Chapter 5
Sketching, Lettering, and Text
Objectives

- Explain the role of sketching in technical communication.
- Describe accepted techniques for sketching.
- Identify different styles of lettering.
- List and describe industry standards used for lettering on drawings.
Objectives

• Explain how guidelines are used to determine the height and slope of lettering.
• Draw single-stroke Gothic lettering.
• Describe the CAD functions used for creating text.
Freehand Sketching

• Done without instruments.
• Used to evaluate concepts before starting drawing.
• Used to share ideas with others.
Types of Paper for Sketching

- Plain paper
- Graph paper
- Isometric grid paper
- Drafting paper
- Tracing paper
Sketching Techniques

• Hold pencil firmly but loose enough for easy movement.
• Hold pencil farther back than in normal drawing.
• Keep eye focused on point where line will end.
• Darken finished lines.
Sketching Horizontal Lines

• Keep your arm perpendicular to line being sketched.
Procedure for Sketching Horizontal Lines

A. Locate end points of line

B. Position arm for trial movement

C. Sketch short, light lines

D. Darken line in one continuous movement

Eye this point
Sketching Vertical Lines

- Work from top to bottom.
- Place your arm approximately 15° to line.
Procedure for Sketching Vertical Lines

A

Position arm for trial movement

B

Sketch short, light lines

C

Darken line

D

Locate end points of line

Eye this point

Eye this point
Sketching Inclined Lines

• Sketch between points or at specific angle.
• Use the same techniques for straight lines.
• Draw with paper square or rotated to simplify sketching.
Sketching Inclined Lines (Cont.)

Sheet Held Square

Sheet Rotated
Estimating Angles

- First, sketch right angle (90° angle).
- Subdivide to obtain desired angle.
Sketching Methods for Circles and Arcs

• Centerline method
• Enclosing square method
• Hand-pivot method
• Free-circle method
Centerline Method

A. Locate centerlines

B. Locate radial points

C. Position for trial movement

D. Sketch lightly

E. Darken shape
Enclosing Square Method

A. Locate centerlines

B. Sketch a box equal to the diameter and sketch arcs where the centerlines meet

C. Sketch the circle
Hand-Pivot Method

A. With centerlines located, use your small finger as a pivot
B. Rotate the paper while holding your finger at the center

First Method

C. Use a second pencil as a pivot while rotating the sheet

Second Method
Free-Circle Method

Sketch two or three approximate circles lightly

A

Darken the most accurate shape

B
Sketching Methods for Ellipses

• Rectangular method
• Trammel method
• Free-ellipse method
Rectangular Method

Locate centerlines A

Sketch a box equal to the ellipse axes and sketch arcs where the centerlines meet B

Sketch the ellipse C
Trammel Method

- Sketch ellipse axes.
- Mark points on trammel.
- Move trammel to mark sketch points.
- Sketch through marks.
Free-Ellipse Method

Sketch two or three approximate ellipses lightly

A

Darken the most accurate shape

B
Sketching Irregular Curves

- Mark points along curve spaced at 1/4” or 1/2”.
- Sketch through marks.

Include at least 3 points in each movement
Lead out of previous curve
Methods Used to Keep Sketches in Proportion

• Pencil-sight method
• Unit method
• Enclosing rectangle method
Pencil-Sight Method

- Hold out pencil to gauge object proportions.
- Lay off distances directly on sketch.
- Move closer to object or farther away to vary size.
- Useful when working with actual object.
Pencil-Sight Method (Cont.)
Unit Method

- Divide distances into units.
- Select appropriate unit measurement.
- Lay off distances on sketch in same proportion.
- Useful when working from picture.
Enclosing Rectangle Method

A. Sketch centerlines and a rectangle equal to the outside proportions.
B. Sketch all features lightly.
C. Erase construction lines.
D. Darken features.

