Balance (Continued)

You must consider many factors to make pictures appear balanced. Some of these factors are as follows:

- Objects placed dead center (mathematical center) in the picture area appear unbalanced.
- Objects placed at the optical center (1/10th page size above mathematical center) appear balanced.
- Objects far from the center of the picture seem to have more weight than ones near the center.
- Objects in the upper half of a picture area seem heavier than objects of the same size in the lower half of the picture area.
- Isolation seems to increase the weight of an object.
- Interesting objects seem to have more compositional weight.
- Regular shapes seem to have more weight than irregular shapes.
- Elements on the right side of a picture area appear to have more weight than elements of the same size on the left side of a picture area.
- The direction in which figures, lines, and shapes appear to be moving within the picture area may affect the perception of balance.

Continued on next page

Unity

Unity in composition is the combining of elements in an organized pattern to solidify the elements into a unified whole. Unity depends heavily upon a balance of harmony, variety, and your personal sense of proportion. A composition without unity appears to be falling apart and produces a disturbing effect.

HARMONY: Harmony results from the use of rhythm and repetition. Rhythm is a measured flow of elements within an image. Rhythm may be a simple or complex variation within a theme (motif) or a reoccurring sequence of line (pattern). Repetition of a motif or pattern results in rhythm.

VARIETY: The opposite of compositional harmony is variety. You can create variety by contrasting unlike elements or by elaborating on like or equal elements. Irregularly grouping elements produces interest and variety by allowing more white space around the outside edges of an arranged group of elements rather than between each individual element. The white border acts as a frame.

Figure 1-18 shows an example of unity.

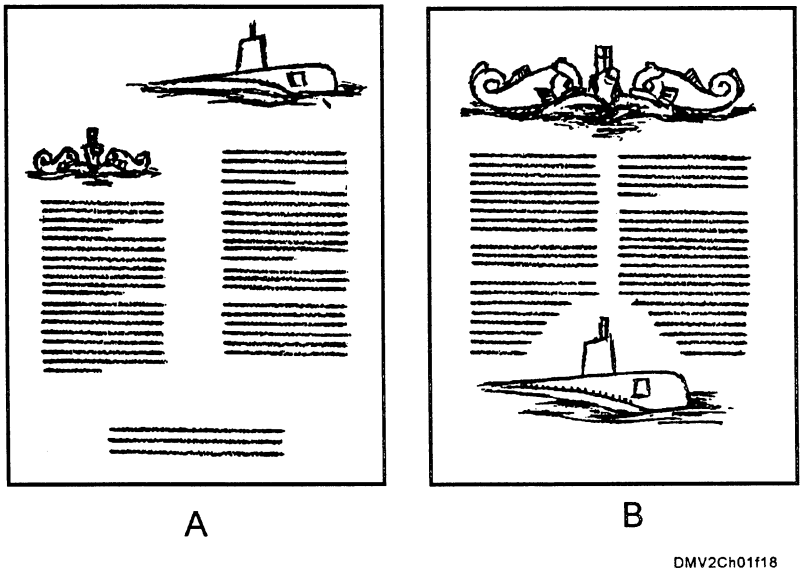

Figure 1-18.—Unity.

Continued on next page

Clarity

Clarity defines elements and guards against blending elements that can confuse the viewer. It is important to maintain legibility in lettering and definitiveness in composition. For example, overlapping objects in the picture area to obscure secondary objects beyond the point of recognition reduces the clarity of the message you are trying to convey. Use contrasting tones when lettering over objects to avoid blending similar tonal areas in subsequent reproductions. Examine your thumbnail sketches for clarity before laying out finished drawings.

Figure 1-19 is an example of clarity.

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Figure 1-19. —Clarity. DMV2Ch01f19

Pictorial Compositions

Introduction

As an artist or illustrator, you exercise total control over a picture area by using the basic principles of composition and dot, line, tone, direction, shapes, motion, color, texture, and scale. No other format offers such limitless control of content.

Picture depth in pictorial compositions

It is impossible to include in a flat two-dimensional picture all you can perceive about an object. When working in pictorial compositions, each two-dimensional representational image is the result of many decisions. One of the early decisions to make before beginning final artwork is whether or not to portray an object in two or more dimensions. Study the works of M. C. Escher, a master mathematician and draftsman. No other twentieth-century artist displays such mastery of image interdimensionally and illusion.

TWO DIMENSIONAL: Two-dimensional images have height and width but no depth. Two-dimensional images are often called *decorative* images. The images float superficially on the substrate surface and do not invite the viewer inside.

THREE DIMENSIONAL: Three-dimensional images have height, width, and depth. Referred to as *plastic* representations, shapes in three dimensions appear to be in-the-round. The viewer perceives three-dimensional images as more realistic.

FOUR DIMENSIONAL: Four dimensional imagery contains height, width, depth, and the element of time. Computer-generated imagery may incorporate time as an element in image creation or image evolution.

INFINITE DIMENSION: Images drawn in infinite dimension appear endless. The picture plane acts as a window through which the viewer observes the subject.

SHALLOW: Shallow images are sometimes called *Limited depth* images because you can control the visual elements and limit the amount of depth in the picture area.

Continued on next page

Proportion in pictorial compositions

By using the basic principles of composition to divide a picture area, the artist has total control over the proportion of the picture area. Since the scene does not already exist, as it does in photography, fragmentation of the picture area is an arbitrary decision left to the illustrator. Study the works of Mark Rotho and Piet Modrian, non-representational painters who successfully divide the picture plane into rectilinear elements. Evaluate your thumbnail sketches to determine their proportions. The following figure illustrates some proportional divisions found to be more pleasing to a viewer than others.

Figure 1-20 shows examples of proportional divisions of picture planes.

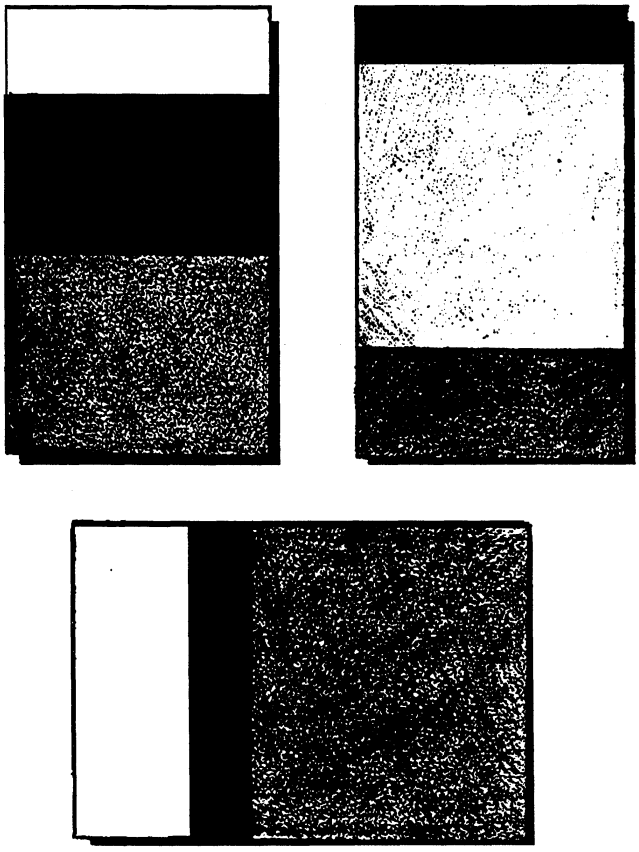

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Figure 1-20.—Proportional divisions of picture planes.

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Figures, props, and borders

The inclusion and placement of figures, props, and borders are also left to the discretion of the artist in pictorial compositions.

Figures

For figures to appear realistic, they must have emotions or feelings. In pictures, you communicate an emotion or feelings you want the figure to portray by expression, gesture, posture, and positioning. To simplify the descision process in determining the gesture, posture, or position of figures, imagine the figure in silhouette. Experiment with different positions until you find one that is successful. The meaning of a picture changes as attitudes or gestures of the figures change. Two or more figures in the same picture may change the attitude of the picture depending on how the figures relate to each other. Since the human figure is a dynamic form, viewers are naturally drawn to it. Figures reenforce the main message in pictures in a way no inanimate object can.

Figure 1-21 shows how reducing figures to silhouettes helps to simplify the selection of gestures, posture, and positioning.

