A

Seminar report

On

AutoCAD

Submitted in partial fulfillment of the requirement for the award of degree
Of Mechanical

SUBMITTED TO: **SUBMITTED BY:**

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Preface

I have made this report file on the topic **AutoCAD**; I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and wholehearted co-corporation of each and everyone has ended on a successful note. I express my sincere gratitude to …………..who assisting me throughout the preparation of this topic. I thank him for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

Acknowledgement

I would like to thank respected Mr…….. and Mr. ……..for giving me such a wonderful opportunity to expand my knowledge for my own branch and giving me guidelines to present a seminar report. It helped me a lot to realize of what we study for.

Secondly, I would like to thank my parents who patiently helped me as i went through my work and helped to modify and eliminate some of the irrelevant or un-necessary stuffs.

Thirdly, I would like to thank my friends who helped me to make my work more organized and well-stacked till the end.

Next, I would thank Microsoft for developing such a wonderful tool like MS Word. It helped my work a lot to remain error-free.

Last but clearly not the least, I would thank The Almighty for giving me strength to complete my report on time.

Introduction

AutoCAD is a commercial software application for 2D and 3D computer-aided design (CAD) and drafting — available since 1982 as a desktop application and since 2010 as a mobile web- and cloud-based app marketed as AutoCAD 360.

Developed and marketed by Autodesk, Inc., AutoCAD was first released in December 1982, running on microcomputers with internal graphics controllers. Prior to the introduction of AutoCAD, most commercial CAD programs ran on mainframe computers or minicomputers, with each CAD operator (user) working at a separate graphics terminal.

AutoCAD is used across a wide range of industries, by architects, project managers, engineers, graphic designers, and other professionals. It is supported by 750 training centers worldwide as of 1994.

As Autodesk's flagship product, by March 1986 AutoCAD had become the most ubiquitous CAD program worldwide. As of 2014, AutoCAD is in its twenty-ninth generation, and collectively with all its variants, continues to be the most widely used CAD program throughout most of the world.

History

AutoCAD was derived from a program begun in 1977 and released in 1979 called Interact CAD, also referred to in early Autodesk documents as MicroCAD, which was written prior to Autodesk's (then Marinchip Software Partners) formation by Autodesk cofounder Mike Riddle.

The first version by the AutoDesk Company was demonstrated at the 1982 Comdex and released that December. The 2016 release marked the 30th major release for the AutoCAD for Windows. The 2014 release marked the fourth consecutive year for AutoCAD for Mac.

AutoCAD Architecture features
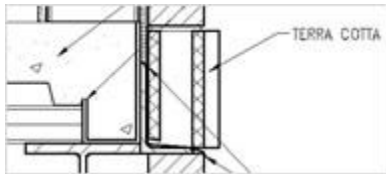
Get more in a suite
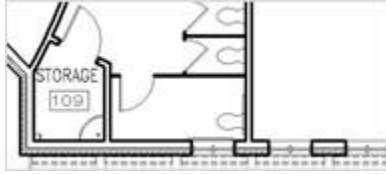
Walls, doors, and windows

Draw walls, doors, and windows that mimic real-world behavior and construction.

Sections and elevations

Generate 2D sections and elevations directly from your floor plans.

Architectural design documentation

Create and annotate drawings with detail components and keynoting tools.

The AutoCAD Advantage

Striker Systems sheet metal fabrication products are available as a plug-in to AutoCAD or, for non-AutoCAD users, as a stand-alone solution based on the AutoCAD OEM Engine. Either way, this combination provides a unique CAD/CAM environment with features not found in many conventional manufacturing products.

Removal of Data Translations

Striker Systems provides a truly integrated CAD/CAM solution that supports the entire manufacturing process from initial part design through the generation of NC programs with no data translations required. And unlike many manufacturing software products with limited design capability, Striker Systems includes an advanced engineering system for the most demanding sheet metal design requirements.

SolidWorks / Solid Edge / Inventor Compatibility

The industry is rapidly embracing 3D solid modeling technology. Being based on Autodesk's industry standard DWG file format, Striker Systems offers a level of compatibility not found in other manufacturing solutions. Many products, such as Inventor and SolidWorks, support Striker's standard DWG file format directly. And Striker also offers direct OLE links into SolidWorks, Inventor and Solid Edge for seamless sharing of data.