Gasket
Lettering

• Used to clarify drawing information.
• Must be done accurately for manufacturing purposes.
• Manual skill comes with practice.
• Created as text in CAD.
Pencil Techniques for Lettering

• Support your arm on table.
• Keep your index finger in line with pencil.
• "Pull" pencil toward your drawing hand.
Hand Lettering Styles

- Roman
- Italic
- Text
- Gothic

**BRAZIL, CHILE AND OTHER**
Advanced ancient cultures flourished in
Roman

**BRAZIL, CHILE AND OTHER**
Advanced ancient cultures flourished in
Italic

**Announcement Big Social Gathering**
Text

**BRAZIL AND SOUTH AMERICAN**
Advanced ancient cultures
Gothic
Gothic Lettering

- Drawn “sans serif.”
- Standard form used in drafting.
- Known as single-stroke Gothic.
- Drawn uppercase on machine drawings.
- May be vertical or inclined (but never both).
Architectural Lettering

• Less “mechanical” in style than Gothic lettering.
• Used in architectural drafting.
Guidelines

• Drawn to ensure uniform letter height and straightness.
• Made horizontal or vertical.
• Should be drawn very lightly.
Guidelines and Line Spacing

- Use dividers or scale to space lines.
- Spacing between lines should be one-half to one full letter.
- Lowercase letters are two-thirds full height.
Drawing Devices for Guidelines

- Ames Lettering Guide
- Braddock-Rowe Triangle
- Parallelograph
Ames Lettering Guide

- Direct setting for crosshatching
- Grouped sets of guidelines
- Finish mark symbol
- 1/8" hole spacing
Single-Stroke Gothic Lettering

• Drawn with single-stroke widths.
• Strokes carefully made as straight stems, crossbars, and ovals.
• Inclined lettering made at angle between 68° and 75°.
Vertical Gothic Lettering Strokes

A V W M N
E F L H I T
K X Y Z
C G O Q D
J S U B P R
Vertical and Inclined Strokes

- Made by finger movement only.
Horizontal Strokes

• Made by hand movement and slight finger movement.
Oval Strokes

- Made by combination of hand and finger movement.
Inclined Gothic Lettering Strokes
Lowercase Vertical Gothic Lettering

i k l t v w x y z

o c e a d q g p b

s m n h u r f j
Large and Small Uppercase Lettering

- Used by some for titles or notes.
- May be easier to read than all uppercase.
- Small letters are two-thirds to four-fifths the letter height.
Proportion in Lettering

- Elements must be spaced correctly to achieve proportion.
- Keep spacing uniform even when space is limited or must be expanded.
Stability in Lettering

• Crossbars placed above center to prevent top-heavy appearance.
• Some letters have smaller upper portion for stability.
Lettering Quality

- Letters are formed, not “written.”
- Style, height, spacing, and stroke kept uniform.
Word Composition

- Spacing between letters based on total letter area.
- Do not crowd letters or space too widely.

AM IM TC BOLT

Proper Composition
(Size of Letters Dictates Spacing)

BORE TO OBTAIN
.0002 CLEARANCE

Poor Composition
(Letters Equally Spaced)
Word Composition (Cont.)

• Spacing between words equal to letter “O.”
• Sentences separated by two letters.

WORDS ARE SEPARATED BY ONE LETTER SPACE. SENTENCES ARE SEPARATED BY TWO LETTER SPACES.
Line Spacing

• Should be two-thirds to full letter height.
• Should be full height if line includes fractions.
Lettering Height

- Typically 1/8” for notes and 1/4” for drawing title.
- Fractions drawn twice full height.
- Company standards may vary.
Spacing Words Evenly

- Typically applied in title block.
- Draw on separate sheet and trace if necessary.

<table>
<thead>
<tr>
<th>ASS’Y. – VALVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HANDLE – WELDED</td>
</tr>
</tbody>
</table>
Lettering with Ink

• Common for technical publications.
• Requires special skill.
• Technical pen typically used.
Mechanical Lettering Devices

- Used to trace letters to simplify inking process.
  - Leroy lettering device
  - Lettering templates
  - Scriber
Lettering Template
Transfer Type

• Available on printed sheets.
• Requires special tool to “transfer” lettering.
• Similar to adhesive-backed overlays.
Transfer Type (Cont.)
Creating Text in CAD

• Provides many advantages over manual lettering.
• Appearance controlled by text style settings.
• Text commands used to enter text.
• Standard drafting symbols available for insertion.
• Editing functions simplify revisions.
LEGEND

- **100** - EXISTING GROUND CONTOUR
- **100.5+** - EXISTING SPOT ELEVATION
- **100** - PROPOSED GRADE
- **100.5+** - PROPOSED SPOT GRADE
- **DFM** - STORM DRAIN & CATCHBASIN
- **SFM** - STORM DRAIN & MANHOLE
- **S** - STORM DRAIN & HEADWALL
- **DFM** - STORM DRAIN FORCE MAIN
- **SFM** - SANITARY SEWER FORCE MAIN
- **S** - SANITARY SEWER & MANHOLES
- **OHE/T** - WATER MAIN & HYDRANT
- **UGE/T** - WATER MAIN & GATE VALVE
- **OHE/T** - GAS LINE & GATE VALVE
- **OHE/T** - STREET LIGHT
- **OHE/T** - OVERHEAD ELECTRIC & TELEPHONE
- **UGE/T** - UNDERGROUND ELEC/TEL & MANHOLES