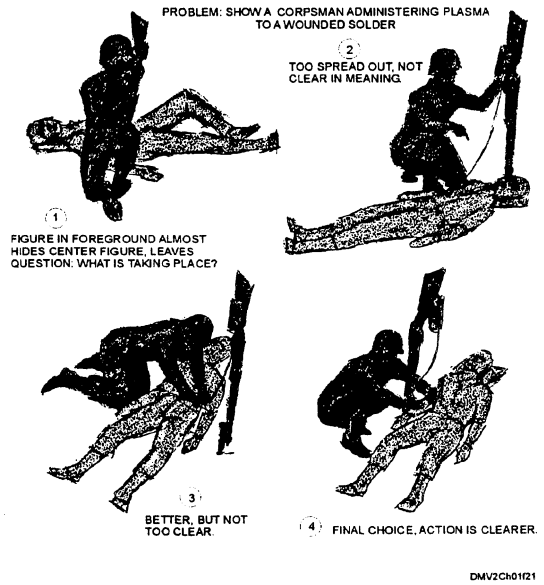

Figure 1-21.—Reduce figures to silhouettes to simplify effective positioning in the picture plane.

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Props

You should use props and settings that contribute to the mood and action in a picture. Props and settings should compliment figures, not compete or overpower them. Size, position, value, and contrast are the most effective means to keep scenes from overwhelming figures. If the purpose of the picture is the setting, give the setting the prominence it deserves.

Figure 1-22 shows the evolution of a simple setting.

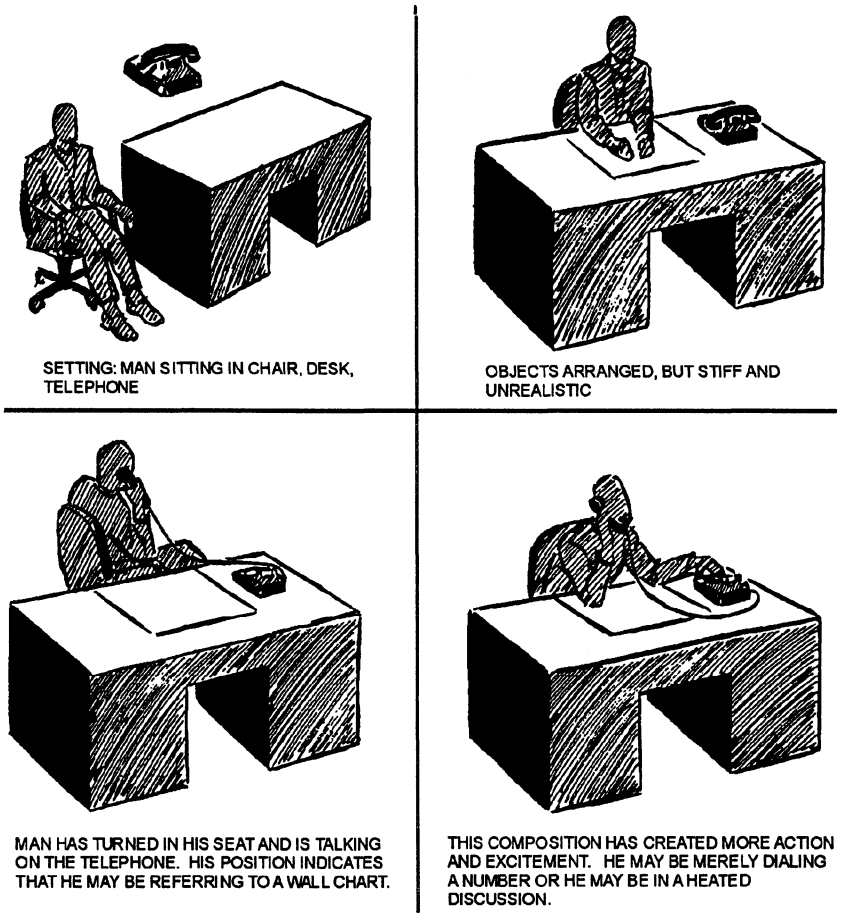

Figure 1-22.—The evolution of a simple setting.

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Borders

Borders outline picture areas. You should consider borders as part of the picture area because they link the picture to the real world. Borders can define or confuse viewers depending on your placement of objects inside the picture area. Figures, particularly, can affect the overall perception of border areas. For example, a figure can obscure a scene if placed too close to the border; the viewer's attention is directed by the figure to look at the border, not the scene. Even when the figure does not touch the border, the figure's gestures direct viewers to the border. Figures placed nearer one border than the other attract attention to the nearest border. To avoid this, leave more space between the figure and the border.

Figure 1-23 shows the affect of a figure on the perceptions of the borders.

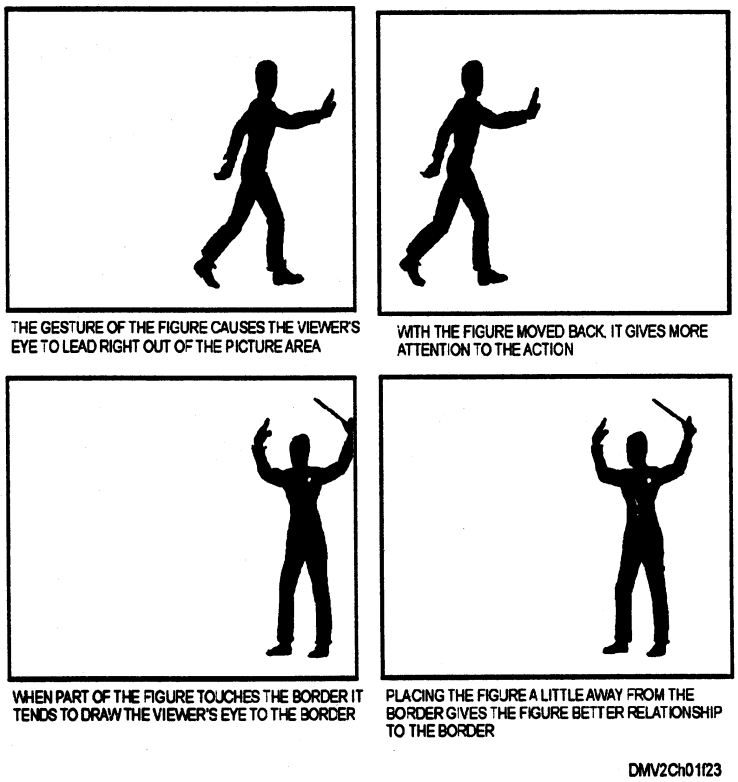

Figure 1-23.—Effects of a figure on borders.

Photographic Compositions

Introduction

Many people believe that photography is the most truthful and accurate representation of three-dimensional objects on a two-dimensional field. Anyone can learn how to take photographs; so what makes a photograph a successful image? You must understand the basic principles of photographic composition to evaluate and select images for use in commanding officer's biographies, web pages, change of command brochures, cruise books, and newsletters.

Photographic compositions

There are no thumbnail sketches in photographic compositions unless you are working in a controlled studio atmosphere. In studio environments you control factors affecting good composition.

In photographic compositions out of the studio area, the scene already exists. Photographic compositional decisions may have already been made for you by the environment and your remaining choices may be limited.

Photographic compositions involve manipulation of the following principles and elements: center of interest, subject placement, simplicity, viewpoint and camera angle, balance, shapes and lines, pattern, volume, lighting, texture, tone, contrast, framing, foreground, background, and perspective. Most of these elements are the same as pictorial compositions, with the exception of center of interest, subject placement, viewpoint, and camera angle.

Center of interest

Each picture should have one principal idea or subject that is called the *center of interest.* Subordinate elements must support, define, and focus attention on the center of interest. The center of interest should not be located in the center of the picture area.

Subject placement

Subject placement is the positioning of subjects or the center of interest in the picture area. In pictorial composition, subject placement relates most closely with proportion, the division of the picture plane into balanced segments. - In photographic compositions, there are two formulas for determining subject placement: the principles of thirds and dynamic symmetry.

Continued on next page

Subject placement (Continued)

The PRINCIPLE OF THIRDS: The principle of thirds refers to the intersection of vertical and horizontal lines that divide the picture area into thirds. The point of each intersection is marked with an "O." These intersections are good locations for the center of interest.

Figure 1-24 shows the principle of thirds for subject placement.

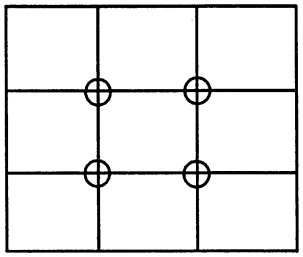

Figure 1-24.—The principle of thirds.

