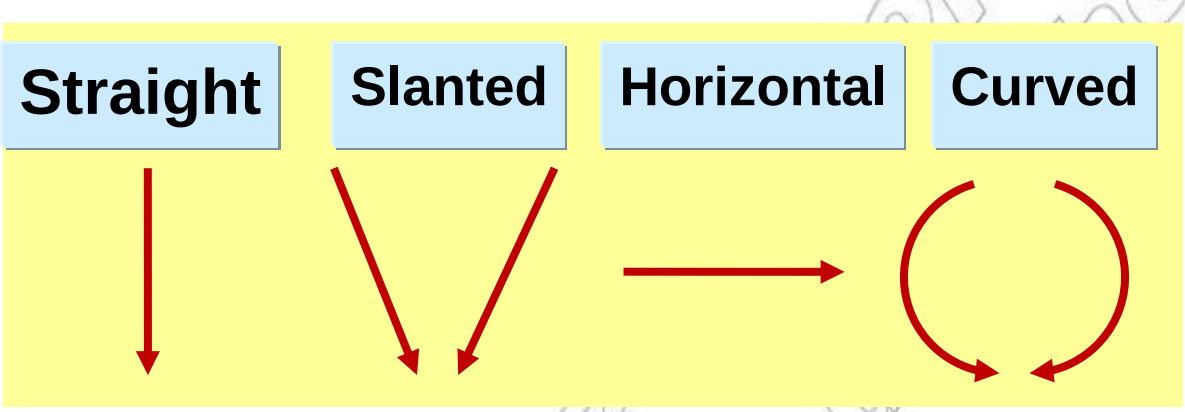
UNIT 4

LETTERING



Basic lettering Strokes

Learning competencies:

Up on completion of this unit you should be able to:

- ✓ **Describe the purpose of lettering on a drawing;**
- ✓ **Identify the various types of drawing lettering styles;**
- ✓ **Make technical lettering, single-stroke; vertical and inclined gothic letters properly;**
- ✓ **Identify proper types of lettering pencils, lettering device and letter guide lines.**

4.1 Introduction

- *What do you think is lettering in technical drawing?*
- *Observe the information given by words on the drawing you brought on activity 3.1 What do you observe from the type of letters?*

The information that a drawing must present cannot be revealed by graphic shapes and lines alone. To make a drawing informative and complete, you must include lettering in the form of dimensions, notes, legends, and titles. Lettering can either enhance your drawing by making it simple to interpret and pleasant to look at, or it can ruin your drawing by making it difficult to read and unsightly in appearance. Therefore, it is essential that you master the techniques and skills required for neat, legible lettering.

Key terms

Legible: capable of being read or deciphered, especially with ease of reading.

Lettering styles

Have you ever used word program on a computer? If you do, try to list out the types of lettering styles found on the Microsoft word program.

There are various forms of a letter used in the art of lettering and each approximate for some particular purpose.

Roman Letters

The term Roman refers to any letter that has wide downward strokes and thin connecting strokes, as would result from the use of a wide pen, and the ends of the strokes are terminated with spurs called serifs. Roman letters include the Old Roman and Modern Roman and may be vertical or inclined.

Italic Letters

Inclined letters are also referred to as italic, regardless of the letter style; those shown in Fig. 4.1 are inclined Modern Roman.

Text Letters

The Text letters shown in Fig. 4.1 are often loosely referred to as “Old English”, are little used where legibility is important, but only where a decorative effect is sought. These letters may be easily and rapidly made with a broad-nib pen.

Gothic Letters

German Text is the only form of medieval Gothic in commercial use today. Commercial Gothic is a relatively modern development that originated from the earlier Gothic forms. Also called sans-serif Gothic, this letter is the only one of interest to engineers, Fig. 4.1. It is the plainest and most legible style and is the one from which our single-stroke engineering letters are derived. While admittedly not as beautiful as many other styles, sans-serif letters are very legible and comparat-

ively easy to make. They may also be drawn in outline and filled in.

Fig. 4.1 Classification of letter styles

4.2 Technique of Lettering

Any normal person can learn to letter if a persistent and intelligent effort is made. Although it is true that "practice makes perfect," it must be understood that practice alone is not enough; it must be accompanied by continuous effort to improve.

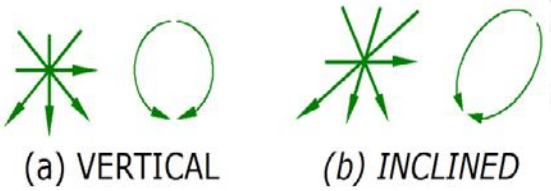


Fig. 4.2 Basic Lettering Strokes

Lettering is freehand drawing and not writing. Therefore, the six fundamental strokes and their direction for freehand drawing are basic to lettering, Fig. 4.2. The horizontal strokes are drawn to the right, and all vertical, inclined, and curved strokes are drawn downward. Good lettering is always accomplished by conscious effort and is never done well otherwise, though good muscular coordination is of great assistance. Ability to letter has little relationship to writing ability; excellent letterers are often poor writers.

There are three necessary aspects of learning to letter.

1. Knowledge of the proportions and forms of the letters and the order of the strokes. No one can make a good letter who does not have a clear mental image of the correct form of the letter.
2. Knowledge of composition the spacing of letters and words. Rules governing composition should be thoroughly mastered.
3. Persistent practice, with continuous effort to improve.