Industry Standard Translators

Many Striker Systems clients must accept drawings from a variety of sources. In the event it is necessary to import data from (or export data to) another CAD software, Striker Systems relies on the same industry standard DXF, IGES, and STEP translators that are found in AutoCAD. Autodesk is the author of the DXF file format and therefore defines this standard. And because AutoCAD is the most popular CAD software in the world, it is a benchmark for the development of translators by many other CAD software organizations. You are guaranteed the highest level of compatibility in the industry.

Reduced Training Time/Cost

Both the AutoCAD based and stand-alone Striker Systems products provide an enhanced user interface that will be immediately recognizable to individuals familiar with AutoCAD. They will readily adapt to the Striker environment thereby minimizing the learning curve. And for organizations that use AutoCAD as their engineering solution, it is not necessary for employees to learn multiple operating environments as they would with separate CAD and CAM solutions.

Rapid Product Advancements

Unlike the developers of stand-alone manufacturing products, the development team at Striker Systems is not forced to continually maintain and advance an underlying graphics database. The Striker graphics database is an AutoCAD engine, the world's de facto standard CAD solution.

This allows the Striker Development Team to concentrate on feature development and advance software at a rapid pace.

The Disadvantages of AutoCAD

Autodesk AutoCAD is one of the most popular computer-aided design (CAD) programs, and it creates accurate, professional drawings. However, the program falls short for computer modeling and graphic design. The application has modeling tools, as well as color and fill tools, but AutoCAD does not compare well to contemporary building information modeling (BIM), three-dimensional modeling or illustration software.

Line

- AutoCAD produces drawings using line and shape tools. Curves, arcs and straight lines produce the shapes, but AutoCAD cannot edit the line and location as freely as illustration programs-- editing and overlapping lines and lineweights is limited to a few options. In addition, AutoCAD creates drawings from only lines, never volumetric models, such as with BIM. Nevertheless, the application can produce precise three-dimensional geometry with limited material effects.

Limited File Formats

- Because AutoCAD is one of the leading CAD programs, it limits the number of file formats it can import or export, because Autodesk expects other programs to export to AutoCAD formats, such as DWG and DXF. Unfortunately, this creates problems when using other programs with more powerful tools and exporting the program to an AutoCAD format-- geometry, color and effects are lost often.

Color, Fill and Texture

- AutoCAD drawings and models can have color, fill and texture, using the line and hatch tools. However, the application limits the number of possible colors to 256 and the hatching provides only a handful of textures, so you cannot create photo realistic images like illustration programs. Instead, you can import image files and create material maps for AutoCAD renderings, but AutoCAD's rendering abilities cannot compete with three-dimensional modeling programs or illustration programs.

Non-Parametric

- AutoCAD provides tools to create three-dimensional models, but editing the models requires many steps, unlike BIM parametric models, which automatically adjust all of the model components while editing elements. Furthermore, information is not attached to the models, such as with BIM parametric models-- BIM gives the designer data about the material and volumetric properties of the building project.

AutoCAD Entity Types and Descriptions

There are two formats used by AutoCAD: DXF (drawing exchange format) files, which are large; and ASCII representations of the binary DWG (drawing) files. Logically, both files are identical and, therefore, the FME treats both file types in the same manner. For AutoCAD DWF reading and writing support please see the chapter on AutoCAD DWF.

AutoCAD files consist of sections, as follows:

1. **HEADER:** This contains settings of variables associated with the drawing.

2. **CLASSES:** This contains class definitions associated with the drawing.

3. **TABLES:** This contains a variety of tables, including:

   o Layers: Each layer entry contains layer definition information such as layer color, layer name, and layer linetype. The AutoCAD reader validates the layer names and may modify them to remove invalid characters.

   o Linetypes: Each linetype entry contains the linetype definition information such as name and alignment. The AutoCAD writer enables linetype definitions to be copied from an existing AutoCAD file, then referenced by name during the data translation.

   o Shape Files: Each shape file entry identifies a shape file referenced by the drawing. Shape files are used by AutoCAD as a different method for defining symbols or fonts. Note: These are similar to the TextStyles in AutoCAD.

      AutoCAD shape files are *not* the same thing as Esri Shapefiles. AutoCAD shape files store symbol and font definitions.

   o Applications: Each application entry contains the name of an application referenced within the AutoCAD file.