DYNAMIC SYMMETRY: The principle of dynamic symmetry locates the center of interest by drawing an imaginary diagonal line from one corner of the picture plane to the opposing corner. Another diagonal line drawn from a third corner perpendicular to and intersecting the first diagonal locates the center of interest.

Figure 1-25 shows the principle of dynamic symmetry.

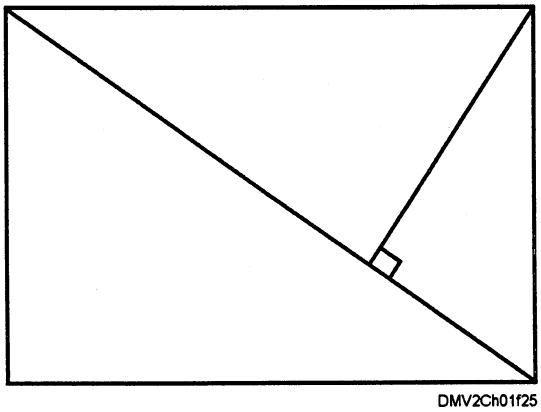

Figure 1-25.—The principle of dynamic symmetry.

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Viewpoint and camera angle

Viewpoint is the camera position in relation to the subject. *Camera angle* is the angle in which the camera is tilted. The terms “viewpoint” and “camera angle” are often used in conjunction with one another and sometimes are used interchangeably. They can also have different meanings depending on how you apply them. Repositioning subjects within the viewfinder and changing the camera angle are two simple ways to control composition.

Photographs made from ground level with the camera held horizontal to the ground is referred to as a *low viewpoint* (camera position); however, the same picture made from ground level with the camera tilted up may be referred to as a *low-camera angle*. Low viewpoints and low-camera angles can add emphasis and interest to many otherwise ordinary scenes. This type of photograph is useful in separating subjects from backgrounds, eliminating backgrounds and foregrounds, distorting scale, adding strength, and for creating the illusion of greater size and speed.

A picture made from a high or elevated position with the camera held horizontal with reference to the ground is referred to as a *high viewpoint;* however, if the camera is pointed down at some angle between horizontal and vertical, the camera position is referred to as a *high-camera angle.* High viewpoints and high camera angles help orient the viewer by showing relationships among all elements within a picture area. High viewpoints and camera angles also minimize apparent strength and size of subjects.

Horizontally held, eye-level photographs are usually taken at a height of 5 ½ feet. With the camera tilted up or down, you have either a high- or low-camera angle, respectively.

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Viewpoint and camera angle (Continued)

Figure 1-26 shows a comparison between camera angles and viewpoints.

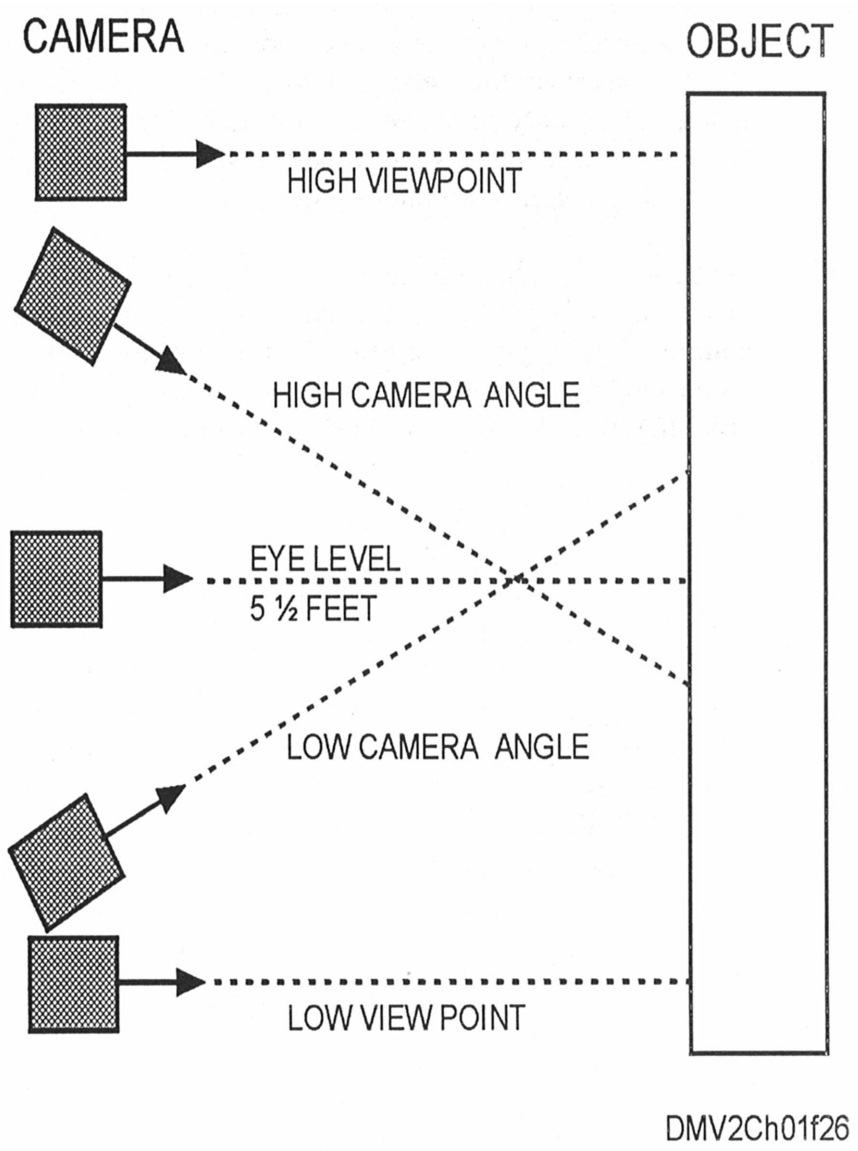

Figure 1-26.—Camera angles and viewpoints.

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Viewpoint and camera angle (Continued)

When selecting or taking photographs of people, particularly commanding officers, executive officers, command master chiefs, and visiting dignitaries, avoid unflattering camera angles and viewpoints. Eliminate images shot at extremely low-camera angles that emphasize double chins, excess weight, and nostrils. To subdue chubby cheeks and double chins, shoot from a high-camera angle to make the subject look up toward you. Because of Navy Regulations regarding eating, drinking, and smoking in uniform, eliminate all images of military personnel in uniform eating, drinking, or smoking. Images are acceptable if the subject is at an informal picnic or social occasion where the members are out of uniform.

When selecting photographs taken on base, onboard ship, or in classified areas, carefully review every element in the picture area for potential compromise. If you are unsure about an image, refer the photograph to the command Photographic Officer before releasing or reproducing it. Simple cropping may eliminate the need to reshoot an image.

Continued on next page

Viewpoint and camera angle (Continued)

Figure 1-27 is a photographic image after the classified areas have been cropped out.

Figure 1-27.—Crop out classified area.

Textural Compositions

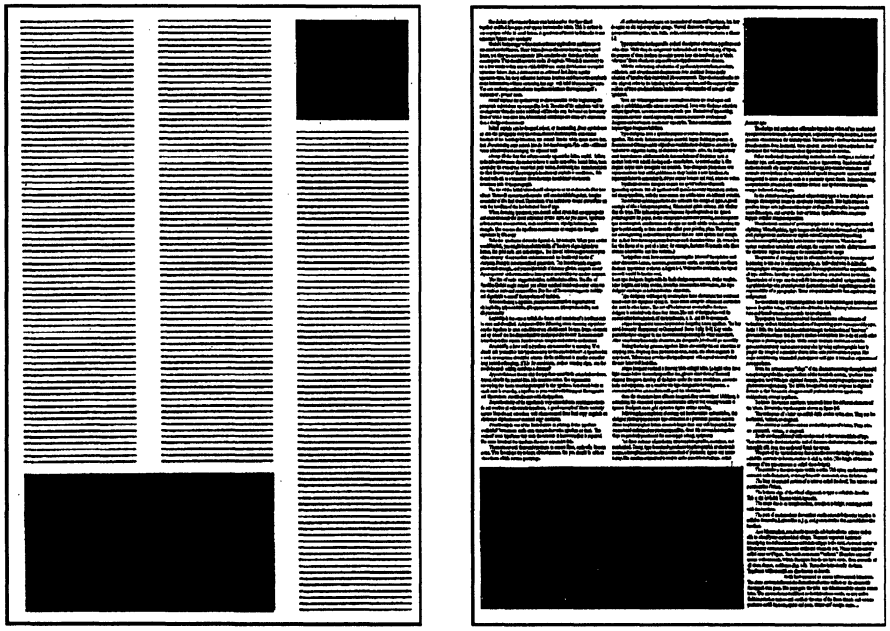
Introduction

Compositions containing only text present a different set of problems to the DM. You should understand the impact of text and illustration in compositions. Plan textural compositions as carefully as you plan pictorial presentations.

