A FROST PROTECTION  
SYSTEM FOR PLANTATIONS***

by

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**Project Report**

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# **DESIGN OF A FROST PROTECTION SYSTEM FOR PLANTATIONS**

***Project submitted by :***      **EVANGELOU SOTIRIS**

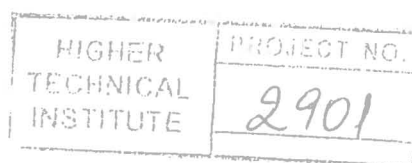
In part satisfaction of the award of Diploma of Technician Engineer in Mechanical Engineering of the Higher Technical Institute, Cyprus.

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## INTRODUCTION

Agriculture is one of the most sensitive sections of our economic activities which is affected to a great extent by various natural dangers. The reduction of the agricultural production under severe weather conditions, is a common phenomenon in Cyprus. The producer is not in a position to react effectively for protecting his crops.

As a result, there are some regions (with small frequencies of destroys ) which are seriously affected by a certain natural danger almost every year. Other regions are not affected at all from the danger although these two may not be far from each other.

One of the most common dangers which affect the agricultural production, especially early crops (e.g. potatoes), is frost. It can be mentioned that during the period between 1980 and 1990, the potatoe plants were affected seriously by frost 7 out of 11 years.

Frost appears when the air temperature falls below  $0^{\circ}\text{C}$ . In order to eliminate that danger, various methods of protection are used. Each of these have as a goal to raise the temperature in the area of the plants to a few degrees above the critical temperature of  $-1^{\circ}\text{C}$  to  $-2^{\circ}\text{C}$ .

One of the methods which has been used in recent years, in different countries, is the wind machine which gave quite satisfactory results, especially in tree plantations and grapes .

During the last 10 ~ 11 years, this method has been in practise in Italy in the farming of low plants such as potatoes and various vegetables. Wind machines are used exclusively for overcoming frost due to radiation which is the most common case in Cyprus.



Some statistical data which has been observed in Cyprus, is given in this project in various Tables and includes the following:

- ◆ frequency of air and ground frosts in the area of Kokkinochoria in the period of 1980 ~ 1990,
- ◆ minimum temperatures,
- ◆ wind velocity,
- ◆ critical temperatures of the plants.

Meteorology helps in addressing the problem of frost in the following manners :

- ◆ Meteorology studies the climatic conditions of an area and helps to estimate how often and when frost may occur.
- ◆ It evaluates the microclimate within the plantations.
- ◆ It studies the natural processes which take place during frost.
- ◆ It analyses information for the methods of protection from frost.

Among the aims of this project are to give a detailed description of wind machines, evaluate their advantages and disadvantages, analyse the losses which have occurred in potatoe plantations during the last years, acknowledge the various possible problems that may arise with the use of wind machines, describe other methods of protecting plantations from frost and finally to submit suggestions and conclusions.