Pencil for Lettering

First, sharpen the pencil to a needle point; then dull the point very slightly by marking on paper while holding the pencil vertically and rotating the pencil to round off the point. Pencil lettering should be executed with a medium pencil, such as an F or H for ordinary paper; the strokes should be dark and sharp, not gray and blurred. In order to wear the lead down uniformly and thereby keep the lettering sharp, turn the pencil frequently to a new position.

In general, draw vertical strokes downward or toward you with a finger movement, and draw horizontal strokes from left to right with a wrist movement without turning the paper. Since practically all pencil lettering will be reproduced, the letters should be dense black. Avoid hard pencils that, even

with considerable pressure, produce gray lines.

4.3 Single Stroke Letters

1. *What do you understand from the phrase single stroke letters?*
2. *Try to sketch single stroke letters on your own understanding.*

Single stroke letters are used universally for technical drawing. This style is suitable for most purpose because it posses the qualification necessary for legibility and speed. The expression single stroke means the width of the straight and curved lines that forms the letters are the same as the stoke of the pen or pencil.

Note: *Upper-case and lower-case letters are to mean capital and small letters respectively.*

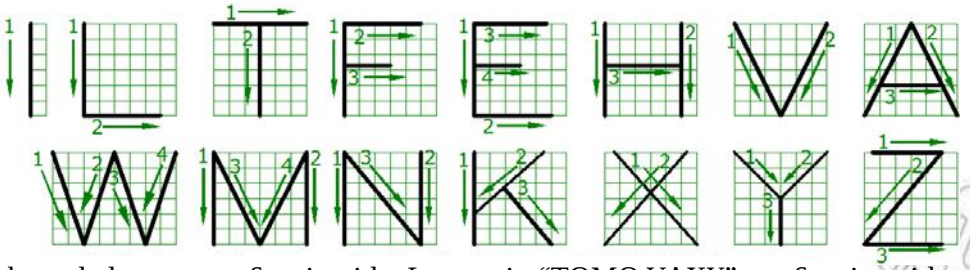
4.3.1 Vertical Capital Letters and Numerals

For convenience in learning the proportions of the letters and numerals, each character is shown in a grid six units high. Numbered arrows indicate the order and direction of strokes. The widths of the letters can be easily remembered. The letter 1 or the numeral 1 has no width. The W is 8 units wide (1.3 times the height) and is the widest letter in the alphabet. All the other letters or numerals are either 5 or 6 units wide, and it is easy to remember the six unit letters because when assembled they spell TOM Q. VAXY. All numerals except the 1 are 5 units wide. All horizontal strokes are drawn to the right, and all vertical, inclined, and curved strokes are drawn downward, Fig. 4.2.

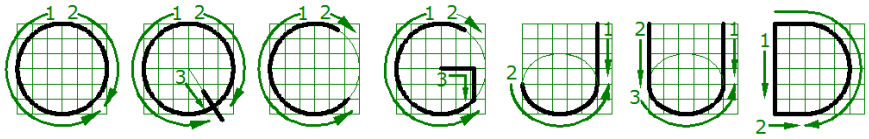
As shown in Fig. 4.3, the letters are classified as straight-line letters or curved-line letters. On the third row the letters O, Q, C, and G are all based on the circle. The lower portions of the J and U are semi-ellipses, and the right sides of the D, P, R, and B are semicircular. The 8, 3, S, and 2 are all based on the figure 8, which is composed of a small ellipse over a larger ellipse. The 6 and 9 are based on the elliptical zero. The lower part of the 5 is also elliptical in shape.

Activity 4.1

1. *Copy the exact number of grids that each letter occupies like an example below. Practice on your drawing paper as accurately as you can the order of strokes for the uppercase, lowercase Gothic letters and numerals.*
2. *Use the HB pencil for the letters, and the red ballpen for the number sequencing of strokes. Lettering is a freehand activity, hence, rulers are not used.*



W is the only letter over 6 unit wide. Letters in “TOMQ VAXY” are 6 units wide-all the others are S, except “I” and “W” curved line letters and numerals.



The letters O,Q,C,G and D are based on a true circle. The lower portion of the J and U is elliptical

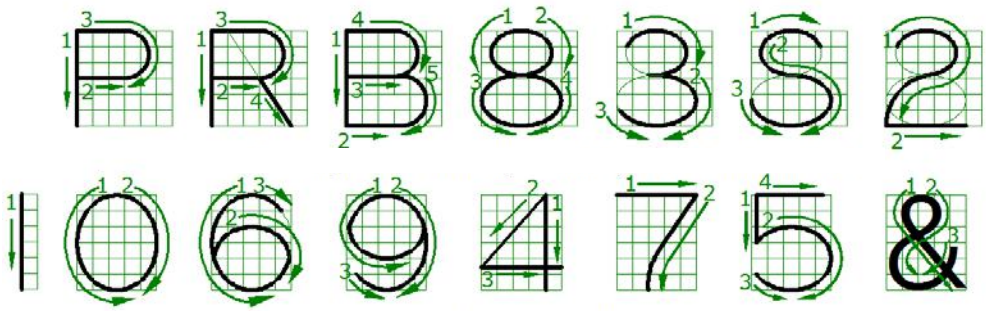


Fig. 4.3 Vertical Capita Letters and Numerals

4.3.2 Vertical Lower-Case Letters

Before beginning a word or line of lower-case letters, the four guide lines (Fig. 4.4) should be drawn. The drop line may be omitted by all except beginners.