Textural compositions

You should approach textural compositions using the guidelines for general compositions; however, with text the eye moves most naturally from left to right, up to down and ending in the lower-right corner of a page. Space, around and within type, called *white space*, is as important as printed space. Excessive white space fragments the visual impact of lettering. You can control white space by setting margins, text justification, adding or subtracting leading, and letterspacing.

Figure 1-28 are examples of manipulating white space.



A. FULLY JUSTIFIED B. FLUSH LEFT, RAGGED RIGHT

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Figure 1-28.—Manipulating white space by setting text: A. Fully justified; or B. Flush left ragged right.

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Textural composition (Continued)

In addition to formal and informal balance, you can manipulate text for expressive representations.

Figure 1-29 is an example of text manipulated to form a pyramid, an inverted pyramid, and a bell shape.

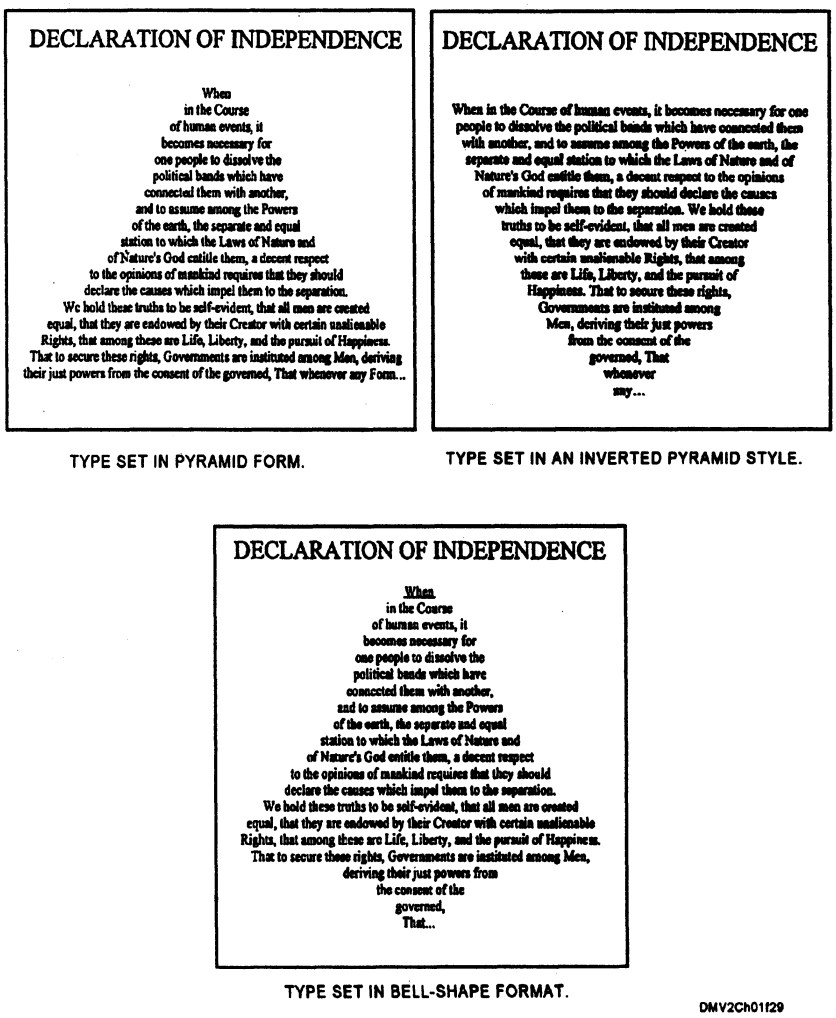

Figure 1-29.—Text manipulation.

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Textural compositions (Continued)

When text dominates compositions, consider the visual impact of each aspect of lettering.

Figure 1-30 shows ways to emphasize type.

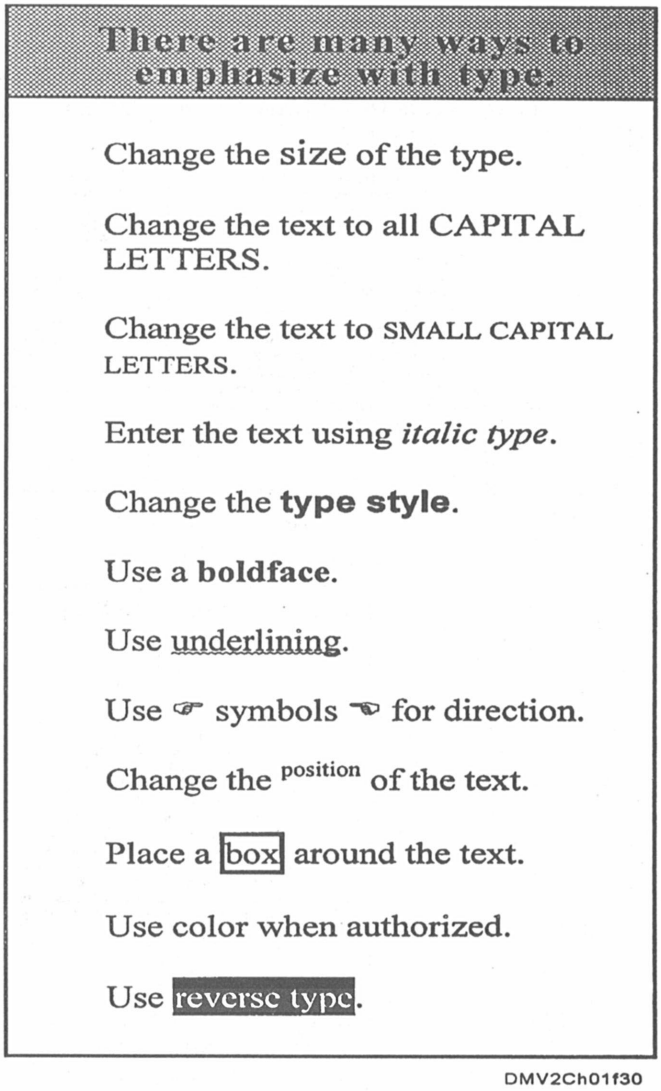

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Figure 1-30.—Emphasizing type.

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Textural compositions (Continued)

Figure 1-31 shows a composition where text dominates the image.

Copy preparation is the planning and preparation that go into predominantly textural compositions if subsequent printing results. Copy preparation includes preparing layouts, making a dummy, selecting type styles, composing the type, and preparing the original artwork.

Preliminary information for textural compositions

In addition to the preliminary information you gather for pictorial compositions, you should make several additional decisions. The final size of the finished product, any special handling of photographic effects such as dropouts and reversals, and the location of illustrations and photographs affect the overall composition.