4. **BLOCKS:** These are used to define symbols and other drawing file objects used repeatedly throughout a drawing. The AutoCAD writer enables copying of block definitions from an existing AutoCAD file, which is then referenced by name during a data translation operation.

5. **ENTITIES:** This is the main section of a drawing file and contains the actual feature entities. Each entity contains standard information, such as its color, layer, linestyle, and geometry, as well as a number of attributes specific to its entity type. For example, all 2D entities have thickness, while a text entity has fields for font, size, and the text string in addition to the standard display attributes.

FME supports both 2D and 3D AutoCAD entities. However, many applications only support 2D DWG and DXF files. The 2DForcer transformer can be used to ensure that only 2D data is written to an output DWG or DXF file.

6. **OBJECTS:** This section stores dictionaries and other helper non-entity objects.

Each entity may also have associated attribution stored within an extended entity data section. FME supports reading and writing of extended entity data.

Each entity may also have associated attribution stored within XRecord objects in an extension dictionary section. FME supports reading and writing XRecord data from entities.

All coordinates within a drawing file are stored as 64-bit floating point values in world coordinates. As such, there is no need to scale or otherwise alter coordinates as they are being read from or written to a drawing file.

The AutoCAD reader and writer use symbolic names for the different entity types stored within a drawing file. This simplifies feature type specification. The following table gives a brief description of each of the different AutoCAD entity types currently supported by the reader and/or writer. The entities are described in detail in subsequent sections.

What Is the Difference Between CAD and AutoCAD?

Computer-aided design (CAD) is the general term that applies to the use of computers in the design of houses, office buildings, interiors and anything else that previously required hands-on drafting. AutoCAD is a specific piece of software used by many architects and designers for commercial design purposes. Read on to find out about the uses of CAD and AutoCAD. Schools offering

CAD and AutoCAD Overview

AutoCAD is software that utilizes computer-aided design (CAD) principles in the modeling of buildings, manufactured goods, urban infrastructure and even fashion design. If you are an architect or designer, you might use AutoCAD software to create 2- and 3-dimensional drafts of custom home designs or renovations. If you work as a civil engineer, you can use AutoCAD software to design improvements in roadways and make cities and towns more energy-efficient. Other industries and professions that employ CAD and make use of AutoCAD software include manufacturing, automotive technology and engineering.

Types of CAD

Depending on the type of work you perform, there are different forms of CAD that you could employ. Drafts that are 2-dimensional are flat, while 3-dimensional and 2.5-dimensional drawings show the depth and space of a design. You might use wireframe, surface and solid modeling to calculate the dimensions of a design or simulate what the inner structure of your design might look like.

AutoCAD Software

AutoCAD is a trademarked product of Autodesk. When you use AutoCAD, you have the ability to draft 2-D and 3-D designs and create photorealistic rendering. Because different fields use AutoCAD in specific ways, there are several versions of the AutoCAD application for a variety of work types, such as architecture, mapping and piping design.

Learning AutoCAD Software

Technical schools or community colleges offer stand-alone courses in CAD that you can complete in a few weeks. You can also find CAD courses as part of a certificate or degree program, such as a fashion design or architecture program. You can enroll in courses and programs that specifically teach the AutoCAD application, though some schools might use other software, such as SolidWorks or TurboCAD, instead.

Autodesk also offers courses and training programs through authorized certification centers. These courses can prepare you to earn certification in AutoCAD from the vendor. Depending on your skill and knowledge level of the application, you can become an AutoCAD Certified User, AutoCAD Certified Associate or AutoCAD Certified Professional. Autodesk certification demonstrates your proficiency of the AutoCAD application.

To continue researching, browse degree options below for course curriculum, prerequisites and financial aid information. Or, learn more about the subject by reading the related articles below:

BASIC DRAWING COMMANDS FOR AUTOCAD

Measuring Commands

GRID: Displays a grid of dots at a desired spacing on the screen.

Command: GRID (enter)

On/Off/Tick spacing(x)/Aspect: (enter value) (enter)

SNAP: Specifies a "round off" interval so that points entered with the mouse can be locked into   alignment with the grid spacing.