Strokes of the letters extending above the waist line are known as ascenders, and those extending below the base line as descenders. All ascenders except that of the t extend to the cap line. All descenders extend to the drop line.

The 3rd stroke of the letter "e" is slightly above mid-height. The dots over the i and j are slightly below the cap line.

The crosses on the f and t are on the waist line and are symmetrical with respect to 1st stroke. The curved stokes of h, m, n, and r intersect stokes 1 approximately two-thirds of the distance from the base line to the waist line.

The descenders of g, j, and y terminate in curves which are tangent to the drop line, while those of p and q terminate in the drop line and do not have the curves.

The letters a, b, c, e, g, p, and q are formed with circles as bases.

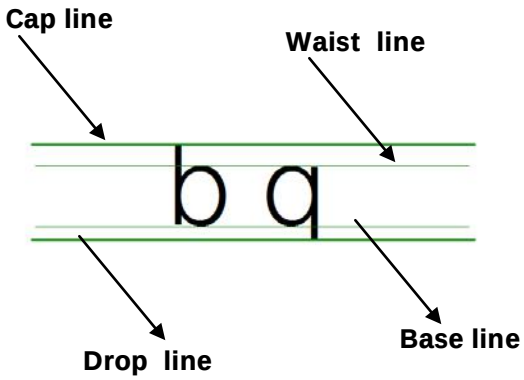


Fig. 4.4 The four guide lines

Key terms

- ***Stem:*** is the straight part of a letter.
- ***Pen nib:*** the writing point of a pen.

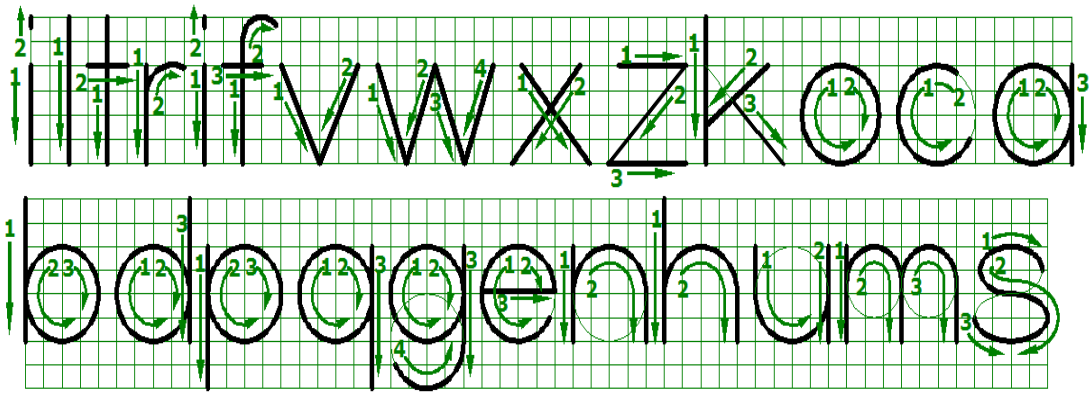


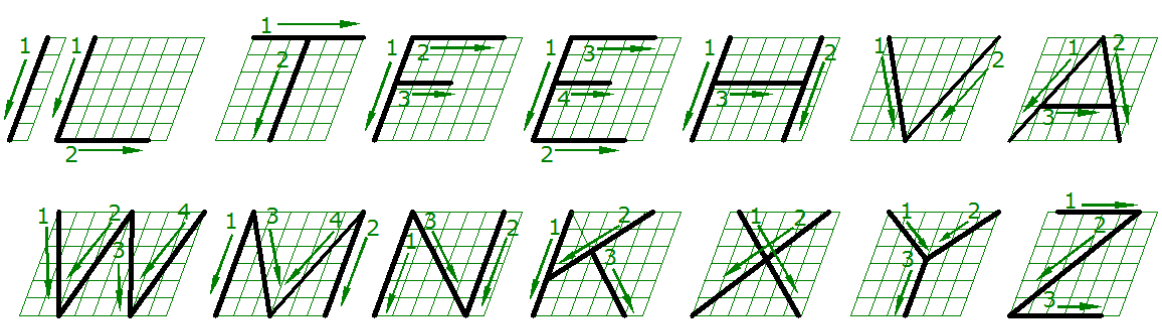
Fig. 4.5 Vertical lowercase letters

4.3.3 Inclined Capital, Lower-Case Letters and Numerals.

Fig. 4.6 & 4.7 the order and direction of the strokes and the proportions of the inclined capital letters and numerals are the same as those for the vertical letters except that they are commonly tilted at an angle of 67 ½° from a horizontal guide line. Inclined letters are also classified as straight-line or curved-line letters, most of the curves being elliptical in shape.

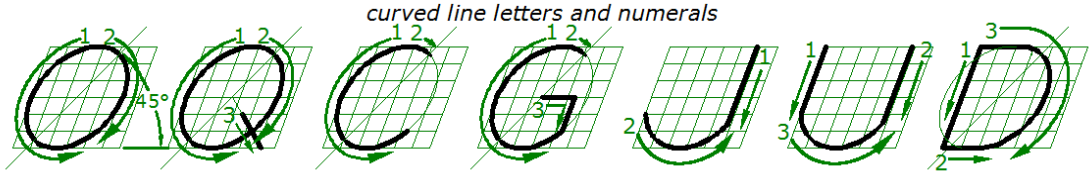
Activity 4.2

1. *Copy the exact number of grids that each letter occupies like an example below. Practice on your drawing paper as accurately as you can the order of strokes for the inclined capital, lower-case letters and numerals.*
2. *Use the HB pencil for the letters, and the red ball pen for the number sequencing of strokes. Lettering is a freehand activity, hence, rulers are not used.*