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Textural compositions (Continued)

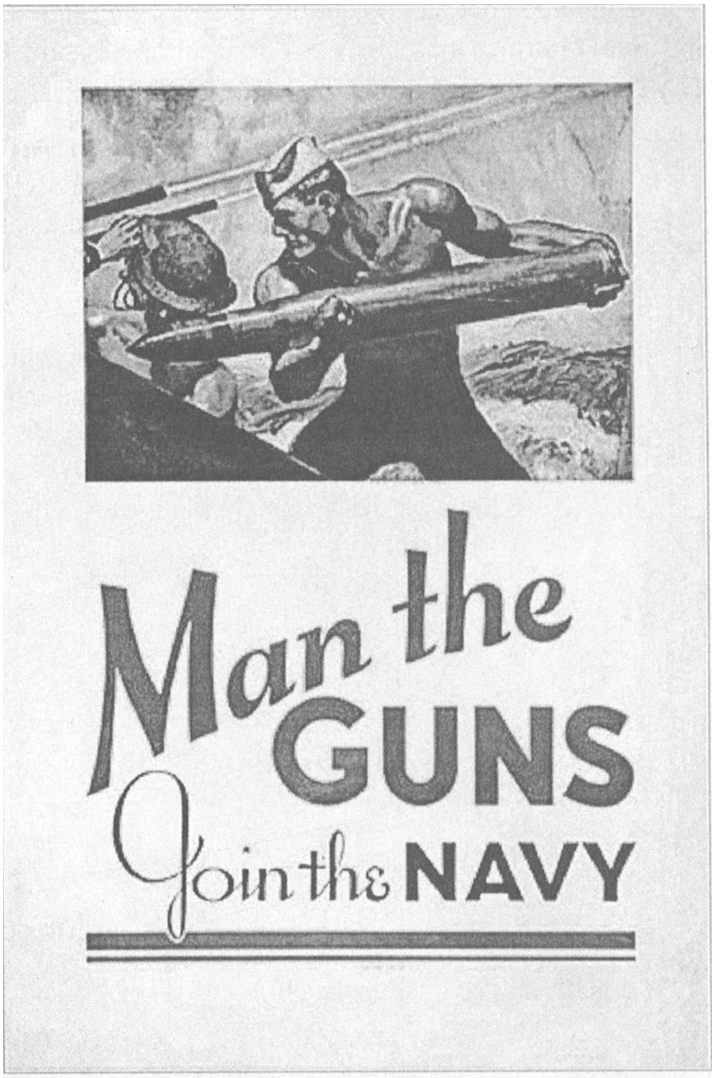

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Figure 1-31.—Dominant text.

Continued on next page

Final size

Selecting a final size for the printed product affects not only the size of the page but page proportion. In determining final product size, consider the size of stock available, the limitations and capability of the reproduction equipment you intend to use, and the finished binding operations. Select a page size that can be cut out of stock sheets with the least amount of waste and conforms, as often as possible, to standard sheet sizes.

Standard sheet sizes

Several standard sheet sizes are used throughout the industry and the Navy. The most common standard sized sheet is 8 ½ by 11 inches. Index card applications are 3 by 5 and 5 by 8 inches. Photographic standards are 5 by 7 or 8 by 10 inches.

Proportion

Size affects the proportion or the ratio from width to height. Placing the above standard sheet sizes with their bottom and left edges together shows the relationship between proportions.

Figure 1-32 shows the proportion between standard sized sheets.

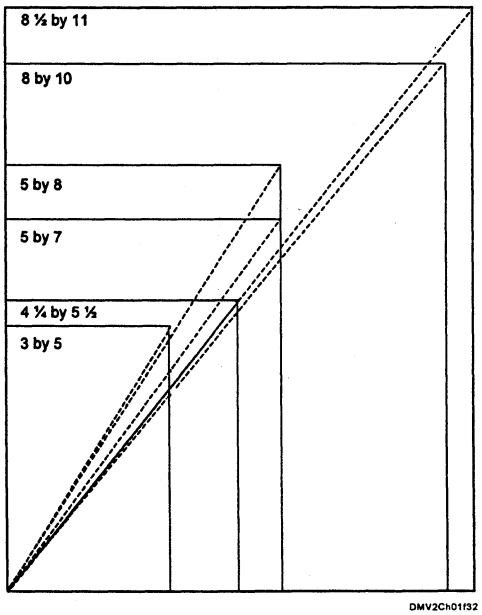

Figure 1-32.—Proportions between standard sheet sizes.

Continued on next page

Proportion (Continued)

To decide on practical and attractive page layouts, determine the amount of copy required and the objective of the final product. Some rectangular forms are more pleasing than others. The three most common rectangular page layouts are the hypotenuse rectangle with a width to height ratio of 5:7, the regular rectangle (2:3), and the Golden Mean rectangle (3:5).

Figure 1-33 shows the three rectangular forms most pleasing to the eye.

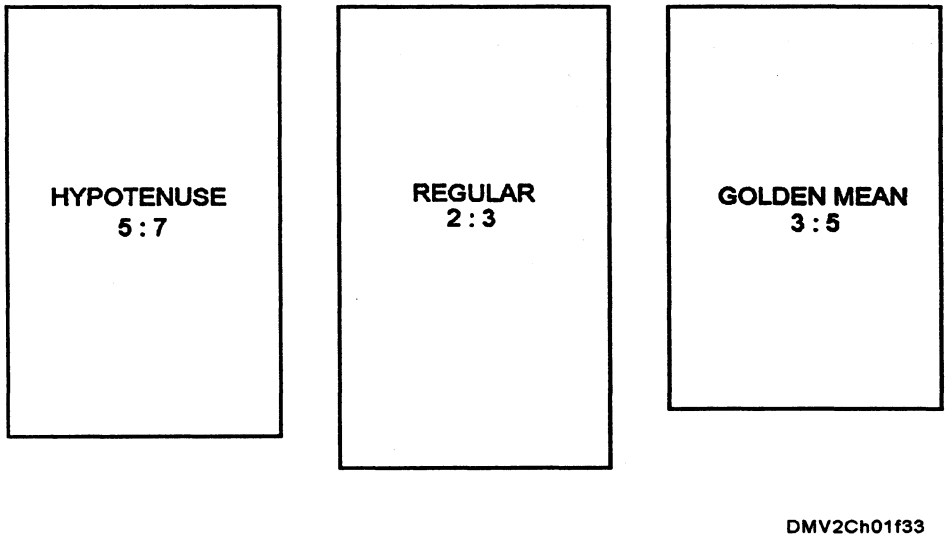

Figure 1-33.—Pleasing rectangular formats.

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Thumbnail sketches

Begin each project with thumbnail sketches. Make sure that all notes, instructions, and sketches stay with the copy to create a paper trail for reference if questions arise. Use lines or "Xs" to indicate lines of type vice actual type. Use sketches to represent illustrations and boxes to indicate photographs.

To prepare thumbnail sketches of textural layouts:

Step	Action
1	Prepare a list of the copy or text.
2	Use a gridded paper and mark the area of the printed product in one-quarter size.
3	Identify copy elements that require emphasis and use block shapes and shading to indicate the main elements on the thumbnail sketch.
4	Use straight lines to represent type that is 12 point or smaller.
5	Outline space for illustrations or photographs. Sketch illustrations or photographic content. Show only enough outline or shape to get an idea of the image.

Rough layout

A rough layout is a refinement of the thumbnail sketch selected by the customer. Rough layouts afford you the opportunity to combine images from the thumbnail sketches, study the designs for changes, and refine the final idea. Rough layouts have more detail than thumbnail sketches. If you must change a layout, the rough layout stage is where it is easiest to make modifications. The rough layout should give you an idea of what the finished product looks like.

Continued on next page

Comprehensive layouts

A comprehensive layout shows how the final product should look. It shows color and shading, illustration placement, and text.

To make a comprehensive layout:

Step	Action
1	Review the rough layout.
2	If the job requires two or more colors, select the colors and use a felt-tipped marker or colored pencils to color each element.
3	Position and letter all display type that is 14 point or larger.
4	Show the position of body type.
5	Sketch illustrations in their correct positions.
6	Box off areas for photographic placement.
7	Prepare overlay sheets if required.
8	Review layout and overlay sheet for correctness.

Figure 1-34 shows a comprehensive layout.

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Figure 1-34.—A comprehensive layout.

Continued on next page

Overlays

Overlays are sheets of paper or acetate containing all the information production personnel need to produce the final product. If an overlay sheet is incorrect, the final product will be incorrect also. The type of information on overlay sheets includes the kind, size, and style of type for each group or part of the layout, specific margins or line lengths, information about illustrations and photographs, colors of ink required with each element marked with each color, paper specifications for the kind, finish, weight, color, and size, the number of copies required, and the reproduction process, if known.

Mechanicals

Mechanicals are camera-ready layouts. Mechanicals are produced after the comprehensive layout and the final decisions are made regarding the end product.

Dummies

Layouts for booklets and pamphlets are called dummies. There are two types of dummies: preliminary dummies and paste-up dummies. Preliminary dummies are made before the type is set. Paste-up dummies are those made from proofs after the composition is complete. Refer to *Illustrator Draftsman Volume* 4, chapter 1, for more complete instructions regarding layout dummies.

BlueprintCompositions

Introduction

Blueprints and technical drawings have very specific formats for composition based on logic and industry standards. Learn blueprint terminology and standards. Do not deviate from the established industry format.