Command: SNAP (enter)

On/Off/Value/Aspect/Rotate/Style: (enter value) (enter)

Basic Draw Commands

CIRCLE: Draws circles of any size.

Command: Circle (enter)

3P/2P/TTR/<center point>: (pick a center point)

Diameter or <Radius>: (Pick a point on the circle)

LINE: Draws straight lines between two points

Command: LINE (enter)

From Point: (pick a point using the mouse)

To Point: (Pick a point using the mouse)

To Point: (Press return to end the command)

ARC: Draws an arc (any part of a circle or curve) through three known points.

Command: ARC (enter)

Center/ < Start point > : (pick the first point on the arc)

Center/End/ < Second point > : **C**

Center: (pick the arc's center point)

Angle/Length of chord/ <End point > : (pick the arc endpoint)

Display Commands

LIMITS: Sets the size of the drawing paper. For size "A" drawing paper the limits should be set for   10.5 x 8.

Command: LIMITS (enter)

On/Off/Lower left corner <0.0000> (enter)

Upper right corner: 10.5,8 (enter)

ZOOM: Enlarges or reduces the display of a drawing.

Command: ZOOM (enter)

All/Center/Dynamic/Extents/Left/Previous/Vmax/Window/<Scale(x/XP)>:

(pick a point to define one corner of a rectangular viewing window then pick a point to define   the second point to define the opposite diagonal corner of the viewing window)

Note: To return the picture to its original viewing size enter **ALL** and press the enter key when prompted instead of defining a window.

PAN: **A**llows you to move your view point around the drawing without changing the magnification   factor.

Command: PAN (enter)

BASIC DRAWING COMMANDS FOR AUTOCAD

Editing Commands

CHANGE: Alters properties of selected objects

Command: CHANGE (enter)

Select objects or window or Last (select objects to be changed)

Properties/<Change point>: (type P)

Change what property (Color/Elev/LAyer/LType/Thickness)? (type Layer)

New Layer: (enter new layer name and press enter)

ERASE: Erases entities from the drawing.

Command: ERASE (enter)

Select objects or Window or Last: (Select objects to be erased and press enter when finished)

EXTEND: Lengthens a line to end precisely at a **boundary edge.**

Command: Extend (enter)

Select boundary edge(s)...

Select Objects (pick the line which represents the boundary edge which lines will be extended   to)

(press enter when finished selecting cutting edges)

<Select object to extend>/Undo: (pick the line(s) that need to be extended

TRIM: Trims a line to end precisely at a **cutting edge**.

Command: Trim (enter)

Select cutting edge(s)...

objects will be

Select Objects (pick the line which represents the cutting edge of line in which trimmed to)

(press enter when finished selecting cutting edges)

<Select object to trim>/Undo: (pick the line(s) that need to be trimmed)

GRIPS

You can edit selected objects by manipulating grips that appear at defining points on the object. Grips is not a command. To activate grips simply pick the object. Small squares will appear at various entity-specific positions. By selecting an end grip you can stretch the entity to change its size. By selecting the center grip you can move the entity to a new location. To remove grips press CTL-C twice. You can perform the following using grips: Copy, Multiple Copy, Stretch, Move, Rotate, Scale, and Mirror.

Creating Layers

LAYER: Creates named drawing layers and assigns color and linetype properties to those layers.

Command: LAYER (enter)

A Layer & Linetype Properties dialog box will be displayed. To add a new layer, pick the New button. A new layer listing appears, using a default name of Layer1. the layer name can be changed by highlighting the layer name. Colors and Linetypes can be assigned to each new layer by picking the color box to assign a color and picking the linetype box to assign a line type.

Standard AutoCAD colors

1 = Red	2 = Yellow	3 = Green	4 = Cyan
5 = Blue	6 = Magenta	7 = White	

Standard AutoCAD linetypes

Hidden2 = hidden lines

Center2 = center lines

Phantom2 = phantom or cutting-plane lines

BASIC DRAWING COMMANDS FOR AUTOCAD

Construction Commands

ARRAY: Makes multiple copies of selected objects in a rectangular or circular pattern

Command: ARRAY (enter)

Select objects or Window or Last: (select object to array)

Rectangular or Polar array (R/P) <current>: (P)

Center point of array: (pick the point around which to form the array)

Angle to fill (+=CCW, -=Cw) <360>: (enter)

COPY: Draws a copy of selected objects.