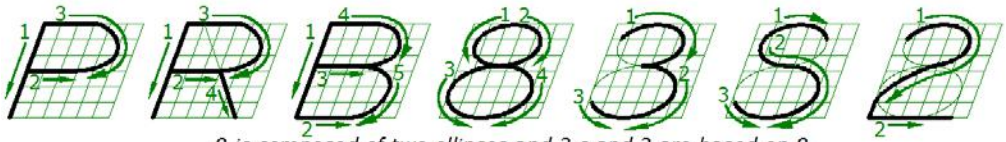


"w" is the only letter over 6 unit wide. Letters in "TOMQ, VAXY" are 6 units wide-all the others are 5, except "I" and "w"

curved line letters and numerals



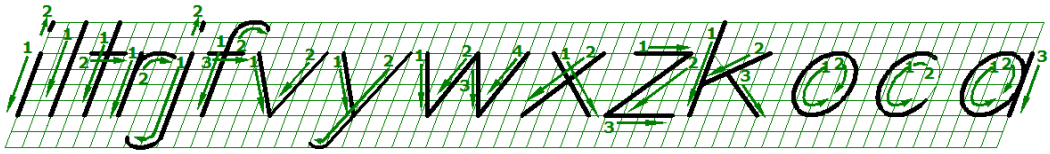
The letters O,Q,C,G and D are based on a true circle. The lower portion of the J and U is elliptical



8 is composed of two ellipses and 3,s and 2 are based on 8.

0,6 and 9 are elliptical

Fig. 4.6 Inclined capital letters and numerals



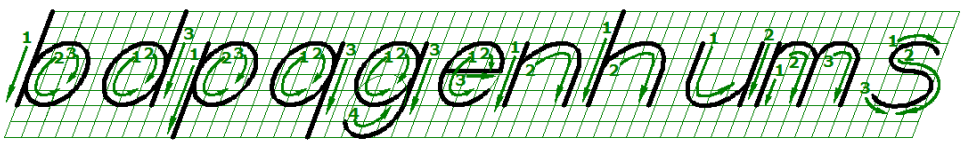


Fig. 4.7 Inclined lowercase letters

4.4 Guide Lines

1. What do you propose to write letters which have equal height?
2. Show your proposal in practice.

Fig.4.8 (A) shows the use of light pencil lines called guidelines. Guidelines ensure consistency in the size of the letter characters. If your lettering consists of capitals, draw only the cap line and base line. If lowercase letters are included as well, draw the waist line and drop line.

The waist line indicates the upper limit of the lowercase letters. The ascender is the part of the lowercase letter that extends above the body of the letter; for example, the dot portion of the character i in Fig.4.8 (A). All ascenders are as high as the caps.

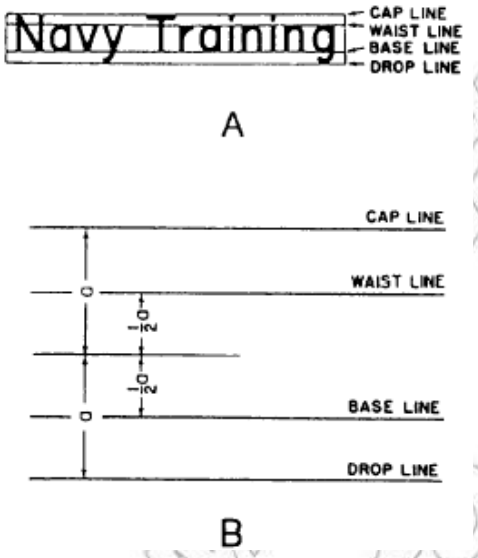


Fig. 4.8 Laying off guidelines

The drop line indicates the lower limit of the lowercase letters. The descender is the part of the lowercase letter that extends below the body of the letter, an example being the tail of the character g in Fig.4.8. (A). The vertical distance from the drop line to the base line is the same as the vertical distance from the waist line to the cap line. It is about one third of the vertical distance between the base line and the cap line, or about one half of the vertical distance between the base line and the waist line.

Fig. 4.8. (B), shows an easy way to lay out guidelines for caps and lowercase. Let the height of a capital be 1½ times the distance "a". Set a compass or dividers to distance "a" and lay off distance "a" above and below the midline selected for the guidelines, the method locates the cap line and the drop line. Then set the compass or dividers to one half of "a" and lay off this distance above and below the midline. This method locates the waist line and the base line.

Complete guide lines should be drawn for whole numbers and fractions. This means that both, horizontal and vertical guide lines or horizontal and inclined guide lines should be drawn.

Fig.4.9, draw five equally spaced guide lines for whole numbers and fractions. Thus, fractions are twice the height of the corresponding whole numbers. Make the numerator and the denominator each about three-fourths as high as the whole number to allow ample clear space between them and the fraction bar.

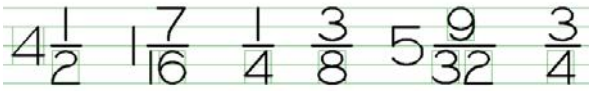


Fig. 4.9 Guide lines for numerals and fractions

To help you keep your lettering vertical, it is a good idea to construct vertical guidelines, spaced at random along the horizontal guidelines. For inclined lettering, lay off lines inclined at the angle you wish your lettering to be slanted (See Fig 4.10). Inclined lines are known as direction lines and are normally slanted at a maximum of 68 degrees.

