CAD Annotations

Annotations:

General term used for textual information presented in notes, labels, specifications, etc. that are added to the drawing to describe the necessary information about features of the drafted object so that it can be produced accurately.

Annotation standards:

Standards help to ensure consistency, clarity and legibility in drawings. Annotation standards are usually discipline, industry and firm or company specific. In CAD, annotations are handled differently than the drawing linework. Two most important concepts to understand in CAD prints for annotations are **annotation styles** and **annotative scale feature.**

Annotation styles: In AutoCAD a feature called **'styles'** is used to maintain the standards for all annotation objects characteristics. For example text style, dimension style, table style multileader style etc.

Annotation scale: Typically in CAD, for any annotation object, its size is determined as per the size it should be on a hard copy to ensure legible as per established drafting standards and assign it in 'style setting' as one of it's characteristic. For example most of the body text is recommended to be 1/8" (3 mm, .12 inch) for ease of print reading. This text objects (1/8" height text) when placed in model space is too small compared to some of the other full-scale drafted objects. Also when a drawing enlargement or reduction scale is applied for printing the text object size is also affected by it. As a result, you must adjust the text size according to the 'drawing scale' for it to be readable on screen as well as printed to the required size on a hard copy.

Scaling method used:

• **Method 1:** Use the scale factor to scale the annotative object yourself

Scale factor for annotation objects
Computing scale factor for a particular scale e.g. ¼"=1'-0"
- How many quarter inches are there in one inch? 4
- How many inches are in a foot? 12
- Multiply 4 times 12, and the result is 48. Scale factor is 48

• **Method 2:** Use the 'annotative scale feature' to let the software automatically do the scaling for you

In AutoCAD a feature called **'annotative scale feature'** is used to scale all annotations as per drawing scale so that they are displayed on CAD screen to appropriate size for legibility and at the same time they are also printed to correct final output size assigned in the style. Using this 'annotative scale feature' within CAD reduces the need for you to calculate the scale factor

manually. It is a method to automatically scale the 'annotation objects' based on the assigned viewport scale for the plotted drawing. The annotation objects that use this feature are able to automatically update (either reduce in size or enlarge to a new size when the scale of the drawing changes in order to be printed to the specific predetermined size irrespective of changes in the viewport scale. The types of object that can have this annotative scale feature include: Text, Dimensions, Multileader, Tolerances, Hatches, Blocks, Attributes

Best practices for text in CAD drawings

- Plan final layout sheet using rough sketches to allow enough room for text and notes
- Always arrange text objects to avoid crowding
- Place related items, notes in groups to make the drawing easier to read
- Place all general notes in a common location.
- Ideally determine the drawing scale and final text height before you actually start placing text in any drawing. This is important because the text objects placed in model space e.g. 1/8” text is too small compared to the other full-scale objects. As a result, you must adjust the text size according to the drawing scale using annotative feature within CAD which reduces the need for you to calculate the scale factor manually.
- Always avoid adjusting text format independently on the text style assigned to the text object.
- Typically, a drawing/drawing set should use the same font and format throughout, except for specific cases such as title block or maps
- Arial, Romans or Century Gothic is common in mechanical drawings
- Arial, romans or sanserif fonts, stylus BT or country blueprint font are common in architectural drawings
- Vertical text is most common however inclined text is approved and used by some companies for specific drawing requirements such as water feature on maps, structural drafting etc.
- Upper case is standards however some companies may use lower case letter for applications such as civil engineering maps.
- Specific heights are used for different purposes. It helps establish hierarchy.
- Although there are slight variations in mechanical and architectural text heights approved standards for most text is 1/8” (.12 inch or 3 mm) and for labels and titles it is ¼” (.24 inch, 6 mm)

Best practices for dimensions in CAD drawings

- Dimensions should be visible, yet thin lines.
- Extension lines should not touch the object being dimensioned.
- When placing multiple dimensions, place the shorter dimension closest to the object, followed by the next larger dimension.

- Extension lines should not cross dimension lines.
- Dimension lines should not cross other dimension lines.
- Group dimensions whenever possible to make them easier to read and follow.
- Avoid placing dimensions close to an object line as substitution for the dimension line.
- Always try to dimension to a view where the features are visible, try not to dimension to
- hidden surfaces or features.
- Leaders should cross as few objects as possible and should never cross each other.
  Use proper dimensioning standards

Mechanical dimensioning conventions

ASME has published industry wide guidelines for style, format, spacing and placement of dimensions known ASME Y 14.5-2009

Dimension placement

- Place dimensions on profile view of feature
- Avoid dimensioning to hidden lines or centerlines of hidden holes
- Group dimensions whenever possible an place between the views of objects
- Avoid drawing extension lines and leaders through dimension lines
- Avoid placing dimensions on the object

Size and spacing of dimension features

- Space between part outline and first dimension minimum .40
- Spacing between succeeding parallel dimension minimum .25
- Dimension text minimum .12
- Set the arrow length to match text height
- Visible gap between outline of part and beginning of extension line is between .032 and .062
- Extension lines should extend .1 to .12 beyond the last arrowhead
- Labels for views minimum .24
- Use uppercase letters
- Use unidirectional alignment of dimension text

Architectural dimensioning conventions

Often standards are described in an in-house drafting manual developed by the drafters in the firm/company. Increasingly National CAD Standards are gaining acceptance and are being adopted.

- Dimensioning conventions for architectural drawings are different than mechanical drawings and are as follows:
- Tick marks (slashes) are used instead of arrowheads
- Tolerances not critical
- Dimension fractions should not be given in increments of less than 1/16”
- Text should be san serif
- Text height minimum 3/32”
- Aligned text is used on architectural drawings and read from bottom and right side to the sheet
- Space between outside edge and first dimension line minimum 9/16” and should be consistent.
- Space between succeeding parallel dimension lines minimum 3/8” and should be consistent.

Dimension placement

- Dimension placement is best determined by understanding of the construction processes.
- Wall thicknesses are usually rounded off to the nearest ¼”
- Stud walls (wood or metal) are typically dimensioned to the center of the walls while foundation and masonry wall (modular) are dimensioned to the nominal face and not the center.
- While drawing plans, a rule to follow to make sure you are designing walls to coursing which applies to wall lengths and openings within CMU walls is
    - E’-0” or E”-8” where E is any even number
    - O’-4” where O is any odd number
- Draw interior walls to 4 ½” and draw exterior walls to 6 ½”
    - Interior walls typically consist of
        - 2X4 wood studs (actual size is 1 ½”X3 ½”)
        - ½” gypsum board (5/8” is used for sound/fire control)
    - Exterior walls typically consist of
        - ½” oriented strand board
        - 2X6 studs (actual size is 1 ½” X 5 ½”)
        - ½” gypsum board
- Doors

  Doors in masonry walls are dimensioned to face while doors in stud walls are dimensioned to the center of the door opening
    - Door thickness is 1 3/8”, 1 ¾” and 2 ¼”
    - Typical sizes range from 1’-0” X6’-8” to 4’-0” X 6’-8”