Command: COPY (enter)

Select objects or Window or Last: (select objects to be copied)

Base point or displacement: (pick a point on the object to be use as a reference

point)

Second point of displacement: (pick a point which represents the new location

of the copied

object)

MIRROR: Makes mirror images of existing objects.

Command: MIRROR (enter)

Select objects or Window or Last: (select objects to be mirrored)

First point of mirror line: (pick a point on top of the mirror line)

Second point: (pick a point on the bottom of the mirror line)

Delete old objects? <N> y or n (enter)

MOVE: Moves designated entities to another location.

Command: MOVE (enter)

Select objects or Window or Last: (select objects to move)

Base point or displacement: (pick a point on the object to be use as a reference point)

Second point of displacement: (pick a point which represents the new location of the object)

OFFSET: Constructs an entity parallel to another entity at a specified distance. Offset can be used with   lines, circles, arcs, and polylines.

Command: OFFSET (enter)

Offset distance or Through <last>: (enter a distance value)

Select object to offset: (select object to offset)

Side to offset: (Pick any point on the side of the object you wish to offset)

FILLET: Changes any corner to a rounded corner.

Command: FILLET

Polyline/Radius/Angle/Trim/Method/ <Select first line > : (pick the first line)

Select second line: (pick the second line)

CHAMFER: Changes any corner to an angled corner.

Command: CHAMFER

Polyline/Distance/Angle/Trim/Method/ < Select first line > : (pick the first line)

Select second line: (pick the second line)

OSNAP

Instantly locates exact points relative to existing objects (points).

Object Snap Modes: Endpoint, Midpoint, Center, Quadrant, Intersection, Insertion, Perpendicular, Tangent,

Nearest, Node, and None.

BASIC DRAWING COMMANDS FOR AUTOCAD

Placing lettering on a drawing

TEXT: Draws text characters of any size.

Command: TEXT (enter)

Justify/Style/<Start point>: (pick a starting point or enter a justification letter)

Height (0) (enter the height of the lettering)

Rotation Angle (0) (enter)

Text: (enter the desired lettering) (enter)

Summary of Options

<Start Point>	Left-Justifies text along its baseline
Justify	Justifies text according to the alignment options
Style	Enters a new text style
Null reply	Enters a new line of text below the previous text.
	(space or Enter key will give a Null reply)

Text Alignment Options

	Alignment	Abbreviation	Orientation
Text automatically	Aligned	A	Aligns text between two points. height will adjust
height	Fit	F	Fits text between two points. Text will not change
specified	Centered	C	Centers text at the baseline of a point

	Middle	M	Centers text horizontally and
vertically at specified point			the baseline of a
	Right	R	Right Justify text at the baseline of a specified point

	Alignment	Abbreviation	Orientation
	Top Left	TL	Left Justifies text at the top of text
	Top Center	TC	Centers text at the top of text
	Top Right	TR	Right justifies text at the top to text
	Middle Left	ML	Left justifies text at the middle of
text			
	Middle Center	MC	Centers text both horizontally and
vertically			at the middle of the text
	Middle Right	MR	Right justifies text at the middle of
text			
	Bottom Left	BL	Left justifies text at the bottom of
text			
	Bottom Center	BC	Centers text a the bottom of text
	Bottom Right	BR	Right justifies text at the bottom of
text			

The SPELL command will check the spelling of a group of text.

Crosshatching a drawing

BHATCH: Allows the user to crosshatch areas of a section view.

Command: BHATCH (enter)

The Boundary Hatch dialogue Box will be displayed. Select the Hatch Options box.

The Hatch Options box will be displayed. Select the Patterns box.

The Choose Hatch Pattern box will be displayed. Select the desired hatch pattern.

The Hatch Options box will be displayed again. You can select a scale and rotation angle for the crosshatch pattern. Select the OK box when finished.

BASIC DRAWING COMMANDS FOR AUTOCAD

The Boundary Hatch dialogue box will be displayed again. Select the Pick Points box. When prompted select the internal point of the are to be crosshatched. Press the enter key when finished.

The Boundary Hatch dialog box will be displayed again. Select the Apply box to add the crosshatching to the drawing.

References

- www.google.com
- www.wikipedia.com
- www.studymafia.org