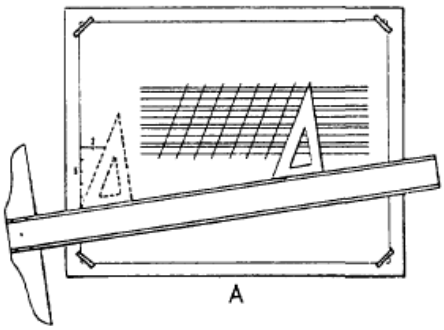


Fig. 4.10 Laying off lines for lettering

4.4.1 Spacing between Guidelines

The spacing between two lines of capitals may vary from one half of the height to the full height of a capital. Two thirds of the height is customarily used.

The spacing commonly used between lines of lowercase letters is shown in Fig.4.11. The space indicated by the letter S equals the vertical distance between the waist line and the cap line.

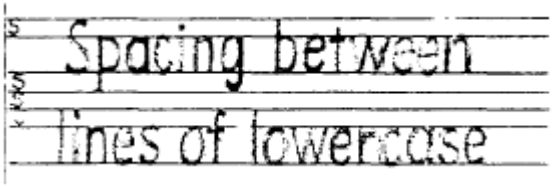
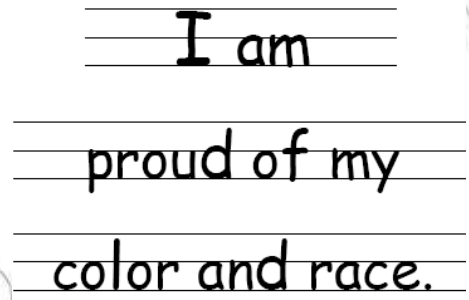


Fig. 4.11 Spacing between lines of lowercase letters

Activity 4.3

On your drawing paper, prepare five sets of guidelines. Write any quotation about nationalism. Use the uppercase and lowercase letters. See the example below.



4.4.2 Guide Lines Devices

Special devices are widely used for spacing. Lettering triangles are made in a variety of forms and sizes. These triangles are provided with sets of holes in which the pencil point may be inserted; the guide lines are produced by moving the triangles with the point of the pencil along the T-square. The lettering triangles are also provided with a slot which has an inclined edge suitable for drawing inclined guide lines.

The Braddock-Rowe lettering triangle has a serious of holes arranged to provide guidelines for lettering and dimensioning

figures, and for spacing section lines. The numbers at the bottom of the triangle indicate spacing of guide lines.

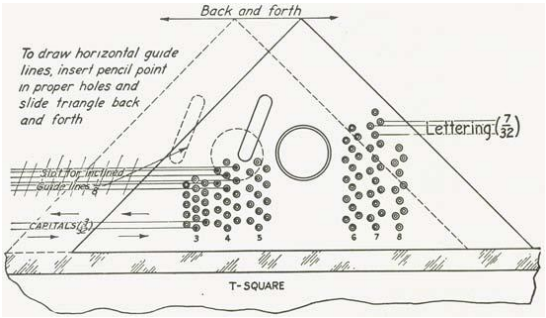


Fig. 4.12 Braddock-row lettering guide

The Ames Lettering Instrument is an ingenious transparent plastic device composed of a frame holding a disk with three columns of holes. The vertical distances between the holes may be adjusted quickly to the desired spacing for guide lines or section lines by simply turning the disk to one of the settings indicated at the bottom of the disk. These numbers indicate heights of letters. Thus, for different height of letters, different corresponding No setting would be used. The center column of holes is used primarily to draw guide lines for numerals and fractions, the height of the whole number being two units and the height of the fraction four units. The No. 4 setting of the disk will provide guide lines for 8 units whole numbers, with fractions twice as high, or 4 units, as shown at (a). Since the spaces are equal, these holes can also be used to draw equally spaced guide lines for lettering or to draw section lines. The Ames Lettering Guide is also available with metric graduations for desired metric spacing.

The two outer columns of holes are used to draw guide lines for capitals or lowercase letters, the column marked three-fifths being used where it is desired to make the lower portions of lowercase letters three-fifths the total height of the letters and the column marked two-thirds being used where the lower portion is to be two thirds the total height of the letters. In each case, for capitals, the middle hole of each set is not used. The two-thirds and three-fifths also indicate the spaces between lines of letters.

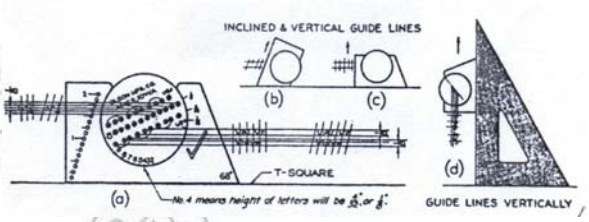


Fig. 4.13 Ames lettering guide

4.5 Uniformity, Stability and Composition of Lettering

4.5.1 Uniformity

In any style of lettering, uniformity is essential. Uniformity in height, proportion, inclination, strength of lines, spacing of letters, and spacing to look well, and some allowances must be made for errors in perception. Uniformity in height and inclination is promoted by the use of light

guide lines. Uniformity in strength of lines can be obtained only by the skilled use of properly selected pencils and pens, Fig. 4.14.