Blueprint compositions

Blueprints are copies of engineering drawings used as plans to construct or fabricate objects and machines. One of the first processes developed to duplicate tracings produced white lines on a blue background; hence the name *blueprint.* Today, other methods are available to reproduce copies and the final images may be brown, blue, black, grey, or maroon. Original drawings are referred to as the *master copy.*

Master copy

Master copies are the original engineering drawings drawn on translucent paper, cloth, or Mylar in pencil, ink, or computer-aided drafting (CAD) systems. Compositional elements in master copies are placed in standardized locations and in very specific ways. Sheet sizes, margins, and the locations of title blocks, revision blocks, drawing numbers, legends, and the associated materials blocks are some of the elements that must be preset in the composition.

Standards

Prescribed standards and procedures for military engineering drawings are stated in military standards (MIL-STD) and American National Standards Institute (ANSI) standards. *The Department of Defense Index of Specifications and Standards* lists these standards and is updated yearly. Sometimes standards are referred to as Department of Defense Standards (DOD-STD). The MIL-STD you need most often is MIL-STD-100A. Obtain a copy of the standards for the shop and make sure you refer to the most current copy.

Continued on next page

Standards (Continued)

The following chart contains common MIL-STD and ANSI standards.

Number	Title
MIL-STD-100A	Engineering Drawing Practices
ANSI Y14.5M-1982	Dimensioning and Tolerances
MIL-STD-9A	Screw Thread Conventions and Methods of Specifying
ANSI 46.1-1962	Surface Texture for Use on Drawings
MIL-STD-12C	Abbreviations for Use on Drawings
MIL-STD-14A	Architectural Symbols
ANSI Y32.2	Graphic Symbols for Electrical and Electronic Diagrams
MIL-STD-15	Electrical Wiring Part 2, and Equipment Symbols for Ships Plans, Part 2
ANSI Y32.9	Electrical Wiring Symbols for Architectural and Electrical Layout Drawings
MIL-STD-16C	Electrical and Electronic Reference Designations
MIL-STD-17B, part 1	Mechanical Symbols
MIL-STD-17B, part 2	Mechanical Symbols for Aeronautical, Aerospace craft, and Spacecraft Use
MIL-STD-18B	Structural Symbols
MIL-STD-21A	Welded-joint Designs, Armored-tank Type
MIL-STD-22A	Welded-joint Designs
MIL-STD-25A	Nomenclature and Symbols for Ship Structure

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Sheet sizes

Drawing sheet sizes are standardized by the American Society of Mechanical Engineers (ASME) and the American National Standards Institute (ANSI). Sheet sizes are designated by letter. These standards are published in MIL-STD-100A. The drawing sheet sizes you use are determined by the needs of your command and your need to economically lay out required information

Figure 1-35 lists drawing sheet sizes and the associated letter designators.

FLAT SIZES				ROLL SIZES				
SIZE DES (LTR)	X (WIDTH)	Y (LENGTH)	Z (MARGIN)	SIZE DES (LTR)	X (WIDTH)	Y MIN (LENGTH)	Y MAX (LENGTH)	Z (MARGIN)
A(HORIZ)	8.50	11	.25&.38*	G	11	42	144	.38
A(VERT)	11	8.50	.25&.38*	H	28	48	144	.50
B	11	17	.38	J	34	48	144	.50
C	17	22	.50	K	40	48	144	.50
D	22	34	.50					
E	34	44	.50					
F	28	40	.50					

*HORIZONTAL MARGINS .38-INCH; VERTICAL MARGIN .25-INCH, ON "A" SIZE DRAWINGS

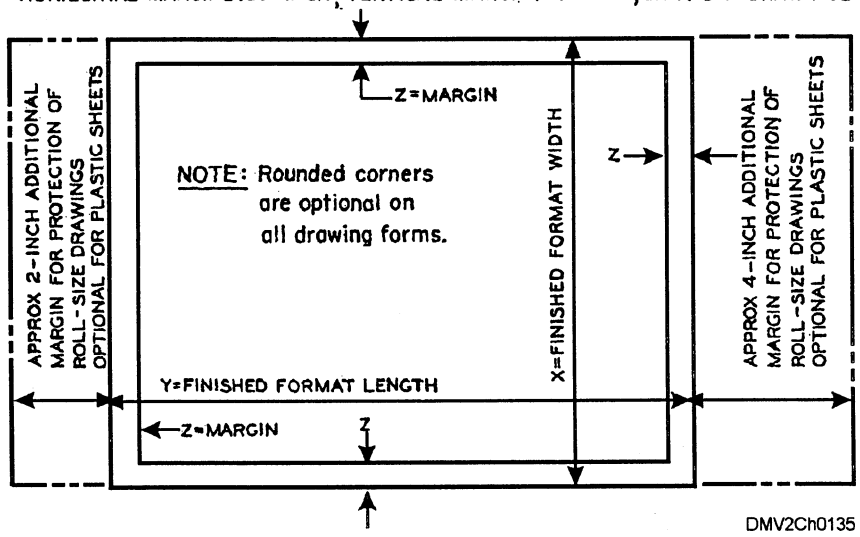

Figure 1-35.—Drawing sheet sizes and associated margin widths.

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Margins

Margins are the distance between the cut line or paper edge and the border. Like drawing sheet sizes, margins are predetermined. Notice that for “A”-size drawings, the margins are not equal.

Figure 1-36 shows margin sizes and placement on “A”-size drawings..

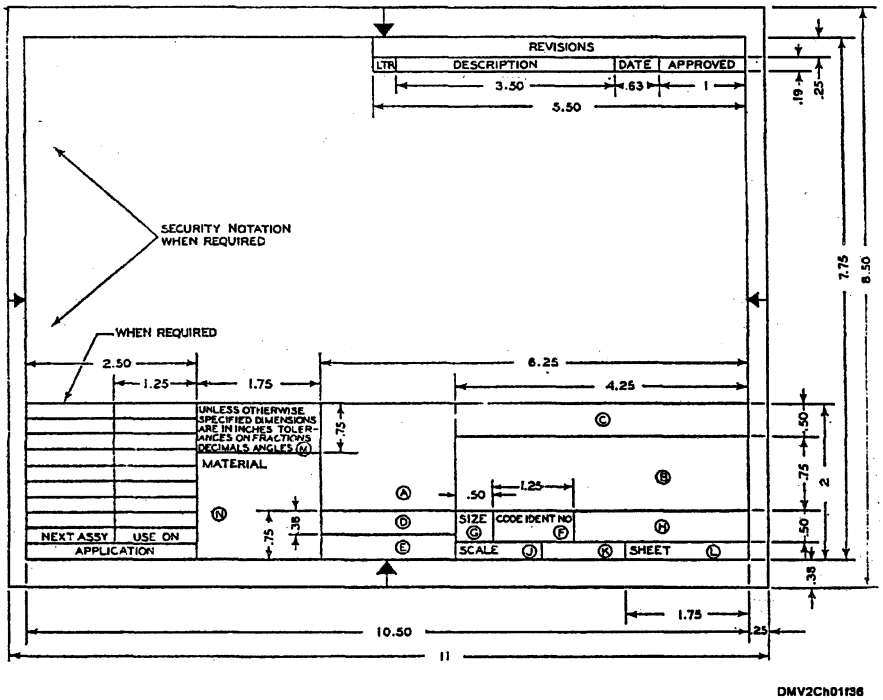

Figure 1-36.—Margins for an “A” -size drawing.

Information blocks

Information blocks provide information on material, composition, scale, dimensional notes, tolerances, surface finish, previous or related drawings, activity identification and approval, and classification level pertaining to fabrication or construction. You may leave some blocks blank if the information is not needed.

Continued on next page

Title block

Title blocks contain the name of the drawn object, drawing number, and all information required to identify the part or assembly. It also includes the name and address of the government agency or command preparing the drawing, scale, drafting record, authentication and date. Locate the title block in the lower-right corner of the drawing.

Figure 1-37 are examples of title blocks.