- **TREE LINE**
- **NHHB** - N.H. HIGHWAY BOUND
- **SB** - STONE BOUND
- **I.PIN** - IRON PIN
- **I.PIPE** - IRON PIPE
- **DH** - DRILL HOLE & STONE WALL
- **DH** - STONE BOUND TO BE SET
- **DH** - IRON PIN TO BE SET
- **DH** - EDGE OF WETLAND
- **DH** - BUILDING SETBACK LINE
- **DH** - WIRE FENCE
- **DH** - CHAINLINK FENCE
- **DH** - CURBING
- **DH** - HANDICAP PARKING SPACE
- **DH** - HANDICAP SIDEWALK RAMP
- **DH** - PARKING SPACE COUNT

(Autodesk, Inc.)
Creating Text in CAD

1. Create text style with appropriate settings.
2. Enter text command.
3. Specify justification and rotation.
4. Select insertion point.
5. Enter text.
Text Style

• Provides efficient way to manage text appearance.
• Multiple styles may be used for notes, dimensions, and title block.
• Settings allow definitions for different drafting disciplines.
## Common Text Style Settings

- **Font**
- **Height**
- **Width**
- **Obliquing angle**

<table>
<thead>
<tr>
<th>Font</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Font 1</td>
<td>1/16” text</td>
</tr>
<tr>
<td>Font 2</td>
<td>1/8” text</td>
</tr>
<tr>
<td>Font 3</td>
<td>1/4” text</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condensed text</th>
<th>Width</th>
<th>Obliquing Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanded text</td>
<td>0° oblique angle</td>
<td>15° oblique angle</td>
</tr>
<tr>
<td></td>
<td>30° oblique angle</td>
<td>−30° oblique angle</td>
</tr>
</tbody>
</table>
Text Font

• Selection depends on application.
• May contain serifs or decorative elements.
• Romans (Roman Simplex) used for mechanical drawings.
Text Justification

• Controls placement of text in relation to insertion point.
• Left justification set by default.
Text Justification Options

- Left
- Right
- Center
- Middle
- Aligned
Text Rotation

• No rotation set by default.
• Measured from 0° horizontal.
• Positive angle rotates text counterclockwise.
• Negative angle rotates text clockwise.
Editing Text

• Text editing command typically used.
• Standard object editing commands also available.
• Double-clicking string may allow modification.
• **Spell** command used to check spelling.
Review Questions

1. Which of the following items should *not* be used when making a freehand sketch?
   A. Graph paper
   B. Scale
   C. F or HB grade pencil
   D. Soft eraser

   **B. Scale**
2. Which of the following guidelines applies when sketching lines?

A. Sketch vertical lines from the bottom to the top.
B. Keep your eye focused on the pencil when sketching initial strokes.
C. Make initial lines dark and thick.
D. Keep your fingers farther back on the pencil than in normal drawing.

D. Keep your fingers farther back on the pencil than in normal drawing.
3. Which sketching method for circles requires the use of hand-eye coordination without layout lines?
A. Enclosing square method
B. Centerline method
C. Free-circle method
D. Hand-pivot method

C. Free-circle method
4. A(n) _____ is a piece of paper marked with points to lay off distances.

trammel
Review Questions

5. _____ is the relationship of one part of an object to another part, or to the whole object.

Proportion
6. The standard letter form used in drafting is single-stroke ______ lettering.

Gothic
7. Horizontal and vertical _____ are used in freehand lettering to maintain uniformity in height and slope.

guidelines
8. Which of the following guidelines applies when lettering?

A. Vertical and inclined strokes are made by pivoting the hand at the wrist.
B. Inclined lettering is drawn at an angle between 30° and 45°.
C. The standard lettering height for notes is 3/4".
D. Spacing between lines of letters should equal two-thirds the letter height.

D. Spacing between lines of letters should equal two-thirds the letter height.
Review Questions

9. A text _____ consists of settings that define the appearance of text.

style
Review Questions

10. The _____ text font is similar to the Gothic typeface and is commonly used on mechanical drawings.

Romans
Review Questions

11. The text _____ determines how a text string will be placed in relation to the insertion point.

justification