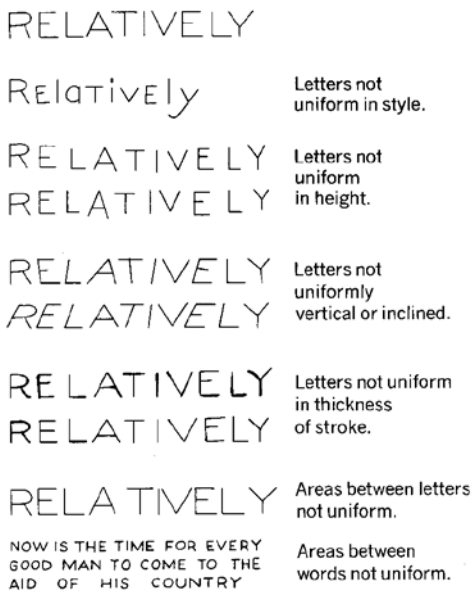


Fig. 4.14 Uniformity in lettering

4.5.2 Stability

- *How do you think letters can be stable or create the feeling of stability when observed?*

If the upper portions of certain letters and numerals are equal in width to the lower portions, the characters appear top-heavy. To correct this, the upper portions are reduced in size where possible, thereby producing the effect of stability and a more pleasing appearance, Fig. 4.15. If the central horizontal strokes of the letters B, E, F, and H are placed at mid height, they will appear to be below center. To overcome this optical illusion, these strokes should be drawn slightly above the center.

Fig. 4.15 Stability of letters

4.5.3 Composition of Lettering

Once you have learned the proper shapes and strokes required to form each letter and numeral, you should concentrate on practicing the composition of words and sentences. Proper spacing of letters and words does more for the appearance of a block of lettering than the forms of the letters themselves. But this does not mean that you should discontinue further practice of correctly forming each letter.

Fig. 4.16 Letter spacing

Letter Spacing

In straight-line lettering, determine the spacing between letters by eye after making the first letter and before making each succeeding letter. To give a word the appearance of having uniformly spaced letters, make the areas between the letters nearly equal, as shown in Fig.4.16. The areas between adjacent letters in a word vary with respect to whether the letters have straight

sides (H, I, M, N) or slanted sides (A, V, W) and whether the letters are round (O, Q, C, G) or open (L, J). Adjacent straight-sided letters are drawn farther apart than are adjacent round letters. Adjacent slant-sided and open letters are drawn nearer together than are adjacent round letters. Where letters L and T, L and V, A and V, and other pairs of like shape come together in a word, the top of one may have to be drawn above the bottom of the other to avoid having the word appear as two or more words. In letter spacing, the six problems listed below are the hardest to solve. The first five problems are solved by moving the letters closer together; the sixth by moving the letters farther apart.

1. Round next to round. (Increasing area at top and bottom where letters curve away from each other, as in Fig.4.17 (A).
2. Round next to slant. (Increasing area at top or bottom where letters move away from each other, as in Fig.4.17 (B).
3. Vertical next to slant. (Increasing area at top or bottom where one letter slants away from the other, as in Fig.4.17 (C).
4. Slant next to slant. (Increasing area at top or bottom where letters slant in opposite directions, as in Fig.4.17 (D).
5. Round next to vertical. (Increasing area at top and bottom where round letter curves away, as in Fig.4.17 (E).
6. Vertical next to vertical. (Decreasing area at top and bottom where stems move together, as in Fig.4.17 (F).

A good way to evaluate the spacing of letters is to hold the lettering away from you and squint your eyes, observing the gray tone throughout the lettering. If the tone appears spotty or varies too much, the letters are poorly spaced.

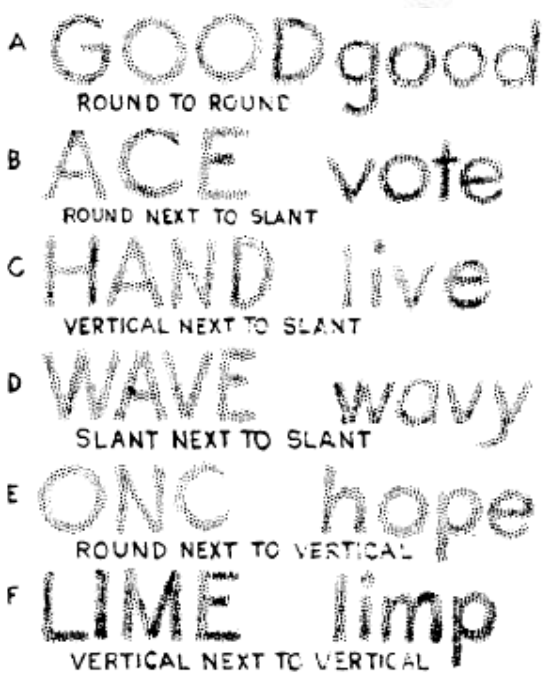


Fig. 4.17 Common spacing problems

Word Spacing

Proper spacing between words is an important factor in making them easy to read. Allow enough space between words and sentences to keep them from running together, but not so much as to cause words to be read one at a time. A good practice to follow is making spaces between words equal to the space that the letter O occupies as shown in Fig. 4.18. If you prefer, you can use the letter N or a correctly spaced letter I instead. Naturally, the design of the last letter of a word and of the first letter of the following word must be considered in

determining the amount of space you leave between words. You should leave a space equal to a capital O between two full-height straight-stemmed letters, such as H and E or D and B. Of course, if one or both of the letters are curved, the space should be appropriately reduced. If the two letters involved are lowercase, use the lowercase o to determine the width of the space. If one letter is full height and the other is lowercase height, such as the words bid now or on him, the space would be equal to half a capital O and half a lowercase o.