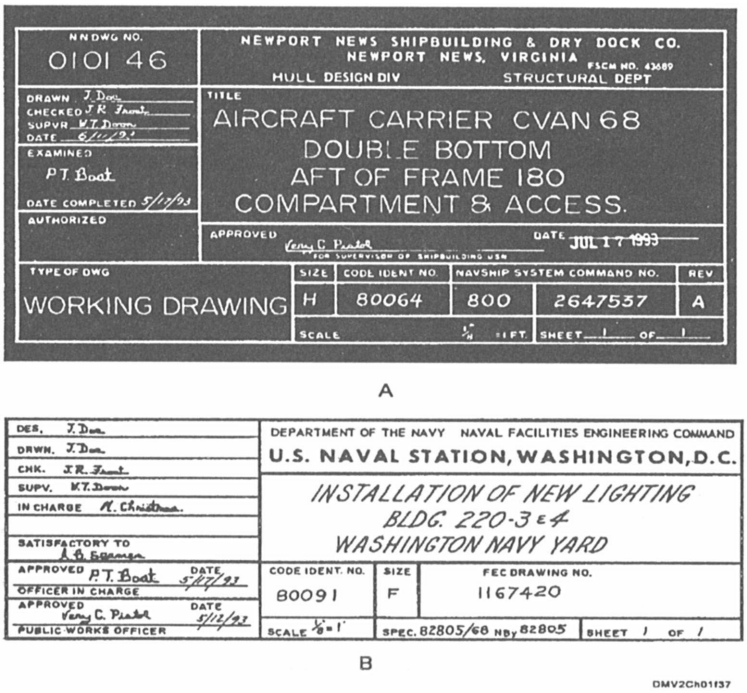

Figure 1-37.—Blueprint title blocks: A. Naval Ship Systems Command; B. Naval Facilities Engineering Command.

Drawing number

A drawing number appears on each drawing. On drawings with more than one sheet, the drawing number block shows the sheet number and the number of sheets in the series. The drawing number appears in the lower-right corner of the title block and may appear near the top border line in the upper corner or on the reverse side at the other end so it is visible when the drawing is rolled.

Continued on next page

Reference numbers

Reference numbers refer to numbers of other drawings. A dash and a number show that more than one detail is shown on a drawing. When two parts are shown in the detail drawing, the print has the drawing number plus a dash and an individual number. Dashes and numbers identify changed or improved parts and right- or left-hand parts. Left-hand parts are usually depicted in drawings. Some drawings use RH or LH for right- or left-hand parts. Others use even numbers for right-hand drawings and odd numbers for left-hand drawings. Reference numbers appear in the title block and they may also appear within the drawing near the parts they identify. Some reference numbers use a leader line to show the drawing and dash number of the part. Others use a 3/8-inch diameter circle around a dash number with a leader line to the part.

Figure 1-38 is an example of reference numbers.

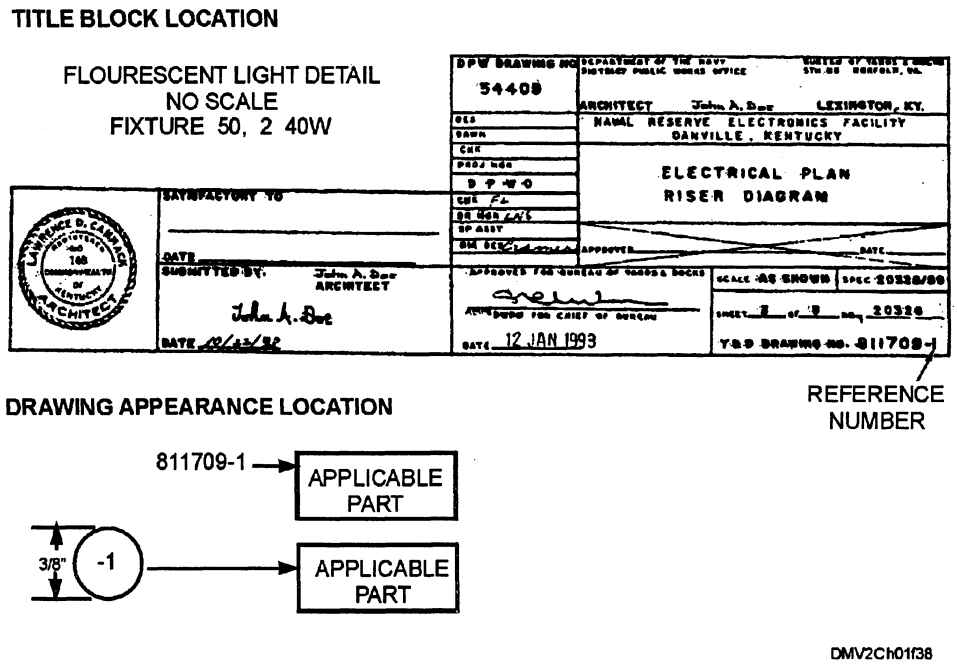

Figure 1-38.—Reference number location.

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Scale

The scale block shows the-size of the drawing compared to the actual size of the part or assembly. Choose the scale to fit the object and the space available on the sheet of drawing paper. Never measure from drawings; always use stated dimensions. Scale usually appears as part of the title block. Indicate scale using the fractional method where the drawing unit is the denominator and the object is the numerator, the equation method where scale is indicated in feet (') and inches ("), or the graphical method with a primary scale to the right of the 0 and a subdivided scale to the left of the 0. Graphical scales are reserved primarily for maps.

Figure 1-39 illustrates the three ways of indicating scale on drawings.

FRACTIONAL METHOD		EQUATION METHOD
1/1	FULL SCALE	12" = 1'-0"
2/1	ENLARGE SCALE	24" =1'-0"
1/2	REDUCED SCALE	1/2" = 1'-0"

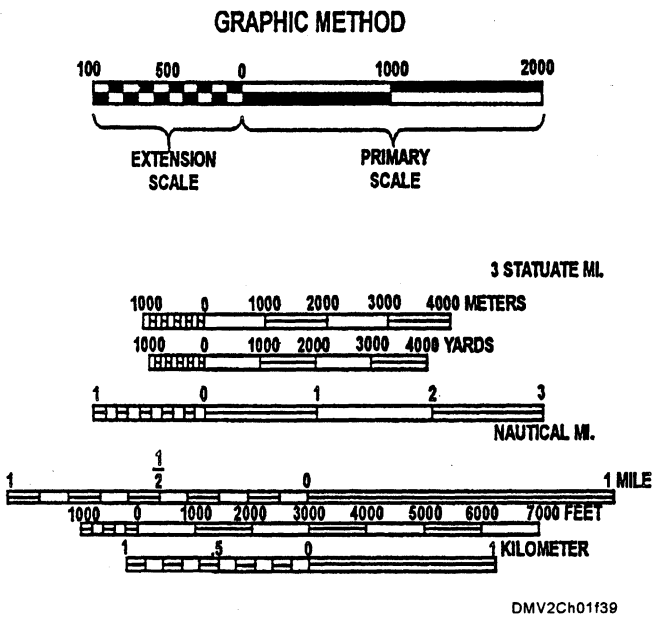

Figure 1-39.—Indicating scale.

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Revision blocks

Revision blocks are only needed on drawings if changes or improvements are made to the original part or assembly. The addition of a letter to the original number and a brief description of the revision in the revision block show that a drawing is revised. Subsequent revisions replace the previous letter with the next letter of the alphabet. Locate revision blocks above the title block on drawings larger than "A" size. On "A"-sized drawings, locate the revision block in the upper-right corner.

Figure 1-40 illustrates how revision blocks on drawings append to the title block.

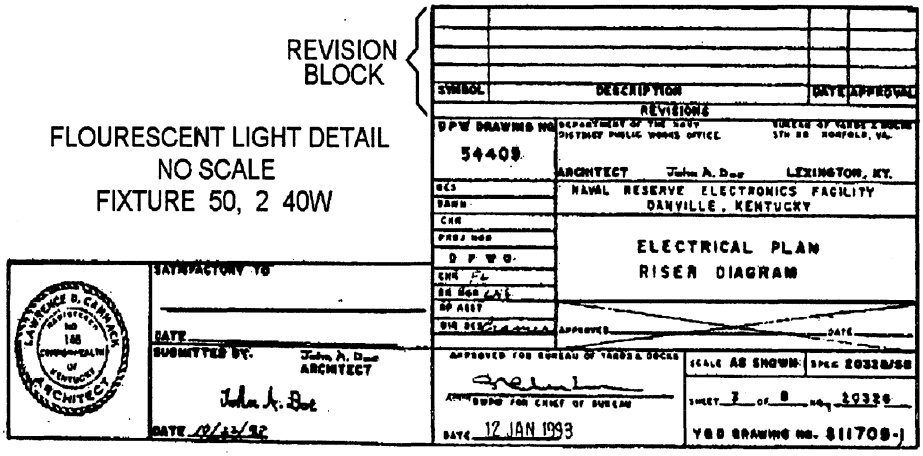

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Figure 1-40.—Revision block appended to a title block.

