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COMPUTER AIDED DESIGN TECHNIQUES  
IN MECHANICAL DESIGN

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# COMPUTER AIDED DESIGN TECHNIQUES IN MECHANICAL DESIGN

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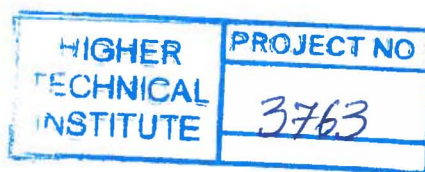
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# SUMMARY

This project has to do with computer aided design techniques in mechanical design. It shows the various steps of design process, necessary for designing a machine component, the importance of drafting and the basic traditional methods of modelling. And finally, introduce the new methods of drafting and modelling through the CAD and CAM software.

It also shows the advantages and disadvantages of using CAD software for visualization purposes and there is a reference of some of the most popular CAD software.

Further more there is a presentation of the most important features of the Autodesk Inventor and the various capabilities it offers.

Finally it shows how simple a mechanical assembly can be shown with the aid of CAD software. The program used for visualizations, as referred above, is Autodesk Inventor professional 2008. The assembly drawings that were made are those of a Machined Casting, Rocking Arm, Wood Plane, Machine Vice and Hand Drill.

## **ACKNOWLEDGEMENTS**

I would like to express my deep thanks to Mr. Paraskevas Demetriou, my project supervisor, for his time, help, and his advices through the whole period of the project construction and organization.

I would also like to thank my family for their support.

I dedicate this project to my father.

Georgios Constantinou



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# ABBREVIATIONS

- Computer Aided Design (C.A.D)
- Product Design Specification (PDS)
- Two dimension (2-D)
- Three dimension (3-D)
- Denoted by the ".dwg" filename extension (DWG)
- Engineering change orders (ECOs)
- Computer Aided Manufacturing (CAM)
- Numerical Controlled (NC)
- American Standard Code for Information Interchange (ASCII)



- **Computer Integrated Manufacturing (CIM)**
- **International Organization for Standardization (ISO)**
- **American National Standards Institute (ANSI)**
- **Bill of materials (BOM)**

# CHAPTER 1

## INTRODUCTION

### 1.1 AIMS AND OBJECTIVES:

1. To present the various phases of design.
2. To investigate areas where computers may be utilized in the design process.
3. To design on a computer various mechanical components.

### 1.2 INTRODUCTION

25 years ago, before computer aided design was advanced, nearly every drawing produced in the world was done with pencil or ink on paper. Minor changes meant erasing and redrawing while major changes often meant recreating the drawing from the scratch. If a change to one drawing affected other documents you were dependent upon having someone manually recognize the need to make the changes to the other drawings and to do so.

Further more in design engineering, small models were required to be produced for visualization purpose. This model was made of wood, clay, plastic or even cardboard. This also was very time-consuming.

In the case of a complicate assembly was needed to be constructed, it was very difficult to make small models of the various parts,

contained in the assembly, and it was even more difficult to put them together. This was not only time-consuming but it was also very expensive.

As we can understand, the visualization phase of an idea, in the design process, in the end, it seems to be the soul of every design, before the final product finally be created. It is here where the imagination needs to find a way to revile the ideas so to be shared and evolve in something real.

All thus problems has been overcome by the use of Computer Aided Design (CAD) software. CAD software has evolved very rapidly throughout the years and is now a very powerful designing tool for every designer.

In the 1950s the first CAD program was developed and was a simple 2-dimensional tool which helped in faster drawing without mistakes and for radars. This however in the next decade became a powerful 3-dimensional tool which made modeling much simpler for the automobile, aerospace and defense industries. Then, there was needed a computer to run this CAD programs. This was solved in the mid 80s when CAD programs was running with computer software and they could not only do 3-dimensional designs, but they could also assemble variable parts together and do stress analysis calculations on any personal computer.

This has made the whole designing process much more efficient with lower costs and much more time and money to gain for every designing business, either in mechanical, electrical, civil or computer engineering.