Line Spacing

In addition to the spacing between letters and words, the spacing between lines of lettering adds to the readability of the lettering. Again your eye and your artistic ability must be your guide. Except when you are trying for a special effect, you should have enough space between the lines to make it easy for the reader to see what he is reading.

The distance between lines may vary from 1/2 to 1 1/2 times the height of the letter, but for the sake of appearance, it should not be exactly the same as the letter height.

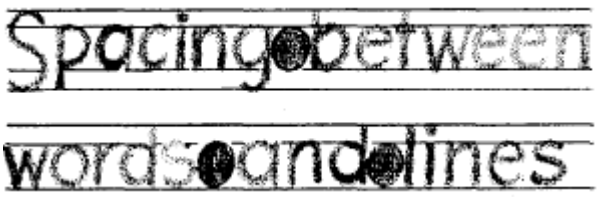


Fig. 4.18 Spacing between words and lines

As a general rule, two thirds of the letter height is a good distance between lines. This spacing allows room for descenders of lowercase letters and still maintains a clear space of one third of the letter height between the descenders and capital letters, or ascenders of lowercase letters of the following line. Fig.4.18 shows proper word and line spacing.

4.6 LeRoy Lettering and Lettering Template/ Guide

4.6.1 LeRoy Lettering Instrument

The LeRoy lettering Instrument (Fig. 4.19) is perhaps the most successful lettering device in use. A pin follows grooved letters in a guide, and the inking point moves on the paper.

Fig. 4.19 Leroy lettering instrument

4.6.2 Lettering Template/Guide

Plastic stencils containing outlines of letters and numbers are available in variable sizes.

The lettering work is accomplished by placing the guide over the portion of the paper on which the lettering is to be done and tracing the outline with pencil/ rapidographs.

UNIT SUMMARY

Lettering has always been considered equal in importance to drawing done in drafting. Before you can illustrate higher forms of drawing, you must first learn how to do simple but legible lettering.

The four basic letter styles are Gothic, Roman, Text and Italics. However we use commercial vertical gothic to draw letter.

Most often elements of quality lettering are stability and uniformity. When we say stability it is to mean the bottom of letters such as B is larger than the top, not top heavy and uniformity is to mean All "A's" are alike, All B's" are alike, etc.

Guidelines are thin lines which serve as guide to ensure uniform height and width of letters when lettering. The four parts of guidelines are the cap-line, waistline, baseline and drop-line.

Fractions are not too common except for certain materials such as wood. Five guidelines are required for mixed numbers. The numerator and denominator are 3/4 the height of the whole number.

The letters in TOM Q. VAXY are exclusively six units wide meaning they are as wide as tall. The remaining letters are five units wide - somewhat narrow. Letter “W” is the widest in the alphabet (8 units wider than its height).

You have your choice between vertical and inclined letters, but are consistent. For inclined letter use a maximum angle of 68 degrees.

In lettering typically use the same pencil that was used to darken the drawing. Avoid too hard a lead which tends to make straight strokes difficult. A too hard makes for crooked strokes while one too soft embosses the paper.

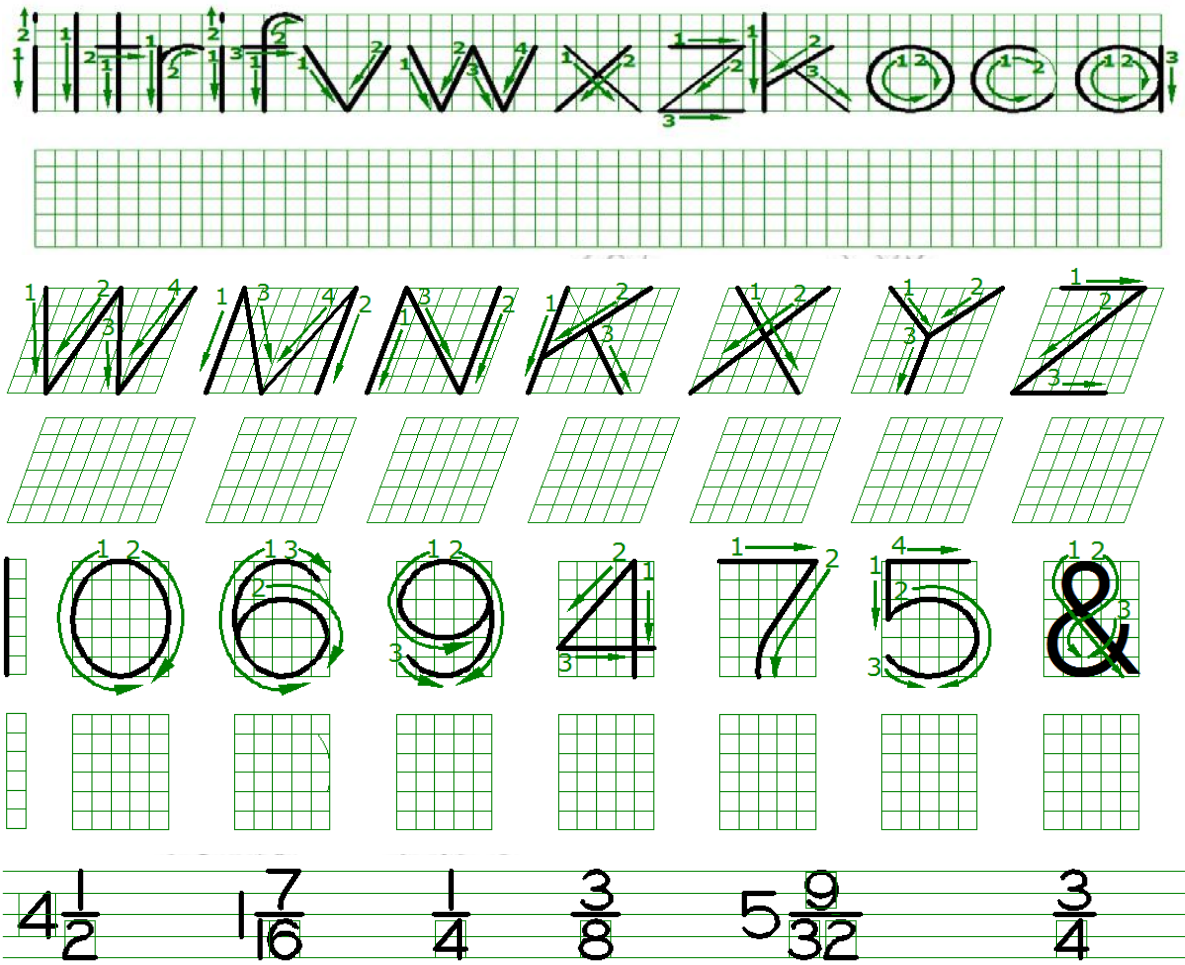
When you draw letters keep space between letters by eye. Pretend to place letter “0” between words.

