

H.T.I.

HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING COURSE

DIPLOMA PROJECT

DESIGN OF A PRESS TOOL
FOR BLANKING AND
PIERCING OPERATIONS

M1774

CONSTANTINOU CONSTANTINOS

1996

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**TO MY FAMILY
AND FRIENDS.**

**PRESS TOOL DESIGN FOR BLANKING
AND PIERCING OPERATIONS**

by
CONSTANTINOU CONSTANTINOS

Project report
submitted to

the department of mechanical engineering
of the Higher Technical Institute
Nicosia - Cyprus

in partial fulfilment of the requirements
for the diploma of

TECHNICAL ENGINEERING

in

MECHANICAL ENGINEERING

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HIGHER TECHNICAL INSTITUTE
NICOSIA-CUPRUS
MECHANICAL ENGINEERING DEPARTMENT
Diploma Project 1995/96

Project Number : M / 774

Title: "Press tool design for blanking and piercing operations"

Objectives:

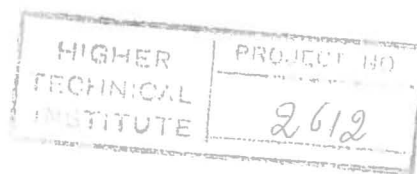
1. To design a blanking and piercing press tool for a given component.
2. To present the object to be constructed giving details as where to be used and justifications for its choice.
3. Prepare detail drawings for all parts.
4. To draw an assembly of the tooling system.
5. To make all calculations including shearing forces and to select materials and possible head treatment.
6. Select the correct capacity of the press.
7. Describe the sequence of operations for the construction of all parts.
8. To carry out an economic appraisal of the tooling system.

Terms and conditions:

1. The component to be manufactured is available.
2. Quantity to be produced will be 5000
3. A light, compact, and foolproof construction is preferred.
4. All dimensions and tolerances must be according to standards(I.S.O or B.S)

Student: Constantinos Constantinou D .

Supervisor: Damianos Roushas.



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A C K N O W L E D G M E N T S

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Thank you all,
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ABSTRACT

This project focuses on the design, fabrication and testing of a press tool. This type of press tool is used to manufacture the end cap of an air filter.

First all the required drawings, showing all the dimensions and details of the component to be produced and the press tool, were prepared.

Continuously:

In chapter 1, the principles of blanking and piercing dies were discussed, the procedure of blanking and piercing was described and also the action of a press tool was presented.

In chapter 2 the different types of air filters and the component to be produced were mentioned.

Chapter 3 deals with the cutting parameters of the press tool like clearance and cutting forces. In the same chapter the press selection is also made.

In chapter 4 the different parts of the press tool and their functions are covered. The designed parts are also described. The sequence of construction, materials and heat treatment for these parts are also mentioned.

In chapter 5, an economic appraisal of the press tool is made which includes of a detail cost analysis of the production process.

Finally in chapter 6, information's about the tool usage, wear, maintenance and proper inventory control are given.

CHAPTER 1

-BACKGROUND

1.1 Introduction

The most common group of metal working operations is that which includes blanking and piercing. More and more industrial sectors today look to blanking and piercing for production of the components they need, from small accurate parts to massively rigid ones. To deal with such a broad range of requirements a considerable know-how in the technology of both tool - design and piercing should be received.

The blanking and piercing technology has been widely used within the automobile manufacturing industry. The car market is characterized by its rapidly changing requirements which cause a constant increase in the diversity of mechanical components. Also the demand on the process to be able to produce parts of greater and greater complexity is continuously increasing. This wide variety of demands created a number of problems in the blanking and piercing technology.

Fine blanking is considered much better, than the normal presswork at tackling these problems, due to certain process specific factor (such as the low punch die clearance and the controlled cutting speed).

Even though the conventional manufacturing methods and the normal blanking and piercing are rapidly replaced, as a result of the above problem and the intensive and continuous search for better economy, here in Cyprus they are extensively used throughout the manufacturing industry.

This project is focused on the design, fabrication and testing of a press tool which will be used in fabricating an air filter component by the normal method of blanking and piercing.