Application blocks

Application blocks identify directly or by reference the larger unit that contains the part or assembly on the drawing. The next assembly (NEXT-ASS'Y) column contains the drawing number or model of the next larger assembly. The used on column shows the model number or equivalent designations of the assembled units part. Locate application blocks appended to the far left side of title blocks.

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Bill of materials The bill of materials block contains a list of the parts and/or material needed for the project. The block identifies parts and materials by stock number or other appropriate number and the quantities required. The bill of materials often contains a list of standard parts known as a parts list or schedule. Locate a bill of materials on the right-side of the drawing.

Figure 1-41 is an example of a bill of materials.

BILL OF MATERIAL

ITEM NO.	DESCRIPTION	UNIT	ASSEMBLY OR FSN NO.	QUANTITIES	
				TROP	NORTH
3 – 1	LIGHTING CIRCUIT – NAVPAC DWG NO. 282414	EA.	3016	3	2
3 – 2	POWER DWG, 100A – NAVPAC DWG NO. 904131	EA.	3047	1	1
3 – 3	RECEPTACLE CKT – NAVPAC DWG. NO. 802060	EA	3019	2	2
3 – 4	BOX, RECEPTACLE W/CLAMP FOR NONMETALLIC SHEATH WIRE	EA	5325 – 102 – 604	3	3
3 – 5	LAMP ELECTRIC, MED. BASE, INSIDE FROSTED, 200W, 120 V	EA	6240 – 100 – 314	60	60
3 – 6	PLUG: ATTACHMENT, 3 WIRE, 15 AMP, 125 V.	EA	5935 – 102 – 305	10	10
3 – 7	PLATE: BRASS, DUPLEX RECEPTACLE	EA	5325 – 600 – 101	5	5
3 – 8	RECEPTACLE, DUPLEX, 3 WIRE, 15 AMP, 125V.	EA	5325 – 100 – 102	3	3
3 – 9	ROD, GROUND, 3/4" x 10'0"	EA	5305 – 200 – 100	12	12
3 – 10	WIRE, NO, 2 1/C STRANDED, HARD DRAWN, BARE	LB	6145 – 130 – 200	52	52
3 – 11	SWITCH, SAFETY, 2P, ST 30 AMP, 250 V, PLUG FUSE	EA	5920 – 142 – 401	2	2
3 – 12	CLAMP, GROUND ROD	EA	5305 – 100 – 101	13	13
3 – 13	SWITCH, SAFETY, 200 AMP, 250V, 3 P	EA	5930 – 201 – 903	1	1
3 – 14	FUSE, RENEWABLE, 200 AMP, 250 V	EA	5920 – 100 – 000	4	4
3 – 15	LINK, FUSE, 200 AMP, 250 V	EA	5920 – 100 – 401	4	4
	FUSE PLUG, 30 AMP, 125V	EA	5920 – 100 – 102	12	12

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Figure 1-41.—Bill of materials.

Zone numbers Zone numbers help locate particular points or parts on a drawing. Similar to numbers used on maps, specific locations designated by letters and numbers serve to pinpoint locations. Mentally draw invisible horizontal and vertical lines to the point of intersection. Zone numbers are read from left to right and from top to bottom, and are located in the margin or border areas of drawings.

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Station numbers

Station points or station markings are a location system for aircraft. Some manufacturers, particularly in the aircraft industry, use station points to locate parts or assemblies. The centerline at the center of the part or assembly is designated by a zero. Incrementally numbered ribs to the left and right of the centerline serve as station markings to locate details. Station points appear on the actual drawing of the part or assembly.

Figure 1-42 illustrates the use of station points in aircraft drawings.

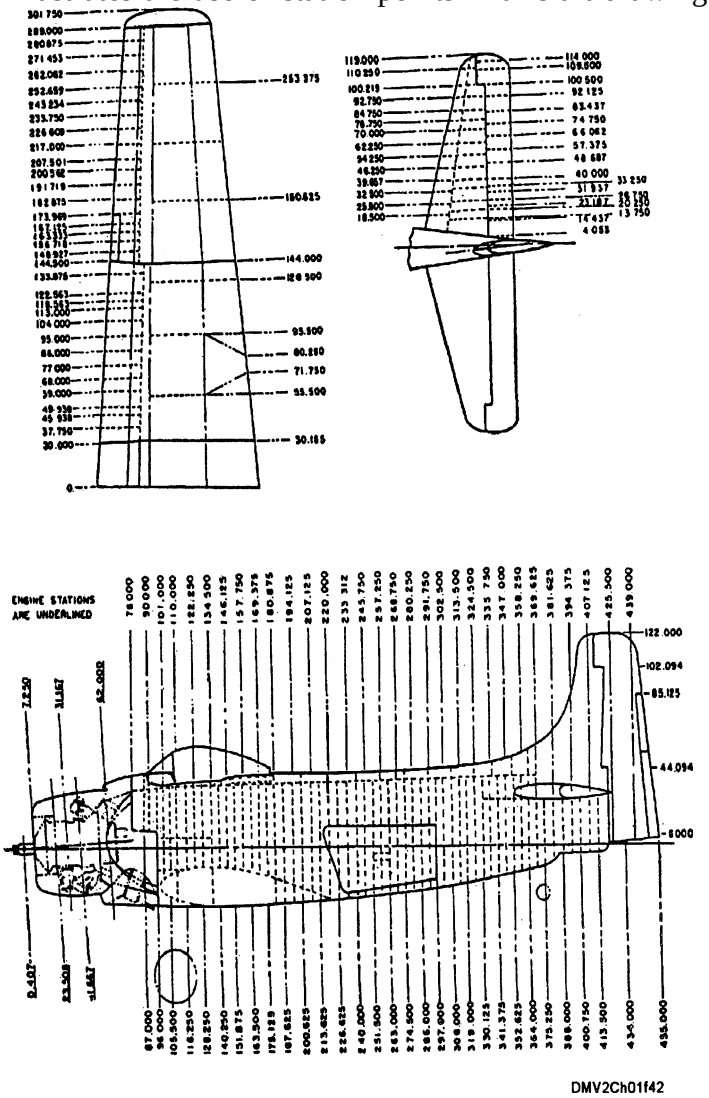

Figure 1-42.—Aircraft station points.

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Finish marks

Finish marks show part surfaces that require finishing by machine. Machining provides a better surface appearance and a better fit with closely mated parts. Machine finishes are not the same as finishes of paint, enamel, grease, chromium plating, and similar coatings. Finish marks appear on the drawing near the surfaces to which they apply.

Notes and specifications

Additional information that does not belong in a regimented information block is included on drawings as notes and specifications. Place notes giving clarifying information directly on the drawing with a leader line that ties into the affected part or assembly. Specifications are statements containing a description such as the terms of a contract or details of an object not shown. Specifications provide additional information to show that the item conforms to the description and that it can be made without the need for further research, development, or design engineering.

Legends and symbols

Legends and symbols explain and define special marks placed on the drawing. Legends, if used, appear in the upper-right corner of drawings under the revision block

Figure 1-43 is an example of a legend.

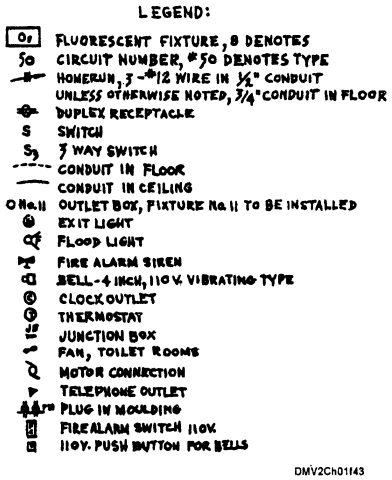

Figure 1-43.—A legend.

Summary

Review

This chapter introduces the concepts of composition, general compositional elements and their effects, and the differences in compositions between pictures, photographs, text pages, and engineering drawings. The success of imagery in all methods and media depends upon strong composition. No hard and fast rules direct what combination of compositional elements works for each situation.

Comments

Composition is one of the most important aspects of the DM rate. All of the talent in the world cannot compensate for poorly designed drawings. Poor compositions fail to communicate or, worse yet, miscommunicate. In today's electronic age, computers do not possess human-like perception in aesthetics. As yet, fundamentals of composition cannot be digitized into cookbook formulas and programmed into a microchip for computer emulation. High-end computer graphics systems still require input from a human with knowledge of compositional principles. It is important to learn the subtle differences between media formats and compositional presentations.