Exercise I

1. What is the purpose of lettering in a drawing?
2. What are the different styles of letters to be used in drawing?
3. What do you understand from ascending and descending lowercase letters?
4. Mention few techniques of letter you know.
5. What does the term Stability refers to in lettering?
6. What are the four guidelines of lower case letters?
7. How do we maintain height and inclination uniformity of letters in a word?
8. What are instruments used for drawing guidelines?
9. What are the lettering devices?

Exercise II

Duplicate the letters in freehand by coping the space provided on your drawing paper.



Copy the format on your drawing paper and practice each letter and number until you can draw each one correctly at least ten times in a row.

A	A
B	B
C	C
D	D
E	E
F	F
G	G
H	H
I	I
J	J
K	K
L	L
M	M
N	N
O	O
P	P
Q	Q
R	R
S	S
T	T
U	U
V	V
W	W
X	X
Y	Y
Z	Z
	1
	2
	3
	4
	5
	6
	7
	8
	9

NAME: _____ LETTERING PRACTICE

Letter each sentence on your drawing paper paying special attention to the spacing of letters in words and between the words in sentences.

LETTERING IS A SKILL THAT REQUIRES EXTRA EFFORT

ANYONE CAN LEARN TO DO A GOOD JOB IF THEY PAY

THE PRICE AND WATCH OUT FOR FUZZY LINES AND STAY

BETWEEN THE GUIDELINES DRAWING THE SHAPES

PRECISE AND EXACT WITH PERFECT NUMBERS 345-9876

IT WILL NOT MATTER HOW GOOD THE DRAWING IS IF

THE LETTERS AND NUMBERS ARE NOT DRAWN PROPER

LETTER SPACING SHOULD BE APPROX. EQUALLY SPACED QUICK AND SIMPLE

NUMBERS USED IN DIMENSIONS AND NOTES SHOULD BE DRAWN CORRECTLY

NOTES SHOULD BE ABOUT 3 INCHES WIDE AND LOCATED ON THE RIGHT SIDE OF THE

DRAWING SHEET SO THAT THEY ARE EASY TO READ AND ARE NOTICED EASILY

TOLERANCES SUCH AS .5673 – .5894 AND NOTES LIKE FILLETS AND ROUNDS R.94623

5892 48.76 60.7| 12" = 1' - 0" 76' - 9" 54.763 6258 973| 7245 |6' - 7"

POOR LETTERING CAN RENDER A DRAWING USELESS AND INDICATE A LACK OF

KNOWLEDGE AND UNDER-DEVELOPED TECHNICAL DRAWING SKILLS

NAME: LETTERING PRACTICE !

On your drawing paper, prepare the notes on the left side of the page and use the ames lettering guide to add guide lines to the right side of the page. Transfer the notes to the left side of the page to right side of the page

DRILL AND REAM FOR NO. 3 TAPER PIN AT ASSEMBLY WITH MACHINED SHAFT

PROTECT THREADS DURING HEAT TREATMENT AND HARDENING

Ø .304 – 309 HOLES SPACED AS SHOWN AND LOCATED WITHIN R.008 OF TRUE POSITION AT RFS

PART B & D CONCENTRIC WITHIN 0.002 AT FULL INDICATOR READING

ALL FILLETS AND ROUNDS R .625 UNLESS OTHERWISE SPECIFIED

FINISH ALL OVER (FAO)

BREAK SHARP EDGES TO R 0.4

96 DP DIAMOND KNURL - 30° RAISED

#808 AMER STD WOODRUFF KEYSEAT

G33106 ALLOY STEEL – BRINELL 340 – 380

ALL DRAFT ANGLES 38° UNLESS OTHERWISE SPECIFIED

$\frac{5}{32}$ DRILL $\frac{7}{8}$ DEEP 4 HOLES

NECK $\frac{3}{4}$ WIDE $\frac{5}{16}$ DEEP 4 HOLES

NAME: _____

LETTERING PRACTICE